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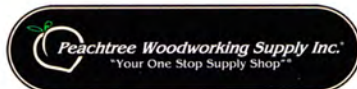


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Notes From the Editor



MY EXPOSURE TO *American Woodworker* (AW) began in the mid-1990s when the magazine, in my opinion, was at its zenith. It was filled with articles from big-time woodworkers who had the chops to build and the eagerness to pass along their knowledge – names such as Klausz, Odate and Dunbar. That's, once again, our target.

Beginning with this issue – as the focus of *AW* slides a bit toward furniture and upscale shop cabinets – you'll find a few changes and discover a couple of surprises. Plus, you'll find projects that help you develop quality techniques and get better organized as your shop continues to evolve.

We've added new departments written by experienced authors. In "7 Questions With a Legend," you'll hear from Frank Klausz. Ron Herman puts his knowledge of old tools to work in "Relic Rehab" – it's not only a hand-tool topic. Don't miss "Top 6" or "My Favorite Jig." And we haven't left out some of your favorites such as "Shop Tips," "Well-Equipped Shops" and "Wood Turning."

Take a look at the new *American Woodworker* magazine. Enjoy.

Glen D. Huey

Contributing Editors



Mark Arnold has made furniture since he was 15. He experimented with woodworking throughout his high school and college years, and worked as a finish carpenter before attending the Cabinet and Furniture Making program at North Bennett Street. Mark opened Boston Woodworking Co., Ltd (bostonwoodworking.com) in 1996. He enjoys adding his own design to the mix to create truly original pieces, and has received several awards for his work.



For 15 years, **Chad Stanton** has been in the building trades. He's a self-taught licensed contractor and professional furniture maker who is eager to share his knowledge. Chad teaches public and private woodworking classes and has produced woodworking videos for other companies and for his own website (woodchoppintime.com). He combines his skills, talents and imagination in his own unique way. Chad's motto is simple, "Watch, laugh and learn."

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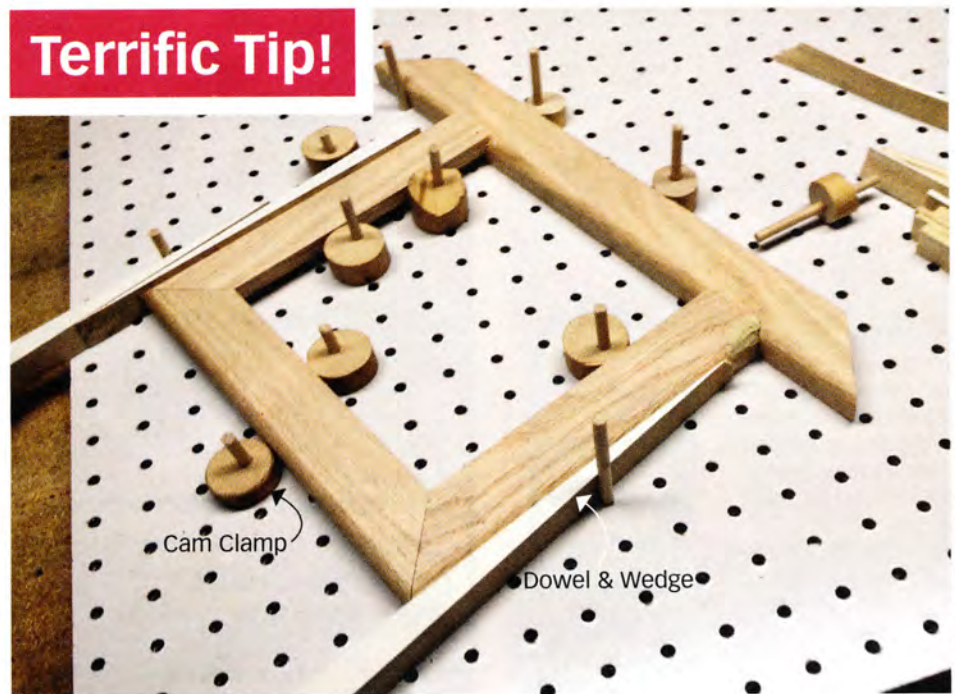
Pegboard Platform

Assembling frames or odd-shaped pieces often requires multiple clamps and blocks to hold the pieces just right. My pegboard platform makes it easy to clamp even the most troublesome assemblies.

To build the platform, glue and pin-nail together four layers of 1/4" pegboard. To make sure the holes line up perfectly during gluing, insert a 1/4" drill bit or a 1/4" dowel through a hole in each corner. If you use dowels, coat them with wax so they don't get stuck in the holes. Weigh down the boards with something heavy until the glue is dry.

I use a combination of clamping methods with my platform, including cam clamps, 1/4" dowels and wedges. To make the cam clamps, cut discs from various diameters of dowel stock. Drill an off-center hole in each disc and then glue in a 1/4" dowel. Use a pencil sharpener to chamfer the ends of each dowel so they're easy to insert into the pegboard. Place a sheet of wax paper under the workpiece to keep glue from

Terrific Tip!



PHOTOS COURTESY OF CONTRIBUTOR

sticking to the platform's surface.

If the pegboard's hole spacing doesn't work out for your cams or wedges, try placing the workpiece at an angle, as shown in the photo.

Ken Sze

Small-Parts Vise

To safely drill small parts, you need a secure way to hold them. Here's an adjustable vise that clamps to your drill press table and keeps your hands clear of a spinning bit.

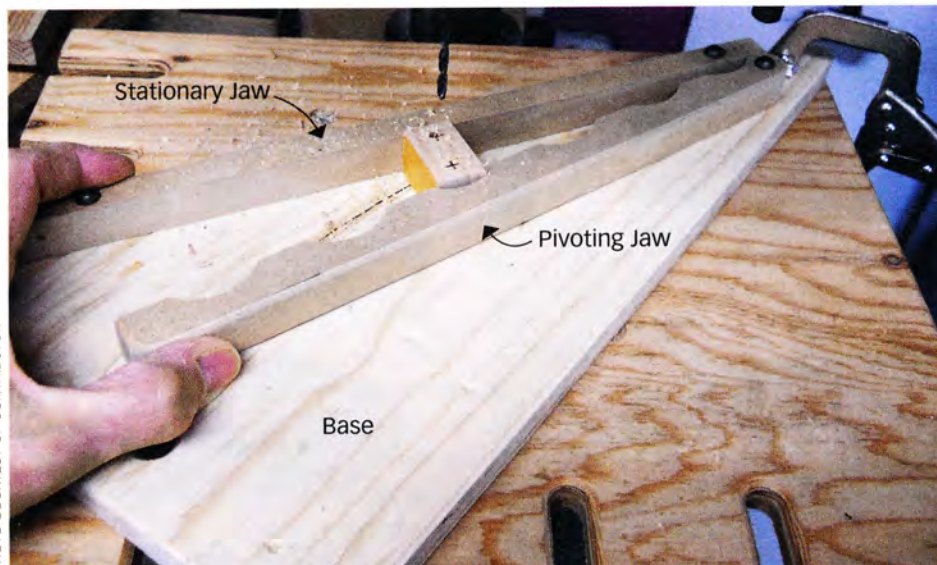


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The vise has three parts: a 3/4"-thick triangular base and two 1" x 1" jaws. One jaw is stationary; the other pivots. Make the base first. Mine is about 16" long and 8" wide, but its size doesn't really matter. Next, cut two jaws the same length as the base. Make scallops in the pivoting jaw's face using a band-saw or spindle sander. The scallops help to lock small parts in place.

Screw the non-scalloped jaw along the back edge of the base. Fasten the scalloped jaw with a single screw at one end.

To use the vise, place the workpiece between the jaws, center the hole's location under the bit and then clamp the base to your drill press table. Squeeze the workpiece with the jaws, then drill.

Serge Duclos

Dust Collector & Guard Combination

The guard on my tablesaw has always frustrated me. It mounts on the back of the saw, but when I added an outfeed table, I couldn't reach the guard's bracket. It had no provision for dust collection, either. To fix both problems, I built a whole new system.

My system has three parts that form one unit: an acrylic shroud, a dust chute and a horizontal arm. A vertical trunk supports the unit and attaches to my saw's fence. When I move the fence, the unit moves with it.

The dust chute connects to a 2½" hose for great dust collection. (Most commercial overarm guards use much smaller hoses, which are less effective.)

A good guard system must also include a splitter to prevent kickback. I installed a commercial one – the MJ Splitter SteelPro from Micro Jig. It's built into a shop-made throatplate.

To attach the trunk, drill and tap three ¼–20 holes in the fence – two in its top and one in the side. Bolts with star knobs secure the trunk to the fence. The horizontal arm attaches to the top of the trunk using a threaded insert and a long bolt with a shop-made handle. The slotted arm slides as you adjust the fence.

The dust chute is attached to the end of the arm. It's also slotted for up and down adjustability. A clear plastic shroud is attached to the bottom of the dust chute to cover the blade and eliminate any possibility of getting your fingers

too close to the blade. When this shroud is dropped into place—almost touching the workpiece – it also helps prevent kickback. ■

Dan Martin

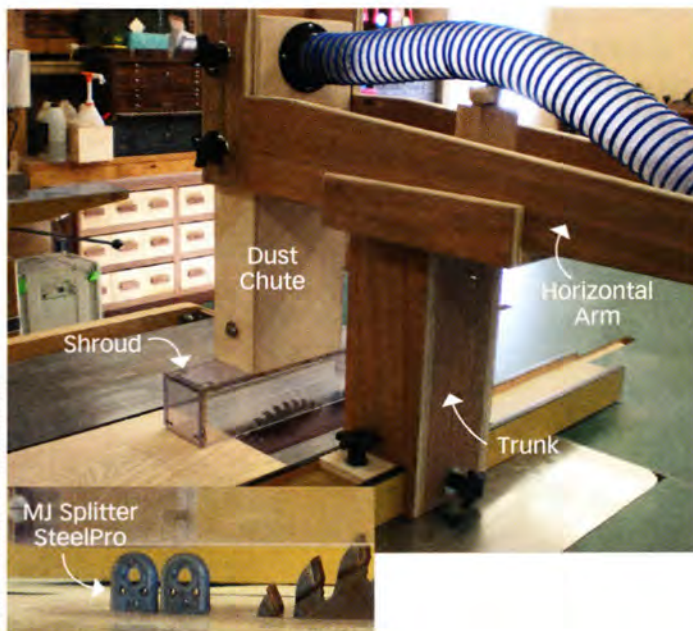
SOURCE

MicroJig

microjig.com

855-747-7233

- MJ Splitter SteelPro, \$40



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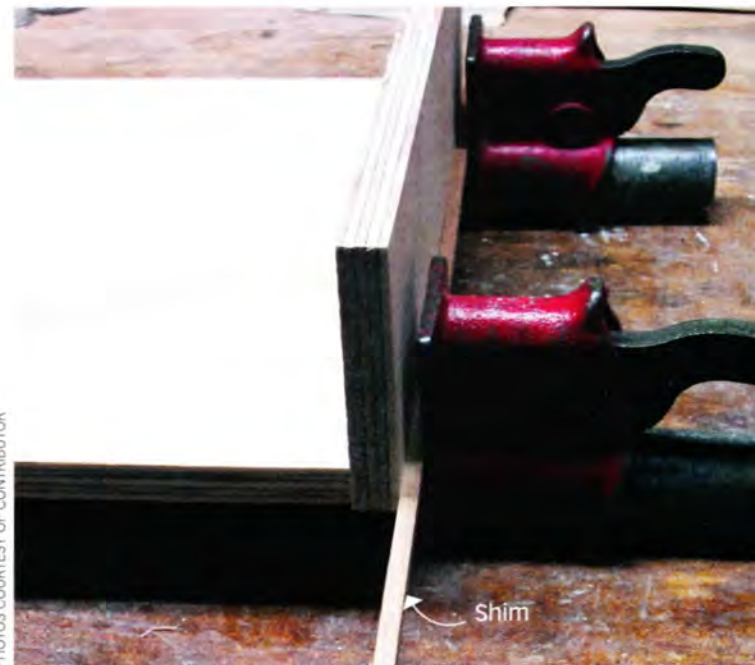
Pressure Drop

Pipe clamp jaws are "toed-in" so they close at the top of the clamp first. The purpose of toe-in is to compensate for the pipe bowing up as pressure is applied.

Good idea – but sometimes a fix for one problem creates another. When I wanted to glue up an open box (as shown below) the jaw's toe-in forced the box's sides out square.

To solve the problem, I inserted a length of ¼" x ¼" hardwood at the bottom of the jaws at both ends of the clamp. This concentrated the clamping force right where I needed it.

Fred Burne



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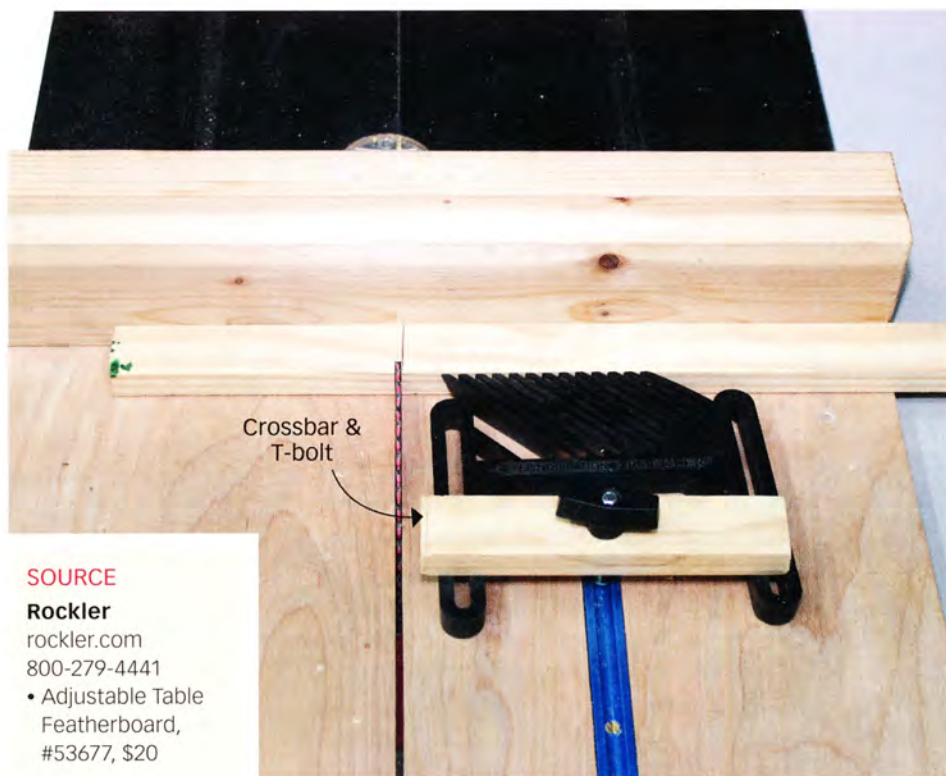
Crosscut Featherboard

A featherboard is typically used to hold stock against a fence for ripping or routing. You can also use a featherboard on a crosscut sled to keep your fingers out of harm's way. Just adapt it for a T-track.

Most commercial featherboards are easy to modify. Out of the box, my featherboard has two short bars that fit in a miter slot and knobs to tighten the bars (see Source). I removed the bars and installed a wooden crossbar and T-bolt to fasten the featherboard to a T-track I had installed on my sled.

To make cuts, position the workpiece against the sled's fence, slide the featherboard snug against it and tighten the knob. For subsequent cuts, just slide the workpiece along the sled's fence.

Fred Burne



SOURCE

Rockler

rockler.com

800-279-4441

- Adjustable Table Featherboard, #53677, \$20

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Simple Starting Pin

A starting pin is an essential accessory for routing operations that don't require a fence. Here's how it works: Before you begin a cut, you bear the workpiece against the pin, then rock the workpiece into the bit until it contacts the bit's bearing. This avoids kickback, so using a starting pin is an important safety measure. If your router table doesn't have a starting pin, here's an easy way to make one.

Let's start with the hole that the pin fits into. Many router table inserts have one, and it's usually threaded. If your insert has this feature, check the thread diameter

and pitch before making the pin. If your insert doesn't have a hole, drill one about 1½" from the center of the insert, toward the front and to the right. Tap it for ¼–20 threads.

To make the starting pin, buy a 1¼"-long machine screw to fit the hole and a 1"-long nylon bushing with an outside diameter slightly larger than the machine screw's head. Slide the bushing over the machine screw and thread the screw into the hole. ■

John Cusimano

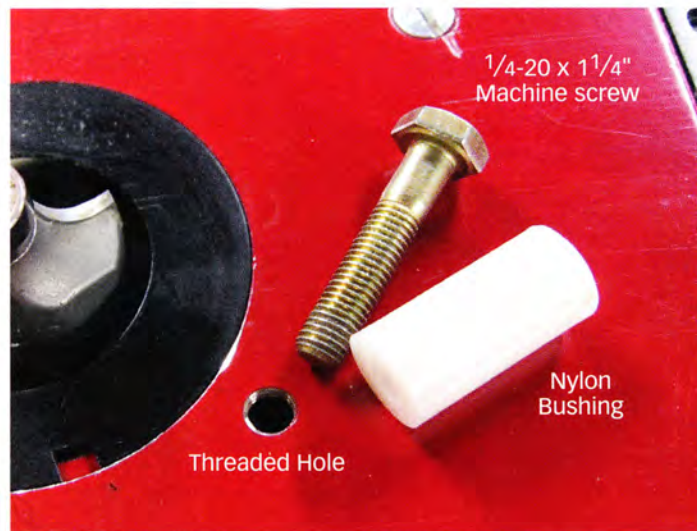
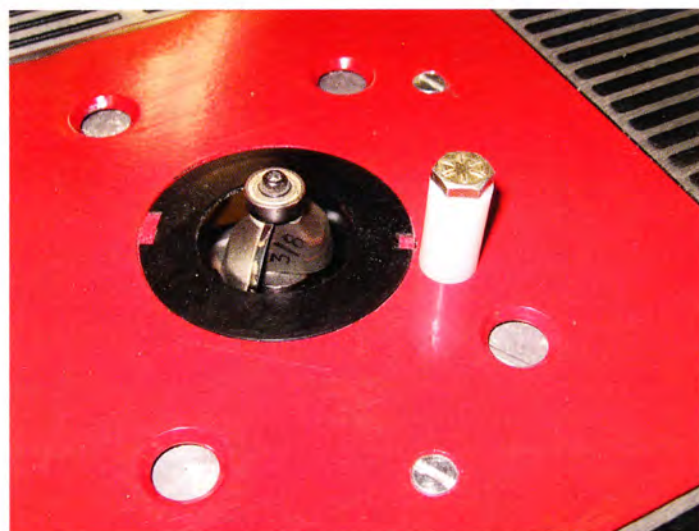


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Relic Rehab

BY RON HERMAN

Stanley's Model B Portable Router





1 A small adjustment plug is the key to height settings. Loosened slightly, the plug allows you to make fine-tuned adjustments by rotating the motor housing. Loosen it more to quickly slide the motor up and down in the base. Dial the plug tight and your settings are locked.

length, and there is a clamp screw in the base which has a pressure pad that engages the threads (photo 1). Check that the pad mates nicely with the housing. This is how you lock and adjust the height of the cut – a half turn to the left loosens the clamp screw to allow you to spin the motor smoothly up and down through almost 2" of adjustment. A full turn to the left releases the

clamp to make fast adjustments.

Better check the toggle switch, too. Listen for a small click as you flip the toggle back and forth. You can replace these switches, but I consider this when I'm determining value and what I'd pay for this router. And make sure the router has its spindle shaft lock button – how cool is that? – in place and in working order. It's located in the center of the router top, and marked "Push to lock shaft."

If these important areas check out, you have a candidate for rehabilitation.

Back to Life

When you have your router back in the shop, the first things to check are the bearings. Pop off the top of the router by removing the two screws in the cap (photo 2). A note of caution when inspecting bearings: The older motors used to run hot and they usually had internal fans to cool them. Be careful when disassembling not to bend any fan vanes or they could rub the housing when you get things re-assembled. Don't be surprised if you find that the top and bottom bearings are dry – that's usually a given, and where a nice can of SAE-20 electric motor oil always comes in handy. When applying oil, remember that too little is better than too much. Just one drop per bearing will do. Oil spinning out of a working tool tends to make a mess of unfinished wood.

The second task to bring your router back to life is to evaluate the armature brushes. In operation, worn-out or ill-fitting brushes make your router look like a lightning storm in your hand. That may look neat, but it's robbing your tool of power.

To pull the brushes, unscrew the insulated caps from both sides of the housing (photo 3). A too-worn brush

AS I SEE IT, there were two neat things made in early 1960: a Stanley portable router and me. The 60's were when the residential power-tool market caught fire. Porter Cable, Ingersoll Rand and Delta were making mostly contractor-grade tools. Most homeowners didn't have the need or budget for such tools, so companies such as Black and Decker, Craftsman/Sears, Skil and Sunbeam filled the void. And there were two hand-tool companies that phased in power tools just to compete: Miller Falls and the legendary Stanley Tools.

Anyone familiar with Stanley's handplanes and chisels knows their practice of quality control. Their power tools were no different. This is why one of my favorite routers to rehab is a Stanley Model 8-B. Featuring a 1/2-horsepower, 1/4"-collet, it's a trophy to the cast aluminum industry, and there's no mistaking it for anything but a Stanley tool – its handles closely resemble the knobs found on the company's Handyman handplanes being marketed at the same time.

If you are trying to outfit your shop or just have a yen for nostalgic tools, don't overlook these routers. They can do everything today's router can do. You can also find a fence and template guides for this router through some judicious hunting of auction sites and garage sales.

Buyer Beware

When you find one of these beauties, there are a few things to check. Make sure the motor housing fits perfectly into the base without any side play. Try spinning the shaft by hand. If it turns freely, this indicates that the bearings are not damaged and the shaft is not bent. Also check the up-and-down adjustment of the base.

