TAUNTON'S

Fine WoodWorking

Invisible fixes for 6 mistakes p. 30

Best block planes on the market

Perfect profiles on the router table

Make an old finish look like new

Flatten wide boards with hand tools

Ebony: Buying it, using it, and faking it

Get started with segmented turning

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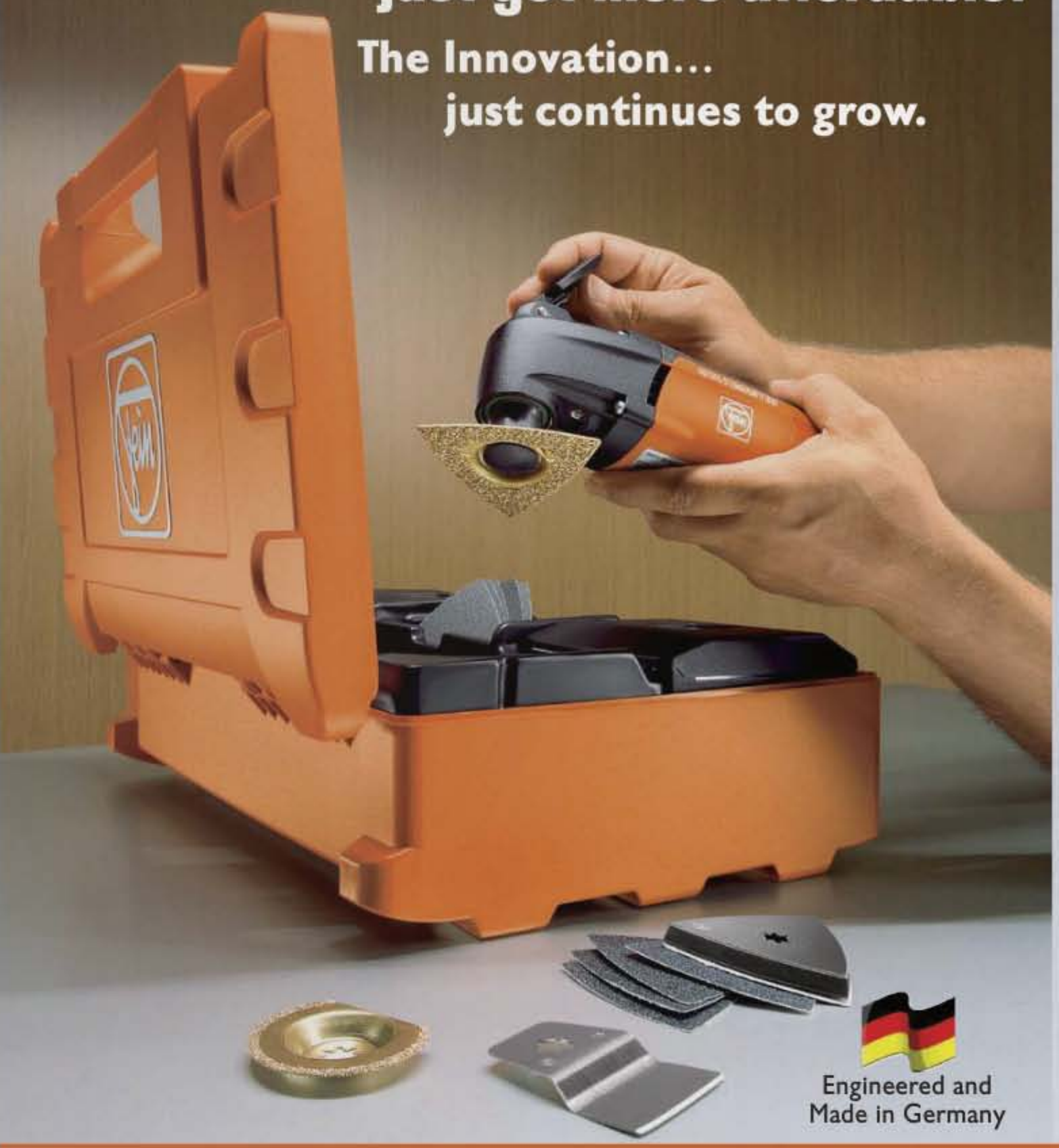

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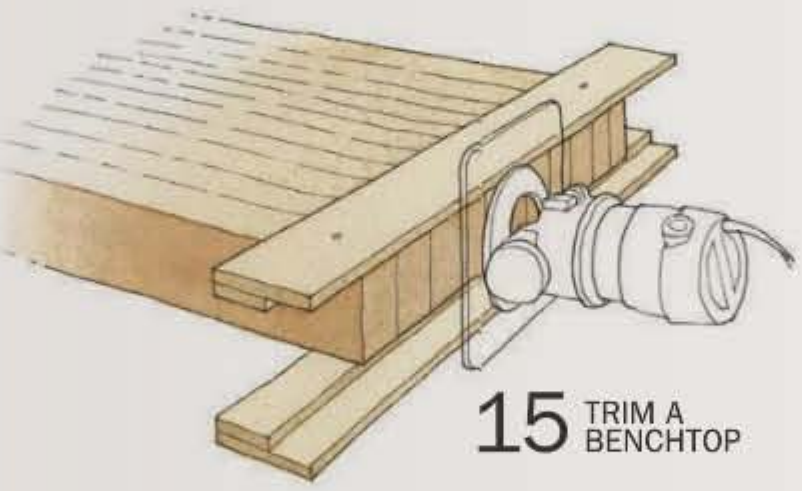

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The Taunton Press
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Cover photo: Michael Pekovich

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THIS MONTH ON FineWoodworking.com/extras

Visit our website to access free web tie-ins, available July 26. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.

VIDEO: What Can a Good Block Plane Do for You?

The humble block plane (pp. 38–43) is as versatile as it is small. Learn how to harness the full potential of this workshop workhorse.

He Nails It

The work of furniture maker Peter Sandback (back cover) proves that you don't need fancy materials to produce stunning inlays. Sandback's creative use of aluminum nails challenges conventional woodworking wisdom. Learn how he does it in a brand-new audio slide show.

VIDEO: Mistakes Happen

All woodworkers make mistakes. What separates a great craftsman from a good one, however, is knowing how to fix what went wrong (pp. 30–37). Learn a few of the editors' favorite tips and tricks.

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VIDEO

Fast Fix: Plywood Edging

Instead of cutting and applying strips of solid wood, learn how to use the sheet goods in front of you to obtain a perfect grain and color match. Plus, browse our entire library of Fast Fix video tips, including:

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- **Leg Tapering Jig**
- **Router Jig for Breadboard Ends**

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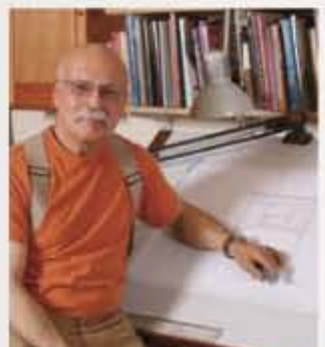
contributors

It's no accident that Art Breese (*"Secrets of Segmented Turning"*) ended up in a corner of the woodworking world that involves lots of clever fixtures and problem-solving. As a young man, he served an apprenticeship as a jig and tool designer in his native Wales, while also attending college to get a degree in mechanical engineering. After working as an engineer for many years, mostly in California, he moved to Sun City West, a huge retirement community near Phoenix. When he tired of golf, he discovered the mammoth, state-of-the-art woodshop and machine shop there, where Breese and his buddies now crank out segmented turnings of all kinds. Their wives call it "adult day care." For a look at this wonderful community shop, go to FineWoodworking.com/extras.



Mario Rodriguez (*"Block Planes"*) started working wood more than 30 years ago, after a four-year apprenticeship with the Carpenters and Cabinetmakers Union in New York City. After a few years toiling for others, he opened a shop in Brooklyn, where he worked on projects from furniture pieces to architectural millwork and cabinetry. His teaching career spans two decades and a number of well-known schools, but he now hangs his shingle outside the Philadelphia Furniture Workshop.

Best advice for new woodworkers? "Never be afraid to fail."

Garrett Hack (*"Ebony, the Dark Knight of Details"*) is one of the most widely traveled woodworkers we know, teaching in Europe, Japan, and all over the United States. His main passion, however, is collaborating with a client on a piece, which he says is often the catalyst for his most beautiful and satisfying work. He also enjoys tending his farm in Vermont.

Why do you prefer your horse over your tractor? "Jazz works as quietly and smoothly as a well-tuned hand tool (most of the time), while my 50-year-old International is a heavy, cast-iron brute."

If you've seen any of the online videos produced by **David Moore** (*Handwork: "Milling Large Slabs"*), you'll have no trouble believing that film-making is his second love, right behind furniture making. Like woodworking, he has been making movies since childhood. His aim is "to capture the feeling and the thrill of any activity through the lens of a camera." You can see some of his innovative how-to videos at FineWoodworking.com and others on YouTube.

Something you love about your shop? "Everything is in its place. It has character and reflects who I am."

For more information on our contributors, go to FineWoodworking.com/authors.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

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letters

From the Editor

IN THE SHOP OR IN THE CAR, TUNE IN TO *SHOP TALK LIVE*

I like listening to my iPod when I'm in the shop. Not all the time, of course, but the truth is that many woodworking tasks are repetitive and even mundane (hello, sanding). That's why so many people have a stereo or a boom box in their workspace.

I have one of those, too, but I prefer the iPod. The earbuds can stay in whether I'm milling stacks of boards with earmuffs on, or whittling a pile of pegs at the bench, and I just run the wire inside my shirt to keep it out of the way.

I tend to listen to mellow music (or nothing at all) when I need to concentrate, and podcasts when I don't. If you aren't familiar with this Internet phenomenon, podcasts are the new radio. You download them from iTunes onto your smart phone or iPod, and then listen at your leisure. The daily commute is prime-time for podcasts, but they are also great for mowing the lawn, vacuuming, and lots of other mindless jobs. There are excellent podcasts on all sorts of topics, from news to sports to hobbies, almost all free.

And now there's one starring your favorite woodworking editors. A few months ago, we launched *Shop Talk Live* (it's not exactly live, but it is shop talk). We field questions from the audience, talk to visiting authors, argue, and just generally crack wise. The idea is to let our (remaining) hair down and have fun, while giving out some good info along the way.

You'll find *Shop Talk Live* on iTunes, or you can go to Finewoodworking.com/blog/shop-talk-live to stream the broadcast on your computer. We post a new episode every two weeks.

—Asa Christiana

Crosscut sled raises safety concerns

About 10 years ago, my left thumb met my moving tablesaw blade. I had thought it was time to finish for the day but decided to do five more cuts. It was the fifth. I am fortunate to still have the digit but it was a powerful lesson. Your recent article, "Foolproof Crosscut Sleds" (*FWW* #227), clearly lays out the steps to build the sled but does not address any of the safety concerns. The most critical is that when cutting thick stock, the blade comes through the rear fence at the end of the cut, right where you might place your hands to push the sled. This risk can be eliminated by fixing a solid block to the back of the rear fence, where the blade will bury itself safely.

—CHRIS WADLEY, Brantford, Ont., Canada

***Hear today.** We should have insisted on hearing protection when we took this photo of Alan Turner.*

Editor replies: *Great tip, Chris. We attach a hollow plywood box to the back of the sleds in the* FWW *shop to serve the same purpose. Other woodworkers mark or paint a bright stripe on the rear fence where the blade passes through, as a warning not to place their hands there.*

I would like to thank Mr. Turner for his article. It has inspired me to finally build my own crosscut sled. However, he is shown wearing a long-sleeve shirt with the cuffs rolled up a bit and hanging below his arm as he operates the sled. Long sleeves and loose clothing have no place in a woodshop with power tools. It also appears that Mr. Turner is not wearing any hearing protection.

—LARRY DICKSON, Newark, Ill.

Editor replies: *We work hard to strike a balance between showing real woodworkers in real shops and demonstrating uncompromising safety practices for a broad audience, but we got it wrong this time. While we might be able to defend the long sleeves for the particular operation Alan Turner was doing, we can't defend the lack of hearing protection. For the record, he says his saw "isn't noisy," so he doesn't wear ear protection there, but he does for lots of other operations. Still, many tablesaws are noisy enough to cause hearing damage, especially when combined with dust collection, and we should have talked him into a pair of muffs or plugs.*

Dado jig needs the router's guide bushing aligned perfectly

I enjoyed the article "Dado Jig is a Cut Above" (*FWW* #226). The valuable feature of the jig is the fact that the width of the dado is automatically the width of the shelf that is used to set it up, relying on the precise offset between a specific bit and guide bushing. The jig will work well until the router is needed for another job. Afterward, to use the router again

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with the jig, the guide bushing needs to be placed in exactly the same position as before, normally exactly centered on the axis of the bit. If not, the router will remove a little material from the lower rail of the jig, which ultimately will ruin the fit of the shelf. Here's the trouble. In the case of the Porter-Cable router shown in the article, the plate that holds the guide bushing fastens to the router base with three screws, and there is more than 1/16 in. of play in its positioning.

—KEN WAGNER, South Pasadena, Calif.

Editor replies: *We should have pointed out that very important fact in the article. Here's the solution. Get a centering cone for your router. They are cheap and widely available. You insert the template guide bushing (and its mounting plate, on some routers), chuck the shaft in the router collet, and then plunge the base to engage the cone in the bushing. This centers the bushing perfectly as you tighten the mounting plate. Some manufacturers include these cones in their router kits.*

Clever cone. *You chuck a centering cone in your router as shown, and then release the plunge base to engage the cone and align the template guide. (On this router, you loosen the whole baseplate to align the guide.)*

Add-on riving knife got a bad rap

A recent clarification on the Letters page (*FWW* #226) said that the Bork aftermarket riving knife add-on caused *FWW* editors to "pause," due to its overall design and the requirement that the purchaser sign a waiver. I helped to upgrade the Delta Unisaw at my retirement community's woodshop with the Bork Bolt-On Ripping Knife ($110 at TheBorkStore.com) and the Bork Dust-Collecting Blade Cover ($130). They both work well, and cost far less than a brand-new saw with a riving knife. The only recommendation I have for the manufacturer is to make the riving knife out of steel instead of aluminum, and/or back up the bolt attachment with fender washers against each face for more lateral stability. The installation instructions are not all that clear, but with two engineers working on it, we managed fine. Last, the Bork universal riving knife add-on is the product of two years of development by an individual entrepreneur working in his own shop, not a large company backed by an in-house legal department, and the product sells for barely more than the cost of the materials and labor involved in making it. As such, the liability waiver is understandable.

—ROBERT A. CHAGNON, Greenville, Del.

Corrections on two recent tool tests

The winner of "Bench Grinders for Woodworkers" (*FWW* #226), the Porter-Cable PCB575BG, is available at Lowes stores and Lowes.com with a 36-grit wheel and a 60-grit wheel (not 120-grit as cited). This is even better news for woodworkers, as a medium-grit wheel is best for grinding tool steel.

Dust separators do a great job at collecting fine particles before they can reach a shop vacuum's filter, thus keeping the filter unclogged and greatly improving airflow/suction. When we last tested them, however (*FWW* #223), our brief writeup left a number of false impressions about the Oneida Dust Deputy, implying that it is not mobile (the $79 Deluxe Kit includes casters) and that its inlet and outlet will not fit larger vac hoses (its tapered design fits a variety of hoses, including the larger standard 2¼-in.-dia. size). Also, while we gave the Dust Deputy credit for capturing more of the fine dust than its competitors, we underestimated the impact that would have on the filter over the longer haul, in terms of keeping it cleaner and maintaining airflow.

My scraper finally works, thanks to Mike Pekovich

The latest issue (*FWW* #227) arrived today. I immediately read the article on card scraper sharpening. I then went to my shop, made the blade holder, and followed Mr. Pekovich's instructions. Within a matter of minutes, I was making fine curly shavings on red oak. I have fussed with sharpening card scrapers for years. Now I can sharpen one that really cuts. Thanks for a fine and useful article.

—LYNN BARTLETT, Tulsa, Okla.

About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't perform operations you learn about here (or elsewhere) until you're certain they are safe for you. If something about an operation doesn't feel right, find another way. We want you to enjoy the craft, so please keep safety foremost in your mind.