The router's height adjustment is neat – the outside of the motor housing is threaded almost the entire



2 Pull two screws and the cap pops off the motor to gain easy access to the bearings and to the wire connections if you need to replace the electric cord.

is short in length and it's end will be curved all the way from side to side. If yours are worn, you'll need replacements. A visit to my local power-tool repair guru helped me locate a spare set, but you may need to contact a parts supplier for yours. Replacements for a tool of this age are sometimes difficult to find. You may get lucky with online retailers, or you can have brushes custom made which would set you back \$25 to \$30.

Size and hardness matters when it comes to proper brush replacement. When you're ready to place an order, make sure you give the model and serial number of your tool, and the manufacture date if you have it. This helps determine the proper brushes for your tool.

How about the cord? The Stanley Model 8-B had something rare by today's standards: an eight-foot cord. On this model, the cord was one of the first to use grounded plugs, so don't be surprised if the router you find at a garage sale is wearing a two-prong adapter. Chances are, when you find a tool of this age, it was not stored in a nice tool vault, so the cord is likely to be dry and cracked and in need of replacing. The task and access is easy once you have top of the router off.

A word of caution: Metal-bodied tools **MUST** have a proper ground. Use of an adapter or a two-pronged cable is strongly discouraged because the tool cannot be properly ground. If you use an ill-grounded router in damp conditions, you're looking at a recipe for disaster. Working "green" in this context (with a ground wire) could save your life. Another interesting note on these



3 Replacing the motor brushes (original part #SA-614) may be the best thing to do as you rehab the router. Finding those brushes is not the most simple task. If you can't find a match, have a set custom made.

routers is that they were set up to function using both alternating current (AC) and direct current (DC). (This, however, doesn't affect the use of the router with today's house wiring.)

Good Router & Good Look

A router that works great should also look great. It's a simple procedure to bring this router's appearance to an off-the-shelf condition. It takes a little elbow grease and #0000 steel wool (I use a little of the oil that I used on the bearings to lube the steel wool). And those plane-like knobs are easily brought back with a little sanding and a fresh coat of black lacquer. When I took them off for the repaint, I gave the router body and base a good polishing. When a polished tool is complete, I give it a light shot of clear lacquer to keep the finish fresh.

With well-oiled bearings, a new set of armature brushes and a replaced cord, your router is good for another fifty years, or thereabouts.

Ron is a carpenter, contractor, woodworker, teacher and tool restorer. He's passionate about tools. Learn more about Ron and his woodworking school at woodworkingwithron.com.

SOURCE

Eurton Electric
eurtonelectric.com
800-423-4789
• Replacement brushes

Helwig Carbob Products
helwigcarbon.com
800-962-4851
• Replacement brushes

H-B Harris Tool, LLC.
614-848-5535
• Custom made brushes

Festool Drill Driver

Cordless drills are as ubiquitous as a hammer was a century ago. You're likely to find at least a couple in every woodworker's shop. I own a few, but the one I reach for most often is Festool's CXS Compact Drill Driver. With its tool-free interchangeable chucks, the CXS is the only one of its kind.

The heart of the system is a 1/4" collet, which accepts all bits and drivers with 1/4" hex shanks. In this form – with no additional chuck attached – the CXS has one of the shortest "nose-to-tail" measurements you'll find. The hex collet is also the mounting post for three other chucks. The CXS comes with a keyless drill chuck and the Festool Centrotec chuck; a right-angle chuck is an accessory.



The keyless drill chuck accepts bits from 1/32" – 5/16". The Centrotec chuck is essentially a stabilizing device. It only accepts Festool's long, round-shanked bits and bit holders, which seat in the hex collet; the round shanks spin in the Centrotec chuck, keeping them perfectly centered for stability and a more efficient transfer of power.

I've used the CXS for years now. Those chucks are handy, but I also have come to like the drill's ergonomics. With its enclosed handle and front-mounted battery, this tool is about as compact and comfortable as possible.

Here are some more good features: The CXS has two speed ranges; 0 – 400 rpm and 0 – 1200 rpm. It has a powerful LED light pointed right where you're drilling and driving. (When this feature started showing up on drills, many of us chuckled, myself included. Now I'd never buy a drill without it.) Like many drills, the CXS has a belt hook. Weighing just under 2 pounds, the CXS is the only drill I've used that's lightweight enough to actually hang

on a regular belt; I've found that heavier drills require a cumbersome tool belt. The CXS comes with two 1.5 Ah batteries and a thirty-minute charger.

For me, the Festool CXS hits the sweet spot for balance, comfort and utility. It feels just like an extension of my hand.

SOURCE

Festool

Festoolusa.com
888-337-8600

- CXS Drill Driver, 564261, \$245.
- CXS Drill Driver with Right-angle Chuck, 564274, \$295.



Senco's Compact Compressor

A small compressor is ideal for a small shop and excellent for use with all types of fasteners. A nice addition to the category, the PC1280 from Senco, has a six gallon tank, delivers 150 psi and weighs just over 37 pounds. While that's not exactly light, the PC1280 is definitely portable.

The larger the tank, the more work you can do before a compressor's motor kicks in. Is a six gallon tank large enough? I think so. In a quick test using 18-gauge, 1 1/4" brads and two thicknesses of 3/4" MDF, I could shoot 25 to 30 nails before the PC1280 cycled on. When it does cycle on, it's relatively quiet; it's not going to rattle your fillings loose.

If you spray finishes or use a pneumatic random orbit sander, however, you'll need a compressor with a larger tank – a small compressor would run continu-



ously trying to keep up to the demands of these air-guzzling tools, shortening its life.

One of the features that I really like about the Senco PC1280 is that it has two air

outlets. If I'm working with another person or with two different tools, there's no need to shuffle hoses.

The only issue that I have with small compressors – including the PC1280 – is that they skate across the floor when they're running. You have to trap them. They're so convenient, however, that this is not a big deal.

SOURCE

Senco

senco.com
800-543-4596

- PC1280 6 Gallon Pancake Air Compressor, \$140.

Shapton-Flat

Among the various sharpening media, Shapton stones have always been at the head of the class. They're extremely hard and long-lasting. Best of all, they cut fast.

Shapton's Glass Stones are 5mm thick ceramic stones bonded to a piece of ultra-flat plate glass. The 500 grit stone, used for lapping and shaping bevels, is the workhorse of the system. Shapton now offers a new version of that stone: the HR "Thick" 500 grit stone, which is 10mm thick. A thicker stone lasts longer, of course, particularly if you flatten it quite often. Any stone used for lapping, like the 500, has to be kept dead flat.

Speaking of flatness, you're probably familiar with the process of flattening waterstones on wet/dry sandpaper. Did you know, however, that this process isn't practical with very hard ceramic stones, like the Shaptons? You need diamond, a much tougher abrasive.

Many types of diamond stones will work, but here's what the extremely picky folks at Shapton recommend: Flatten your stones with their Diamond on Glass Lapping Plate (DGLP). It's an engineering marvel. According to the manufacturer, it's flat to within 1/3 the thickness of a human hair, and the grit size is uniform to within 9 microns. While you may be tempted to use the DGLP for lapping the backs of chisels and plane irons, it's not recommended. According to the manufacturer, it's best to reserve the DGLP for your stones; using it on steel would cause it to wear faster than it should.

Many would argue that this level of flatness is overkill for woodworking tools, but I've never heard anyone complain that their stones are "just too flat." It stands to



SOURCE

Shapton USA
shapton.com
877-692-3624

- HR "Thick" 500-grit Stone, \$245.
- Diamond on Glass Reference Lapping Plate, #DLGP, \$380.

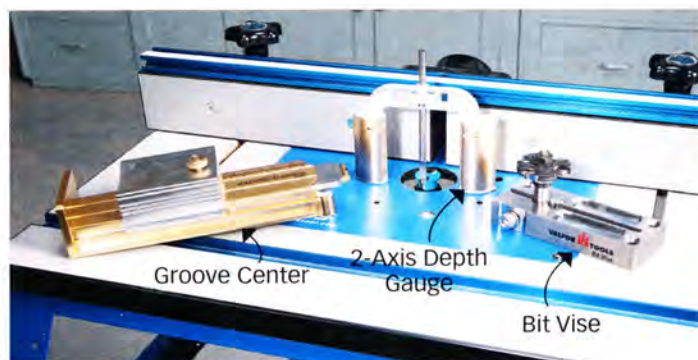
reason that the flatter the stone, the faster it'll cut, because more of the abrasive is in contact with the steel. And when you're lapping, a high degree of flatness is essential for getting quick results. The price tag for Shapton's super-flat lapping plate is pretty steep, however.

I don't flatten my stones as often as I should; probably only four or five times a year. But they seem reasonably flat. To test them on the DGLP, I made a series of pencil lines across the stones so I could see my progress and then started lapping. Turns out my stones weren't nearly as flat as I thought they were. But the DGLP had each stone flat in less than a minute, using only light pressure. Sweet!

Router Set-up Kit

Setting up a router up is a lot easier with three devices from Valfor Tools: a special vise to hold a bit, a depth gauge to measure a bit's height or distance from a fence and a jig to make perfectly centered grooves or mortises.

The bit vise holds your bits securely while you change cutters or bearings; it won't damage the bit's shank as a pair of pliers or vise might. That's important because a



scored shank could compromise the grip of your collet. The vise is made from stainless steel and has holes for bits with 1/2" and 12mm shanks. (Other shank sizes are accommodated using a reducer collet.) Countersunk holes on the vise allow you to mount it to directly to your router table, bench or any other convenient place.

The 2-Axis Depth Gauge is a cleverly designed item. Used vertically, you can take precise bit-height measurements. With the gauge horizontal, rotate the oval-shaped legs to take height measurements. The end of the depth rod is flat like a screwdriver, so it's easy to line up with the top edge of a cutter. You can also measure the distance to your fence when the gauge is in this position.

SOURCE

Valfor Tools
valfortools.com

- Bit Vise, \$70.
- 2-Axis Depth Gauge, \$50.
- Groove Center, \$150

The equally clever but slightly more complicated Groove Center makes quick work of setting up any centered groove or mortise, as well as the fussy lock miter bit.

New to Market

BY BRAD HOLDEN

Bosch Compact Slider

A compact, lightweight saw is big news for someone who hauls their tools around to make a living. Bosch's new CM8S 8" sliding compound miter saw delivers nearly the same cutting capacity as a much heavier and larger 10" miter saw – 12¼" cross-cut at 0°, 8" miter at 45°, 2¾" upright base and 3½" maximum crown molding.

At 37 pounds, The CM8S is about half the weight of

a typical slider, with a soft-grip top handle for comfortable one-handed carrying. The saw's controls – including a bevel lock lever and turret stops – are on the side of the tool for easy access.

Because of the compact size of the CM8S, the Bosch team added an adjustable front foot to maintain the saw's stability when cutting at maximum width.

The saw's clear lower guard provides an unobstructed view, so you can see exactly where you're cutting. A large, easy-to-read miter scale allows miter adjustments from 52° left to 60° right. Ten adjustable miter detents are set at the most common cuts, and an intuitive, easy-to-access thumb-activated detent override allows accurate adjustment when cutting at angles near the detents.

Base extensions slide out and expand the bed to a full 29" for additional support and retract to 18" for transport. The CM8S has a 12 amp, 5,600 RPM motor for optimal performance. ■

SOURCE

Bosch

boschtools.com

877-267-2499

- CM8S 8" Single-bevel Sliding Compound Miter Saw, \$469.



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Ron Herman

Getting the details right – by hand or machine



WALK INTO RON HERMAN'S Columbus, Ohio shop and you'll discover a thousand handsaws, hundreds of axes and countless braces and bits. You'll find molding planes, chisels and other hand tools stacked floor to ceiling. And you'll find a man passionate about tools. But you won't find a hand tool purist.

"We've had power tools ever since you could poke a mule in the butt to spin a lathe," Ron says. "I'm not a hand tool purist, I'm a details purist. And I'll use whatever tool it takes to get the best results."

Wearing Lots of Hats (& a Well-worn Tool Apron)

Ron wears a lot of hats – carpenter, contractor, woodworker, teacher, tool restorer – and they all fit him well. When asked what he'd be doing if he hadn't entered the world of wood, Ron is uncharacteristically speechless. "I don't know. When I was growing up I just presumed everyone's dad had a big shop and could make anything. I'd walk around jobsites with a magnet picking up bent nails – I didn't even know I was working. It was like I grew up in Mayberry."

Ron's woodworking lineage can be traced back to his great grandparents who worked as carpenters near the legendary Black Forest of Germany. Wood runs in his DNA. He began working in the family construction business out of high school, though he was the only one of his siblings to pursue woodworking. "The other ones went off and did things that made money, but I love what I do. If you're an account-

PHOTOGRAPHY: LEAD PHOTO BY GLEN D. HUEY; OTHER PHOTOS BY RIC DELIANTONI

GREAT AMERICAN WOODWORKER



1 In Ron Herman's shop, moldings of every size, shape and species can be created or re-created – some from the cutters used to create the original moldings.



2 Herman's projects range from restoring a family-heirloom dollhouse to historic restorations of its life-size counterparts.



3 A few of the thousand handsaws Herman has in his shop today. "I'm pretty sure Henry Disston – the guy who made them – would approve of the idea they're being used today."



4 For small production runs, Herman still prefers molding planes over routers and shapers. "I can make 20 feet of molding by the time you get your router set up."

tant, at the end of the day you turn around and see a pile of paper. I get to turn around and see beautiful furniture and houses that will last generations."

Originally Ron focused on building high-end houses and, oftentimes, the furniture that went inside. In the mid-80s he turned his focus more toward historic restoration – a transition made easier by the fact he already owned many of the tools and cutters used to make the original moldings and millwork (photo 1). Today Ron's 9 to 5 job includes, not only restoring house and furniture, but also building high-end casbinets, fireplace mantels and libraries for homes and businesses. He has a stash of molding knives and woods to recreate almost any molding or repair any piece of furniture. And a deep well of knowledge to know how to use them.

"We get a lot of variety," Herman says. "We just finished a wine cellar on the 16th floor of a condo – though I'm not sure how a cellar can be on the 16th floor – and

recently someone brought in a family-heirloom dollhouse they want restored" (photo 2).

The Best Tool is the One That Gets the Job Done

While he may have thousands of tools in his collection, Ron doesn't consider himself a collector. "Tools should be used, not left to languish on a shelf. I have handsaws that Henry Disston himself touched – and I'm pretty sure Henry would approve of the idea they're being used today" (photo 3). He finds the tools-on-display decor of a Cracker Barrel Restaurant downright depressing.

Ron runs a "blended shop," when it comes to his day job, using power tools for large production jobs and hand tools for smaller restorations (photo 4). "I can make 20 feet of molding with a molding plane by the time you get your router set up," he explains. "But if I'm building a hundred shelf units, I tool up." For large production runs



5 Herman has a love affair with hand-powered miter saws and – due to their enormous capacity – often uses them on jobsites today.



6 Herman's multi-generational company has been around so long, he owns some of the original power tools from when they first came out. The "Take About" sander allowed the worker to bring the sander to the project rather than vice versa.

of some moldings he's not averse to firing up his computer, scanner and a CAD program to get the profiles right. He encourages woodworkers to do as much as they can with power tools then use their time and energy to finish up with hand tools where it really counts. But he reminds us using any tool requires skill. "A power tool makes the same mistakes as a hand tool, it just makes them a hell of a lot faster."

Ron maintains, despite all the new technology, some hand tools have no power-tool equivalent. He has hand miter boxes that can cut crown molding 8" tall and 3" thick (photo 5). "You won't find a power miter saw that can handle something like that," he says. "At least not an affordable one."

Most of the power tools – both hand and stationary – in Ron's shop are also vintage (photo 6). "People walk into the shop and at first they think they're in a tool museum, but it's a functioning shop. Every tool seen gets



7 Although it may look like an unorganized museum, this is actually a functioning wood shop. All the tools are used.

used. It's a little bit like stepping back into a photo of a shop from 1890 – except it's in color."

Ron excels – indeed teaches classes – in both hand and power tool restoration. He maintains there are great tools available at bargain-basement prices at garage sales and flea markets. With a little know-how, elbow grease and a few replacement parts, old tools can become hard-working members of anyone's shop (photo 7).

Every Wood Under the Sun

After decades of restoration work, Ron knows his woods and the tricks of the trade. He stocks over fifty different woods in his shop and has his own wood lot, which allows him to cut and custom mill lumber for special projects (photos 8 and 9).

He stores a small supply of walnut lumber outside in the sunlight to "pre-fade" it to blend better with existing woods when doing furniture restoration work. He has a good selection of sassafras on hand; it has ideal coloration and grain for patching existing oak flooring and also comes in handy for reproducing parts subject to moisture. And he loves holly because it can be dyed to readily mimic many other types of wood. Gum is one of his favorite woods for furniture restoration. Ron even creates his own spalted maple, sycamore and ash by stashing freshly-cut logs in the woods, introducing spores, then keeping them covered with a clear tarp for a year or two.

"If you're going to be a furniture, house or tool



restorer, you have to take the time to understand wood, how it ages, and how it moves,” Herman says. And he does.

The Teacher

Ron presents at conferences and teaches two or three classes per month on topics ranging from how to make moldings to power tool joinery to handsaw sharpening (photo 10). The classes are small – usually 6 to 8 people – and the learning is hands on. “People wear old clothes and we keep the Band Aids in the middle of the workbench,” Ron jokes.

And he’s a stickler for ergonomics. To prevent injuries and provide students maximum bang for the effort, workbenches and stools are adjusted to be the right height, and tool handles are cus-

tomized to fit the user. “In your own shop, even the bed of your band saw and table saw should be the right height to prevent back strain. You can’t do good work if your tools don’t fit you right.” He even encourages people to eat their lunches “ergonomically”; to use that time to rest body parts and muscles that might get strained during other parts of the day. He also encourages his students to be organized. “The first casualties of the workshop is the horizontal surfaces.”

He feels the goal of teaching is threefold: To improve knowledge, advance skills and promote the right attitude, with attitude being the most difficult element. Part of the challenge is getting people to back up – to learn to walk before they run. In a class on hand cutting dovetails, Ron begins by teaching the vocabulary, history of the process and tools involved – then has people make 50 angled cuts to learn the basics and build skeletal and muscle memory. Then they cut dovetails.

“People go home with a nicely crafted dovetail, but we also make them bring home their mistakes,” Ron explains. “Since they don’t have a master looking over their shoulder at home, they have to become their own master. Mistakes are a visual reminder; they have to know what they did wrong so they can do it right the next time.” ■

Ron Herman’s new column on hand- and power-tool restoration appears in this and future issues of *American Woodworker*. Find out more about Ron and his classes at woodworkingwithron.com.

Spike Carlsen is the author of “A Splintered History of Wood,” “Woodworking FAQ” and the newly released “The Backyard Homestead Book of Building Projects” (Storey). Find more information at spikecarlsen.com.



8 Herman owns a wood lot and sawmill allowing him to custom-cut and mill lumber for special projects.



9 Some of the more than 50 woods stored in the shop used for moldings and furniture restoration projects.



10 During presentations and while teaching, Ron explains that workbenches, stools and tools – especially hand saws – should be custom fit to users.



Build a classic design using period techniques. And there's a bit of router trickery, too.

Not-too-tall Tall Chest

BY GLEN D. HUEY

PHOTOGRAPHY: LEAD PHOTO BY AL PARRISH, STEP PHOTOS BY AUTHOR



1 Set your router cutting depth so the bit just reaches the scribe line of your dovetails, then work from side to side as you cut from front to back removing the waste. Clean the pins with a chisel.



2 I use a simple jig to hold the bottom vertical to the sides when transferring the dovetail layout. (For more information on this jig, see "My Favorite Jig," page 66.)



3 A jigsaw is a great power-tool choice to cut the pin sockets. It's designed to do this job accurately and quickly.



4 Mark the top and bottom of each drawer runner area, then rout the dados from the front edge of the case to eliminate blow-out on the front of the chest.

CHESTS OF DRAWERS are found in a myriad of sizes and shapes, and the number of drawers varies, too. Similar to Goldilocks' adventure, some chests are too short, others are too tall and occasionally you find an example that's just right. To me, this chest is just the right size – 4 1/4' tall – and has a great three-over-five design.

Antique chests are often described by the drawer layout, such as three over five or three over two over four. Sometimes the drawers are what they appear to be; sometimes they're not. There really aren't eight drawers in this chest. The top drawer, which appears to be three smaller drawers, is a single drawer front with a bit of router-work trickery. Upon a closer look, a knowledgeable woodworker would uncover its secret, but to an untrained eye, it's a form of trompe l'oeil.

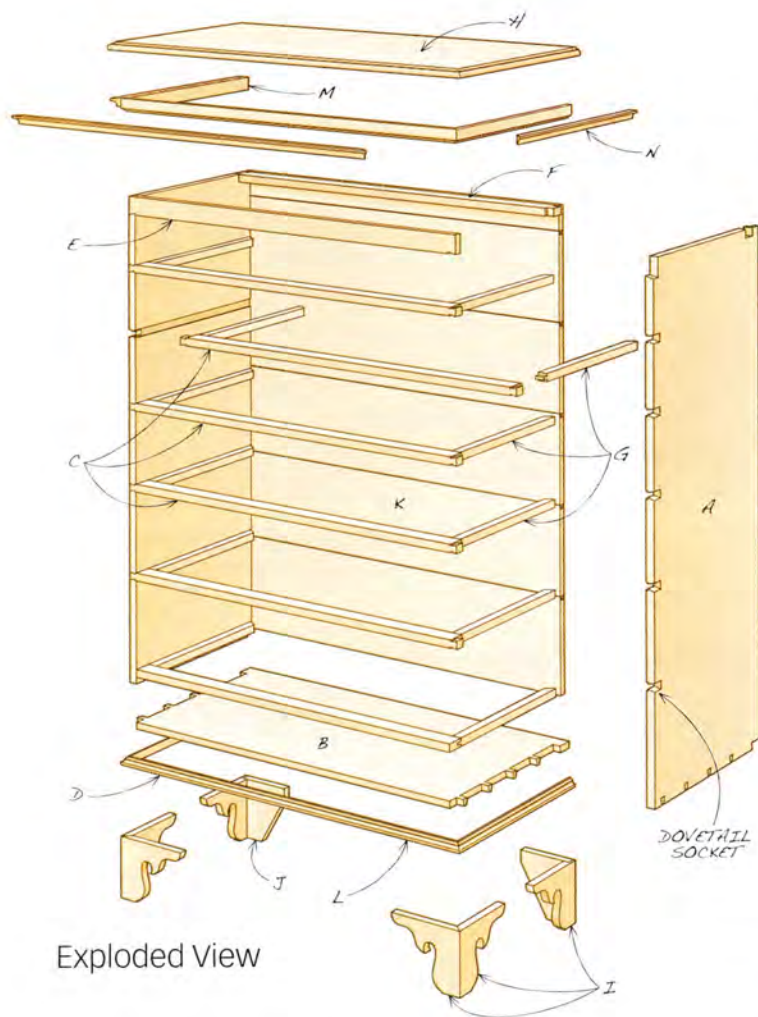
Structural Dovetails

To get started building this chest, mill the case sides and bottom to thickness, width and length. (A panel-cutting

sled helps make this job easy.) Dovetails join the bottom and sides, but these pins and tails need not to be perfect. In the finished chest they're not seen. This is the time to practice your dovetail skills, or try different methods. Because you can use tail sockets of any width, lay out wide tails then use a router with a 1/4" spiral up-cut straight bit to hog away the waste. Experiment and have fun.

Before anything is cut, layout is needed. Set a marking gauge to the side's thickness, then scribe a baseline along the bottom's ends; mark both faces. Clamp the case bottom into your vise with its bottom facing away. Use a bevel square or dovetail layout jig to mark the pins and tails – I scribble in the waste areas. Define the sockets using a dovetail saw. Watch both lines as you cut, making sure the front line stays vertical.

To use the router setup, clamp a thick scrap along the back face of the workpiece to help balance the router as you work; hold it flush with the end of the board (photo 1). It's a freehand router operation that's much



Exploded View

easier than you may think. Any waste left after routing can be removed using a flush-cut saw or chisel.

Pins dictate the tails, so position the bottom to the case sides, then transfer your layout (photo 2). This is another area to try new things. A jigsaw is a great option here (photo 3). Cut each pin-waste area splitting the layout lines, then remove the waste using your chisels – no tricks are available for this task. Test-fit each joint and make any necessary corrections. Aim for a snug fit that goes together with light mallet taps.

Case Preparation

Accuracy is a must when laying out for drawer rails (also called drawer blades or dividers). I find it best to lay out the front edge of one case side then transfer the layout marks directly to the front edge of the second side. Pull your dimensions from the front elevation on page 26. As you work, mark both the top and bottom of the blades (photo 4). Use an accurate square to transfer the layout marks to the back edge of each side to locate dados to house your drawer runners; I mark an “X” between the lines to remind me where to plow.

A simple fence – always set to the left of the cut – allows me to easily position for my dados (photo 5). Clamp the fence at your layout marks, chuck a $\frac{3}{4}$ ”-diameter pattern router bit with a top-mount bearing into your router,

Six-drawer Chest Cutting List

Overall Dimensions: $53\frac{1}{4}$ ” H x $38\frac{3}{4}$ ” W x $19\frac{3}{8}$ ” D

Part	Name	Qty.	Material	Th x W x L
A	Case sides	2	Tiger maple	$\frac{3}{4}$ ” x 18” x $46\frac{5}{8}$ ”
B	Case bottom	1	Poplar	$\frac{5}{8}$ ” x 18” x 36”
C	Drawer dividers	6	Tiger maple	$\frac{3}{4}$ ” x $1\frac{3}{4}$ ” x 36” (a)
D	Drawer divider - bottom	1	Tiger maple	$\frac{3}{4}$ ” x $1\frac{3}{4}$ ” x $34\frac{1}{2}$ ”
E	Top Rail	1	Tiger maple	$\frac{3}{4}$ ” x $1\frac{3}{4}$ ” x 36” (b)
F	Rear support	1	Poplar	$\frac{3}{4}$ ” x $1\frac{3}{4}$ ” x 36” (a)
G	Drawer runners	12	Poplar	$\frac{3}{4}$ ” x 1” x $15\frac{1}{4}$ ” (c)
H	Top	1	Tiger maple	$\frac{3}{4}$ ” x $19\frac{3}{8}$ ” x $38\frac{3}{4}$ ”
I	Feet - show	6	Tiger maple	$\frac{7}{8}$ ” x $5\frac{7}{8}$ ” x 7” (d)
J	Feet - back	2	Poplar	$\frac{3}{4}$ ” x $5\frac{7}{8}$ ” x 5”
K	Back	1	Poplar	$\frac{5}{8}$ ” x $35\frac{1}{4}$ ” x 46” (e)
L	Base molding	1	Tiger maple	$\frac{5}{8}$ ” x $\frac{3}{4}$ ” x 80”
M	Top molding (#1)	1	Tiger maple	$\frac{1}{2}$ ” x $1\frac{1}{4}$ ” x 80”
N	Top molding (#2)	1	Tiger maple	$1\frac{1}{16}$ ” x $1\frac{1}{16}$ ” x 80”
O	Kickers	2	Poplar	$\frac{3}{4}$ ” x 1” x 6”

Notes:

- a) Dovetail at each end.
- b) Half dovetail at each end.
- c) $\frac{1}{2}$ ”-long tenon one end.
- d) Two feet rabbeted at back.
- e) Shiplapped pieces.

Chest Drawers Cutting List

Part	Name	Qty.	Material	Th x W x L
AA	Front - drawer #1	1	Tiger maple	$\frac{3}{4}$ ” x $4\frac{7}{8}$ ” x 35”
BB	Front - drawer #2	1	Tiger maple	$\frac{3}{4}$ ” x $5\frac{5}{8}$ ” x 35”
CC	Front - drawer #3	1	Tiger maple	$\frac{3}{4}$ ” x $6\frac{3}{8}$ ” x $34\frac{5}{8}$ ”
DD	Front - drawer #4	1	Tiger maple	$\frac{3}{4}$ ” x $7\frac{1}{8}$ ” x 35”
EE	Front - drawer #5	1	Tiger maple	$\frac{3}{4}$ ” x $7\frac{7}{8}$ ” x 35”
FF	Front - drawer #6	1	Tiger maple	$\frac{3}{4}$ ” x $8\frac{5}{8}$ ” x 35”
GG	Drawer sides	12	Poplar	$\frac{1}{2}$ ” x 16” (aa)
HH	Drawer backs	6	Poplar	$\frac{1}{2}$ ” x $34\frac{3}{8}$ ” (bb)
II	Drawer bottoms	6	Poplar	$\frac{5}{8}$ ” x 16” x $33\frac{7}{8}$ ”

Notes:

- aa) Drawer sides are $\frac{3}{8}$ ” narrower than drawer fronts.
- bb) Drawer backs are $\frac{3}{4}$ ” narrower than drawer sides.

set the depth of cut at $\frac{1}{8}$ ” then rout the dado. Set the router on top of the fence and keep the bearing tight to it throughout the cut. Create the 10 dados, five per side.

Before putting your router away, cut the back-board rabbets. This operation could be made using other methods, but while the router is in hand, use it.

Place marks $\frac{3}{4}$ ” in from the back edge at the top and bottom of each case side. Place one case side inside-up on your bench or work table. Position the second side interior face down on top. Slide the upper workpiece to the layout marks, then clamp the two pieces together. Set the $\frac{3}{4}$ ” pattern bit to leave $\frac{5}{16}$ ” of material after the rabbet. (Material slightly thicker than $\frac{1}{4}$ ” is less apt to break when moving the cabinet around the shop.)

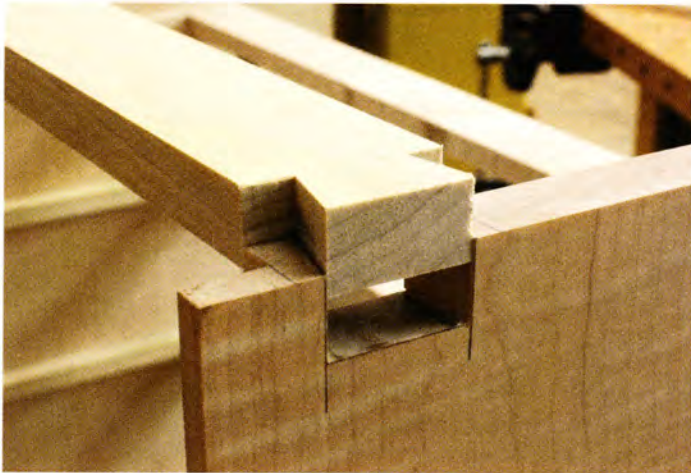
It’s possible, but not good practice, to rout the entire $\frac{3}{4}$ ”-wide area in a single pass. It’s better to climb-cut the



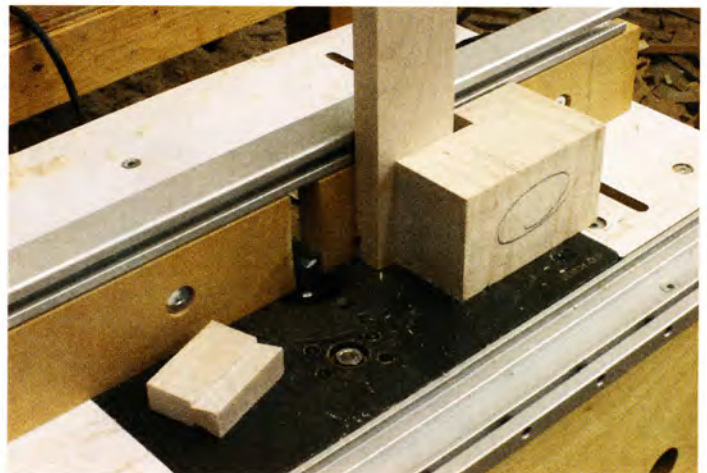
5 A piece of plywood with a narrow second piece stacked and attached on top makes a great fence to guide my router and top-mounted pattern bit when cutting the dados.



6 Cut rabbets for the backboards using a pattern bit. Climb-cut the first pass, then finish the cut moving left to right as you work.



7 Leave a wide shoulder on the dovetail joint next to the rabbet. A narrow shoulder would weaken the joint.



8 To make dovetailed ends on the dividers: Bury the bit into your router table fence so it just grazes the stock as it's passed through the cut.

first pass to reduce the possibility of damage to the case sides as you work, and it's less strain on the router and bit (photo 6). Having a small shoulder as you make the second pass with the bearing tight to the case side provides a sheer point to keep your cuts clean. Reverse the two case sides and complete the rabbet on the second side – I use the front edge of the previously routed side as my guide.

The rear support is a single dovetail (one at each end) that fits into a socket cut into the case sides (photo 7). The socket is cut with its widest portion at the outside face of the sides. Lay in the dovetail angles, extend your lines $\frac{3}{4}$ " down the face of the side then use your handsaw to define the socket. You can chop the waste using your chisels, or clean the area using your router as shown earlier.

Exposed Through Dovetails

The drawer blades are cut to the total width of your case. Assemble the case sides and bottom to get the exact measurement. As you mill the blades to thickness, it's

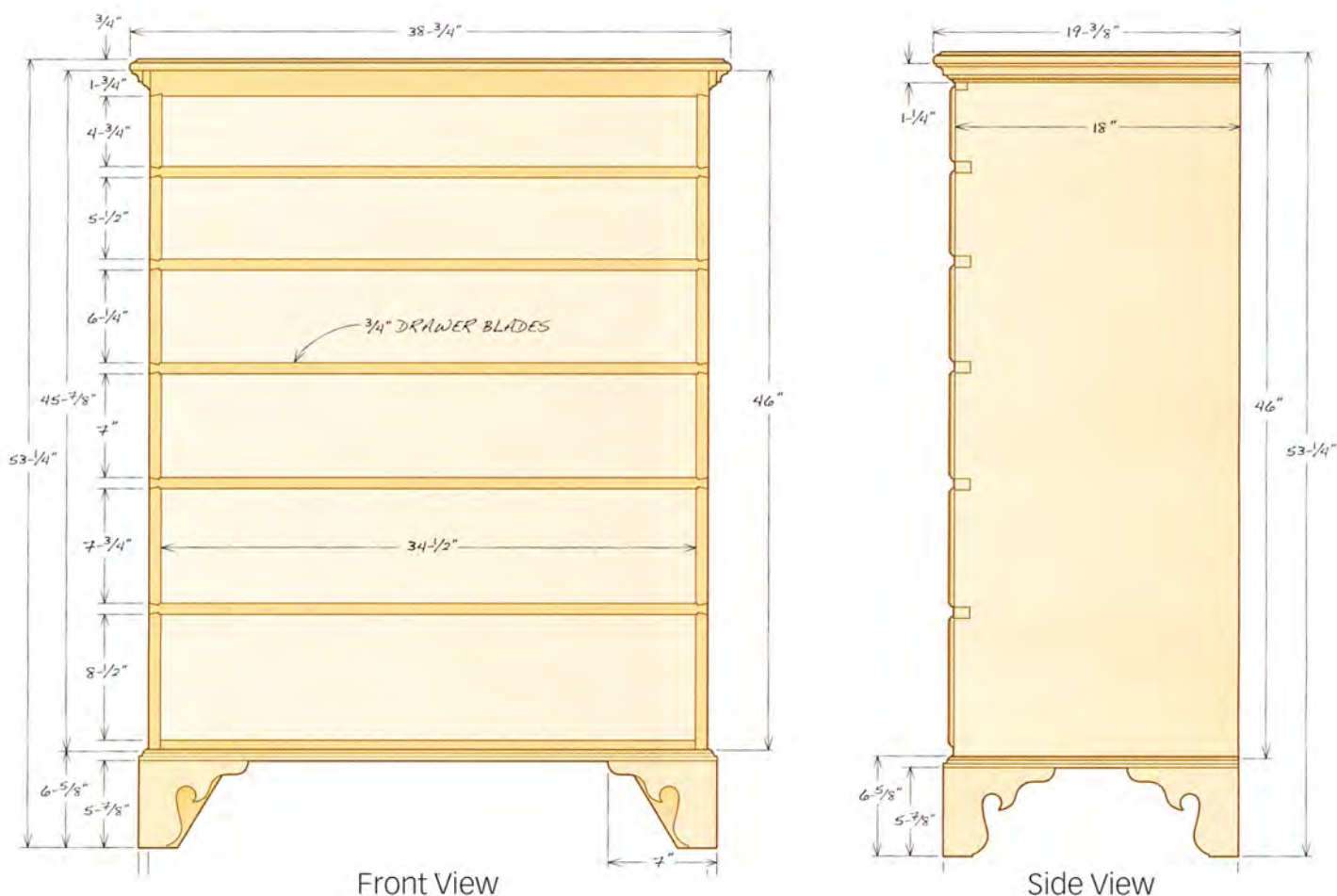
important to fit them exactly to the dados in the case sides. Mill the top rail and rear support to size, too.

The first operation is to form dovetails on each end of the blades; the bottom drawer blade is cut to fit between the case sides and tight against the case bottom. Make all the pieces the same, then choose the least appealing for the bottom piece.

To make the ends, install a $\frac{3}{4}$ " dovetail bit in your router table, raise the bit height to $\frac{5}{8}$ " (the thickness left after the dados are routed). Set the fence to keep the dovetail as wide as possible without leaving any flat at its end, then run the ends of all drawer blades. A shop-made guide block works as a push stick (photo 8).

Step two in making the dovetail ends is to cut away the back portion of each dovetail. This is best accomplished at your table saw. It's OK to use the miter square and fence in this way; it's not a through cut.

Trim away the unused portion of the dovetail using the same table-saw setup, or grab a handsaw to do



the job. Make the cuts at both ends of each divider to complete the dovetails on the blades, leaving a 1"-long section. Flush and square the divider ends, then lay out and cut $\frac{1}{2}"$ -deep, centered mortises (photo 9).

Fitting the divider dovetails to your case requires square lines, a sharp saw and conditioned arm. Position the divider to your case then trace the edges of the dovetail onto the case using a sharp pencil (photo 10). Use a square to extend the lines down the case sides to the 1" mark, then draw a horizontal line connecting the two layout lines. Inside the pencil lines is the dovetail socket.

Use a dovetail saw to cut the two outside lines; be accurate. To make removal easy, kerf the waste area with four or five more cuts to the baseline. Use a chisel to wedge the small pieces side to side to break out the waste. (Due to grain orientation, the pieces snap at your base line.) Pare away any waste to flush the bottom of the socket (photo 11). Repeat these steps for each socket, then check the dovetail's fit. If you hit your lines, the tails should tightly fill each socket. Add glue to the divider dovetails and on the walls of the socket, then tap the pieces together.

Wrap-up the Case

The last two pieces fit to the case are the top rail and the rear support. The top rail fits similar to the dividers only with a half-tail design. Dovetail sockets for the support were previously made.

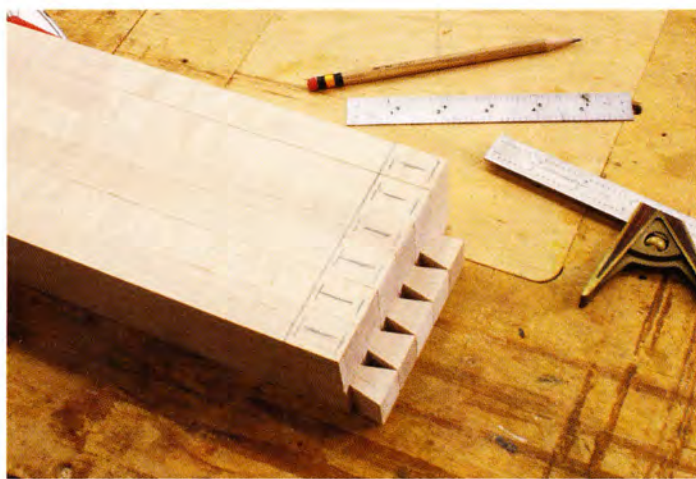
At both ends of the rail, mark lines equal to the thickness of your case sides. Lay in a dovetail angle at one edge of the top rail – I used 12° for my slope. Saw to the dovetail line, or use a chisel to pare away the waste. Repeat the steps on the second end.

Position the top rail onto the case, then transfer the half-tail design onto the case-side edges. Square a line down $\frac{3}{4}"$, and draw in the baseline. Remove the waste material using the same steps as used when cutting the divider sockets. When the parts fit tight, add glue to the tail and socket then assemble the two. I added a screw for good measure – it's covered with moldings and doesn't show (photo 12).

Drawer runners begin with wide pieces of poplar onto which a tenon is created. Use a two-step process at the table saw; the first cut is with the stock flat to the table, and the second has the pieces standing as it passes over the blade.

With the tenon formed on the wide stock, rip the runners to final width (photo 13). Each tenon has to be trimmed to fit the mortises. This is best done using a tenon jig at the table saw (photo 14). I also clip the opposite end of the runners at a 45° angle at my chop saw, just to clean up their appearance.

To install your runners, add glue in the mortise and on the tenon, then slip the joint together as you fit the runner into its groove. Joinery holds each runner at the front; a



9 Lay out $\frac{1}{4}$ "-wide x $\frac{7}{8}$ "-long mortises into the back of the divider ends to house the drawer-runner tenons. Each mortise is $\frac{1}{2}$ " deep.



10 The square shoulder of the divider fits into the groove and the dovetail rests on the case side; transfer the layout onto the case side then square lines down 1" to define the saw lines.



11 Multiple kerfs make it easy to break out the socket waste, then pare the socket's bottom flush with your chisel. If you're accurate when sawing, the joint will be snug.



12 The top rail fits to the case with a half-tail design. Fit the two using the same steps as the dividers. I added a screw, which is covered by moldings, for extra support.

single nail holds it at the back (photo 15). Drill an over-size hole through the runner, then use a $1\frac{1}{2}$ "-long clout or shingle nail – the larger head holds the runner secure while allowing for seasonal movement of the case sides.

A full-length kicker placed above the drawer box – used to keep the drawer from dropping as it's pulled from the chest – would interfere with how the top is attached. A shortened piece does the same job, and still makes attaching the top easy (photo 16).

Traditional Foot Application

This chest stands on bracket feet. Make a pattern out of $\frac{1}{4}$ " plywood. The pattern is then used to lay out the six show feet needed for the chest – four that are mitered together for the front feet of the chest, and two that are attached to feet made from secondary wood and used at the back. Trace the design onto your blank, then drill a small pilot hole to locate the bit for the next step (photo 17). A small dimple is all it takes.

With the feet laid out on the $\frac{7}{8}$ "-thick blank, install a $1\frac{1}{4}$ " Forstner bit, align the bit's point to the dimple made in the workpiece then drill the six holes. The next step is to cut the profile at a band saw (photo 18). A quick stop at a spindle sander cleans up the sawn lines.

The front feet need 45° miter cuts so they can be joined to form the corner. With the table saw blade set to 45° , one of the mating feet is cut with the miter gauge pushing the stock through the blade while the second cut is made with the setup reversed in the miter slot – place the foot with its face down to the table, and the long edge tight to the miter fence (photo 19). I use a stop block with each of these cuts to keep the foot from creeping away from the blades as it's cut.

The two mating pieces are then glued together. There are no splines and no other connections except for a glued-in block set behind the joint. This is the way feet were joined in the 18th century, and they've stood the test of time. And the back feet, which are sometimes



13 Form a single tenon on a wide piece of stock, then rip the drawer runners to final width; that beats having to handle every runner.



14 Each tenon needs shoulders cut to fit into the drawer blade mortises. Using a tenon jig is the best method.



15 Installation of the runners is straightforward. Add glue to the tenon, inside the mortise and about 5" into the groove, then fit the piece into the groove as the joint slips together.

18th-Century Drawers

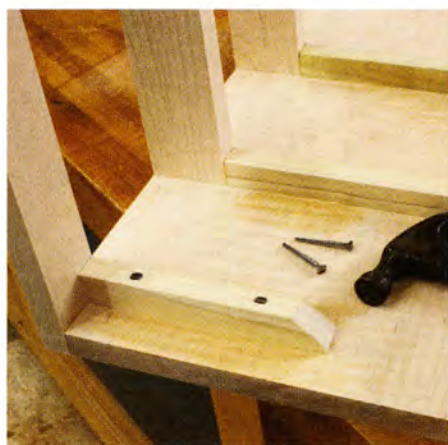
A typical 18th-century drawer features a side-to-front connection of half-blind dovetails (tails on the sides), and a back-to-side connection of through dovetails. The drawer bottoms slide under the drawer back and into $\frac{1}{4}$ "-wide x $\frac{1}{4}$ "-deep grooves cut into the sides and front of the drawer parts (Photo 1).