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methods of work

EDITED AND DRAWN BY JIM RICHEY

Best Tip Boom arm for a shop vacuum

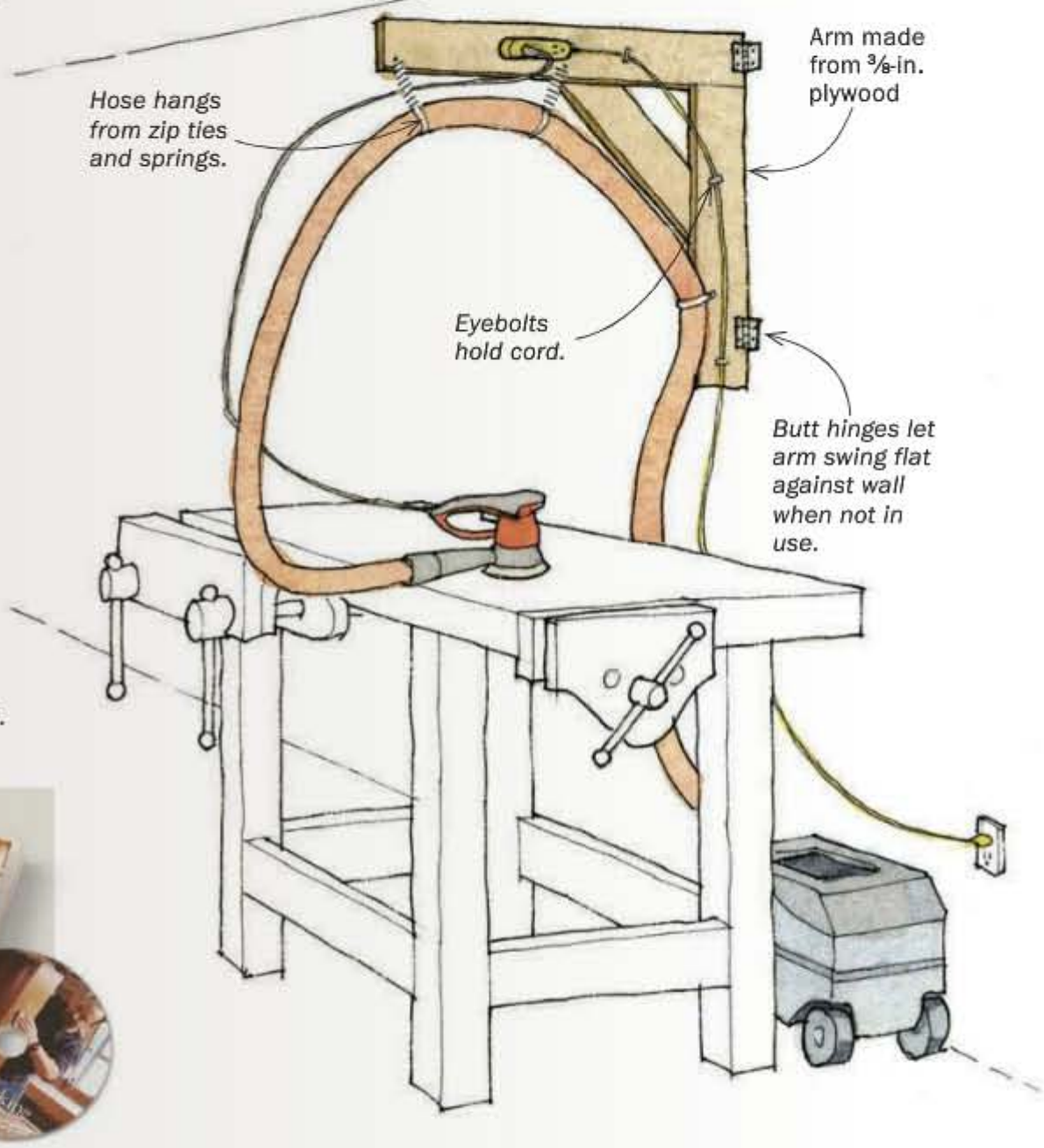
Dyami Plotke has spent much of the last four years outfitting his garage shop at his home on Long Island. He blogs about woodworking at penultimatewood shop.blogspot.com.

To help keep my bench clean, I built this boom arm that lets me reach every corner of the work surface with a vacuum hose while keeping the hose up and out of the way.

I made the arm from scrap ⅜-in. plywood and mounted it to the wall with butt hinges. I attached the vacuum hose and an electrical extension cord with small eyebolts screwed into the side. For the vacuum hose, I installed springs between the hose and the boom arm to allow added play. All of the connections were made with plastic tie-wraps.

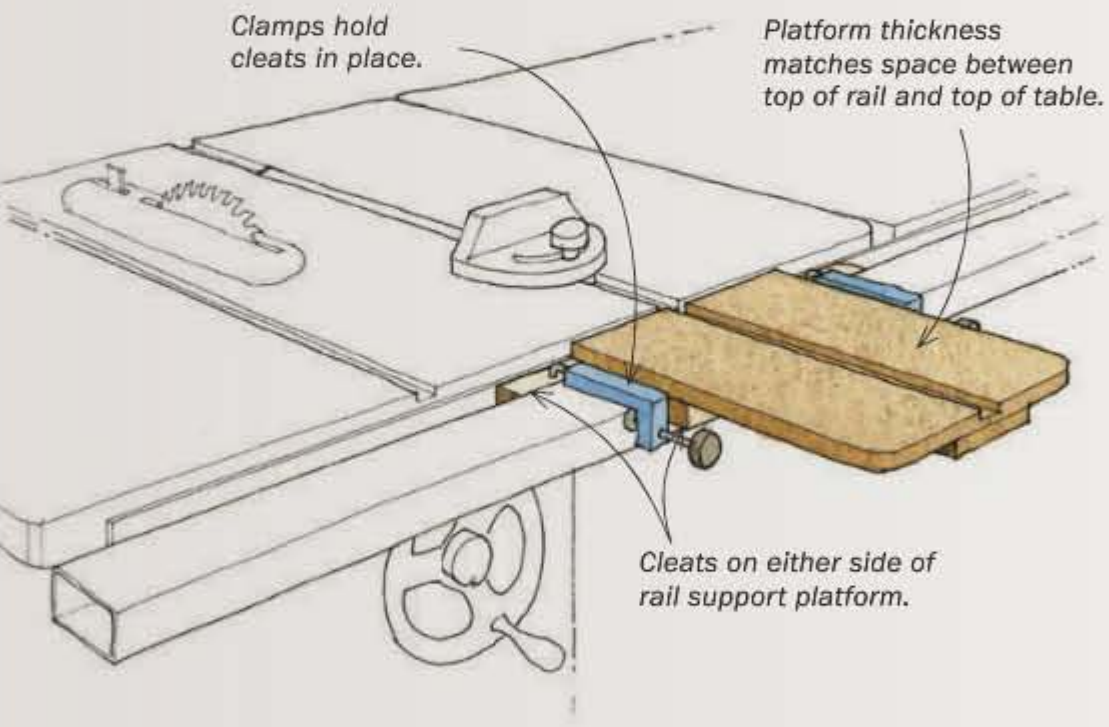
When not in use, the boom arm folds against the wall while the hose and cord drop behind my bench.

—DYAMI PLOTKE, Islip, N.Y.



A Reward for the Best Tip

Send your original tips to fwmow@taunton.com or to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470. We pay $100 for a published tip with illustrations; $50 for one without. The prize for this issue's best tip is a *Fine Woodworking* DVD archive.



Extend a tablesaw's miter-gauge slot

There are times when the tablesaw's miter-gauge slot is too short for the job at hand. This is especially true when using a large crosscut sled. This attachment extends the slot on the front edge of the saw, supporting the miter gauge or crosscut sled out past the front of the table to make a wide cut.

The fixture consists of a slotted plywood platform, two cleats that straddle the rip-fence rail, and two universal fence clamps (available at Rockler and other suppliers) that fasten the fixture to the saw. Make the platform's thickness match the gap between the top of the rip-fence rail and the top of the table. Cut the miter-gauge slot into the plywood, taking care to match the width and depth of the slot in your saw table. If needed, add a reinforcement strip to the bottom of the platform. Drill two ⅜-in. holes in the front cleat to attach the fence clamps, which tighten on the rip-fence rail.

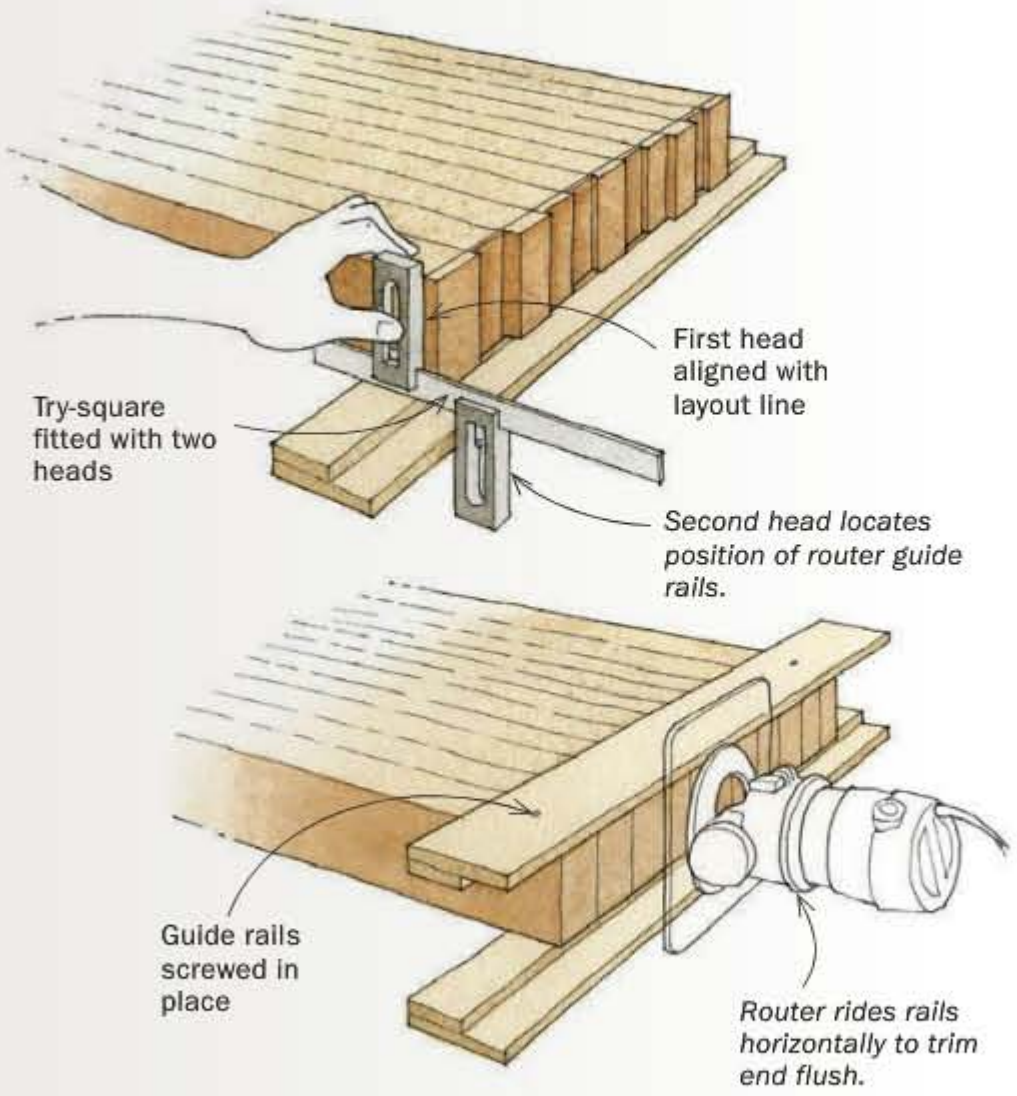
—DAN SWEENY, Naples, Fla.

Trimming the ends of a benchtop

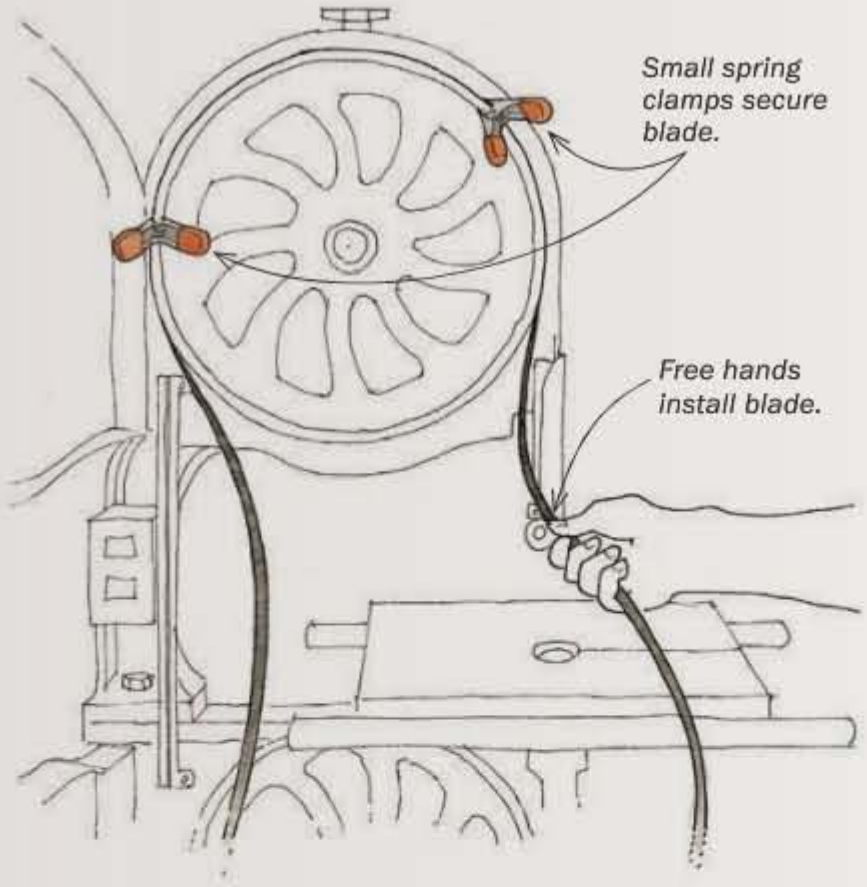
I needed to trim the ends of a 300-lb., 4-in.-thick oak workbench top. A circular saw wouldn't handle the thickness and pushing the heavy workpiece across my bandsaw would be dangerous. So I decided to set up two parallel rails and use a router across the end to trim it level.

I started by penciling a trim line around the end of the workpiece. To make the idea work, I needed to attach two rails to the outside edges of the workpiece that were parallel to the layout line and each other. The rails needed to be offset horizontally as well as vertically, and on opposite sides of the workpiece. I accomplished this using two Lee Valley Precision Machinist Squares. I put both heads on one rule, lining up one head with the layout line and the other with the desired fence height. This created a clear reference for setting the rail's height. Repeating this offset at each end of the rail gave me perfect parallel alignment at the right offset. With an auxiliary base attached to the router, it was then easy to flatten the end of the workbench in small, incremental passes.

—JOSEPH SCANNELL, Novato, Calif.



Extra hands when changing a bandsaw blade



When I change a blade on my bandsaw, it's like wrestling snakes. I always need one more hand than I have. So I bought two small clamps and use them to hold the blade on the top wheel while I maneuver it between the guides and around the lower wheel. This simple tip has cut my blade-changing time by two thirds.

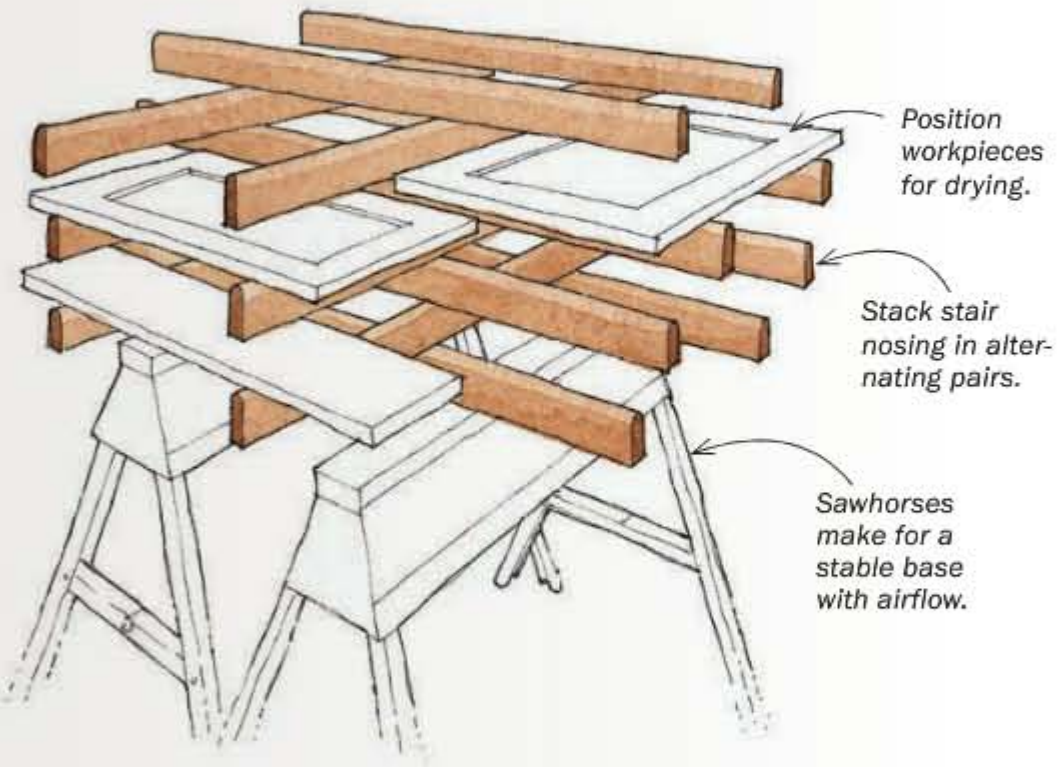
—BRUCE CYNAR, Leo, Ind.

A way-too-simple drying rack

The drying rack I use when finishing is simple and cheap, and it knocks down for storage. I make it from 4-ft.-long leftover stair nosings stacked up in a tic-tac-toe configuration. The arrangement shown in the sketch will hold about 15 cabinet doors.

All four sides are easily accessible for placing or removing the finished doors. The arrangement looks shaky but is actually quite stable and the more weight is added the more stable it becomes. Just be careful on the top tier to place the first door in the center. The weight of the oak sticks is sufficient to allow the placement of a single door anywhere, but I suggest starting at the bottom. Since I will spray cabinet doors about twice, maybe three times a year, I keep the sticks up in the rafters, off the floor, out of sight. I have about 30 or so and I'm not throwing them out.

—DAVID KALIN, Kaneohe, Hawaii

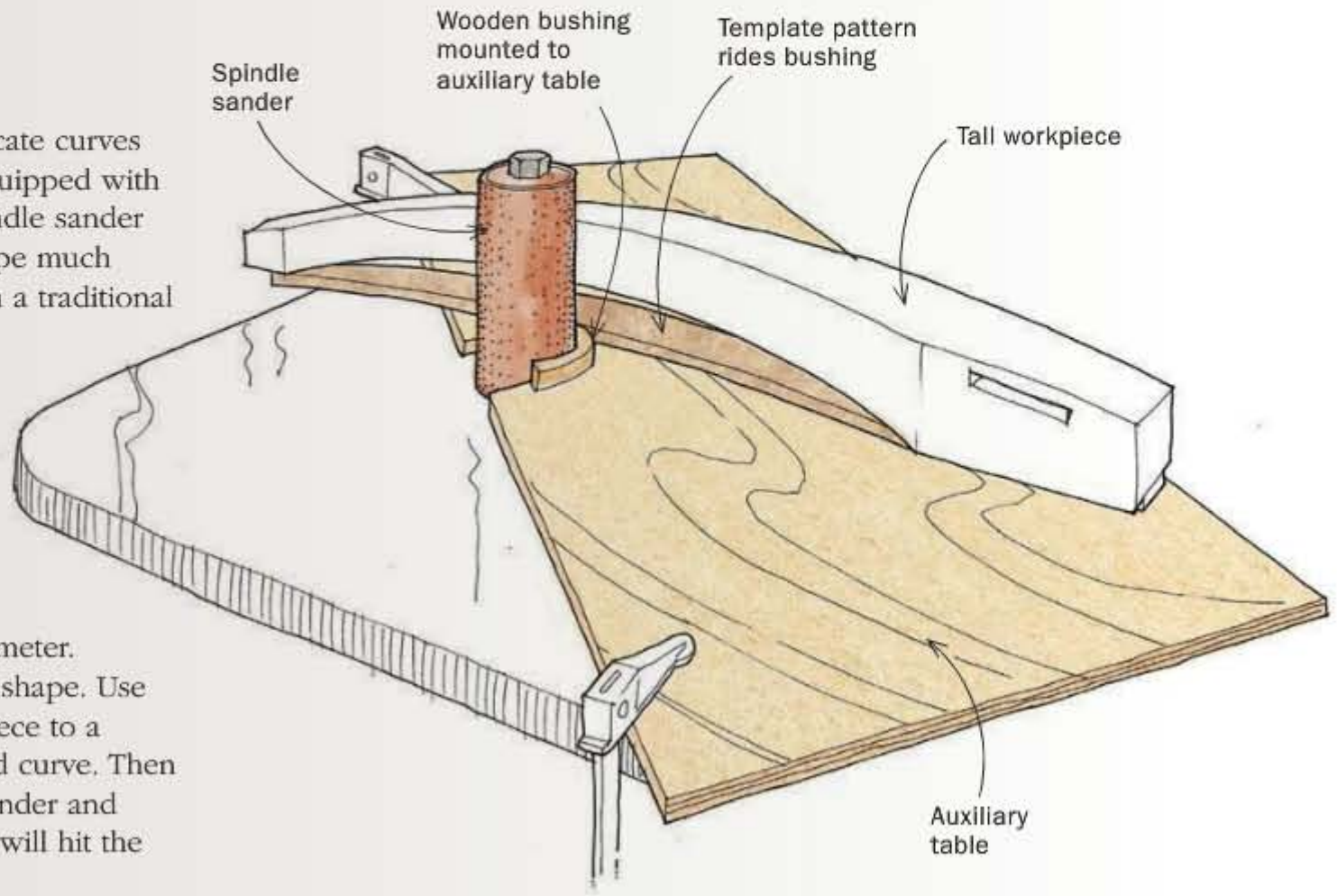


Make duplicate curves with a spindle sander

A spindle sander can be used to duplicate curves with crisp edges, similar to a router equipped with a flush-trimming bit. However, the spindle sander is longer than a router bit and can shape much larger workpieces than is possible with a traditional template and router combination.

To use a spindle sander for pattern sanding, make an auxiliary table for the sander and attach a half-circle wooden bushing to it. Don't be too precious about the bushing. It just needs to wrap around the spindle without touching it and be as smooth and even as possible on its outside diameter. Now bandsaw the workpiece to rough shape. Use double-sided tape to attach the workpiece to a template cut in the shape of the desired curve. Then push the workpiece into the spindle sander and move across the spindle. The template will hit the bushing when the shaping is finished.

—MIKE TUCKER, Oakland, Calif.



■ POWER TOOLS

Trim-router kit gives you more for the money

Compact Router Kit from Makita
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The Home Depot

MAKITA HAS JOINED THE RANKS of power-tool makers that sell larger trim routers that offer more utility for woodworkers. The kit comes with a variable speed, ¼-in.-collet router motor (1¼ hp), and multiple bases, which are easily swapped out, thanks to a quick-release lever. It also comes with an edge guide, a roller guide for flush-trimming veneer on curves, template guides, and a couple of dust shrouds.

The fixed base was comfortable to use and allows for smooth and precise bit-height adjustment. A dust shroud for the fixed base goes on and off easily. Overall, dust collection was good, except when the bit is exposed and the chips can fly out underneath. The plunge base was comfortable to use and easy to control, with a three-step turret system that is very intuitive. The kit also includes a helpful bar-style handle that can be fastened to the offset base to better control the router for edge-profiling and flush-trimming.

The Makita isn't big or powerful enough to handle the larger bits required for deep mortising or big, complex moldings, and I wish it had an LED light. But it will tackle most handheld routing jobs in a typical woodworking shop. It is a powerful, versatile trim router, and with all the accessories that are included, a great router for someone getting started.

—Gregory Paolini is a furniture maker and teacher (gregorypaolini.com).

Liftoff and landing. *The levers lift loads easily by foot, but heavy loads are tough to release in the same way. You may be tempted to try it by hand, but the levers snap up under heavy pressure. It's safer in these cases to use a board (right).*

■ ACCESSORIES

Heavy-duty casters mobilize any bench

Workbench Caster Kit from Rockler
$80
Rockler.com

MY MAIN WORKBENCH IS A HEAVY BEAST with a couple of vises mounted topside, and a bench grinder and a bunch of other tools stored on the lower shelf. I frequently need to free up assembly space in my small shop, and dragging the bench across the floor is more than one man can muster. I needed a better way.

Locking casters weren't a solution, as they often allow the bench to slide across the floor as I do heavy work up top, like handplaning boards. But with Rockler's new workbench caster kit, I can lift the bench via the foot-bracket, or lever, on the casters, roll it to a new spot, and then drop it down. The bench doesn't sit permanently on the wheels, so it stays put. The 2⅜-in.-dia. urethane casters are rated for 100 lb. each and are large enough that they won't get easily stopped by floor debris.

If you often need to move your bench, say if you work in a garage shop, these casters are a life (and back) saver.

—Roland Johnson, contributing editor and avid gearhead, is still trying to figure out how to motorize his workbench.

Photos, except where noted: staff; this page (bottom left): Roland Johnson

■ ACCESSORIES

Steam-bending kits open the door to curved work

STEAM-BENDING WOOD WAS A CAREER-CHANGING revelation for me. It's easier than bent-lamination, and the continuous-grain pieces are stronger than sawn curves.

Many species, especially when green or air-dried, bend with ease when heat is introduced, and the box that holds the wood (and steam) can be a surprisingly modest affair (plans are included in the Rockler kit and on their website, and you can also find plans in *FWW* #195, p. 106). The trick is finding a quality source of steam. The new steam kits from Rockler and Woodcraft have many advantages. They are relatively cheap and portable; they produce steam quickly (about 30 minutes) and have more than enough capacity (5 liters) for most bending jobs; the water level is clearly visible; and there is an automatic shutoff if you let the water level drop too low.

Steam Bending Kit from Rockler
$90
Rockler.com

Earlex Steam Generator for Bending Wood
$70
Woodcraft.com

My only criticism of the kits is that the hoses are too long and if uncoiled will cause some minor heat loss on the way to the box. To get around this, I coiled the excess tightly and wrapped it in a towel.

The kits are identical, except for the color of the reservoir, and both are simple and safe to use. So I'd go for the less-expensive model: the Earlex.

—Peter Galbert is a Windsor-chair maker in Princeton, Mass.

Curves on the cheap. *With these simple units, you can get into steam-bending for under $100, including the cost of materials to make the steam-box.*

Silicone Glue Brush
$4
Rockler.com

■ ACCESSORIES

The last glue brush you'll ever need?

ROCKLER'S NEW GLUE BRUSH FEATURES nonstick silicone bristles. It's super easy to clean, and if you forget to clean it after an exhausting glue-up, no worries. You can simply peel off the dried glue from the bristles.

The tapered bristles spread yellow glue evenly, and don't leave any hairs behind, unlike the cheap glue brushes you can buy at the hardware store. The paddle on the end of the handle is for spreading glue in tight spots, like inside mortises or on the sides of dovetails.

At about 1 in. wide and ½ in. thick, the brush is great for wide surfaces and joints, but it took some finagling to use it in narrow dadoes (¼ in.) for a small shelf I was making. I asked a Rockler rep if they will be selling different-size replacement tips for the brushes. They said they'd be "offering additional silicone accessories," but declined to elaborate. I'm hopeful, because different-size brushes would cement this as the ultimate tool for glue-ups.

—Tom McKenna is a senior editor.

No cleanup necessary. *Dried glue peels off the nonstick silicone bristles easily and cleanly.*

Don't overlook liquid hide glue

BOTTLED VERSION IS STRONG AND EASY TO USE

BY STEVE LATTA

Like an Indiana Jones adventure, the recorded history of hide glue begins in an ancient tomb. Deep inside Egypt's Valley of the Kings burial complex, archaeologists early last century unearthed wall art depicting tradesmen cooking the glue and using it to apply veneer. This, along with furniture found inside the funeral chambers, confirms that hide glue has been in use for thousands of years.

Before Titebond. *This scene of craftsmen using hide glue was found in the tomb of Rekhmire, an Egyptian governor buried about 3,500 years ago.*

For most of that time, working with hide glue meant mixing it yourself and heating it all day to keep it liquified. But since the 1930s, we've had the option of using bottled hide glue that stays liquid at room temperature. Liquid hide glue offers several other advantages for beginner and veteran alike, helping to reduce the stress of assembly and finishing while matching more modern glues for strength. Liquid hide glue doesn't promise the adventure of an archaeological discovery, but—honestly—who wants assembly to be an adventure?

Strong, stress-free glue-ups

Before we go any further, a little myth-busting: Hide glue is plenty strong. A

READY TO GO AT ROOM TEMPERATURE

Liquid hide glue has been available since the 1930s. While not used as often as yellow or white woodworking glues, liquid hide glue offers a unique set of working properties that make it a smart choice in many situations. It sets slowly, cleans up easily, and forms a strong, rigid bond.

Cookware for the shop. *A glue pot holds its contents at about 140°. The dry glue granules are sold in varying strengths by most woodworking retailers.*

Some like it hot

I can't write about liquid hide glue without mentioning its much older brother, hot hide glue. Unlike bottled hide glue, the hot type has a very short open time, with a fast bond that makes it possible to apply veneer even on curved work without a veneer press or vacuum bag. This quick tack also lets you attach pieces like glue blocks or cleats with a simple "rub joint" that requires no clamps at all.

Veneer without clamps. *The glue quickly holds the veneer flat against its substrate with simple firm pressure from a veneering hammer.*

3 strengths

SETS SLOWLY

Tricky glue-up? Take your time. *Liquid hide glue's long open time makes it ideal for assemblies in which there are many glue surfaces or joints to bring together and square. It is also more slippery than other glues, making assembly easier.*

2007 *FWW* test (How Strong is Your Glue?, *FWW* #192) found liquid hide glue to be only slightly weaker than more commonly used yellow PVA glue, with both being much stronger than the wood itself. More recently, the folks at Franklin International (makers of Titebond) told me their liquid hide glue equals their yellow glue in strength and outperforms their white glue.

So, how is liquid hide glue different? For starters, it stays workable longer after you apply it. This extended "open time" can be a lifesaver, giving you 20 minutes or more to realign parts and fully seat joints before the glue locks everything in place. You can check that aprons are flush with the tops of table legs, that edge-glued boards are lined up, that drawers are square. And you can breathe normally while doing so. The flipside is that your assembly will be in clamps longer (I allow at least an hour), but that's a small price to pay for peace of mind.

CLEANS UP EASILY

Squeeze-out is no problem. *A warm, damp rag removes the glue easily (far right). If you miss any, the same technique will also remove dried glue.*

FORMS A RIGID BOND

Great for small veneering jobs. *Liquid hide glue forms a rigid bond that won't creep over time. This tendency in other glues can cause veneer joints to fail over time.*

For cleanup or repairs, add water

Using hide glue will also make it easier to get your project ready for a finish. You can remove squeeze-out—even after it has cured—with a warm, damp rag. Yellow glue is harder to remove when wet and, when cured, must be chiseled, scraped, or sanded away. Any that remains will be more visible under a finish than hide glue will. The glue's weak resistance to heat and moisture also makes it possible to loosen or reverse the adhesive bond, if you have to, for making repairs. Also, the glue will bond to itself,

Photos, except where noted: staff; facing page (top left): Erich Lessing/Art Resource, NY

meaning the old glue doesn't need to be scraped away first. Instrument makers and furniture restorers take advantage of these traits, as veneer and some joints allow good access to the glueline. But mortise-and-tenon joints, for example, are not so easy to loosen, so repairs are still a last resort.

The bond won't creep away

Liquid hide glue is also a good choice for laminations and veneer work, in part because it forms a rigid bond. Yellow glue, even after it has cured, remains slightly elastic, allowing laminated parts to slowly slide out of alignment with one another. The damage from this "cold creep" can be dramatic: I've seen Queen Anne chairs on which the laminated back splats crept so much that they ripped the crest rail right off the legs. Modern plastic resins may be more practical for larger tasks, but for small jobs such as veneering doors or drawer fronts, or bent laminations with gentle curves, liquid hide glue works great and is easy to use. □

Contributing editor Steve Latta teaches at Thaddeus Stevens College of Technology in Lancaster, Pa.

VS. YELLOW GLUE

Hide glue weakens when exposed to moisture, and it spoils more quickly than yellow glue, with a shelf life of about one year. Keep it in a cool, dry place to maximize its life. Apart from those weaknesses, it performs as well as or better than its more modern counterpart.