There are many ways to cut the drawer bottoms. My choice is the table saw, and if your setup is exact, the job is simple. Tilt your blade to 12° and set your

fence $\frac{3}{16}$ " away from the blade as its inside-facing tooth is flush with the saw's top. Raise the blade to cut through the $\frac{5}{8}$ "-thick drawer bottoms and you're good to go (Photo 2). Cut the two ends and the front edge of the bottom panel. Clean away any saw marks, then slide the bottoms into your drawer boxes.

To hold the bottom tight to the drawer back, use a single nail through an $\frac{1}{8}$ "-wide slot cut at the back edge (inside edge of the drawer back).





16 Short kickers are placed at the front edge of the case to keep the top drawer from tipping as it's extended. A full-length piece would interfere with attaching the top.



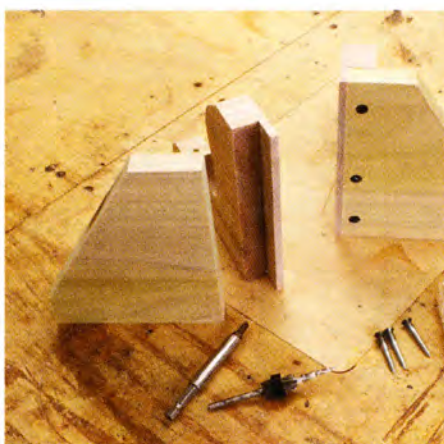
17 A plywood pattern makes it easy to lay out the feet profiles: a center mark helps locate the drill bit used to form the foot's spur.



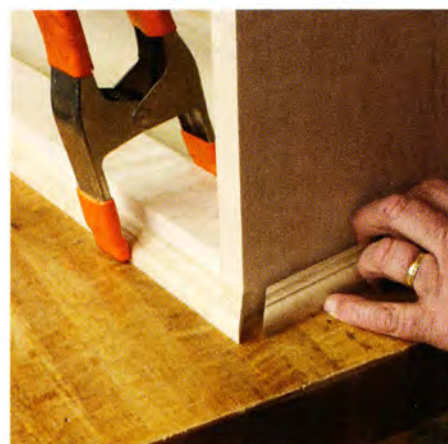
18 Band saw your feet working from the outside into the drilled-out holes, then spin the foot and work back to the outside, finishing the cuts.



19 Half the feet are cut with the miter gauge behind the workpiece; half are cut with it in front. The stop-block and the push stick make this operation safe and accurate.



20 Cut a rabbet in the rear side foot then glue and screw the back foot in place. Use a pilot hole and lube your screws.



21 Make and install the front molding using glue and brads along the entire length. The side moldings are glued along the first 6" from the miters, and brads complete the connection.

mitered, dovetailed or simply butt-joined to the show foot, are attached with a bit more strength (Photo 20).

Before the feet are added to the chest, the molding that wraps the chest to cover the dovetails needs to be attached to the case – the feet fit under the molding and partially on the chest. It's best to rout your edge profile on $\frac{3}{4}$ "-thick stock then rip the molding to width ($\frac{11}{16}$ "). I used a cove-and-bead router bit to profile the molding. The front corners are mitered (Photo 21).

Wrap up the feet by gluing the paired sets in place, then add the corner blocks. Each block is glued then nailed in place using 1" brads (Photo 22).

Top Off the Chest

The last pieces needed for the case are the top and the top moldings. Mill your top to thickness, length and width then profile the front edge and two ends – leave the back edge square (Photo 23).

The top fits to the case with a series of wooden clips and screws. Cut slots in the case front and sides using a plate joiner. Make two cuts – the first is $\frac{1}{2}$ " from the top edge of the case and the second is $\frac{5}{8}$ " – to leave a $\frac{1}{4}$ "-wide slot. The clips have a $\frac{1}{4}$ " tongue that fits into the slot, then a #8 x $1\frac{1}{4}$ " wood screw is driven through an oversized hole to pull the top tight (Photo 24).

Two-piece moldings for the top of the chest are created at a router table. Step one is made from material that's $\frac{1}{2}$ " thick x $1\frac{1}{4}$ " wide. One edge is profiled using a small cove-and-bead router bit. The molding fits around the case just under the top – it's mitered at the front corners and cut square at the rear. The second molding is $\frac{11}{16}$ " square with a $\frac{1}{2}$ " cove routed at one edge. This molding is fit around the first molding, and also mitered at the front corners (Photo 25).

Before adding the molding to your chest, sand the upper case sides and front area to #180 grit to keep from



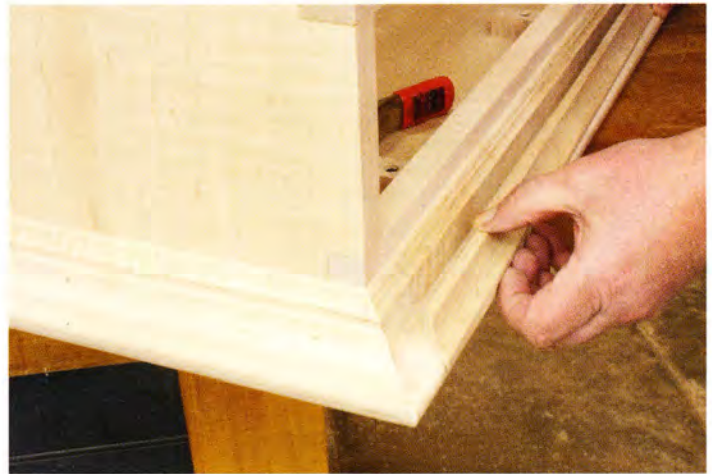
22 Strengthen the feet with blocking. A vertical block actually carries the load of the chest.



23 The bottom molding and the top have the same cove-and-bead profile. The bottom edges are rounded with a $\frac{3}{16}$ " roundover bit.



24 Join the top to the case. To allow for seasonal movement, use wooden clips and #8 x $1\frac{1}{4}$ " screws with the heads blacked for aesthetics.



25 Add shop-made moldings to the underside of the top. Each piece is attached with brads and the miters are glued.

bumping the molding as the case is sanded. The balance of the chest can be sanded later. The molding is glued and nailed with brads just as was the lower molding.

Drawers & Backboards

Drawer fronts are sized to the individual openings, and should be made from your best available stock – drawer fronts are the primary focus of the chest. Add a $\frac{1}{4}$ " to the overall height of the opening, and $\frac{5}{8}$ " to its length. The extra material forms the lip of the drawer fronts. Each drawer front is profiled using a $\frac{1}{4}$ " roundover router bit. Set the bit to leave a $\frac{1}{16}$ " quirk.

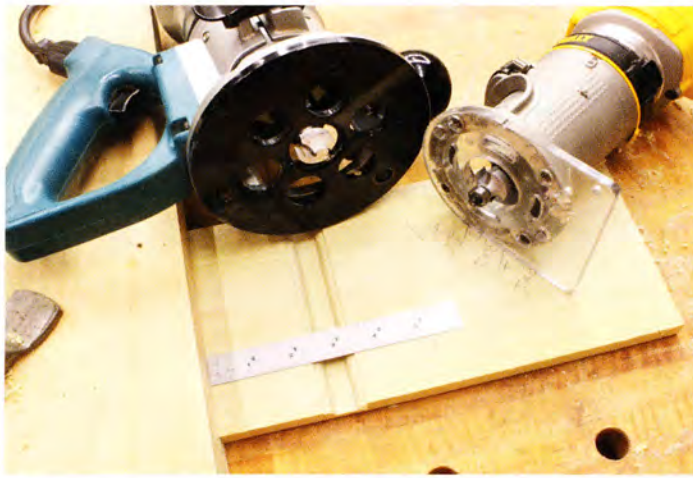
The top drawer has extra router cuts that change the single-drawer look into the appearance of three drawers. This is done using an ovolo router bit – the profile matches your roundover bit, and is set to a matching depth of cut. To get the necessary measurements, clamp a fence to a piece of scrap then make a pass with your router base tight to the fence (photo 26).

Divide your drawer front into three sections, taking into account the area cut away by the routed profile. Position your fence the measured distance from the center of the profile, then rout the drawer front – I use a simple jig held in place with a holdfast. To complete the design, reposition your fence and make a second cut (photo 27).

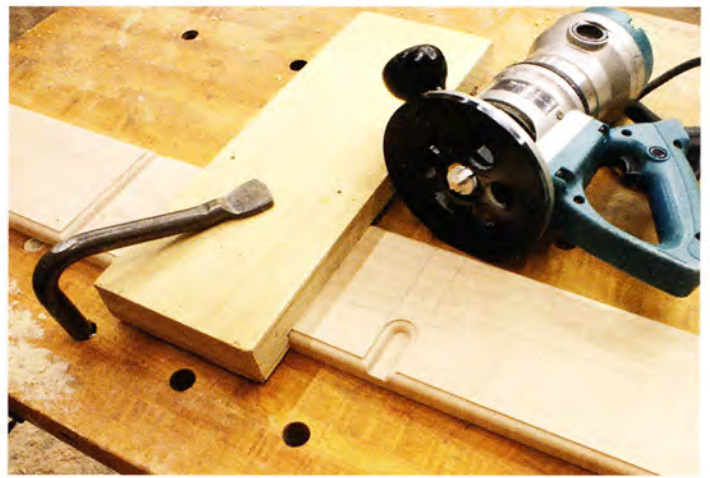
Create the lipped effect on the drawer fronts (Photo 28). Rabbet the two ends first, then the top edge of each drawer front – the bottom edge of the fronts are left without rabbets.

Make the rabbets on one drawer front then check the side-to-side fit of the drawer, and the top to bottom fit. You should have a $\frac{1}{16}$ " of gap per side and enough top-to-bottom movement to allow the drawer to operate easily. (If the side-to-side fit is OK and the front is tight top to bottom, cut the ends of each drawer front, then adjust the fence to take more material off the drawer's top edges.)

Build the drawer boxes. I used period construction techniques. (See "18th-Century Drawers" on page 28.)



26 Make a test cut using an ovolo bit set to the same depth of cut as the roundover bit. Determine the distance from the fence to the center of the routed area, and its total width.



27 Accurately lay out the location of your router cuts so the three areas are of equal length, position the fence then rout the profile. (The router's base rides against the fence.)



28 Bury a dado stack inside a sacrificial fence with $\frac{3}{8}$ " exposed, raise the blade to leave a $\frac{5}{16}$ " lip then cut the ends and the top edge of each drawer front.



29 Shiplap the edges of your backboards. It's easy to do this at a table saw – the fence extension provides better support.

After sanding the chest and drawer fronts to #180 grit and knocking off any sharp corners, your chest is ready for finish. (For information on the finish I used, see "Finish for Prized Woods," page 32.)

When you wrap up your finish it's time to fit and install the backboards. Mill your pieces to thickness, then true the edges and square the ends.

The edges of the backboards are shiplapped using with the same two-step method used to make the drawer runner tenons (photo 29). The first and last board used are cut only on one edge.

If you use four nails per board to attach the back pieces, you're restricting movement which could be problematic with seasonal movement. To attach the boards but allow free movement, nail

the lower edge of the first board – the lap-under edge is against the case rabbet. The next board is then nailed on the lap-over edge, which pinches the board below. This method is used with each board until you get to the top board which is nailed at the four corners – I generally make the top board smaller in width to lessen seasonal movement.

You may think of this chest as bedroom furniture, but with its size and proportion, it can easily be used anywhere in your home. ■

Glen's favorite hardwood for furniture is tiger maple. He's been known to build anything and everything using this fantastic species. You can contact him at (513) 531-2690 or at glen.huey@americanwoodworker.com.

SOURCE

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- H-15 pulls, 2 $\frac{1}{2}$ " boring, post and nut, antique brass. (13 pieces required)
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Take a three-step approach to make the finish of any figured-grain wood stand out and be noticed.

Finish for Prized Woods

BY GLEN D. HUEY

FIGURED HARDWOODS are the most challenging and satisfying to work. With most of these woods, including tiger maple, I aim for a finish that makes the figure really pop. No single finish can do this as well as a three-step process using water-base aniline dye, boiled linseed oil and shellac. It's easy to learn. The only chance you have to ruin the final appearance is by lack of preparation or sanding through the dye or topcoats.

Groundwork for Finish

Project preparation is key to a good finish. All parts should be sanded smooth to #180 grit. It's also important to knock off any sharp corners and ease all edges; finish does not sit well on sharp corners, and is easily rubbed, knocked or sanded off.

After your project is sanded, wipe over the entire piece with a wet cloth to raise the grain. Your cloth should be soaking wet to the point that water is dripping from it as you work. After the wood dries, knock off the fuzz by sanding all surfaces using #400-grit sandpaper. The application of water-based aniline dye will probably raise more grain, but if you raise the grain with plain water first, you're minimizing the amount of sanding needed after the color is added. And that means there's less of a chance you could sand through the dye.

As you're sanding, pay attention to the sharp edges and corners. I use #120-grit sandpaper to knock off those

edges. Sand enough to ease the corners. Do not round them. Not only does the easing help hold dye and finish, the rougher surface wicks in more dye which helps hold the color, too. Once you've raised the grain and knocked off the corners, you're ready for dye.

Color From Powder

I recommend Moser's powdered aniline dyes. They're available in 1 oz., 4 oz. or 8 oz. containers. The 1 oz. container contains enough dye for most small projects; the 8 oz. container can handle multiple projects. I use water-based dyes because they are the most resistant to fading in sunlight. Alcohol-based dyes are less resistant to fading, and their quick drying times make them difficult to apply.

Mixing a water-based dye is simple. Begin with water that is heated to just below boiling point. (You'll know the water is ready when you see small bubbles come off the pan's bottom). Dump 1 oz. of dye into an opaque jug (to protect the finish from sunlight), add the hot water, replace the jug's cap and shake the solution. After the dye has cooled, pour the solution through an old T-shirt or paint strainer and you're ready to go.

If done correctly, you cannot mess up the dyeing process. You have to drench your project, so work in an area where it's OK to get dye on the ground. (Go outside if you can, or place a sheet of plastic on the floor.) Brush or



1 Water-based aniline dye, when used on figured woods, is the first step to highlighting the wood's prized grain. Apply a soaking amount to your project, then wipe away the excess.

spray the dye until your piece is soaked, then keep it wet for five minutes. Dye seeps into highly figured spots more than on flat grain, because they present more end grain to the wood's surface. Keep an eye on these areas and apply more dye if they dry out quickly. After five minutes, wipe off any excess. If there's no excess, you didn't use enough dye. Let the project dry completely, which could take four to 24 hours. When the dye has dried, knock down any raised grain using #400-grit sandpaper. Use a light touch, and be careful around any corners or previously sharp edges (photo 1).

Add Linseed Oil

I usually apply a coat of boiled linseed oil next. To my eye, it adds depth to figured grain and warms the wood's color in a pleasing way. Just as with the dye, the oil will soak into the grain to build depth. It also helps fill pores which gets you to a smooth finish quicker. (By the way, don't use raw linseed oil. Boiled linseed oil has driers added to it; raw oil doesn't.)

Brush the oil onto the project. Keep things wet for five minutes, then wipe away any excess. Hang your rags up to dry outside right away; left in a pile, they could start a fire. Really! Just as with the dye, there should be excess. Allow the oil to thoroughly dry. Depending on the weather, this could be as short as 48 hours or as long as a week (photo 2).

Apply Your Choice of Shellac

Shellac is perfect to seal in the oil, and it's a great finish for furniture. You can apply it with a brush or spray it. And you can manipulate the tones of the finish using different colors or grades of shellac. I usually make my own finish by dissolving shellac flakes in denatured alcohol, but you can also buy pre-mixed shellac, ready to go. Shellac is easiest to brush, I've found, when it's made as a 1½ lb. cut (That's a ratio of 1½ lb. of flakes to 1 gallon of alcohol.) If you buy pre-mixed shellac, dilute it 50/50 with alcohol to make a 1½ lb. cut.



2 A coat of boiled linseed oil soaks into the figured grain to deepen the finish; it also helps fill pores before your topcoats begin.



3 Use #0000 steel wool followed with a coat of paste wax, and a lot of elbow grease to dull the finish; an abraded surface is less apt to show defects in your finish.

I start with clear shellac, then add a layer of amber to further warm the wood's overall appearance before going back to clear. Before you apply the first coat of shellac, wipe down the project with an abrasive pad to remove any lingering dust that may have mixed with the oil. Wipe your project with a clean cloth and you're ready for applying the topcoats.

If you brush on the shellac, apply a couple of coats. Sand each coat before applying another. If you spray the finish, you can apply three to four coats before sanding. I usually apply five to six layers of 1½ lb. cut shellac to attain the smooth finish I'm after. The last step of finishing is to apply a coat of paste wax.

SOURCE

Woodworker's Supply, Inc

woodworker.com
800-645-9292

• J. E. Moser's Aniline dyes in dry powder. The company has a free color chart available for download.

If you're not a fan of the high sheen that shellac delivers, you have a couple of options. You can use #0000 steel wool to abrade the surface, or apply a dull or satin finish over the top of your shellac (photo 3). ■

Glen has worked with aniline dye finishes and shellac for more than 20 years. If you have questions, contact him at (513) 531-2690 or at glen.huey@americanwoodworker.com.

With this much iron,
dovetails are the way to go.

Plane Cabinet

BY BRAD HOLDEN





1 Flatten one face of the cabinet's top, bottom and sides by hand, then run the other face through a planer. All of these parts are less than 12½" wide.

AS THE OLD SAYING GOES, you can't have too many clamps. But can you have too many planes? So far, I've got 21. Each one serves a special function, and when a collection gets this big, it deserves a special home.

Notes on Construction

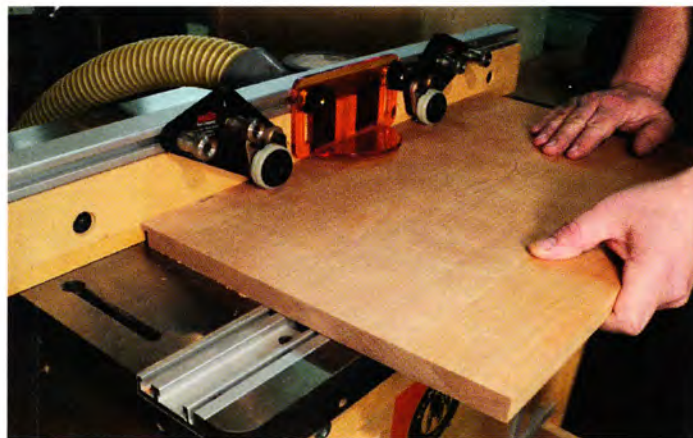
This cabinet is sized to fit my particular set of planes, but you can easily change its dimensions to accommodate your own set. The bottom compartment houses a #7 and a #6 nested on their sides. The vertical compartments hold a #5½, #5 and a low angle jack plane. The remaining shelf space is deep enough for most smoothing planes to go in straight. The rest of the planes in my collection are tucked in wherever they'll fit.

All of the cabinet's parts are made from solid wood, and the carcase is joined with dovetails, for strength. Once loaded with tools, this thing is pretty heavy. Dovetails virtually guarantee that the cabinet's joints never fail, no matter how much weight they must carry.

The cabinet goes on a wall, with no support underneath. It's hung with a French cleat that's glued and screwed to the cabinet's back. A French cleat is simply a board with an angled edge that rests on another angled board that's screwed to the wall. It's a simple, but incredibly strong method to hang a heavy cabinet.

Build the Carcase

The cabinet's bottom and sides are 12" wide – just wide enough to fit through a benchtop planer. The cabinet's top is only a ¼" wider. If you're lucky, you may be able to find individual boards this wide, but it's certainly OK to glue up these pieces from narrower stock. If you use narrower stock, joint and plane the boards about ⅛" extra-thick.



2 Rout stopped rabbets to accept the cabinet's back. Stock guides ensure that the rabbet has a consistent depth and help hold the part tight to the fence.

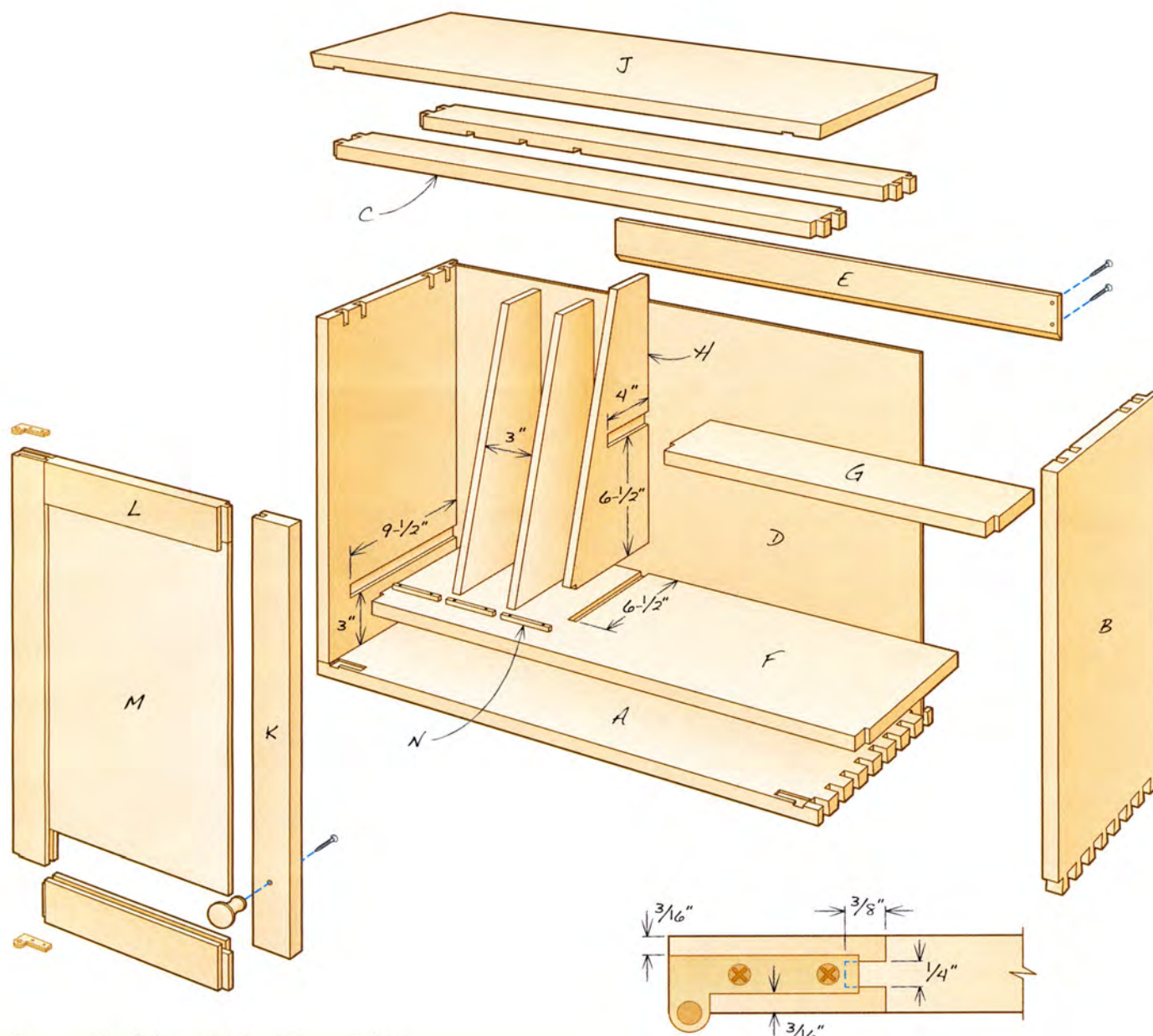


3 Cut through-dovetails to join the cabinet sides to its bottom. I use a modified Moxon vise to guide my chisel when making vertical cuts.