	PVA GLUE	LIQUID HIDE GLUE
Strength	X	X
Open time		X
Moisture and heat resistance	X	
Cleanup		X
Reversibility		X
Laminations/veneering		X
Shelf life	X	

Surface a large slab

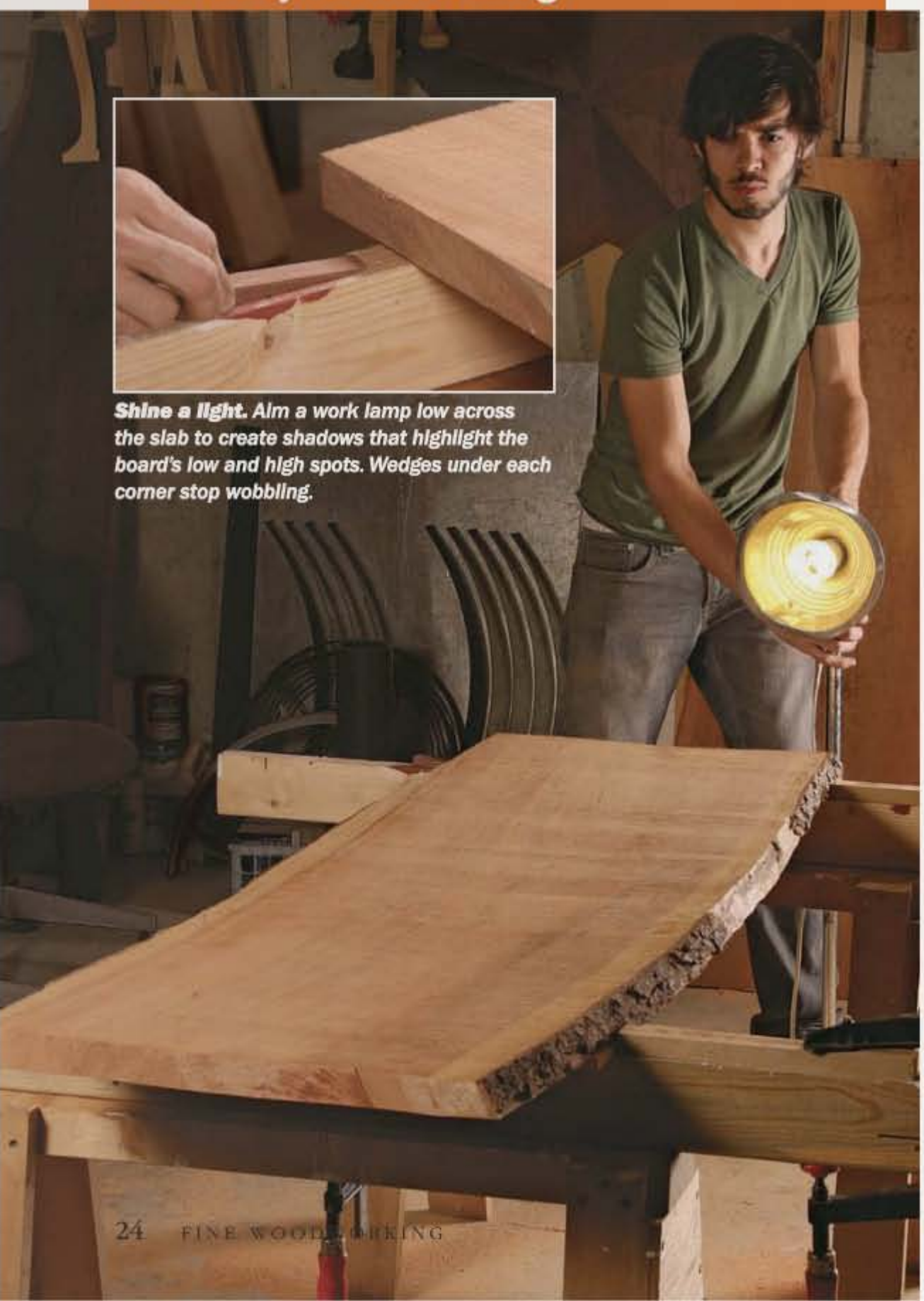
USE HANDPLANES TO FLATTEN AND THICKNESS BEAUTIFUL WIDE BOARDS

BY DAVID MOORE

For a recent dining table commission, I went looking for sources of wide lumber. Frustrated by the selection in the lumberyards, I sought advice from members of my local woodworkers guild and, in the process, tapped into a rich vein. My friends had their ears to the ground, and they pointed me to sources that don't advertise, such as part-time log dealers and hobbyist millwrights cutting slabs from downed street trees and yard trees. Suddenly, I had an array of beautiful, wide boards to choose from.

But then I faced a problem—how was I to work these boards when my machines weren't big enough?

Get ready for flattening



Shine a light. *Aim a work lamp low across the slab to create shadows that highlight the board's low and high spots. Wedges under each corner stop wobbling.*

Check for twist. *Winding sticks—a pair of matched wood or metal straightedges—reveal any twist from one end of a board to the other. Sight across the top of the sticks.*

Circle your targets. *Mark the high spots with pencil scribbles. In addition to the winding sticks, lay a long straightedge along the surface in various places.*

Photos: Steve Scott

Flatten one face

START WITH THE SCRUB PLANE

Designed for heavy cutting, the scrub's narrow, severely cambered iron excels at removing material quickly. Moore's version is a converted rabbet plane from ECE Primus.

My answer was to flatten and thickness them with handplanes. This takes practice and elbow grease, and it calls on many skills. But the rewards are great: You'll grow as a woodworker, and you'll be creating furniture with beautiful, one-of-a-kind boards.

Get ready for a workout

To flatten and thickness stock, you'll need a long straightedge, a pair of winding sticks, a combination square, a scrub plane, a jack plane, a jointer plane, and a smoothing plane. I use metal winding sticks, but you can make a pair from any straight, stable hardwood (see Fundamentals, *FWW* #177).

You also will want a work surface other than your bench, which likely is too tall for this task. Setting the slab on a pair of low sawhorses instead makes it easier to reach across the board's full width. It also lets you lean more heavily into each planing stroke, delivering more power from your legs and back without sacrificing downward pressure or control.

I stand just under 6 ft. and find a work height around 28 in. ideal for this task. If I tried to do the work at my 37-in.-high bench, my arms would be Jell-O in minutes. Finding the right height may take some trial and error, but what matters most is what is comfortable and sustainable for long periods.

Weight the sawhorses with sandbags and place wedges under the slab to hold it still. Keep a work lamp nearby to shine across the board at a low angle. This will create shadows that make plain the high and low spots.

When flattening, be sure to scrub first

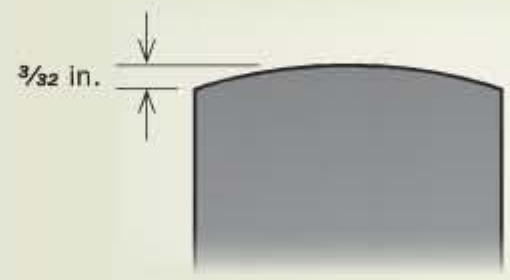
The first stop in any milling job is to flatten one face as a reference for bringing the board to uniform thickness. The same is true here. Start by

Level the high spots. *The scrub plane is designed for heavy stock removal. It makes deep, fluted tracks and thick, brittle chips.*

Check your progress with the straightedge. *There is no reference line against which to gauge your work, so you'll need to take repeated sightings with the winding sticks and long straightedge.*

Grind a steep curve into a scrub-plane blade

Moore grinds back the corners on his scrub-plane iron by 3⁄32 in. Pivot the blade as you work the edge to establish the radius.



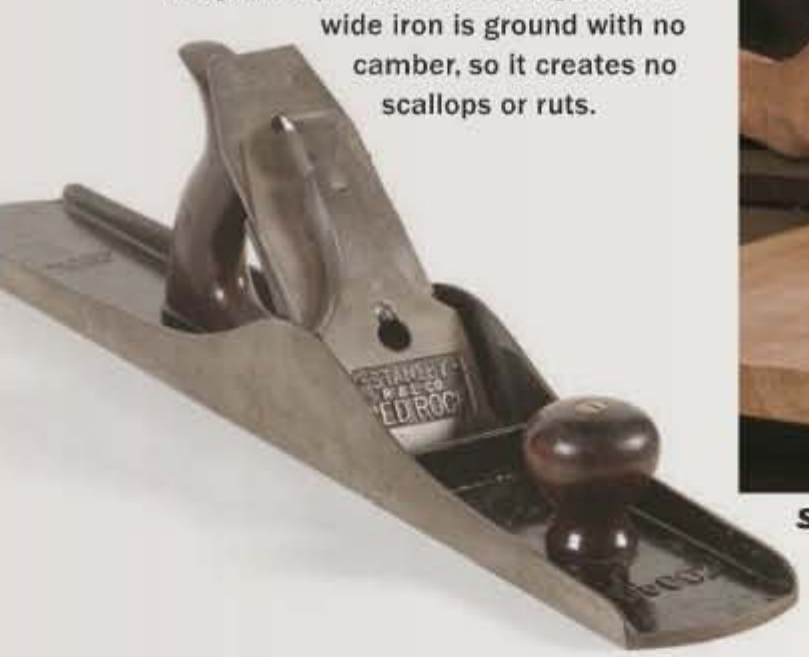
Flatten one face continued

SWITCH TO THE JACK

The jack plane cuts aggressively, too. Its wider iron is also cambered but less severely than the scrub, with the corners ground back just 1/32 in.

Refining the surface. *The jack's wider, shallower cut levels the ridges left between the scrub plane's ruts. Work across the grain and diagonally.*

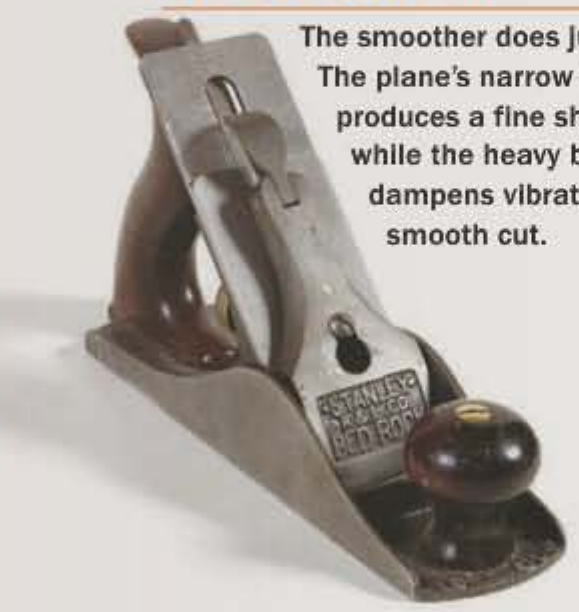
FLATTEN WITH THE JOINTER



The jointer plane makes things flat. Its wide iron is ground with no camber, so it creates no scallops or ruts.

Start across the grain. *Change directions as needed. The plane's long sole will find any remaining high spots, bridging the valleys that a shorter plane would follow and deepen.*

FINISH WITH THE SMOOTHER



The smoother does just that. The plane's narrow throat produces a fine shaving while the heavy body dampens vibrations for a smooth cut.

Tackle tearout. *Working in all directions, remove whisper-thin layers from the entire slab until the tearout is trimmed away, leaving a dead-flat, glassy surface.*

carefully examining the surface using the straightedge and winding sticks, marking the high spots with chalk or pencil. Often, a board is twisted, with high spots at opposite corners, or bowed, with high spots at each end or in the middle. Some boards are both twisted and bowed, but the strategy is the same: Mark and level the high spots until the surface is roughly even, then smooth away the tool marks to create a single flat plane.

To level the high spots, use the scrub plane. Its narrow blade cuts deeper than a bench plane with the same effort—narrow and deep vs. wide and shallow.

Work the high spots, planing directly across the grain with slightly overlapping passes. This approach effectively weakens the wood fibers, causing them to release more easily from the wood in short, brittle shavings.

There are no depth lines to work toward, so gauge your progress often with the straightedge and winding sticks. Set aside the scrub plane as soon as the entire surface is level with the lowest spot. Once this is done, switch to the jack plane to begin removing the deep scallops cut by the scrub plane. The jack plane's cambered iron cuts aggressively, but less so than the scrub plane. This step creates scallops that are broader, smoother, and not nearly as deep. Continue working across the grain and diagonally until the scrub-plane scallops are gone, checking for high spots and addressing them if necessary. Afterward, it's time for the jointer plane.

Jointer plane tackles the entire surface

Use the jointer plane to skim the board's entire surface, taking lighter shavings and leveling the remaining scallops. With its long, broad sole, the jointer will reveal extremely subtle high spots. If needed, mark these spots and revert to the jack plane to tackle the bulk. Then continue with the jointer plane, changing directions as needed, until all the jack-plane tracks are flattened.

After checking again for flatness with the straightedge and winding sticks, switch to the smoothing plane for tearout removal. Even if you plan to power-sand the surface before finishing, using the

Clean up the edges

Use a drawknife to remove the bark. *Short strokes and a shallow angle lift the bark without digging into the surface underneath.*

An irregular surface calls for a nimble tool. *The spokeshave's short sole leaves the contours of the edge intact while shaving the surface smooth.*

smoother will create a more consistently flat surface than sanding alone.

The edges are next. If you're gluing up a pair of slabs, use the same strategy on the mating edges that you used to correct the faces. For a seamless joint, the edges must be square to their reference faces, straight, and twist-free. To debark and dress a live edge, I use a drawknife followed by a spokeshave.

Thicknessing: Mark, flip, and repeat

Flattening the opposite face so that it is parallel and the whole board is an even thickness is just as much work as the first task. This time, though, you'll have a clear finish line. Set a combination square to the desired thickness and pencil a line on all four edges, using the flattened face as a reference. Start with the scrub plane again, switching to the jack plane when you get close to the pencil line. Again use the jointer plane to expose the remaining high areas, followed by a razor-sharp smoother to remove any remaining imperfections.

With the job complete, I collapse in my rolling chair and scan the freshly milled material. I immediately sense order. The twist has been tamed and the wide board seems relaxed as it lies gracefully within the same plane, perfectly flat. □

David Moore makes custom furniture in his one-man shop in St. Louis, Mo.

Flatten the second face

Mark out the thickness. *Set a combination square to the desired thickness and reference from the flattened face to draw a line along all four edges.*

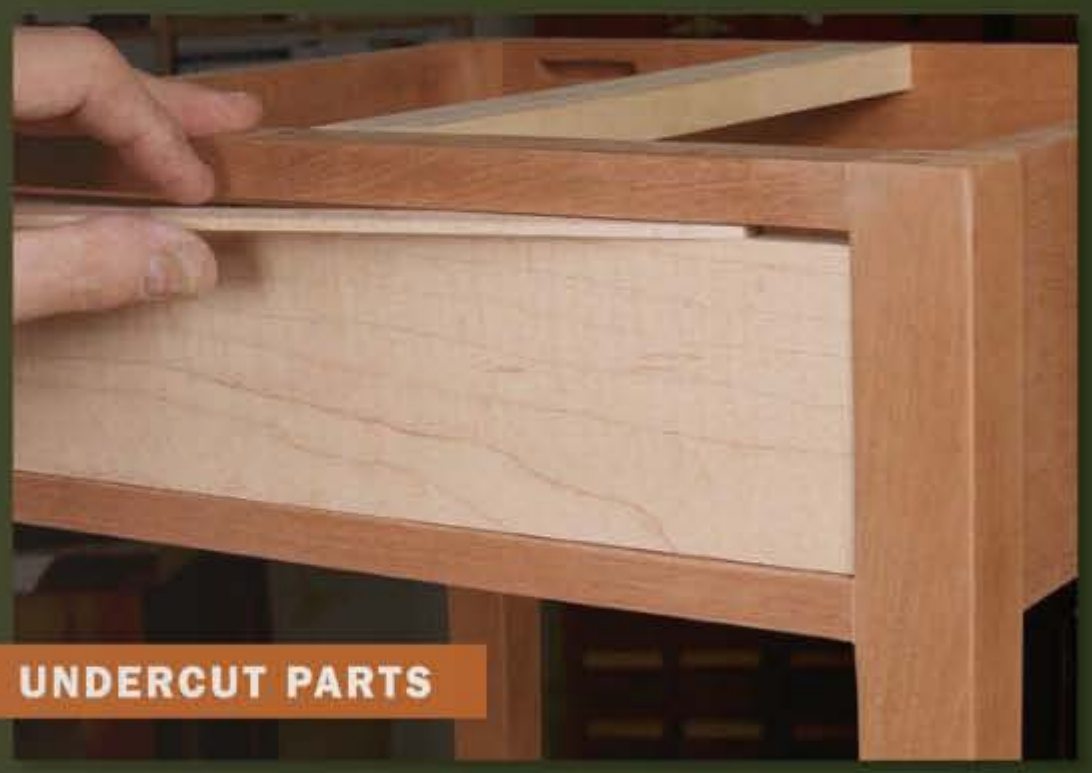
Flip the board and repeat the process. *Stay with the scrub plane for quick stock removal until you get close to the layout lines.*

How to Fix Flaws and Mistakes

Invisible repairs that will save you time and frustration

BY MARK SCHOFIELD

MISCUT JOINERY



UNDERCUT PARTS

DEFECTS AND DAMAGE

It's an old chestnut, but it's true: The difference between a professional and an amateur is that the pro knows how to cover up his mistakes. We all make mistakes, so it is almost certain that the hole you find yourself in has been previously occupied—and that a former occupant found a successful way out. To compile a woodworker's survival guide, I talked to *FWW*'s top authors to get their greatest tips on fixing mistakes. I've divided the problems into defects and flaws in the wood, miscut joinery, and undersize parts, but there are some tips that apply to every mistake and every project.