Glue them together, using cauls or clamps, if necessary, to ensure that the assembly is flat and that the joints are as even as possible.

The next step is to make one face of each piece truly flat. I did it by hand. (That's what planes are for, right?) First, I planed across the grain with my #6, whose blade has a slight camber, then planed with the grain using my #5. I finished with a finely-set #4.

Alternatively, you could flatten one side with your planer. Of course, you can't just shove the boards through the planer as they are, because what goes in also comes out. That is, if you plane a board that's twisted, it will come out twisted. To flatten a board with a planer, place the board on a flat piece of plywood as wide as the board and



Plane Cabinet Cutting List

Overall Dimensions: 20^{3/4}" H x 30^{1/2}" W x 12^{1/4}" D

Part	Name	Qty.	Material	Th x W x L
A	Bottom	1	Cherry	3/4" x 12" x 30"
B	Sides	2	Cherry	3/4" x 12" x 20"
C	Stretchers	2	Cherry	3/4" x 3" x 29 ^{1/2} "
D	Back	1	Cherry plywood	1/4" x 19 ^{3/4} " x 29 ^{1/2} "
E	French cleats	2	Cherry	1/2" x 2 ^{3/4} " x 29 ^{1/2} " (a)
F	Lower shelf	1	Cherry	3/4" x 10 ^{1/2} " x 29" (b)
G	Upper shelf	1	Cherry	3/4" x 5" x 18 ^{1/2} " (b)
H	Partitions	3	Cherry	1/2" x 7 ^{1/2} " x 15 ^{1/4} " (b)
J	Top	1	Cherry	3/4" x 12 ^{1/4} " x 30 ^{1/2} "
Door Parts				
K	Stiles	4	Cherry	3/4" x 2" x 19 ^{1/4} "
L	Rails	4	Cherry	3/4" x 2" x 11"
M	Panels	2	Cherry plywood	1/4" x 11" x 16"
N	Plane stops	3	Cherry	1/4" x 1/4" x 3"

Notes:

- a) One edge of each part is cut at a 45° bevel.
b) Notched at front corners.

at least 1" longer. Place shims under the board so it can't rock or get squashed by the planer's feed rollers, then run the assembly through the planer, taking very light cuts.

After flattening one face, run the pieces through the planer down to their final thickness (photo 1). Cut the bottom and side pieces to final width and length, then mill the stretchers to their final dimensions.

Rout rabbets in the sides and bottom to receive the cabinet's back and French cleat. I used a router table, taking multiple shallow passes to avoid tearout (photo 2). Stock guides help hold the parts tight to the table for a consistent cut. You could, however, use a hand-held router as well.

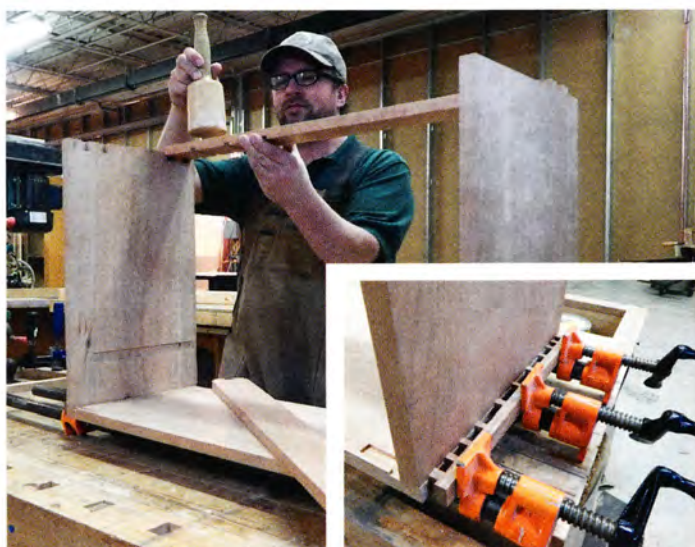
I stopped the rabbets so they wouldn't show on the outside of the case. Thinking about it now, I could have avoided this bother by starting the rear dovetails with a tail rather than a pin. This way, a through rabbet comes out on the underside of the case. The hole it reveals can



4 Make stretchers to go under the cabinet's top. They'll be joined to the sides with half-blind dovetails. Cut tails on both stretchers, then dado the rear piece.



5 Cut half-blind sockets for the stretchers. These joints sit right under the cabinet's top. For aesthetic reasons, I want them to be invisible.



6 Assemble the case without glue to test-fit each joint. Clamping cauls push on each tail to make sure the joint sets tight.



7 Mark the cabinet's bottom to indicate where the door's knife hinge goes – its mortise is set back from the cabinet's side by the thickness of three playing cards.

easily be filled with a small block. I had my mind set on a pin-first arrangement, so the rabbets had to be stopped.

Lay out and cut through dovetails to join the cabinet's sides and bottom (photo 3). I graduated my joints, but their spacing isn't all that important. The tails have to go on the side pieces because you're creating a joint that must mechanically resist downward force. (Think how heavy those planes are.) Lay out and cut the pins in the cabinet's bottom.

While you've got your tools out, move on to joining the stretchers and cabinet sides with half-blind dovetails. These joints could be through dovetails instead, but I didn't think dovetails that show on the outside of the cabinet would look good here, since the cabinet's top sits right above them. Cut tails on the stretchers first.

Before you move on, mill wood for the lower shelf, upper shelf and partitions. Leave these pieces 1" or so extra-long; you'll determine their exact length after the

cabinet is assembled. Rout stopped dados in both of the cabinet's sides to receive the lower shelf and in the right side to receive the upper shelf. Cut through dados in the rear stretcher (photo 4). Finish up the half-blind dovetails by chopping sockets in the cabinet's sides (photo 5).

Dry assemble the bottom, sides and stretchers (photo 6). Make sure all the joints go fully home. Now you can tackle the interior parts, in this order: First, trim the lower shelf to final length. Cut stopped dados in the shelf to correspond with the dados in the rear stretcher, then install the shelf. (Be sure to cut notches on the front end of the shelf in order to cover the dados. The upper shelf and partitions will need similar notches.) Trim the partitions to final length, then cut a stopped dado in the right-hand partition to receive the upper shelf. Install the partition, then trim the upper shelf to final length. Once the interior work is done, cut the cabinet's back and French cleat to final size.



8 Disassemble the cabinet, then rout and chop mortises for the knife hinges. The cabinet's top must be mortised for knife hinges as well.



9 Glue the cabinet together, then slide in the shelves and partitions to hold your handplanes. Be sure there's room to add more.



10 To begin your doors, cut grooves in all the stiles and rails to accept using 1/4"-thick plywood panels.



11 Cut stub tenons on the ends of the rails to fit into the grooves. Use a dado stack to make each tenon in two passes.

Before disassembling the cabinet, there's one more job to do: Lay out mortises for each door's knife hinges. The washer between the two halves of the hinge determines the gap around the doors. This washer is about the thickness of three playing cards, so I used three cards to mark one end of each mortise that goes in the cabinet's bottom (photo 7). Clamp the cabinet's top in position and mark the ends of its hinge mortises as well.

Disassemble the case to lay out and cut all of the hinge mortises. With a marking knife, strike a line at the hinges' ends and at the L-shaped offset. Mark the mortise's long sides with a marking gauge. (Note that the center of the hinge's pin is even with the front of the case.) The cabinet's top overhangs the case, so you'll have to reset the gauge to mark the top's mortises.

Cut the hinge mortises using a 1/8"-diameter router bit in a laminate trimmer or small router. Set the bit's depth of cut to the thickness of one hinge leaf, then freehand rout most of the waste inside the mortise. Use a chisel to cut to the layout lines (photo 8).

Sand and pre-finish all of the interior parts as well

as the inside of the case and the back. Mask off any areas that will be glued. The back will be glued to the shelves as well as the rabbets, so mask those areas, too.

Glue and clamp the sides to the bottom one at a time. With each glue-up, make sure the case is square.

Add the stretchers as well, without glue. After both sides are done, glue the stretchers. Next, glue all of the shelves and partitions in place (photo 9).

SOURCES

Lee Valley & Veritas

leevalley.com, 800-871-8158
• Brusso Double Offset Knife Hinges, #01B14.06, \$27.70 per pair, (2 pair req.)

Nice Knobs

niceknobs.com, 908-832-2723
• 7/8"-diameter Shaker knob, #SO78 - Cherry - 7/8", \$1.31 each, (2 knobs req.)

JessEm Tool Company

jessem.com, 866-272-7492
• Clear-Cut Precision Stock Guides, #04215, \$100 per pair.

Build the Doors

Mill the stiles and rails to thickness, length and width. Size these parts so your doors fill the entire opening, without any gaps. Cut centered grooves in one edge of



12 I add a thin bead of glue into the grooves to strengthen the door's construction. This only works for a plywood panel; a solid-wood panel should never be glued.



13 To make knife-hinge mortises in the doors, rout away most of the waste using an 1/8"-diameter router bit, then finish with a chisel.



14 Screw and glue a French cleat to the back of the cabinet. The cleat's bottom edge is angled to engage a mating cleat fastened to your wall.



15 Slide the doors onto the hinges, then install the hinge screws. Knife hinges are almost invisible – a nice touch for a craftsman's cabinet.

each stile and rail (photo 10). Cut a tongue on the end of each rail (photo 11). Cut the plywood door panels, then assemble the doors (photo 12).

Place the doors in the cabinet. Joint or plane the doors, if necessary, so they're square to the cabinet. Joint or crosscut the doors so the gaps at top and bottom are three playing cards wide. Joint the outer stiles so the doors have a similar gap at the hinge sides but are tight where they meet in the middle. Lay out and cut the doors' hinge mortises, again using a router and chisel (photo 13).

Place the cabinet on its face, apply glue to the rabbet and shelves and install the back, securing it with pins. Glue one French cleat to the cabinet's back, then screw the cleat to the cabinet's sides (photo 14). Drill and countersink holes

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through the stretchers, then fasten the top to the cabinet.

Place the cabinet on its back to hang the doors. Screw the cabinet member of each hinge into its mortise and then slip on the door members. Slide the doors onto the hinges, then screw the hinges to the doors (photo 15). Close the doors, then plane a slight bevel on the inner stiles. As you work, adjust the gap between the doors as necessary.

Sand and finish the cabinet's exterior, then install the knobs. Make stops for the three partitions to keep the planes from sliding out, then screw them in place. The position of the stops depends on the length of your planes. Fasten the other French cleat to the wall, hang your cabinet and fill it up!

This is the perfect cabinet to store and protect your planes. It looks great in the shop, too. ■

Brad is a contributing editor with *American Woodworker* who specializes in one-of-a-kind custom pieces. He has a deep interest in making, restoring and using traditional tools. Contact him at americanwoodworkerbrad@gmail.com.

Six pieces of wood, a free weekend and a bit of ingenuity, lights your way in the night.

Lantern of Candlelight

BY CHAD STANTON





1 Set the fence for a $\frac{3}{16}$ "-wide cut, raise the blade to $\frac{3}{16}$ " and run the cut on two adjacent post sides; a regular-kerf saw blade is perfect to make the slots for the glass panes.



2 Form a bead on the outer corner of each post. A $\frac{5}{32}$ " beading bit in your router table setup makes this quick work.



3 Drill holes in the outside faces of the lid and bottom plates. Counterbore these holes with a bit that matches the diameter of one of your plug cutters.



4 Chamfer the upper faces of the lid and the bottom plate, then fasten the posts between both of these pieces.

DURING THE CIVIL WAR, soldiers didn't have flashlights to light their paths at night. Most of them used candle lanterns, like this one. Judging from photographs of the era, most of those lanterns were very simple, without any molding or decoration. I've spruced up the design a bit, but my lantern is basically the same warm source of light used 150 years ago. It's perfect for the backyard, deck or camping trip.

This lantern design is simple. Four posts, attached to a bottom and lid, capture four pieces of glass. A slot in the lid allows you to lift up one of the pieces to easily change the candle inside. The candle fits in a base that has a rod attached to it. Lifting the rod and base brings the candle up through a hole in the lid, making it easy to light the wick.

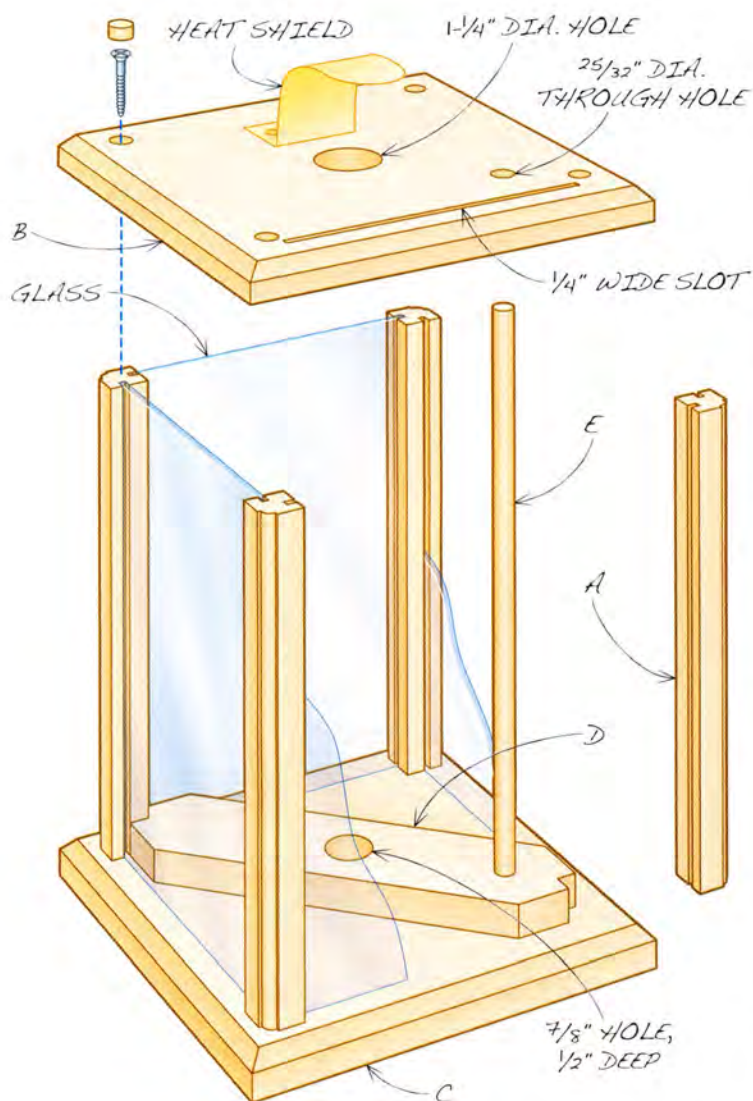
Post Preparation

Because the lantern could hang outside all night, it's best to choose a wood that is resistant to rot. White oak, sassafras and mahogany weather well; I used mahogany.

To get started, thickness the wood for your posts, base and lantern bottom to $\frac{3}{4}$ " and the lantern lid to $\frac{5}{8}$ ". Remember that machines, if you use them for this step, have limitations as to length. All of these pieces are less than 12" long. It's unsafe to run a board this short through a planer, however. To protect yourself, mill longer lengths of material then trim them to the size, or you could simply prepare enough material to make a few lanterns at the same time.

With your material cut to the proper thickness, rip the parts to width and cut to length. Adjust the fence on the table saw to cut the $\frac{1}{8}$ " kerf needed for the glass, set the blade height to $\frac{3}{16}$ " then make two cuts into each post (photo 1). To dress this lantern up a little, I moved to the router table to form a $\frac{5}{32}$ " bead on the outside corner of each post (photo 2).

Before setting aside the posts, locate, mark and drill a small pilot hole for the screws used to attach the posts to the bottom and lid of the lantern (see the drawing on page 42). Take extra care in this step. Accurately



Drill $\frac{7}{32}$ "-diameter holes through the plates. (These holes that are just slightly larger than the threads on the screws). On the outside faces of both plates, drill $\frac{3}{8}$ " counterbored holes using a Forstner bit (photo 3).

To add another shadow line, I chucked a chamfering into my router table, then routed a $\frac{1}{4}$ " chamfer around the top faces of both plates (photo 4). Without a chamfer or molding here, these pieces look pretty plain.

Uplifting Measurements

Before making the candle base, assemble the lantern so you can get a few sizes. Attach the four posts to the base and lid with #6 x $1\frac{1}{4}$ " wood screws. This is a great time to make sure your holes are accurately located and to check the fit of your posts. Also, take this opportunity to order your glass panes, or cut the pieces and check the fit.

Measure diagonally across the base – from inside post corner to inside post corner. To get a ruler or tape measure into this tight area is almost impossible. A trick I learned a while back is to use two small thin scraps. The ends of the scraps should touch the corners of the post, and make sure the scraps overlap each other. With a pencil, mark where the two pieces of scrap overlap (photo 5).

Lay out a 90° notch at one end of the candle base. Next, lay the scrap pieces on the base aligning one end with the point of that notch, and the second piece with your pencil line. Mark the end of the second piece of scrap (photo 6). This is point of the second 90° notch. Cut each notch using a band saw, then clean the surfaces with a rasp or file, if necessary.

With the notches cut, check the fit of the candle base inside the lantern and between the posts. Tweak things if needed. Once the base fits and operates smoothly up and down the posts, mark the candle base just inside the glass slots (photo 7). Trim these edges with a saw, or pare the waste using a chisel.

Raise the base to the underside of the lid and clamp the pieces tight. On the outside face of the lid, mark the location for the rod used to raise the candle, and find and mark the center of the lid. At those two locations, drill a $\frac{1}{8}$ " pilot hole through the lid and into the candle base. This not only marks the lid, but also locates the holes needed in the candle base.

Slip the candle base from the lantern, and drill a $\frac{3}{8}$ " hole $\frac{1}{2}$ " deep at the rod location. Drill a $\frac{7}{8}$ "-diameter hole, also set about a $\frac{1}{2}$ " deep, to accept the candle (photo 8). For added stability, I hammered a small finish nail through the bottom, centered in the candle hole. Before setting aside the base, cut and install a 12" section of dowel – it's best if the dowel matches your lantern wood.

Slip & Slide Candle Base

Using the small holes in the lid as a guide, drill a $1\frac{1}{4}$ " hole through the plate to allow access to the candlestick's

Lantern of Candlelight Cutting List

Overall Dimensions:

Part	Name	Qty.	Material	Th x W x L
A	Posts	4	Mahogany	$\frac{3}{4}$ " x $\frac{3}{4}$ " x 9"
B	Lid	1	Mahogany	$\frac{5}{8}$ " x 6" x 6"
C	Bottom	1	Mahogany	$\frac{3}{4}$ " x 6" x 6"
D	Candle base	1	Mahogany	$\frac{3}{4}$ " x 2" x $5\frac{1}{2}$ "
E	Posts	1	Dowel rod	$\frac{3}{8}$ " x 12"

locating the holes is crucial to straight posts when the lantern is complete. And it impacts how the candle base fits and operates.

Plate Preparation

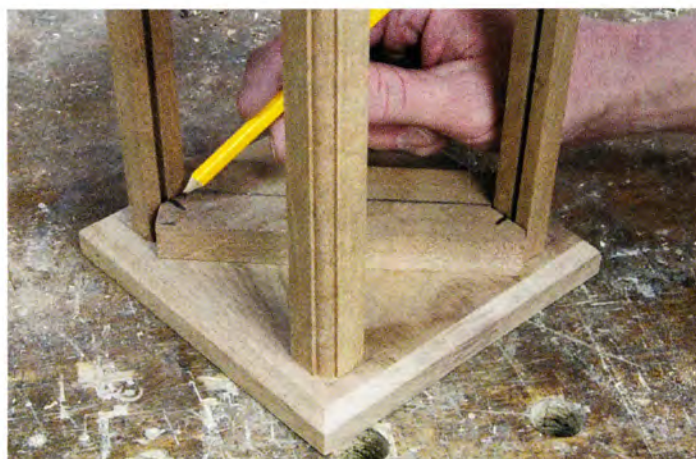
Work on the bottom and lid begins with simple layout. At each corner of both parts, mark lines in $\frac{3}{4}$ " from the outside edges. You'll drill the holes for the screws where these lines cross.