Will Neptune told me about a student in the musical instrument department at North Bennet Street School who had almost completed a violin. He was applying a French polish when his pad stuck to the surface, leaving a blemish in the otherwise flawless finish. In a rage, the student smashed the violin to pieces.

Too bad he didn't take Garrett Hack's advice and sleep on the problem. More often than not inspiration will strike, either in the early hours or the next morning when you are no longer angry at yourself. In the case of the violin, rubbing the spot with an alcohol-dampened pad would have removed the error in minutes!

Michael Fortune said his universal tip is to hang onto every piece of scrap until a project has left the workshop. It's much easier to get a good grain and color match for a patch if you still have part of the board left over.

Mark Schofield is the managing editor.

Photos: Mark Schofield

Defect or damage? Don't lose hope

Nobody's perfect, not even nature. So as well as self-inflicted damage, someday you'll face a beautiful board marred by a loose knot or a large wormhole. Learn ways to overcome both.

Online Extra

For more of our favorite fixes, go to **FineWoodworking.com/extras.**

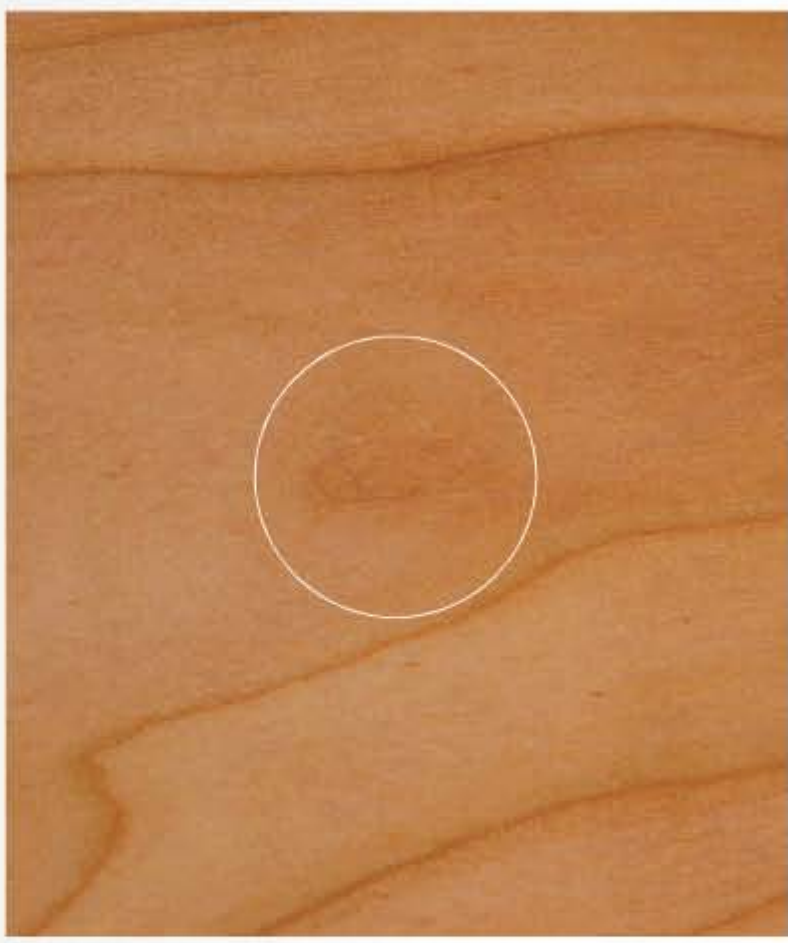
Smart scoop, invisible patch

When **Chip Ogg** drilled through the top of a 48-in.-dia. tabletop, he knew his boss, Charles Shackleton, wouldn't be happy. So he did some fast thinking. Using nothing but a carving gouge, he created a repair that was so good, he challenged his fellow cabinetmakers to find it.

Scoop around the hole. *Take a deep carving gouge that is slightly wider than the damage, in this case #8/10mm, and carve out a shallow depression around the hole. Practice on some scrap first.*

Create a patch. *Place the piece you just removed on a piece of scrapwood that closely matches it in grain and color. On a tabletop, your best bet is the underside. Using the same gouge, scoop out a slightly deeper patch.*

Glue and clamp. *After dry-fitting the patch (it should fit evenly and be slightly proud), glue it and clamp it in place with plenty of pressure. Waxed paper prevents the caul from sticking to any squeeze-out.*



An invisible repair. *After the glue has dried, sand the patch flush with the tabletop. Even under a finish, a good repair is hard to find.*

Replace a loose knot

A loose knot doesn't add character; it detracts from the wood's beauty. Instead of scrapping a nice board or cutting it in two, Steve Latta shows how to save it with clever plug that looks like an area of nice figure.

Trace the knot. *Draw the outline of the loose knot on a piece of clear plastic, such as a three-ring file divider.*

Find your patch. *Use the transparent pattern to find a nice, tight knot of similar size on a piece of scrap and resaw it to about 3⁄16 in. thick. Draw a similar outline and cut it out on a scrollsaw.*

Draw around it. *Place the patch so that it covers the whole knot and draw around it with a very sharp pencil.*

Make a recess. *Use a small plunge router or a rotary tool in a plunge base to excavate to a depth of about 1⁄8 in. After that, work up to the layout lines with a small chisel or gouge.*

Clamp the patch. *Latta uses liquid hide glue because it is less visible under a finish. If the repair is not close to an edge, you can form a bridge as shown to extend clamping force beyond the reach of the clamp.*

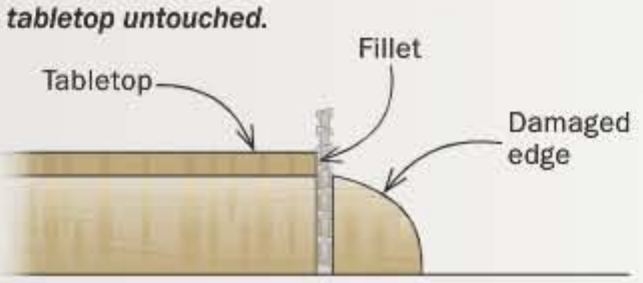
Scrape it flush. *A good repair will look like natural figure in the wood.*

Drawings: John Tetreault

Magic molding repair

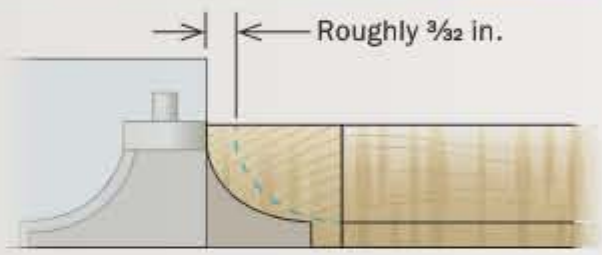
Sometimes tearout just happens, particularly on curly wood. If it occurs while profiling the edge of a tabletop, you may not be able to simply trim that edge and re-rout, as that will affect the overhang. Instead, Steve Latta shows how to add a strip and conceal the joint in the profile.

Cut away the damage. *Saw in line with the fillet (step) of the profile to leave the center of the tabletop untouched.*



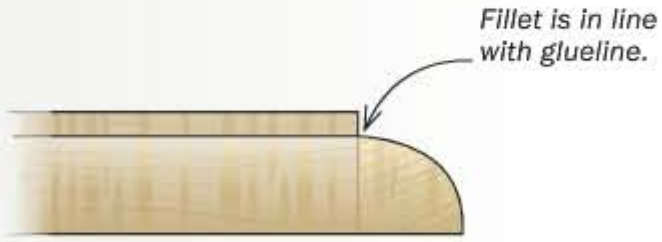
Glue on a strip. *Find a piece of scrap that closely matches the rest of the top in color and figure and glue it on.*

Make a test cut. *After trimming the strip to leave the tabletop approximately 3/32 in. wider than the desired final width, re-rout the profile.*



Dial in the location. *Measure how far the fillet of the profile is from the glueline of the repair. Set the tablesaw to rip off this exact amount, leaving a flat edge (as shown).*

Last pass. *Make one final pass on the router table to bring the fillet of the molding in line with the joint for a nearly invisible repair.*



Miscut joinery: What was I thinking?

We've all had that sinking feeling when we realize we've cut a mortise on the wrong face of a leg, or a groove on the wrong side of a drawer side. Instead of starting from scratch, probably using a board that doesn't match, there are ways to achieve near-flawless repairs.

Hide a misguided mortise

The secret to many repairs is to avoid straight lines. They aren't found in nature and they will attract the eye. **Michael Fortune** shows that even a large patch will blend right in if it is curved.

Rescue boat. *Find a piece of similar-looking scrapwood and cut out a long, ⅛-in.-thick, boat-shaped patch on the bandsaw or scrollsaw. Taper the sides 1° to 2° on some sandpaper and mark the orientation with an X.*

Cut around the patch. *Glue a piece of tracing paper over the damaged area, then glue the patch to the paper over the hole. When the glue is dry, mark around the patch with a knife. Then break off the patch at the paper line.*

Remove the waste. *Chop a 1/16-in.-deep recess for the patch using knives and small chisels.*

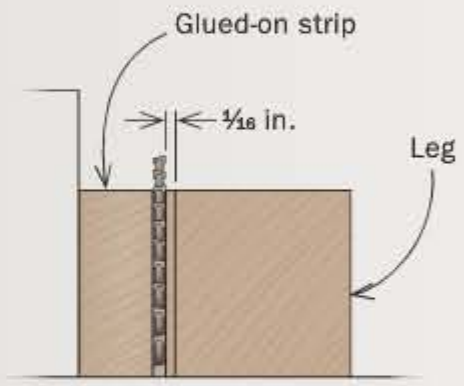
Check the fit. *Adjust the size and shape of the patch using sandpaper until it fits seamlessly.*

Where's the repair? *The curved shape of the patch helps it blend into the background.*

Or reface the whole face

Sometimes it will be impossible to hide a patch. However, **Steve Latta** has a super-smart way to add a thin piece of wood to the whole surface, with no one the wiser.

Cut and paste. *Run the damaged face of the leg across the jointer to remove 1/16 in. Then glue to the same face a slightly longer piece of wood that closely matches the color and grain.*



Rip trick. *Now just rip away the waste, leaving 1/16 in. glued to the damaged face. Trim the strip to match the leg's taper, then break its edges to conceal the seam.*

Remove a groove

It's a common mistake to cut a groove for the drawer bottom on the wrong side of a drawer side. Instead of cutting all those dovetails again, **Latta** shows how to quickly replace the miscut section only.

Rip and replace. *Rip the drawer side in line with the top of the groove. Glue on a new strip, and rip the side to width.*

Cut a half-dovetail at each end. *This goes quickly compared to dovetailing a brand-new side completely.*

Ready to assemble. *The last step is to plow the groove. With only a little time invested, you've created a hard-to-find repair.*

Undercut parts: Just add wood

Did you measure twice and still get it wrong? Instead of throwing out a component that's too short or too narrow, there are creative ways to lengthen or widen a piece. The final result may end up looking better than the original design.

Stretch a drawer front

Nothing looks worse than big gaps between a drawer front and the carcase. Instead of starting over and cutting a new front, Latta shows how gaps can be filled invisibly.

TOO SHORT: BEAD THE FRONT

Fill the gap. *A gap along the top or bottom of a drawer front is unsightly. Add a strip whose thickness closely matches the width of a small bead made by a scratch stock.*

No-worry beads. *Scratch or rout a bead along the bottom of the drawer front and another along the top (left). The quirk of the top bead conceals the repair's seam. You may not have intended to bead the drawer front but it adds a pleasing detail (below).*

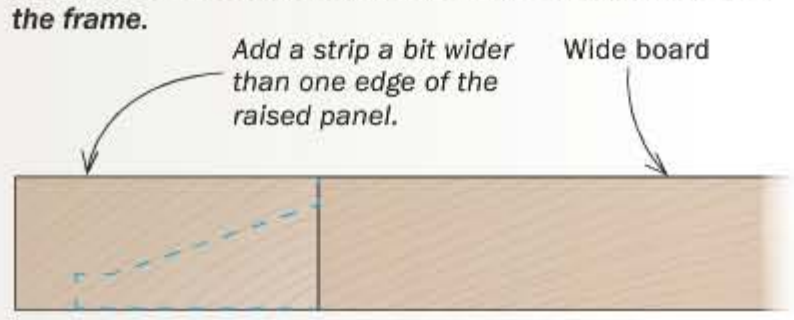
TOO NARROW: SHIM THE POCKET

Veneer to the rescue. *Add a strip of veneer up to 1/16 in. thick to one or both inside faces of the legs between the drawer rails (left). When the front edges of the strips are broken, they blend right into the face of the leg (right).*

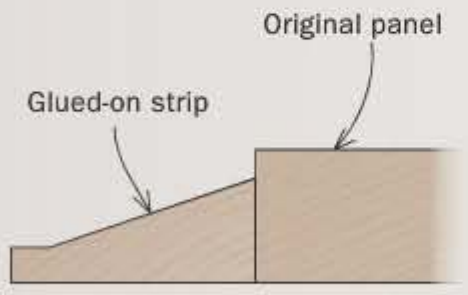
Widen a raised panel

Perhaps you mistakenly cut a panel to match the inside width of the frame, forgetting about wood for the grooves. Or perhaps the perfect board for the panel is just too narrow. In either case, Latta shows how to save the panel by adding a strip and cunningly concealing the joint.

Add a strip. *Find a piece of wood that matches in grain and color and allows the main board's figure to be centered in the frame.*



Start shaping. *Rip the panel a little over width and start to cut the raised-panel profile on the router table or the shaper (above). Joint and mold the edge of the board until the fillet of the profile falls in line with the joint in the panel (right).*



Beautiful result. *The panel now looks centered in the frame and the joint with the strip is only slightly visible on the ramp at either end.*

TOOL TEST

Block Planes

We tested them all, but low-angle is your best bet

BY MARIO RODRIGUEZ

WHAT A BLOCK PLANE CAN (AND SHOULD) DO FOR YOU

A block plane is the go-to tool for a bunch of jobs. Rodriguez put every plane through its paces, testing it on the following tasks.

Chamfers *A good block plane will cut precise bevels on both long grain and end grain.*

End grain *The best models planed end-grain oak cleanly, meaning they'll trim your dovetails, too.*

Cornering *A block plane should be able to level corner joints, where grain changes direction.*

Face grain *With a tight mouth and sharp blade, you should be able to handle a curly hardwood.*

Edges *This versatile tool should also be able to smooth both straight and curved edges.*

I'd be lost without my block plane. Though small, this tool has a big place in my woodworking, and I use it at least a dozen times each day when I'm in the shop. I trust it to bestow the critical finishing touches on a project, like carefully fitting a drawer into a carcase. The plane's small size makes it easy to control on an assembled piece, say for chamfering a table edge, and well-suited for jobs like removing machine marks from the edges and ends of a board, planing curved edges, and trimming joinery flush.

Because a block plane gets so much use, it's important that you get a very good one, one that fits your hand, cuts well, and adjusts easily. Choose wisely and you'll have a trusted friend for life. Choose poorly, and you'll kick yourself many times over.

I gathered 23 of the most popular block planes on the market (both standard- and low-angle models), ranging in price from $30 to $285, and compared their performance and quality head to head, running each one through a gauntlet of common shop tasks. In the end I discovered that a low-angle block plane is really all you need (see "The argument for a higher angle," p. 41), and also which ones are the best.

What's important in any block plane

You want the tool to be comfortable to hold, well-machined, and free of defects, such as burrs and rough spots. When it comes to weight and mass, it's a tough balancing act. A heavier block plane will work better when using the full width of the blade, or planing end grain, because the weight and mass help increase inertia and lessen the force needed to keep the tool moving. But for most jobs a block plane is meant to perform, like chamfering, weight is less of an issue. I recommend a two-handed grip when possible, but for those other times, a compact, well-balanced model will be easier to control.

Because these tools lack a chipbreaker, a thicker blade is paramount, as it will dampen vibration and chatter, providing a smoother cut. The blade also should be well-prepped from the factory, with a flat back and a square tip, ground to the proper bevel. You'll need to hone the edge for true sharpness, but you shouldn't have to do a whole lot more than that.

Blade adjustments also should be easy and smooth, and they must hold during use. You'll also want the blade to be relatively easy to remove and replace for sharpening.

Though not necessary, an adjustable mouth is a helpful feature, allowing you to increase the opening (to about 1/16 in.) for coarse work or close it (from about 1/64 in. to 1/32 in.) to eliminate tearout on tricky grain.

Versatility and agility, put to the test

I wanted to work with the planes as they came from the box, as a novice woodworker would likely do. So before the test I did nothing more than hone the blade. I put all of the planes through a woodworking

Highlights and low points

BLADE ADJUSTMENTS

It should be easy to remove and replace a blade for sharpening. And once the blade is in, adjustments should be smooth.

Depth but not lateral *Most planes featured a threaded depth adjuster but required manual side-to-side adjustments.*

Separate affairs *On some models, blade adjustments are made with two different adjusters: A lever handles lateral moves, while depth adjustments are done via a threaded knob.*

Best of both worlds *A Norris-style adjuster combines both lateral and depth adjustments and adds precision to both.*

Nice feature. *Unique to the Veritas planes are set screws in the body that help prevent the blade from shifting sideways as you adjust the depth or use the plane.*

obstacle course, using poplar, soft maple, and oak. The tasks assigned to each plane were fairly typical of those performed in a shop. First I used the planes to remove machine marks from a freshly jointed and planed face.

To evaluate how the planes handled narrow surfaces and tricky situations, I planed edges and end grain. I also used each plane to smooth a 9-in. radius convex curve and to cut a ¼-in. chamfer on an edge. I often use a block plane where I have swirling grain because it's easy to navigate the tool around the tough patch to smooth it. So I challenged the planes by using them to smooth a curly ash board. Finally, I used the planes to flush a corner joint (like that on a door frame) and to flush hardwood edging to a veneered plywood panel.

I rated each tool's performance on how easy it was to set up and adjust before and during the task, how long it took to perform the work, how much physical force was required, and the quality of the completed sample. During the test, I also evaluated the comfort of each plane: its weight, grip, and whether there were any sharp or rough machinings that made the tool tough to hold.

The best of the best

It was a long test, and it was difficult to choose a single winner among the top performers. In the end I chose multiple champions: the Lie-Nielsen 60½ and 102, and the Veritas DX60 and Low-Angle Block Plane (the best standard-angle planes are Lie-Nielsen's 103 and 9½). The winners all proved exceptional not only in the performance arena but also in the areas of comfort, fit and finish, and ease of adjustments. Yes, you'll spend a bit more on these models, but considering how much use they'll get, it's money well spent. □

Online Extra

For a video on how to get the most from your block plane, and the test results for standard-angle planes, go to **FineWoodworking.com/extras.**

Mario Rodriguez helps run the Philadelphia Furniture Workshop (philadelphiafurnitureworkshop.com).

Photos: Thomas McKenna

MOVING MOUTHS

Most of the block planes have adjustable mouths, which can be opened for better action on heavier cuts or tightened for tricky grain.

Twist and lever

On the most convenient models, you loosen the lock knob on top and pivot a lever at the front.

Twist and slide

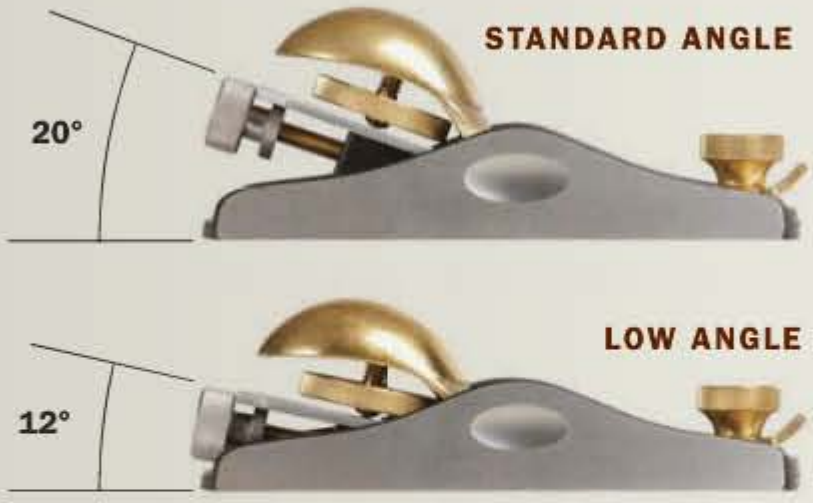
To adjust the mouth on other planes, you loosen the lock knob and slide the plate fore or aft. It's not as precise as a lever, but it works fine.

IS BIGGER BETTER? NOT USUALLY

Most of the time, a block plane is used on small, narrow surfaces, such as when you're trimming dovetails flush or chamfering, where a small, agile tool has an advantage. Occasionally, when using the entire blade, as when planing a broad edge, you will be helped by the additional width and increased weight of a bigger model.

The large and small of it. *The Stanley Sweetheart (left) is the largest in the low-angle group with a 1⅝-in. blade and weighing over 2 lb. The Lie-Nielsen 102 (right) is the smallest, with a 1¾₁₆-in. blade and weighing just over 1 lb.*

The argument for a higher angle



Standard-angle planes are taller. *This makes the grip less comfortable for small hands.*

There's been a long-running debate about whether you need both a standard-angle block plane and a low-angle model. Standard-angle planes, which generally have the blade bedded around 20° for a 45° cutting angle, should be better at planing boards with difficult or changing grain. Low-angle planes, on the other hand, have the blade bedded around 12°, resulting in a cutting angle of 37°. They're supposed to better handle end grain, where the lower angle will slice the vertical wood fibers more easily, leaving a smooth and clean surface with less effort and less wear on the blade's edge.

But my tests revealed no significant difference in performance between the two.

If you are buying your first block plane, or have the budget for only one, I recommend a low-angle model. I think the blade is better supported, more stable, and less prone to chatter or balking. This model will handle almost any job you throw its way, and if you encounter trouble, say if you're planing some tricky long grain, you can resharpen the blade, take a lighter cut with a tighter mouth, and get great results.

LIE-NIELSEN 9½
$165 lie-nielsen.com

LIE-NIELSEN 103
$115 lie-nielsen.com

Best of the standards. *If you'd like a higher-angle block plane for tricky grain, your best bets are Lie-Nielsen's 9½ and 103 models. You can see the test results for all the standard-angle planes at FineWoodworking.com/extras.*

And the winners are ...

Four planes earned top marks in our tests. Read closely to uncover the subtle differences between them.

LIE-NIELSEN 102

$115 lie-nielsen.com

BEST OVERALL CHOICE

BEST VALUE CHOICE

The 102 is small and spare but very nicely crafted. The compact size will fit any hand, and the simple design makes it easy to set up and adjust. The 102 will deftly handle any job a block plane is meant to perform, although its narrow blade will require more passes to handle wider surfaces. It doesn't have any bells and whistles, but there's not a better block plane available for the money.

LIE-NIELSEN 60½

$165 lie-nielsen.com

BEST OVERALL CHOICE

The 60½ is a step up from its cousin, the 102 (left). It's bigger, which means more weight and a bigger blade, making the plane more efficient at tackling wider surfaces. An adjustable mouth allows you to dial in the opening for different situations (wider for coarse work; narrow for tricky grain). All adjustments were smooth and precise, and the tool is very well-balanced and comfortable to hold.

VERITAS DX60

$185 leevalley.com

BEST OVERALL CHOICE

With the DX60 (and its pricier nickel counterpart below), Veritas tossed aside traditional lines and engineering. Both are extremely well made and very comfortable to hold and use. Both feature adjustable mouths, smooth-operating Norris-style adjusters, and set screws on the side of the body to help hold the settings. But these are a bit narrower than the other Veritas model (right), giving them a slightly more comfortable grip. The NX60's high pricetag took it out of contention for best overall, but you might opt for its high style and corrosion-resistance.

VERITAS LOW-ANGLE

$140 leevalley.com

BEST OVERALL CHOICE

This is the largest and heaviest plane among the winners, making it the best for broad surfaces. Despite its size, the plane is comfortable to hold, with detents in the body that put your fingers in the right spots. The plane has a smooth-operating Norris-style adjuster, which handles depth and lateral adjustments, and set screws in the body to hold the lateral settings. Mouth adjustments are smooth and responsive.

MODEL/SOURCE
Anant 60½ rlarson.com
Groz Low-angle Block Plane amazon.com
BEST OVERALL CHOICE **Lie-Nielsen 60½** lie-nielsen.com
BEST OVERALL CHOICE BEST VALUE CHOICE **Lie-Nielsen 102** lie-nielsen.com
Rider 60½ traditional-woodworker.com
Stanley 60½ woodcraft.com
Stanley Sweet Heart 60½ woodcraft.com
BEST OVERALL CHOICE **Veritas DX60** leevalley.com
Veritas NX60 leevalley.com
BEST OVERALL CHOICE **Veritas Low-Angle Block Plane** leevalley.com
Wood River woodcraft.com

STREET PRICE	SIZE/WEIGHT	BLADE	PERFORMANCE	EASE OF ADJUSTMENTS	FIT AND FINISH	COMMENTS
$42	1 13/16 in. wide by 6 1/8 in. long; 1 lb. 8.3 oz.	5/64 in. thick by 1 3/8 in. wide	Fair	Depth: poor Lateral: poor Mouth: good	Poor	Though it has a low silhouette that should make it comfortable to hold, sharp edges and rough machining interfere with the grip; blade deflection caused lots of chatter; sole was flat.
$37	1 3/4 in. wide by 6 1/4 in. long; 1 lb. 7.3 oz.	5/64 in. thick by 1 3/8 in. wide	Fair	Depth: poor Lateral: poor Mouth: good	Poor	Blade is not adequately supported, causing chatter, and is difficult to adjust; edge of blade was not square and had to be reground to work; adjustments didn't hold; sole was flat.
$165	1 3/4 in. wide by 6 1/4 in. long; 1 lb. 9.8 oz.	1/8 in. thick by 1 3/8 in. wide	Excellent	Depth: excellent Lateral: excellent Mouth: excellent	Excellent	Top-notch tool; well-made and well-balanced, comfortable to hold; sole was flat.
$115	1 5/8 in. wide by 5 1/4 in. long; 1 lb. 0.07 oz.	1/8 in. thick by 1 3/16 in. wide	Excellent	Depth: excellent Lateral: excellent Mouth: none	Excellent	A pleasure to use; very comfortable and well-balanced; compact design; simple to set up; lack of adjustable mouth did not hinder performance; sole was flat.
$80	1 3/4 in. wide by 6 1/8 in. long; 1 lb. 12.3 oz.	3/32 in. thick by 1 3/8 in. wide	Very good	Depth: good Lateral: good Mouth: good	Good	A good-value plane; low profile is a little hard to grip but overall balance is good; responsive to blade adjustments; sole was flat.
$47	2 in. wide by 6 3/8 in. long; 1 lb. 13 oz.	3/32 in. thick by 1 5/8 in. wide	Good	Depth: fair Lateral: fair Mouth: good	Fair	Was fairly comfortable to hold; well-balanced; blade adjustments were stiff; fit and finish was fair, with chipping paint and mill marks; sole was flat.
$105	2 1/8 in. wide by 6 3/8 in. long; 2 lb. 0.06 oz.	1/8 in. thick by 1 5/8 in. wide	Excellent	Depth: good Lateral: good Mouth: good	Fair	Problems with fit and finish held this plane back; aluminum lever cap is difficult to engage and you must be careful not to overtighten; hard corners left scratches in wide stock; sharp edges needed work; paint showed signs of wear; sole was flat.
$185	1 13/16 in. wide by 6 9/16 in. long; 1 lb. 11.6 oz.	9/64 in. thick by 1 3/8 in. wide	Excellent	Depth: excellent Lateral: excellent Mouth: excellent	Excellent	Innovative styling; impeccable manufacturing; very comfortable to hold; well balanced; adjustments are very responsive; set screws near mouth help hold lateral adjustments; sole was flat.
$295	1 13/16 in. wide by 6 9/16 in. long; 1 lb. 11.6 oz.	9/64 in. thick by 1 3/8 in. wide	Excellent	Depth: excellent Lateral: excellent Mouth: excellent	Excellent	Same basic design as DX60, but made from corrosion-resistant nickel instead of ductile iron. This is where the retro tool styling really shines, but you'll pay a premium for it.
$140	2 1/16 in. wide by 6 1/2 in. long; 1 lb. 13.1 oz.	1/8 in. thick by 1 5/8 in. wide	Excellent	Depth: excellent Lateral: good Mouth: excellent	Excellent	Plane is a bit heavier than the other winners, but it's well-balanced and comfortable to hold; very responsive to adjustments and held its settings; set screws near mouth help hold lateral adjustments; indents in the plane body are perfectly placed; excellent value; sole was flat.
$95	2 in. wide by 7 in. long; 1 lb. 14 oz.	1/8 in. thick by 1 5/8 in. wide	Excellent	Depth: difficult Lateral: good Mouth: good	Good	A big tool, but well-balanced and easy to control; sole was flat, but blade adjustments were extremely stiff.

Arts & Crafts with an English Accent

Desk and wall cabinet make an elegant matched set

BY NANCY HILLER

For several years around the turn of the 20th century, an English manufacturing firm, Harris Lebus, produced classically styled English Arts and Crafts furniture that is highly collectible in Britain today, but not well known in the United States.

Lebus was one of very few Arts and Crafts manufacturers to combine the movement's ideal of making beautiful, useful, yet affordable objects with running a profitable business. It did so with striking examples of British Arts and Crafts design, featuring elements that set it apart from American Arts and Crafts furniture by Stickley, Hubbard, Greene and Greene, and others.

For today's furniture makers seeking a fresh take on Arts and Crafts, these designs are a great resource. Best of all, in my view, they are drop-dead gorgeous.

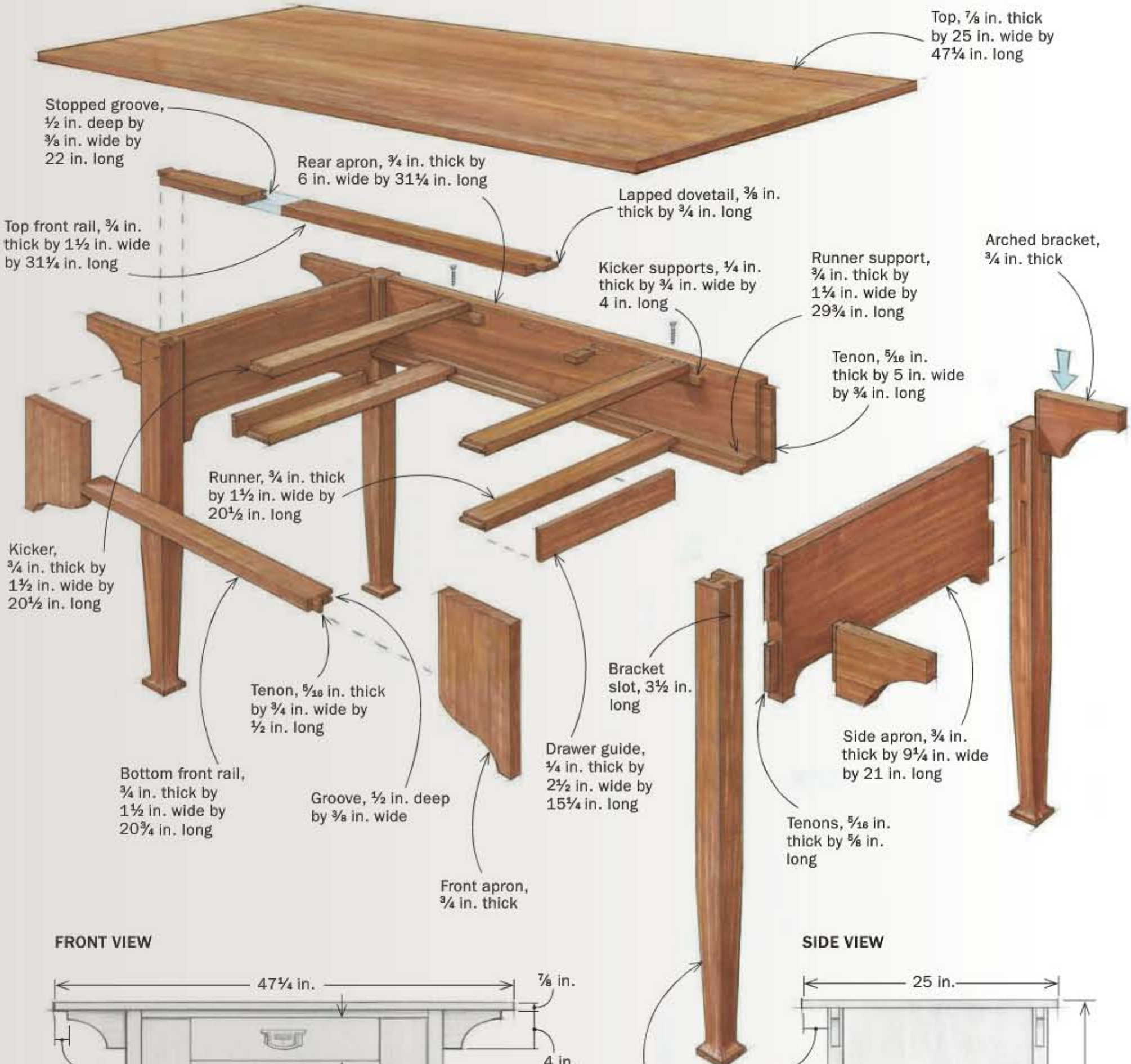
In designing this desk, I closely followed a set of the company's drawings for bedroom furniture, incorporating the square, flared feet and curved front aprons. The wall-mounted gallery is a perfect complement, combining Lebus's signature crown, with its dramatic bevels and exaggerated overhangs, with a simple inlay. The cabinet was originally designed to sit on the desk, but I raised it to the wall to keep needed items handy while freeing up space on the work surface.