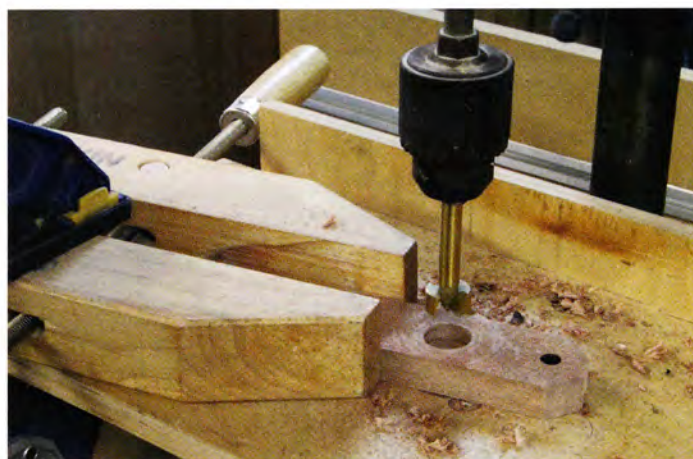
5 Measure the distance between the posts using a miniature pair of pinch sticks. You'll need this measurement to make the candle base, which fits between the posts.



6 Notch one end of the candle base, then use the pinch sticks to mark the location of an opposite notch.



7 Place the base in the lamp, then draw marks opposite the grooves in the posts. Remove the base and trim off these corners – the glass goes here.



8 Drill a stopped hole in the base to receive the candle. Drill a through hole at one end of the base for the rod that will lift it.

wick. Also, drill a $\frac{25}{32}$ " hole for the lift rod – this hole must be slightly larger than the rod itself.

There are a number of ways to create the slot such as using a router or mortiser. I drilled a series of $\frac{1}{4}$ " holes going with the wood's grain (photo 9). I then used a sharp, wide chisel to clean the sidewalls (photo 10). (If you make the slot across the grain, the small portion of wood from the edge to the slot could potentially crack or split.)

With all the pieces complete and the lantern disassembled, now is the time to apply finish to all the pieces except the outside face of the lid. I used a couple of coats of an exterior varnish as my finish, but a few coats of boiled linseed oil would be a good option to add a bit of color and still have moisture protection.

With the parts dry, reassemble your lantern, and make sure you slip the glass panes into position before screwing on the lid.

A really clean look on the lid is best, so those ugly

screw heads have to be covered up. A dowel rod could fill the holes, but that would show end grain and as soon as finish hits the surface, those dowel ends would scream at you. To make them less noticeable, you need face-grain plugs from the same species of wood. They're easy to make with a plug cutter and drill press.

Knock out a few plugs, add a small amount of glue then insert them into the four lid holes. Orient the plug's grain in the same direction as the lid's grain. If done right, the holes almost disappear (photo 11). After the glue dries, trim any excess plug off using a flush-cut saw. Sand the plugs, then finish the lid.

The lantern needs a handle. A coat hanger would suffice for this, but I think a length of copper wire adds to the look. Instead of curling the handle's ends to wrap around screws, I flatten the ends on my anvil (any piece of flat steel or even a rock would work) then drilled it for a small screw. Attach the handle to the lid and you're good to go.



9 Drill a series of holes in the lid to begin creating a slot. You'll raise one of the glass panes through this slot in order to put in a new candle.



10 Finish cutting the slot by paring with a wide chisel. The wider the chisel, the easier it is to cut a straight line.



11 Glue face-grain plugs into the screw holes. For the best color match, make your own plugs from scraps left over from the project.



12 Fasten a heat shield, made from a door plate, to the top of the lantern. Use a single screw so you can pivot the shield out of the way for lighting a candle.

When the candle burns, the heat from the flame can burn your hand. A heat shield deflects the heat. I made one from a door's brass push plate, trimming it with tin snips. I bent the plate by holding it in a vise. It's easy to do.

Offset the small brass screw used to fasten the heat shield to the lid so you can pivot the shield

out of the way when lighting a candle. (photo 12).

What a great weekend project. At one time, fellow countrymen used a candle lantern during a brutal war; today, it feels much better to use one for a peaceful cookout. ■

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Unique designs
are created when
two seldom-paired
techniques collide
into a single element.

Sgraffito in Wood

BY MARK ARNOLD



PHOTOGRAPHY: LEAD PHOTO BY AL PARRISH, STEP PHOTOS BY AUTHOR

CARVING AND VENEERING are usually thought of as separate disciplines within the realm of decorative wood-working. While individually they can often be found together on the same piece of furniture, carved elements are seldom veneered and veneered elements are rarely carved. But when both techniques are executed on the same element, unique design possibilities are created.

In the artistic world, the technique broadly known as sgraffito (skra-FEE-toh) means to skillfully and systematically scratch, cut or carve through an overlay to

reveal the substrate to which it is applied. This technique is both intriguing and replete with design potential for its combination of additive and subtractive qualities.

I was first introduced to this technique through the work of the contemporary furniture artist Kristina Madsen. I have since used it on several projects, carving through a thick lighter-toned overlay veneer to expose a darker solid-wood substrate below (photo 1). Reversing the arrangement of the light and dark woods results in a dramatically different composition.

There are some differences, however, between this technique and those commonly used for decorative veneer. To be amply thick to carve, the overlay must be thicker than most sliced veneers, which are only about $\frac{1}{40}$ ". I prepare the $\frac{1}{16}$ " veneer in my shop. (Some commercial veneers are available in $\frac{1}{16}$ " thicknesses, but they can be hard to find and more difficult to carve because knife checks tend to be more pronounced.)

Where the goal of decorative veneer is to show off a highly figured grain, I select rather mundane, straight-grained stock for my overlay veneer. It can be easily carved, and the grain will not distract from the final design (photo 2).

Sgraffito is applicable to both flat and curved work,

but be aware that the thick overlay is not as nearly as flexible as thin veneer, so there are some limitations. And because a solid wood substrate is necessary, caution should be exercised when using this technique on pieces wider than 5" or 6" as some cupping of the workpiece may occur.

Preparing Materials

I begin any project by sketching ideas on paper. I then decide upon the two contrasting species before heading to the shop. It's much easier to glue the overlay to the substrate before any parts are cut to finish length or width, although in some cases – the four sides of a tapered leg, for example – this is not always possible or

Indexing Jig

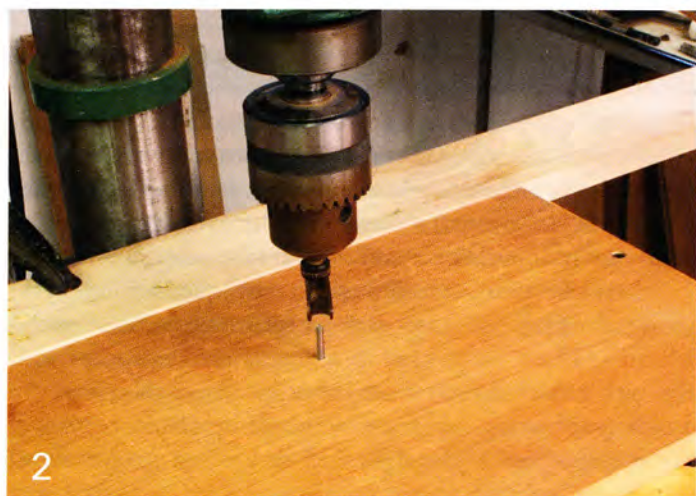
For precise and consistent spacing of circles, a jig makes work easier. There are a few simple steps needed to bang out this jig.

First, drill $\frac{1}{8}$ "-diameter holes through a piece of MDF, using a paper pattern to center the holes within each desired circle (photo 1). Next, attach the workpiece to the MDF pattern piece using double-stick tape.

Drill a single $\frac{1}{8}$ "-diameter hole into an auxiliary bed, then insert a $\frac{1}{8}$ " metal pin into the hole to allow the workpiece to be indexed at each point where a circle is desired.

Clamp the auxiliary bed in place with the metal pin centered directly under the quill of the drill press (photo 2).

To use the jig, position the workpiece assembly over the metal pin at the first hole. Lower the plug cutter into the workpiece surface to create the circle, then move the workpiece assembly to the next hole. Repeat the steps until all your circles are created (photo 3).

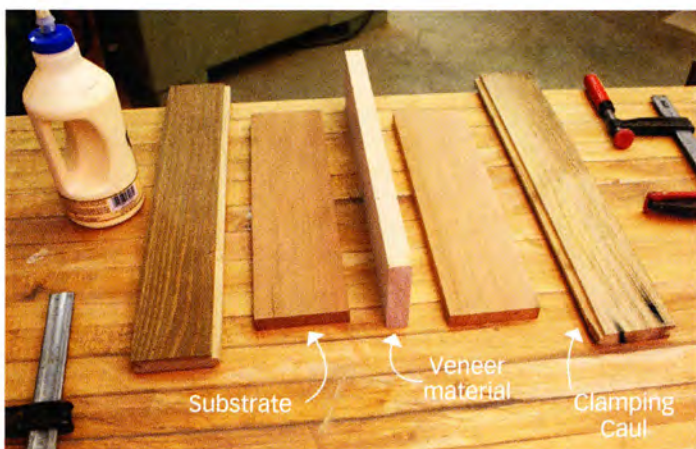




1 In wood, sgraffito is the art of cutting through a layer of veneer to reveal a solid-wood substrate. It offers endless design possibilities.



2 Straight-grained veneer stock makes the best material to use in sgraffito designs – it carves easily and the grain doesn't detract from the design's overall appearance.



3 One method to prepare stock is to sandwich the veneer material between two pieces of substrate. Two cauls evenly distribute clamping pressure.



4 "Resaw the glue-up to create two substrates covered with 1/16"-thick veneer. Two passes are necessary for wide stock.

desirable. If my design requires cutting a longer piece into shorter pieces for aprons or drawer fronts, I typically apply the overlay first. There are always exceptions, however, so thought must be given to the most efficient method. As with any veneer, it is best applied before the joinery is cut, although dovetails are a notable exception. Some projects may require that the overlay be applied, and even carved, as various subassemblies are prepared.

To prepare the 1/16"-thick veneer, I mill a piece of 4/4 straight-grain stock. Beech, maple (hard or soft) and birch – species of diffuse porous hardwoods that have a light blond color – work nicely. Quartersawn or rift-sawn stock with tight parallel growth rings is best, though not required (photo 3).

I use a variety of methods to laminate the pieces. For narrow pieces, I simply glue the substrate to both sides of my overlay material, slice it slightly oversized on the table saw after the glue has dried, then smooth the sawn faces (photo 4). For pieces too wide to cut on the table saw, I follow the same steps, then cut as much as possible at the table saw before finishing the cut at the band saw.

For curved parts, the 1/16" veneer will need to be applied as a thin sheet instead of sawing to thickness later. Preparing such thin stock can be tricky. For narrow pieces, I rip them at the table saw, with the fence set a heavy 1/16" from the blade (photo 5). Smooth the reference face after each cut so every strip has one smooth side.

When wider pieces of veneer are required, I plane them to 1/16" with my thickness planer, using an auxiliary bed to bridge the rollers. Attention must be paid to grain direction when planing extremely thin stock to avoid tear-out, which can sometimes be very dramatic. Using a drum or wide-belt sander eliminates the risk of tear-out.

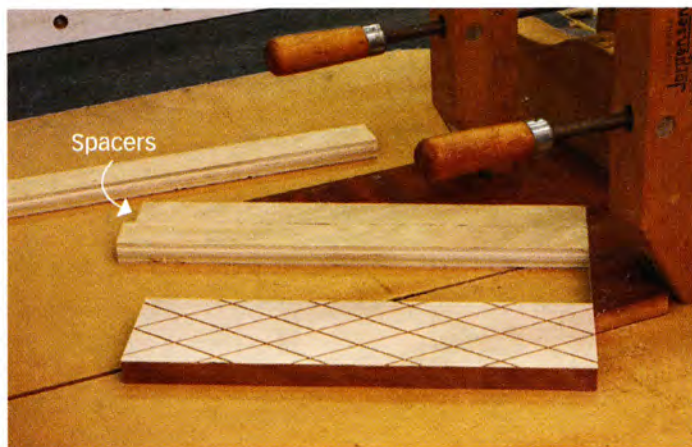
Use cauls when gluing the thin overlay – smoother side to the substrate – to equalize clamping pressure; smooth the saw marks after glue-up. After the overlay has been glued to all the parts to be carved, cut the pieces to size then complete any needed joinery before carving.

Sgraffito Techniques

There are a number of different methods used to remove the overlay to reveal the substrate beneath. They can



5 To cut thin veneer for curved sgraffito work, use a zero clearance insert to support the strips as they exit the cut, and a long push stick is essential, too.



6 Make a crosshatched diaper pattern – 60°/120° diamonds, here – by clamping a simple jig to the table saw's sled. You don't have to move the jig after each cut. Just insert spacers to move the workpiece the required distance.



7 When using a V-parting tool to carve sgraffito by hand, the amount of substrate revealed depends on the depth of cut.



8 Irregularities of handwork, as shown here with shallow grooves cut using a gouge, add texture to the surface and impart a human quality; just don't carve through the overlay.

be broadly classified into two groups: machine methods (table saw, drill press, or router) and hand methods (chisel, gouge, or riffler). Often times, both machine and hand methods are used on the same piece to achieve the desired effect.

When thin straight lines are required, I use a small-diameter, thin-kerf saw blade at my table saw (photo 6). To incise circles, I use a plug cutter mounted in my drill press. When the spacing of the circles is critical, a simple jig allows me to repeatedly make precise cuts at exact locations (see Indexing Jig page 46).

A router can also be used to remove the overlay material. For straight lines, the edge of the workpiece can ride against a fence. For curves and other irregular lines, the router can be used to follow the contours of almost any odd-shaped pattern, or it could be swung on a tram-mel setup.

Other machine-based techniques that yield interesting results include mounting the workpiece on the face-plate of a lathe or using a rosette cutter. When consider-

ing how a machine may be used to remove the overlaid veneer, the possibilities are almost endless.

The Touch of Hand Work

While machines excel at making either straight or circular lines, it's the tool marks created by chisels and gouges that truly indicate that a work was made by hand. Robotic precision, in my opinion, is not a prerequisite for successfully executed carving. While I do strive for consistency, I find the subtle differences from one carved element to the next to be a welcome sight.

If you've already done some type of woodcarving, you may already have the tools you'll need for sgraffito. You don't need a huge variety. To excavate the overlay to cut narrow lines such as those required for vine work or for defining the outline of certain elements, a V-parting tool is a logical choice – 45° or a 60° tool works well for this job (photo 7).

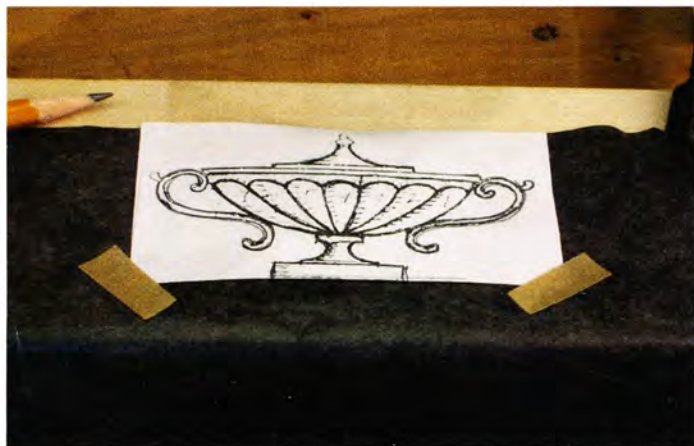
There are only two basic types of cuts made with gouges (photo 8).



9 Use stab-and-relief cuts with a single gouge to create the guilloche pattern while exposing the dark substrate.



10 Invert the sweep of a second stab-and-relief cut to create the leaf elements in this diamond pattern.



11 Place carbon paper under a pattern to transfer its outline to a workpiece. Trace the drawing's major components as well.



12 Rifflers are handy for filing odd shapes and hard-to-reach areas. Use a riffler with a simple curve to flatten the ground and define the wall of the oval surrounding your sgraffito design.

The second cut useful for sgraffito work is a combination stab-and-relief technique – a staple of all woodcarvers. For this cut, push a gouge into the workpiece at an angle (usually between 30° and 45° from vertical), then reposition the gouge on the work and insert it at a corresponding angle so the waste is cut free when the tool has reached the bottom of the first cut (photo 9). Inverting the sweep for the relief cut yields a football-shaped design that is ideal for stylized leaves (photo 10).

When sequencing cuts, I typically do the deeper carvings first to expose the substrate. I then move to the shallow cuts, which are made only in the overlay – don't pierce the overlay when making the shallow modeling cuts. Cutting across the grain or on a bias makes chipping out ahead of the tool less likely.

I also use this technique with common carving methods. The urn carving is a perfect example. The pattern I use is the same one used to make an urn paterae if you're working on traditional inlay.

Use carbon paper to trace your favorite pattern on

the workpiece (photo 12), then use a V-parting tool to cut as close to the lines as possible, but don't cut into the substrate. Use a selection of chisels and gouges that come close to the curves that need to be cut and make stab cuts angled away from the line at about 20°. Make the corresponding relief cuts to define each element, and try not to go any deeper than the top of the substrate.

Trace an oval line around the urn and follow that with the V-parting tool, cutting just through the overlay veneer. Use a shallow gouge to remove as much of the waste as possible without taking too much of the substrate. Some shallow modeling to the urn, and stab-and-relief cuts at the top of each rib gives the work some depth. The finished carving can be cleaned up with rifflers, a fine sanding sponge or burnished with a hard nylon file brush (photo 13). It's now ready for a coat of finish or can be assembled into your finished project. ■

Mark Arnold is a graduate of the Cabinet and Furniture Making program at North Bennet Street School. For 18 years, he's operated Boston Woodworking Co., Ltd (bostonwoodworking.com) in Sunbury, Ohio.

Drawer-Rail Strategies

Traditional joinery can add a telling detail to a simple piece.

BY TOM CASPAR

SOME JOINTS DO MORE than just hold a piece of furniture together. They also add visual interest, becoming part of the piece's design.

The joint that connects the side of a case to the rail that goes under a drawer – sometimes called a drawer divider or blade – offers a great opportunity to catch the viewer's eye. Here are five variations. Four are taken from Shaker furniture; the other is Chinese. The original joints were made by hand, of course. I'll show you how to make them by machine.

Half-blind dovetail. This joint is essentially a short sliding dovetail. It's an excellent choice if you're assembling a complex case with multiple drawer rails. You can glue the case first, then install the rails one by one later on.

Bare-faced through dovetail. This joint exposes some dark end grain on a case's side, which can be a nice decorative touch. If you start out with the joint a bit fat, a few licks with a hand plane on the flat upper face of the drawer rail quickly results in a perfect fit. Like the previous joint, the rails can also be installed after the case is glued.

Pegged blind single tenon. The peg draws your eye, doesn't it? By using a very dark wood, such as walnut or ebony, you can treat these pegs as accent marks. This joint must be glued when the case goes together.

Miter and tenon. This joint is common in traditional Chinese furniture. The miter allows you to run a molding on the inside edge of the case and continue the same molding along the drawer rail. This joint requires some precise handwork and is very fussy to fit.

Twin through tenon. The dark end grain of the two tenons indicate, to me, a joint of great strength. Making this joint by hand is really a challenge; making it with power tools is much easier.

SOURCE

MLCS

mlcswoodworking.com, 800-533-9298

- #16509 Top-Bearing Pattern bit, 1/2" diameter and 1/2" cutting length, \$19.

Freud

freudtools.com, 800-334-4107

- #22-115 Dovetail bit, 1/2" shank, 17/32" diameter and 25/32" cutting length, \$29.80.

Porter Cable

portercable.com, 866-357-5175

- #42045 Templet Guide, 17/32" ID and 8/8" OD, \$6.

Half-Blind Dovetail



Begin by drawing full-size side and plan views of the joint. The dovetail's socket should be $\frac{2}{3}$ the thickness of the cabinet's side and $\frac{1}{16}$ " to $\frac{1}{8}$ " narrower than the thickness of the drawer rail. The socket should also be as deep as the rail is wide.

Select a dovetail bit and a template guide for your router. Make a template from 1/4" hardboard, then mark the sockets and drill out most of the waste with a Forstner bit. Rout the sockets in the cabinet's sides (photo 1).

To rout the rails, glue up a large block of 3/4" MDF (photo 2). Cut a dado in the block that is exactly the same width as the rails and exactly as deep as the rails are thick. Install the same dovetail bit in the router table and adjust its height to match the depth of the socket. Make some trial runs with scrap pieces; the first pass should make a dovetail that's too fat. Adjust the fence inward until the fit is just right.



1 Rout the joint's socket using a shop-made template.



2 Rout both sides of each rail using a vertical jig.

Bare-Faced Through Dovetail

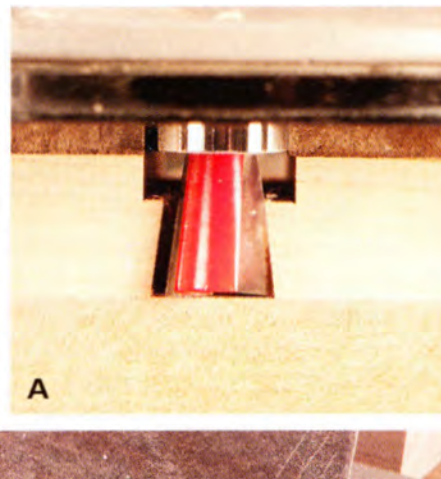


In this joint, the dovetail passes all the way through the cabinet and is angled on only one side. Mark the location of each drawer rail on the cabinet's sides, then plough $\frac{1}{4}$ " deep dados across the full width of both sides.