Bandsawn legs have flair

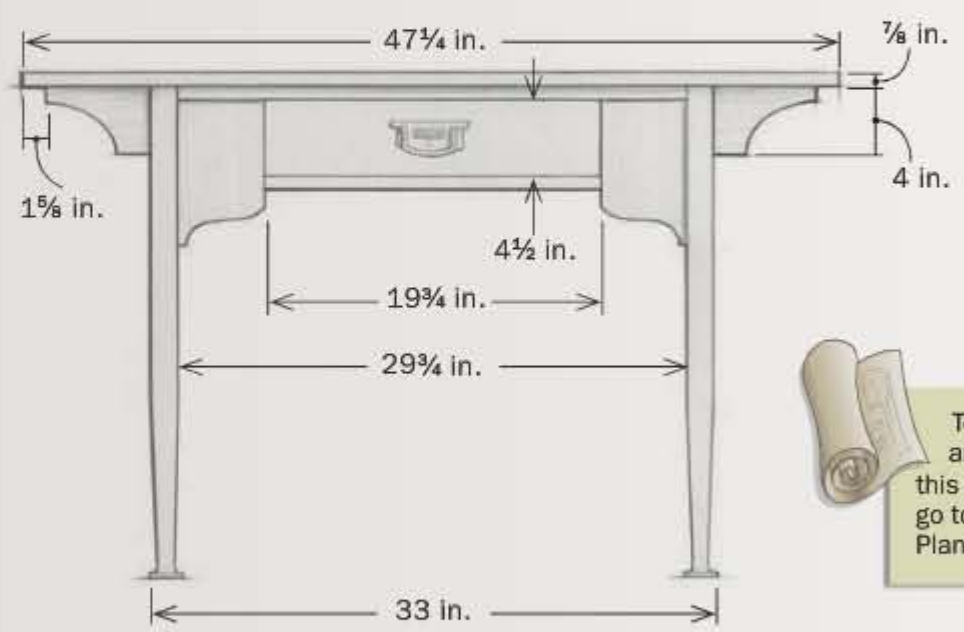
The striking feature of this leg is the flared square foot, which is slightly wider than the leg itself. Take care when making the legs and assembling the piece; there is some fragile short grain

Start with the desk

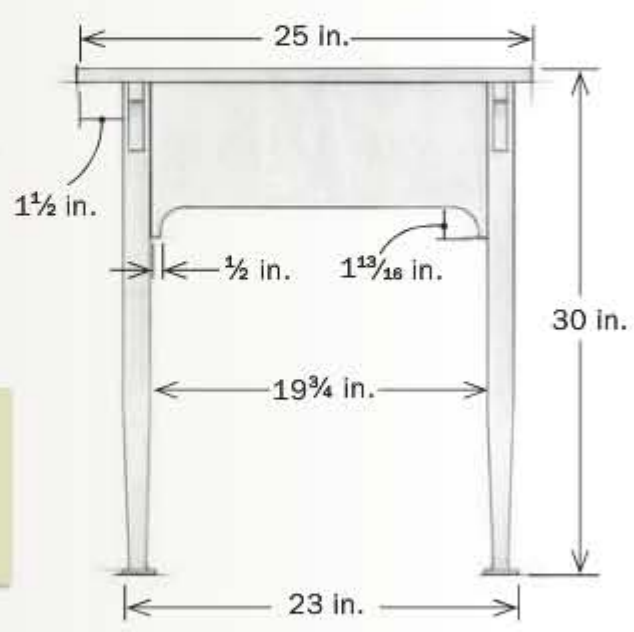
It's a smart marriage of eye-catching curves and straightforward joinery. The challenge is shaping the flared, square feet, but there are tricks for that.



FRONT VIEW



SIDE VIEW



To purchase scaled plans and a complete cutlist for this desk and other projects, go to FineWoodworking.com/PlanStore.

Photos: Steve Scott; drawings: Bob La Pointe

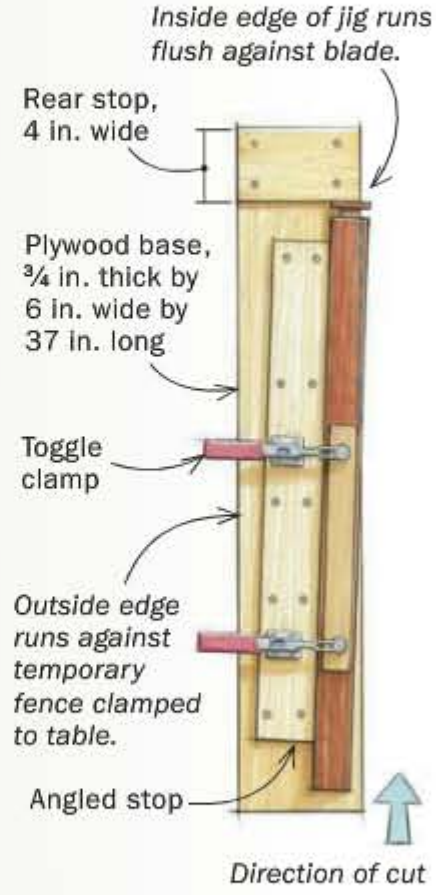
Make the leg from the bottom up

The feet look better if they are flared wider than the leg post itself. So you need to start with stock thick enough to make the foot, trimming it back afterward to create the slimmer post.

Shape the foot first. *Hiller creates the sharp curve at the top of the foot by drilling out the cuff on all four sides with a ½-in. Forstner bit buried only partially in the wood.*

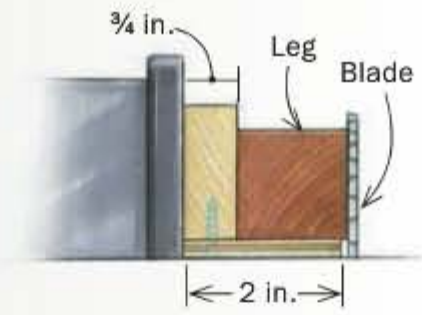
Taper the ankles with a bandsaw jig. *Align the workpiece so the bottom of the taper transitions smoothly into the tight curve of the foot.*

BANDSAW JIG FOR STOPPED TAPERS



Trim the top afterward. *Remove ⅛ in. from each face to make the post more slender than the foot that supports it. After the first two cuts, use a sled as shown to keep the foot off the table and fence, and the workpiece straight and stable. Adjust the rip fence as needed.*

TABLESAW JIG FOR REDUCING WIDTH



in those feet. Mill the leg stock to 1¾ in. square and leave the blanks a little long so they can be cut off and reused if you make a mistake on the feet.

I use a Forstner bit on the drill press to produce the sharp inside curve where the narrow leg transitions into the flared foot. Mark the workpiece indicating the height of the foot and the thickness of the leg at this transition, and use the marks to position the leg against the fence and under the bit. Clamp a stop block to the fence to keep the workpiece in this position as you rotate it for cuts on all four sides. Drill all the way down each of the four sides, keeping the leg firmly against the fence and the stop.

After drilling, you'll need to remove a small triangular nib of waste on each side. I do this at the bench with a tenon saw.

A short, gentle taper connects the leg's narrow point at the ankle to the broader portion a third of the way up. I cut this taper at the bandsaw, mounting the leg in a simple angled carriage jig that bears against a temporary fence. The cut starts at the top of the tapered section and stops at the hole cut earlier on the drill press.

After smoothing these tapers and the transition to the curve of the foot with a sanding block, rip the portion above the taper down to 1½ in. square. Because the foot will end up protruding beyond this main part of each leg, you must use a jig to keep the leg level on the tablesaw. Take care to ensure that your sawcut is perfectly square, because this part of the leg will be mortised for the side and back rails and will determine the position of the aprons.

Curves accent the base

One of the things I really like about this piece is the light

Cut the desk joinery

There are plenty of standard mortises and tenons. Here are some tips for the rest.

DOVETAILED RAIL JOINS THE FRONT LEGS

This job goes quickly with a combination of hand and power tools.

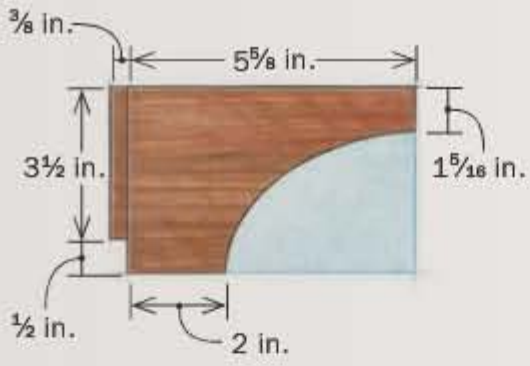
Tails by hand. *Saw and pare the tail, then saw away half the thickness to create a lap on the bottom side of the joint (left). The lapped dovetail rests securely on the mating piece (above), making it easy to transfer the layout.*

Saw and chop the socket. *Align the saw with the layout lines and angle the blade downward as shown to cut as far as you can. Then chop and pare with a chisel to finish the socket.*

SLIDING TAILS HOLD THE ARCHED BRACKETS

A traditional choice, this joint provides a strong connection where end grain meets long grain. It is also easy to assemble once the rest of the base is together.

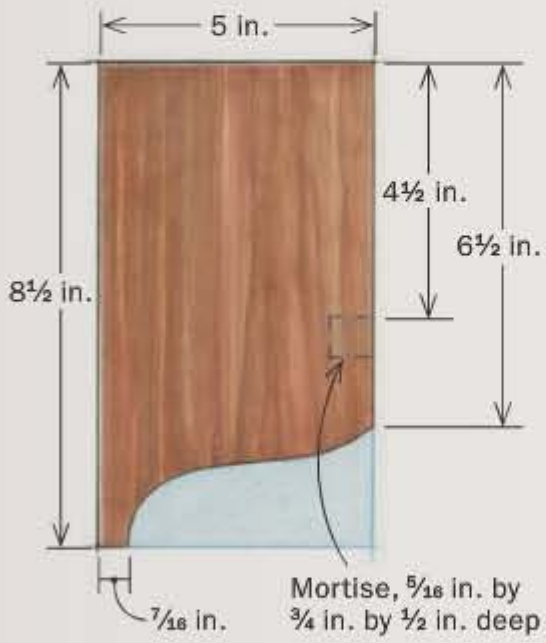
ARCHED BRACKET DETAIL



Tails by router. *The socket cuts are stopped by aligning registration marks on the leg and fence (above). After cutting the tail at the same bit height (right), saw away the bottom ½ in. to fit the socket.*

FINISH OFF THE FRONT

FRONT APRON DETAIL



After the bandsaw. *Use a bearing-guided router bit to trim the rough-cut curves on each apron flush with a plywood template (above). Hiller uses a hollow-chisel mortiser to make the mortise for the lower rail (right).*

Assemble the desk

Do it in sections. *Start with the sides, making sure the joints are square and the tops flush (1). When the glue has set, join the sides with the back rail and the dovetailed top rail in front (2).*

way it feels visually, in contrast to some of the massive, square designs often associated with Arts and Crafts furniture. This feeling comes partly from the curves, starting with the ones you just cut in the feet, and repeated in larger scale in the decorative aprons and arched brackets of the base. These curves are simple to create, but they tie the piece together visually and lend it a touch of grace.

Building the base starts with cutting the lapped dovetails on the top rail and the mating sockets in the tops of the two front legs.

Making the decorative front aprons is straightforward. Each one is mortised on its inside edge to accept the lower drawer rail, but there is no other joinery to cut. The aprons are glued to the legs and upper rail with simple butt joints. Be sure to mark out the decorative shape with the grain running vertically. This avoids short grain at the end of the curve and provides long grain for gluing the apron to the leg.

After bandsawing the aprons close to the layout lines, I rout

Set it in place. *With the aprons and lower rail already glued up, set the front assembly in place. The aprons are simply edge-glued to the legs and top rail. Use a spacer (above) to dial in the location.*

them into perfectly matching shapes using a pattern-cutting bit. The bit has a top-mounted bearing that rides a plywood template clamped to the workpiece. Afterward, I smooth the shapes with sandpaper.

When both aprons are shaped and mortised, dry-clamp them into position within the leg-and-top-rail assembly so you can fit the lower rail. To fit the rail, start by cutting a shoulder on one end of your rail stock. Now hold the shoulder against the inside edge of one apron while marking the location of the opposite shoulder where the piece meets the other apron. Now return to the tablesaw to finish cutting the shoulders and trimming the tenons to length. This is a good time to determine the length of the table's rear apron by measuring between the shoulders on the top front rail dovetails. Add ¾ in. at each end for a tenon. Now cut the side and rear aprons to length and cut the tenons.

Once this is done and the lower rail is in place, dry-clamp the entire front assembly and check for fit. The assembly should be the same length at the top of the legs and several inches down, level with the lower rail. If the lower measurement is too long, trim the tenon shoulders to fit.

The arched brackets are slightly more complicated than the decorative aprons. Each bracket is joined to the outside of its leg with a stopped sliding dovetail. I cut the joinery at the router table, first cutting the stopped socket into the outside of each leg. Next I cut the dovetails, making test cuts to position the fence correctly.

Before gluing up the base, dry-fit the assembly and measure for the runners and kickers that will support the drawer. These components are tenoned into grooves cut into the rear edge of the front rails.