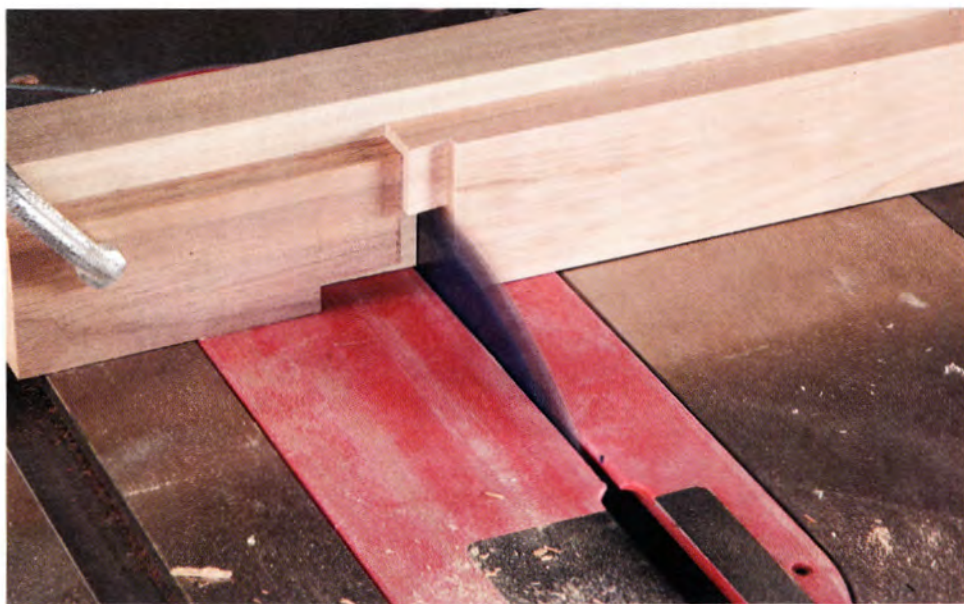
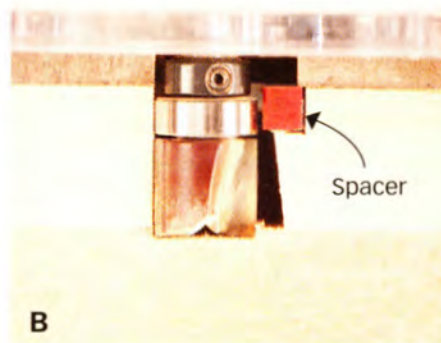
The dovetail socket will be $\frac{1}{16}$ " to $\frac{1}{8}$ " narrower than the thickness of the rails. It will only be about half as deep as the rail is wide. Choose a dovetail bit and template guide, then make a $\frac{1}{4}$ " hard-

board template. The opening in the template should be exactly as wide as the dado (photo 3). Place a sacrificial board under the cabinet's side, then cut the socket in two steps. First, use the dovetail bit and template guide (photo 3A). Next, insert a $\frac{1}{4}$ " x $\frac{1}{4}$ " spacer into the dado (this prevents overcutting), and use a top-bearing pattern bit (photo 3B).

Rout a half-dovetail on the rail using the same method shown in the Half-Blind Joint (page 51). Remove the remaining waste in three steps. First, make a rip cut on the bandsaw. Crosscut on the bandsaw, staying $\frac{1}{16}$ " away from the joint's shoulder. Finish on the tablesaw (photo 4).



3 Rout this joint's socket in two stages (A and B, at right), using one template.



4 Use the vertical jig to rout one side of each rail, then trim the excess.

Blind Single Tenon



In this particular cabinet, a face frame is applied to a solid-wood case. That's a huge advantage: You can mortise the face frame's stiles while they're still loose pieces (photo 5). The mortise should be as long as the drawer rail is thick, so there's

no need for shoulders above or below the tenon. The mortise should also be at least 1" deep. After cutting all the mortises, glue the face frame's stiles to the cabinet sides.

Cut the front and back shoulders of the drawer rails' tenons using a dado set (photo 6). Cut the front shoulder first, making sure the drawer rail will be flush with the face frame. When cutting the back shoulder, adjust the height of the dado blade to make a snug-fitting tenon.

After assembling the cabinet, drill holes for 1/4"-diameter pegs. The center of the hole should be about 3/8" from the inside edge of the stile. Glue in the pegs and trim them flush with a chisel.



5 Cut each mortise in the face frame before gluing it to the cabinet.



6 Cut both sides of the tenons using a dado stack.

Miter & Tenon



This joint is often used to accommodate a molding on a cabinet's rails and stiles. The joinery comes first, however. Make the molding after making and fitting the joints.

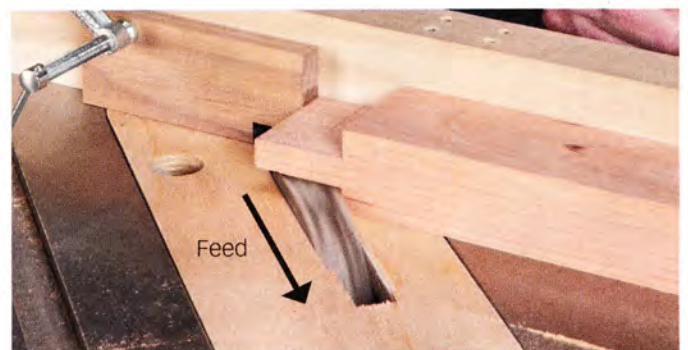
Begin by cutting mortises in the cabinet's stiles. The mortise should be as wide as the top-to-bottom dimension of a drawer rail. It should be as deep as possible, so the tenon extends beyond its miter. Make a number of blocks that fit tight into the mortises, then insert one block into each mortise.

Make a thick block that is the same width as the stiles, then cut an angle at one end. (In this example, the angle is 45°; other angles are OK, too.) Use this block to lay out the miters on the stiles, then remove most of the waste using a Forstner bit in a drill press. Clamp the block to each layout line, then pare away the remaining waste (photo 7).

Cut the back side of the tenons first, using a dado set. Cut the front side of the tenons by angling your miter gauge (photo 8). You'll have to turn it in both directions and move the stop block. This is a very fussy operation, so nibble away at both sides until you get it right.



7 Use a guide to pare miters next to a mortise.



8 Cut miters on the tenon using a dado stack. Angle the miter gauge both ways.

Twin Through-Tenon



The secret to successfully machining this joint is making an accurate template. Start with a full-size drawing of the joint. In this example, the mortises – and the space between them – are $\frac{5}{8}$ " wide. Mill a number of sticks that are $\frac{5}{8}$ " wide x $\frac{7}{8}$ " thick. In

addition, make two spacer blocks that are $\frac{5}{8}$ " wide x the thickness of your drawer rail. (In this example, the rail is 1" thick.) The spacer blocks will determine the length of the mortises.

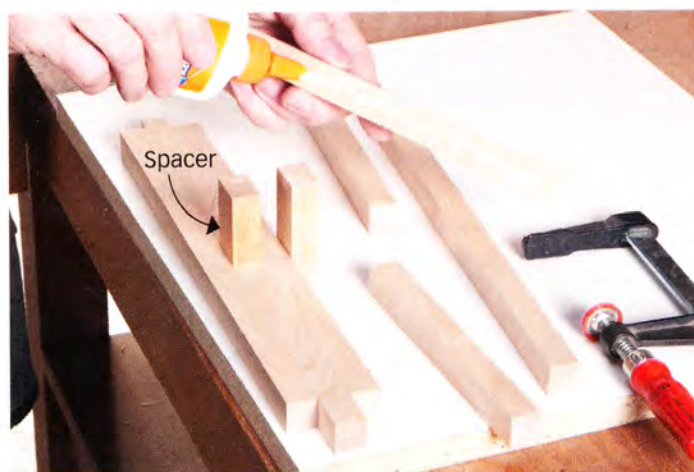
Build the template in stages. First, coat each spacer with wax so it won't get glued to the template. Make the outer three layers of the template first (photo 9). Clamp the spacer between the short template pieces; the spacer must fit tight in its hole. Glue the remaining pieces of the template in the next stage. Make sure both spacers are

in alignment by checking them with a square. Joint and plane the template until it's $\frac{3}{4}$ " thick.

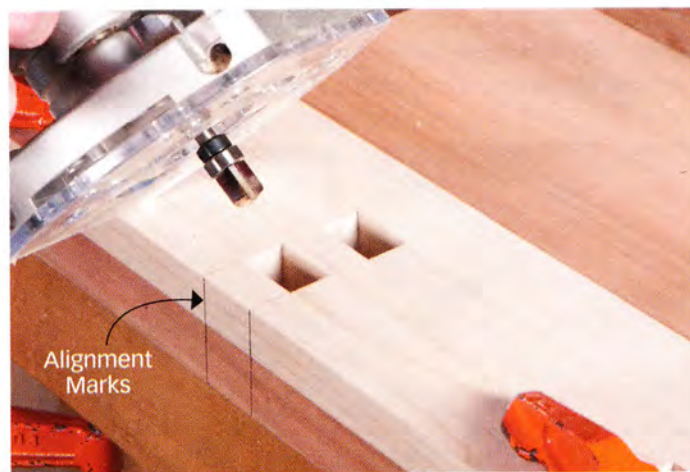
Draw alignment marks on the template and clamp it to an outside face of the case. Trace around the mortises, remove the template and drill out most of the waste. Chuck a $\frac{1}{2}$ " pattern bit in a plunge router. Adjust the depth of cut so the bit sits $\frac{1}{16}$ " above the surface of the workpiece (photo 10). Place the bit in one of the template's holes, turn on the router and plunge a bit more than halfway into the cabinet's side. Rout around the hole, then repeat the operation in the second hole. Square the corners of each mortise with a chisel (photo 11). Remove the template, flip the cabinet side over, carefully align the template and repeat the operation.

The best way to cut the tenons is to use a tenoning jig (photo 12). Remove most of the waste with a band saw first, then adjust a dado set to cut exactly the width of the tenon ($\frac{5}{8}$ "). Use a backer board to avoid tearout. ■

Tom is senior editor of *American Woodworker* magazine. He can be reached at tom@americanwoodworker.com



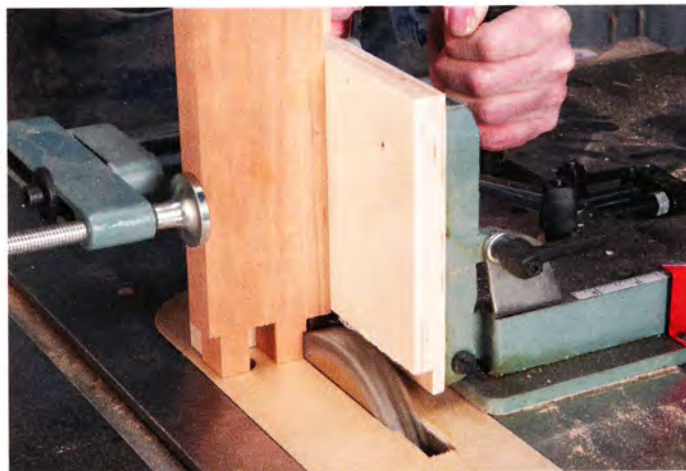
9 Make a template for the mortises using spacer blocks.



10 Rout the mortises from both sides using a short pattern bit.



11 Square the corners of each mortise using the template as a guide.



12 Cut the tenons using a tenoning jig and dado stack.

Wedged Mortise & Tenon

Inside, it's really a dovetail joint.

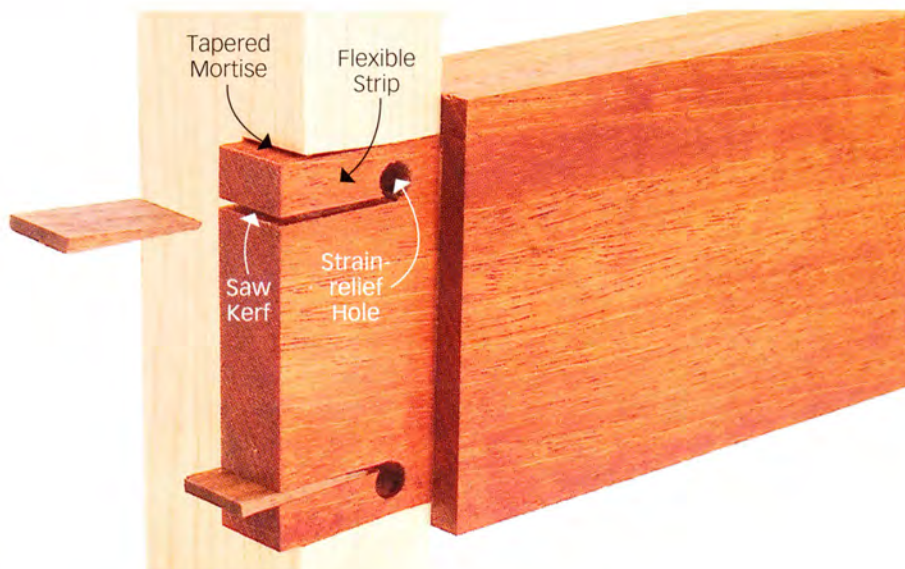
IF YOU WANT TO MAKE A woodworking joint that's super-strong, it's hard to beat the wedged mortise and tenon. Made correctly, it will never loosen up.

This joint resists being pulled apart for a simple reason: Essentially, it's a dovetail. The mortise flares outward; when you install the wedges, the tenon flares, too (Photo 1).

Making this joint usually requires some experimentation. How much bending can the tenon take? Where does the slot for the wedge go? The best way to solve these problems is to make a mock-up that looks like the cutaway view in photo 1. Here, the "mortise" is actually a dado. When you insert a trial wedge, you can see what happens inside the joint. To make the dado's flared sides, simply angle your miter gauge when cutting the dado. Once you've got the angle figured out (here, it's 3°), taper the sides of the mortise with a chisel (Photo 2).

For more information about how to make this remarkable joint, go to AmericanWoodworker.com/WebExtras. ■

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1 Wedges cause the tenon to flare like a dovetail. The mortise is flared, too. Holes in the tenon allow it to bend without breaking.



2 Make a flared mortise by guiding your chisel with an angled block. The joint's wedges will taper at this angle, too.

7 Questions With a Legend

BY KARA GEBHART UHL

Frank Klausz

Frank Klausz demands the best – of himself and of those who work for him. Educated in the Hungarian trade school system, at the age of 14 Frank entered a formal apprenticeship with his own father, a stern master, and graduated journeyman cabinetmaker in 1959. The success he's achieved as a master cabinetmaker is largely because of his belief that any job worth doing must be done well.

In 1967 Frank, along with his wife, Edith, left Hungary and moved to the United States. He worked in various woodworking jobs including casework and carpentry, and in 1972 he opened Frank's Cabinet Shop, specializing in fine furniture reproductions and custom architectural fixtures. A strong believer in the art of learning from skilled craftspeople, Frank has dedicated much of his life to teaching woodworking to others, through classes and DVDs.

Here we catch up with a man who is now a household name in woodworking circles, and talk about everything from his recent retirement to what today's craftsmen must do to succeed.



Q & A

AW: Now that you're two years retired, how do you fill your hours in any given day? And what has become of Frank's Cabinet Shop?

Frank Klausz: "I did not know that life could be so good. I do what I want to do. My days are different than they used to be. I used to go to the shop every morning, be there at 7:30 and work all day. Now when I wake up I decide what I'm going to do. I do a lot of small things for myself. I'm very happy that I'm working for my family, spending time with my grandchildren and traveling. I was recently in Arizona at the Southwest Center for Craftsmanship for a week of teaching. Everybody made a small chest of drawers. I have some private students now to deal with on and off, so that's what I'm doing.

Frank's Cabinet Shop was taken over by two men who have worked with me in the last 20+ years. They learned the craft from me in the shop. They have the same clients, same architects, so it's pretty much going like before."

AW: Do you now work out of a personal home shop and do you plan to keep a busy teaching schedule?

Klausz: "I set up shop in my backyard in a renovated water tower. It is a beautiful building with large skylights and plenty of space. My wife calls it a rotunda. In the new shop I have pretty much set up everything but I still don't have a jointer or a planer because I can't make up my mind what to buy.

I do less teaching than I used to but I still do some teaching, yes. ... I enjoy meeting the people and I love teaching. It's very hard work, especially when you have a class. I am very demanding of myself and I expect the best of my students."

AW: You were once a contributor editor to *American Woodworker* magazine. Can you think of one particular project or article or joint effort with the magazine that you loved? A favorite?

Klausz: My kitchen table in the October 1998 issue (# 68) was a nice article. It was fun to work with David Sloan, Ellis Walentine and Andy Rae.





7 QUESTIONS WITH A LEGEND

it's an old, beat-up Mercedes. And that piece of furniture in five, ten years is going to be worth more and you can pass it down to your children's children if it's well-made. You have to be a very good craftsman, but you also have to be a good salesman. No matter how beautiful your work is, if you can't sell it you're pretty much stuck. It's a craft in which people compete with each other. We woodworkers should learn from the plumbers and from other crafts. You don't find a plumber who comes cheaper than another. And when woodworkers don't have enough work, they try to do things cheaper, for less money, undercutting each other – that's a bad thing to do. If you don't get well paid for your work, you can't afford to do super-fine work, and if you don't do super-fine work, you'll never excel.

AW: In Hungary at 14, you entered a formal, contractual apprenticeship with your father. What advice would you give to a parent today who has a teenager interested in the craft?

Klausz: "I recently met a teenager who came to the shop with a friend of mine and showed him a couple wood-working joints and how to cut hand-cut dovetails. He was enthusiastic about it and he went home and kept doing it. His parents came to me and thanked me for introducing him to woodworking. It's a problem these days because fewer and fewer high schools have shop classes. But I would like to tell people out there who are starting out to seek help. Buy DVDs. Go work for a professional shop. ... You learn so much more. ... I taught myself wood-turning and it was so difficult. Finally I met someone who was a woodturner and in five minutes I learned more from him than I did spending hours on my own. Anyone who starts out should find a professional shop to work in, where they can practice the craft. You learn a lot more just watching what they're doing and how they're doing it."

AW: What is your assessment of woodworking by professionals in America today?

Klausz: There are a lot of talented people out there who do fine wood-working. The biggest problem is we face is to educate our customers about why they should buy from us. Some people have no problem spending big money on a car, but find it difficult to spend money on a piece of furniture. A piece of furniture is an investment. That car in five to ten years is going to be an old car. Maybe it's a Mercedes, but

AW: You've had a very industrious career. What has been your proudest moment?

Klausz: We had a beautiful job from the New Jersey Statehouse through the State Council on the Arts. We made some beautiful furniture. The job had to be done from New Jersey red oak. And it was some of the nicest work we've done in the last 20 years. In the 90s wood-working was booming and we had a lot of big jobs. We worked on very big houses in the Somerset Hills area. We did very big architectural millwork, coffered ceilings, beautiful paneling on the walls made of white oak, big crown moulding, big trim. And the guys at Frank's Cabinet Shop are still doing that, working with local architects. The architects do the design work and demand very high-quality work.

AW: Any final thoughts on wood-working today?

Klausz: You have to love wood-working to make it a career. To build a professional business from cabinet-making you have to be persistent and do very fine work. It's important to understand when you do very fine work, people will come back to you. And you have to deliver a top-of-line job and charge enough to cover your expenses. Good craftsmen should be able to sell their work and be able to understand the business part of the business. You have to understand what it takes for you to open a shop and run it. ■

Kara Gebhart Uhl is a freelance writer and editor from Fort Thomas, Kentucky. Read more about her and her work at pleiadesbee.com.



Chests of Drawers From the Top Six Classic Styles of American Furniture



William & Mary (1690 - 1725)

Dovetail joint introduced
Frame-and-panel designs fade
Drawer parts began to thin
Figured veneers as surface decoration
Built by Chuck Bender



Chippendale (1760 - 1785)

Chests develop swelled fronts
Flush-fit drawers with cockbead
Ball & claw feet reach a pinnacle
Case pieces grow in stature
Built by Ed Stuckey



Arts & Crafts (1860 - 1910)

Simple forms without excessive decoration
Exposed joinery takes center stage
Sturdy, affordable furniture
Combined machine & hand-tool work
Built by Darrell Peart



Federal (1785 - 1810)

Flush-fit drawers with cockbead
French foot or turned reeded legs
Better chests have fancy veneer
Inlay enhances designs
Built by John Zahurak



Jacobean (1607 - 1690)

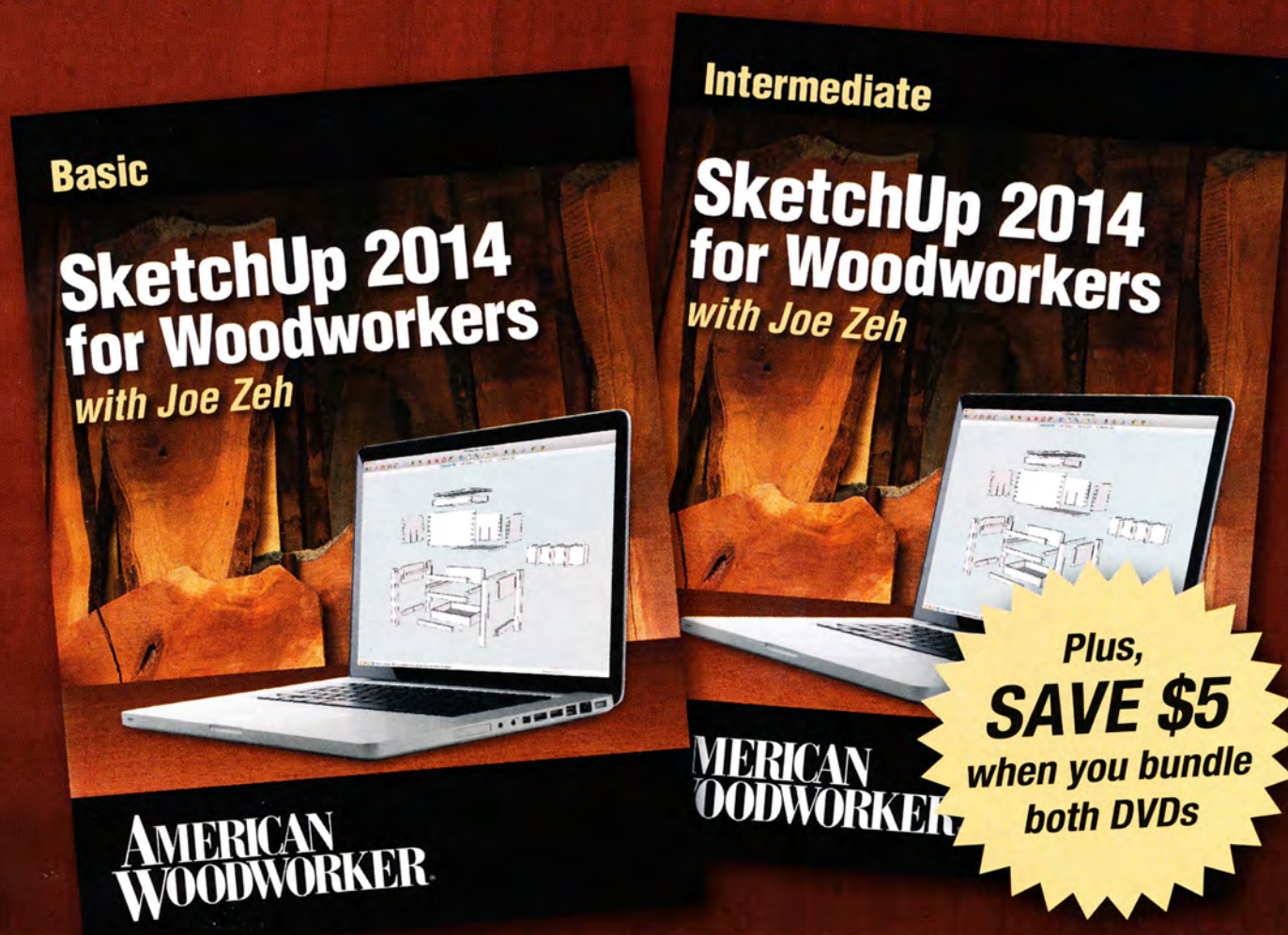
Primarily built in oak and ash
Mortise-and-tenon was universal joint
Parts were riven, not sawn
Shallow relief carving and split turnings
Built by Peter Follansbee



Queen Anne (1725 - 1760)

Bracket feet & cabriole legs appear
Drawers have overlapping lips
Graduated drawers add to height
Shell & fan carvings add to design
Built by Dennis Bork

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From the set-up and intro to the program to designing more complex pieces Joe Zeh will take you through the free program and show you all you need to know to successfully design furniture.

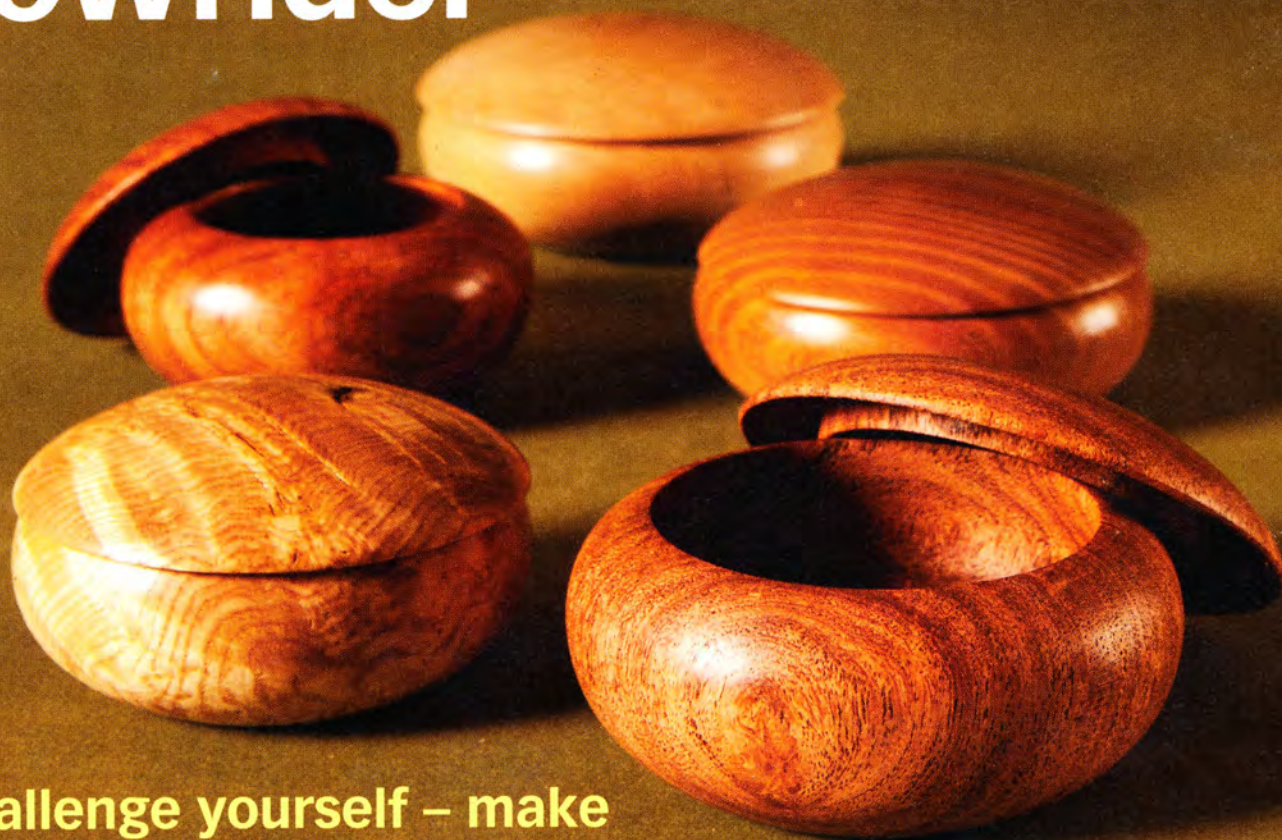
Basic SketchUp 2014 for Woodworkers – Explains how to set-up the new 2014 version and use the basic tools; design a piece from the ground up (including drawers); work with texture, components, and layers; master dimensions and much more!

Intermediate SketchUp 2014 for Woodworkers – Joe helps you take your skills a step further with how-tos for designing curved pieces; how to work with shade and lighting tools to highlight your curves; the secrets to designing cove moulding, bull nose edges, Ogee bracket feet, and more!

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Item #: T4162-T4161-BUNDLE

Lowrider



Challenge yourself – make an unusual lidded box.

WHEN IT COMES TO TURNING, clay and wood have a lot in common. Ceramic artists have been exploring round forms for thousands of years, and so have turners. We often cross paths. After studying some Japanese ceramic containers, I was inspired to make these small boxes. Their lids interested me – I'd never seen a turned box with a lid that wraps over the base and includes a tenon.

Start With One Blank

Make the box from a blank that's about 3" to 4" in diameter x 4" long; the grain must run the length of the piece. Just about any wood will do, as long as it's good and dry. I'll be using mesquite, which is perfect for a lidded box. Mesquite tends to stay quite round after it's turned.

Mount the blank between centers and round it into a cylinder with a spindle roughing gouge. Using a parting tool and outside calipers, create tenons that fit your scroll chuck on both ends of the blank.

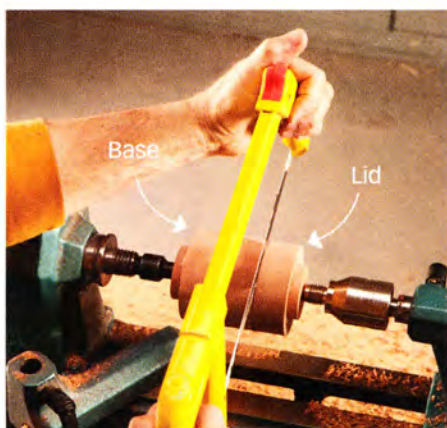
One portion of this blank will be the box's lid; the other portion will be its base. Making both parts from

a single blank guarantees that the wood's figure nicely flows from one to the other when the box is assembled. To lay out the lid, mark a line about 1¼" from one of the ends of the blank.

Your next task is to cut the blank into two pieces, separating the lid from the base. There are two ways you can do this: Part it with a thin-kerf parting tool or saw it with a hacksaw (photo 1). Both methods minimize the amount of wood lost to the kerf, so there's the least amount of interruption in how the figure flows.

If you choose the hacksaw method, use a saw with a heavy, rigid frame. (Don't use anything else!) Install a high-quality 18 teeth per inch, bi-metal blade and orient the teeth so they're pointing away from you. Remove the lathe's tool rest and run the lathe at a moderate speed of 400 to 600 rpm. It's also important to wear a full faceshield with an ANSI Z87+ rating.

Here's how to proceed: First, cut a shallow "V" shape on the marked line using the long point of a skew. (This is an optional step, but it's very helpful.) Sight along the



1 Turn a cylinder that includes both lid and base. With the lathe running, cut through the cylinder to separate the lid from the base.



2 Shape the underside of the lid. Using a detail gouge, form the lip that overhangs the base, then turn a tenon inside the lip.



3 Hollow the tenon using a half-round scraper. To scrape with the grain, move the tool from the hollow's small diameter to its large diameter.



4 Remove the lid, then set a divider to $\frac{1}{8}$ " less than the diameter of the lid's tenon.



5 Install the base in your scroll chuck, then use the divider to mark the tenon's approximate diameter while the work is spinning.



6 Use a detail/spindle gouge to shape the top of the base. Use a half-round scraper to begin hollowing a mortise to fit the lid's tenon.

"V" to position the saw at a right angle to the lathe's axis, then place the middle of the saw's blade in the "V." If the saw bounces or fights you, it's not quite square – reposition it. Apply moderate downward pressure. Once you've cut about $\frac{3}{4}$ " deep, you can push and pull the saw back and forth to speed up the process. When the cut is nearly complete, you'll hear a hollow sound. At this point, stop sawing and turn off the lathe. Remove the blank and cut or twist it apart. If you cut all the way through while the blank is spinning, don't worry; the pieces won't fly off!

Shape the Lid's Underside

Mount the lid in a four-jaw scroll chuck. Determine how much of the lid you wish to overhang the base. Let's call this overhang the "lip." On your first box, make the lip about $\frac{1}{2}$ " wide. (If the lip is wider, you'll have a harder time back-hollowing the interior portion of the base underneath the lip.) You'll also be cutting a tenon next to

the lip. The tenon should be $\frac{1}{4}$ " to $\frac{3}{8}$ " long.

Cut the lip and tenon at the same time, using a freshly sharpened $\frac{3}{8}$ " detail/spindle gouge (photo 2). When shaping the lip, move the gouge from left to right. This results in cutting against the grain, so cut slowly to minimize tearout. Be sure to cut the outside edge of the tenon parallel to the lathe's axis.

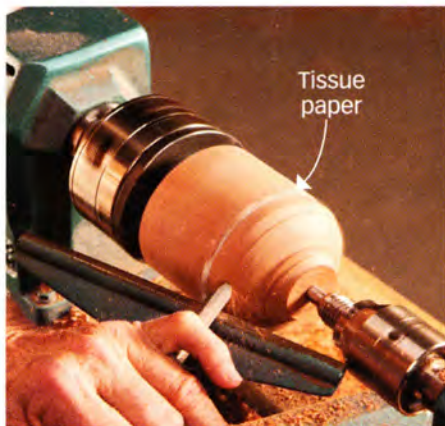
Hollow the inside of the lid using a $\frac{1}{2}$ " half-round scraper (photo 3). As the lid will be quite thin, cut only $\frac{1}{2}$ " deep. Sand the entire underside of the lid.

Move On to the Base

Mount the base portion of the blank in the scroll chuck. Measure the outside width of the lid's tenon using a set of dividers, then close up the dividers by about $\frac{1}{8}$ " (photo 4). Set the lathe to a low rpm and place the dividers on the tool rest, approximately centered on the blank. Lightly touch the left leg of the dividers to the wood,



7 Gradually increase the mortise's diameter using a small parting tool – make diagonal cuts until the tenon barely fits, then finish with a straight cut.



8 Place the lid on the base, then shape the lid's top. If necessary, insert a piece of tissue paper between lid and base to ensure a tight fit.



9 Shape most of the base with the lid in place, using a detail gouge. It's best to see both pieces together to create a pleasing overall form.



10 Remove the lid, then drill the base to roughly establish the depth of its interior. This step also simplifies hollowing the base.



11 Use a half-round scraper to hollow most of the base's interior.



12 Switch to a bent round-nose scraper to create a concave area under the base's rim. When you're done with all turning and sanding, part off the base.

leaving a shallow scored line. (A word of caution: Never touch the wood with the divider's right leg. The wood's rotation will kick the dividers back at you.) If the dividers are centered, the right leg will be positioned immediately above this line. If the right leg is off a bit, reposition the dividers and score a new line. When both legs indicate that the dividers are centered, push the left leg into the blank a bit deeper to clearly mark a diameter (photo 5).

Using a $\frac{1}{2}$ " half-round scraper, make a mortise by removing the wood inside the scored line. Cut about $\frac{5}{8}$ " deep in the center and right up to the line. Using a detail/spindle gouge, begin rolling over the outside of the base, but only about 1" back from the mortise (photo 6). To cut with the grain, move the gouge from the outside of the blank toward the mortise. This area will be underneath the lid's lip, so it should be slightly convex.

Gradually widen the mortise using a parting tool (photo 7). Take it easy, holding the tool diagonally to

create a taper. Remember, every cut you make effectively doubles the size of the mortise. Removing $\frac{1}{32}$ " from one side of the mortise, for example, actually widens the mortise by $\frac{1}{16}$ ". The taper allows you to find the correct diameter without overshooting too far.

Test-fit the lid's tenon to the mortise quite often. Once the tenon just starts to enter the opening, turn off the lathe and rotate the tenon on the mortise. The tenon will lightly burnish the mortise, leaving a mark to guide you. The goal is to achieve a tight enough fit so you can mount the lid on the base in order to turn both as a pair. If you accidentally make the mortise slightly too wide, place one layer of tissue paper between the lid and base. If one layer is insufficient and the lid is still loose, start over and make the base shorter.

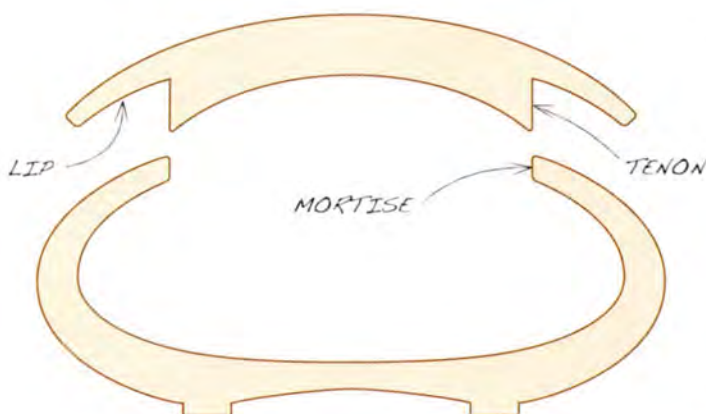
With the lid now securely in place, bring up the tail-stock with a flat-faced center, or use the center's normal point covered with a small piece of wood. Use the detail/



13 Turn a snug-fitting tenon on the remainder of the original blank in order to reverse-chuck the base.



14 Complete the underside of the base using the half-round scraper. Raise the scraper on edge, as shown here, to make the final finishing cuts.



spindle gouge to shape the outside of the lid first. I prefer a gentle low dome with a continuous curve (photo 8).

Cut a small chamfer on the lower edge of the lid's rim so you'll be able to lift the lid from the base when the box is complete. Shape the lid right up to the tailstock center. Slide away the tailstock and complete the final shape. Sand the outside of the lid to completion.

Set in with a parting tool to establish the height of the box – I usually make the visible portion of the base twice as tall as the lid – then start rounding towards the bottom and up to the rim of the lid. Remove the lid and refine the upper half of the base using very light cuts with a detail/spindle gouge (photo 9). When you're done, sand the outside of the base.

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Next, mount a Jacob's style chuck and a 1" Forstner bit in the lathe's tailstock. Drill to about ¾ of the final inside depth of the base (photo 10). Using a half-round scraper, hollow as much of the inside as you can reach, aiming for a wall thickness of ¼" or less (photo 11).

At some point, you will find there are areas that can only be worked with a bent scraper (photo 12). This tool can be aggressive, so work slowly. Strive to achieve the same wall thicknesses as elsewhere on the box. Take the inside to the final depth, then finish its surface – where possible – by shear scraping. (In shear scraping, the tool is held at

a 45° angle or higher and is tilted in the direction of the cut). Completely sand the inside.

Fine-tune the lid's fit; it should be just loose enough to come off by itself. (You shouldn't have to hold on to the base to remove the lid.) To do this, widen the mortise ever so slightly with a half-round scraper. In addition, refine the final shape and diameter of the lower edge of the base using a detail/spindle gouge. Sand this area, then part off the base.

Reverse Chuck the Base

There is one more crucial step in completing a well-turned box: Finishing its bottom. A good bottom should be turned smooth, not left rough or merely sanded smooth off the lathe. To do this, you'll use "reverse chucking", a process that holds a piece backwards, with its bottom facing out.

Turn a tenon to fit the base's mortise on the remainder of the original blank or on a new piece of wood (photo 13). The tenon should fit tight enough so the base doesn't spin when you turn it, but not so tight that you'll have to pry off the base when you're done.

Cut the bottom lightly with the half-round scraper. For this tool to work its best, form a small hook on its end with a burnisher and shear scrape (photo 14). I prefer making a bottom that has a slightly concave surface and a small rim about ¼" wide. Make the rim by light scraping with the skew chisel held parallel to the bottom face. Once you've completed this work, sand the bottom.

Apply a finish, then sit back and study the piece. Is it too tall? Too squat? Make some more and experiment with different diameters and proportions. Explore the possibilities of this wonderful form.

Alan is a turner, writer, demonstrator and instructor living near River Falls, Wis. For more information visit alanlacer.com.

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Right-Angle Jig

I find “tricked out” jigs a waste. More often than not they’re aggravating to work with and over-complicated. The best jigs are those that are simple to make and easy to use.

I have a short list of plywood jigs found in my shop, and this one is my favorite. I use it to assemble pieces, transfer dovetail pins and tails and much more (photo 1).

My right-angle jig has only four parts. The face and base pieces are equal in length and width, and the support pieces are made to fit. There’s enough width to keep large panels balanced and sufficient length to easily grab pieces with spring clamps. You can make it any size you want. Mine is large enough to hold panels, but it’s also small enough to perform other tasks.

On my jig, I have the base and face sized at 5½" wide x 20" in length (most furniture panels are 18" or less). To hold the parts at a true right angle, I attached a couple supports using two screws from each face. The supports are also plywood, and can fit flush with the edges of the other parts. Or not. As long as you hold the pieces at a right angle, it doesn’t matter. Also, the supports are a great place to store your spring clamps.

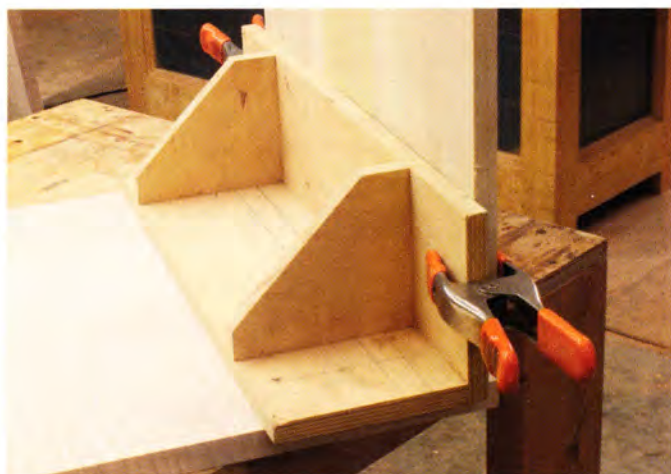
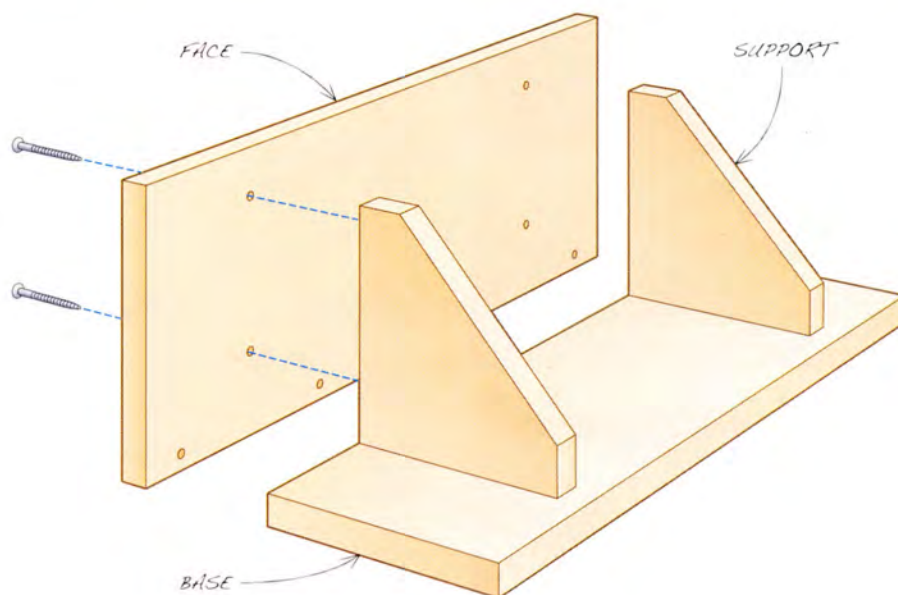
Holding panels, however, is not the only use for this jig. I’ve always been frustrated with the fences provided with most band saws. They’re fixed at 90° to the table and can’t be adjusted for blade drift. I always adjust for drift

before I rip or re-saw lumber, using this jig as my fence. By clamping the fence to the saw, I can set whatever angle is needed to compensate for drift (Photo 2).

I’ve also used my right-angle jig to stop the spread of feather-like shavings coming off my router table from being thrown around my shop. That alone is hardly a good reason to take the time to build the jig. It is, however, a nice added benefit.

A good jig has many uses, but you shouldn’t need an advanced degree to understand how it’s used. ■

Glen is editor of *American Woodworker* magazine. Contact him at glen.huey@americanwoodworker.com or (513)531-2690 x 11005



PHOTOGRAPHY: BY AUTHOR

1 I built my jig to hold panels as I transferred pins and tails while dovetailing. The jig proved way more valuable in the long run.



2 I also use the jig to compensate for blade drift at my band saw. With it clamped in position, you’re more apt to have straight cuts.

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