Build the base in stages

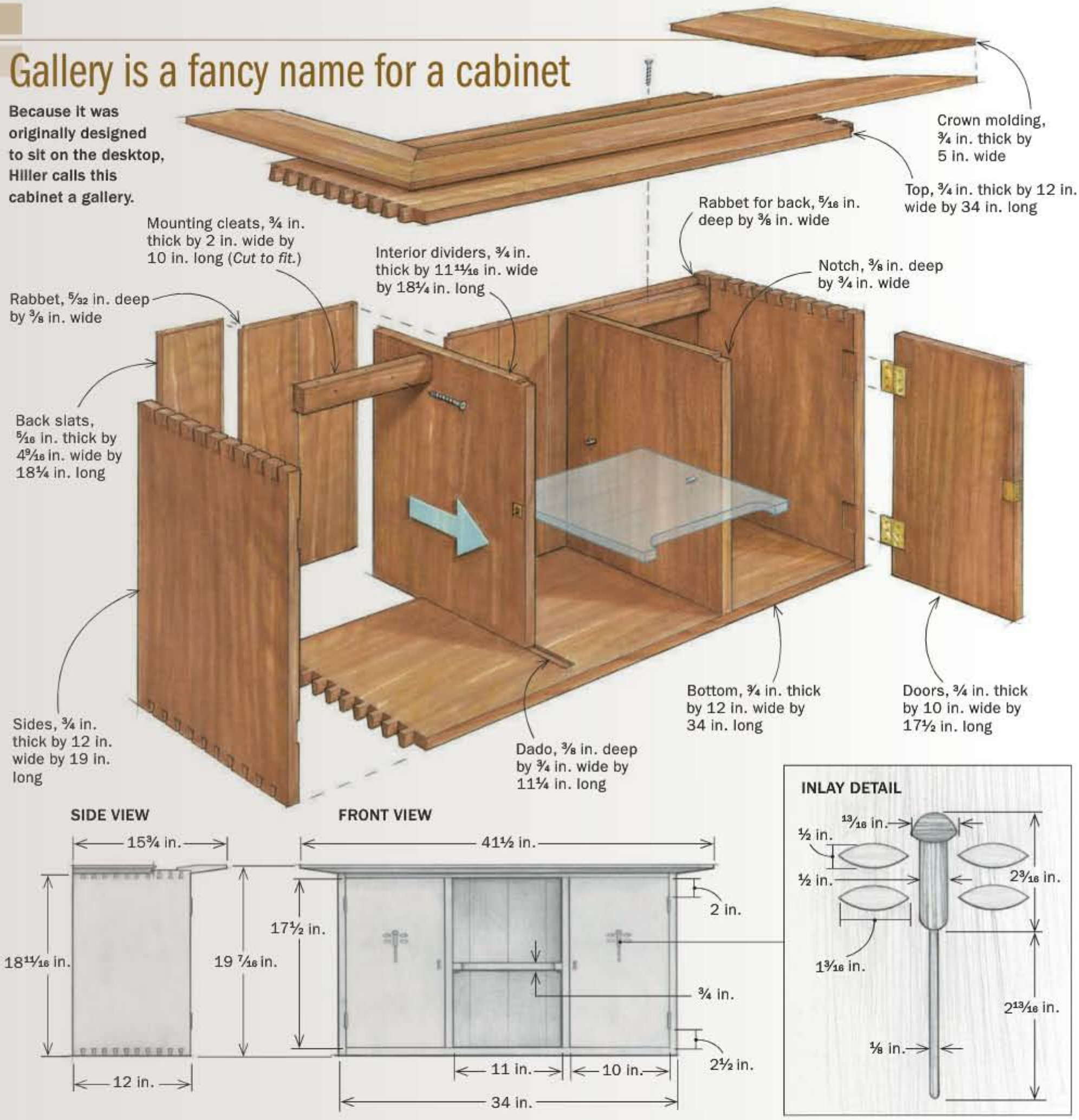
Start by gluing up the side assemblies and then joining them with the back apron, creating a three-sided assembly. Dry-fit the dovetailed top rail to help keep the base square.

The next day, assemble the front as follows: Glue the dovetailed top rail into the legs and tap home. Next, glue the bottom front rail into the aprons; add glue to the outer edges of the aprons, and lightly clamp this assembly in place between the front legs. Adjust the position from front to back as necessary, and when it is perfect, increase the clamping pressure. Once this is done, glue the runners and kickers in

Guides, then kickers. *Glued to the side of the drawer runners, the guides keep the drawer aligned in its opening (above). Install the kickers next; they keep the front of the drawer from tipping downward as it opens. They tenon into a groove in the top rail (left) and are screwed to a support block at the back (below).*

Gallery is a fancy name for a cabinet

Because it was originally designed to sit on the desktop, Hiller calls this cabinet a gallery.



place, ensuring they are parallel to each other and square to the front of the desk. After the assembly is out of clamps, give the upper section of each leg a light sanding to remove clamp marks and glue, and then glue in the arched brackets. Now cut the tabletop to size and dry-fit it.

Wall-hung gallery is a crowning touch

With its wide beveled crown molding and inlaid doors, the case that hangs on a wall above the desk is a perfect counterpart in both function and style. The case construction is basic, with routed through-dovetails at the corners and stopped dadoes housing the vertical dividers.

After gluing up the case, cut the bevels for the crown on the tablesaw. Then cut a rabbet on the underside of the crown to fit over the upper case and hang down about ⅛ in. Mark the miters for one corner and cut them, leaving the parts overlong. Now predrill and countersink three mounting holes in the front section of crown. Be careful to position the holes near the center of the rabbet's width.

Next, position the front piece precisely on the case, using the mitered return piece to confirm the front's position and fit.

Make the dovetailed case

Quick, strong dovetails. *Hiller uses a two-piece aluminum jig from Keller to rout the long rows of dovetails quickly and accurately.*

Rout stopped dadoes for the vertical dividers. *Clamp the top and bottom pieces together at the back edges to rout both pieces at the same time. If your guide rail is square to the pieces, the dadoes housing the top and bottom of each divider will be perfectly aligned.*

Rout the rabbet for the back and install the dividers. *Hiller uses a ⅜-in. rabbeting bit, set for a cut that is 5/16 in. deep. When skipping past the divider dadoes (above), be careful to keep the bearing from diving in. Tap the uprights home until their front edges are flush with the front of the case (right).*

Drill a pilot hole for the center screw and fasten the front section temporarily so you can mark its opposite end for cutting to length. Now remove the front section to cut the miter on it and on the return piece.

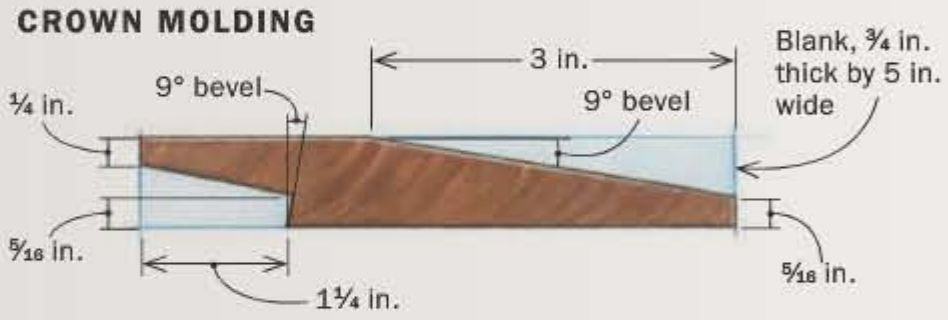
When the miters are perfectly fitted, start installing the crown by fastening the front piece, securing it first with the center screw. Check to make sure the rabbet is pulled flush against the top edge of the case from left to right, then drill pilot holes for the other two screws and run them in.

Now mark the back edge of each return section, flush with the back edge of the cabinet, and cut each to final length. Pre-drill and countersink two holes in each return section —one near the miter and one near the back of the cabinet. To install each return, brush glue on the miter and slide the return section into place, holding the joint with an Ulmia miter clamp (or by wrapping packing tape across the joint). Next, drill pilot holes and screw the return section of crown to the case. Reinforce the miter joints with brads, predrilling to avoid splitting. When dry, sand carefully.

Inlay enhances the doors

This design calls for simple slab doors with half-mortise locks

Wide molding is a crowning touch



Three angled cuts create the crown. *Hiller starts with a through-cut, running the stock on edge past the angled blade to create the crown's top rim (1). An angled cut along the opposite edge creates one side of the angled rabbet (2). And a shallow angled cut frees the waste (3).*

Fit and install the crown. *With all the miters cut, Hiller positions the front piece of crown and secures it with countersunk screws. Then she puts glue on the miters, putting the return pieces in place and clamping the corners with Ulmia miter clamps before securing the return pieces with screws.*

(paxtonhardware.com). For a good primer on installing them, see Lonnie Bird's article "Choosing and Installing a Lockset (*FWW* #162). The doors are simple, but the decorative dragonfly inlay elevates their appearance. Using quartersawn stock minimizes shrinking and expanding across the width, which is critical in this type of door.

I use gouges to cut the veneer for the head and wings. I cut the veneer for the straight body and tail from larger stock at the tablesaw, shaping the curved ends with gouges and sandpaper. The mortises are all cut with a router, except for the wings, which I can cut cleanly with a gouge at the same time I am cutting the veneer.

To begin, lightly mark the dragonflies' positions in pencil on both doors. To shape the head, simply pierce a sheet of veneer with mating cuts from two gouges, using a larger radius for the bottom. Trace around the workpiece to mark the door for routing the mortise. Fit the veneer using gouges to pare the mortise walls and sandpaper to trim the veneer.

Next, rout the mortises for the body and tail. Cut the veneer from ¾-in.-thick solid stock, ripping it to fit the mortise width at the tablesaw before resawing it to approximately 3/16 in. Use gouges and sandpaper to shape the curves at each end of the body and tail sections. You can cut the inlay and the mortise for the wings at the same time. Tape the veneer stock over the mortise location and chop with a mallet-struck gouge until you have cut through on each side of the wing.

Glue the inlay stock in place, cover with paper, and clamp well with cauls until dry. When dry, scrape and sand flat. □

Nancy Hiller operates NR Hiller Design Inc. in Bloomington, Ind. (nrhillerdesign.com).

Inlay decorates the doors

The inlay's dragonfly design is consistent with Arts and Crafts attention to natural forms, and it's easy to create.

Gouges give the head its shape. *Hiller uses a #9-15mm carving gouge to pierce the veneer for the top of the dragonfly's head. A mating cut with a #7-14mm gouge creates the bottom of the piece.*

Transfer the layout to the door. *After marking the location for the overall inlay, hold the workpiece in place to trace the outline of the head. Then tap with the gouges to incise the profile.*

Cut the mortise for the head. *Hiller uses a small router with a ⅛-in.-dia. bit, cleaning up the edges with the same gouges used to cut the veneer.*

Mortise for the body and tail. *Guide the router along a fence for a straight cut. Use a ½-in.-dia. bit for the body and ⅛-in.-dia. bit for the tail (above). Use the same gouge that created the bottom of the head to cut a matching curve in the top of the body veneer (left).*

Step saver. *With the veneer taped to the workpiece, chop through the veneer to create the inlay piece and mark its mortise at the same time (left). Then finish chopping the mortises. After the wings are in (below) and dry, plane and sand the veneer flush.*

Ebony, the Dark Knight of Details

Small doses can do big things for your furniture

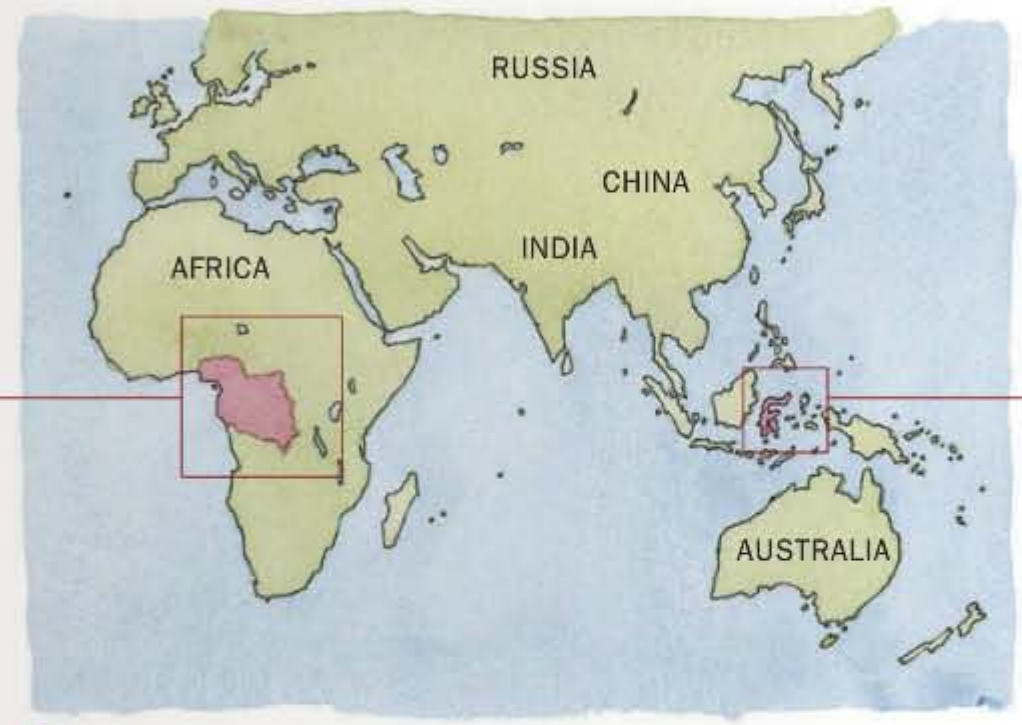
BY GARRETT HACK

Photos, this page: Dean Powell (top left); Dean Palmer (center left), Roger Heitzman (bottom right)

When I saw my first ebony tree in Java more than 30 years ago, I was stunned by its small stature. In a climate where trees grow year-round, this 90-year-old was about 11 in. in diameter. Such stunningly slow growth helps explain ebony's extreme density, why typical boards are so small, and why the wood is so valuable that it's sometimes sold by the pound.

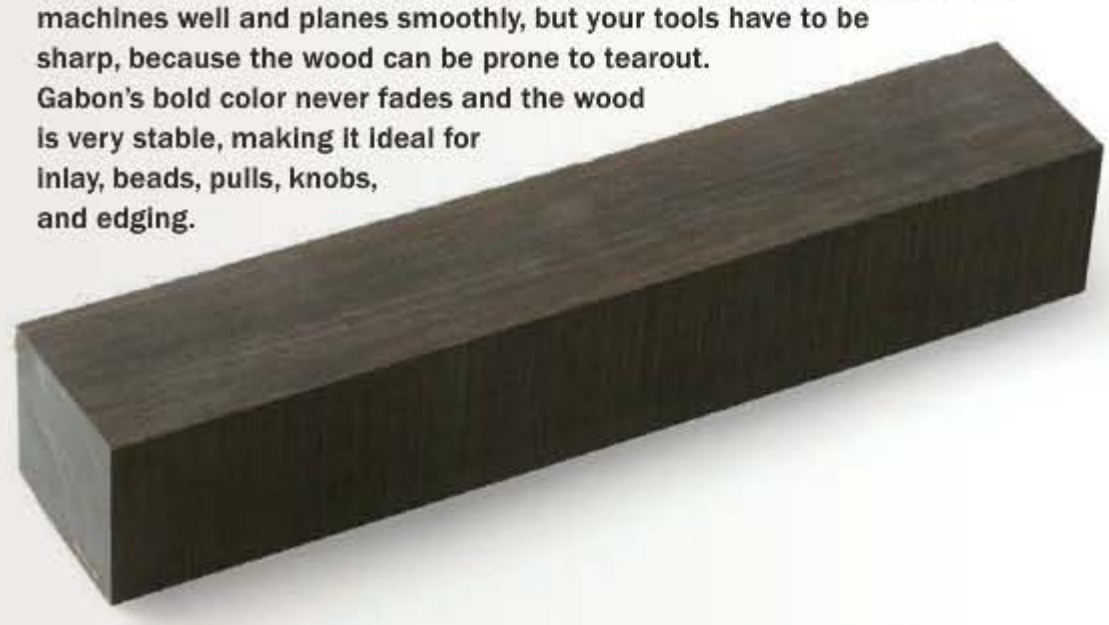
There are more than 450 species of ebony, mostly found in the tropics. All species are endangered, and you should be mindful that what you purchase is certified to have been harvested legally, to ensure its sustainability. A certified board will have a detailed chain of ownership, from its source all the way through the milling process to the sale.

In my woodworking I've used three types of ebony: Gabon (*Diospyros crassiflora*), Macassar (*Diospyros celebica*), and Mun (*Diospyros mun*). Unfortunately, Mun is no longer being exported, at least legally. Each is stunning, very expensive (expect to pay $35 to $85 a board foot), and hard to find. Veneer is a more economical option, but you should still expect to pay about $9 to $24 per square foot, depending on the width and thickness of the sheets.



Gabon works small wonders

Gabon, or African, ebony is mostly available in small sizes, but with its jet-black color, a little goes a long way. This rare beauty is somewhat brittle, but the texture is very consistent, with almost no visible growth rings. It machines well and planes smoothly, but your tools have to be sharp, because the wood can be prone to tearout. Gabon's bold color never fades and the wood is very stable, making it ideal for inlay, beads, pulls, knobs, and edging.



Make bold statements with Macassar

Quite unlike its African cousin, Macassar ebony has rich brown and black striping (mostly in quartersawn faces). A favorite of the Art Deco designer E.J. Ruhlmann, the wood's grain can vary from widely spaced to so tight it appears almost all black. It's not as brittle as Gabon and can be found in somewhat longer and wider sizes. Surfaces can be hard to plane smooth, but they scrape wonderfully. Macassar's grain patterns make it well-suited to larger surfaces, such as drawer and door fronts, but it's also suitable for cabinet and table feet.

Go lightly on the machines

To avoid wasting any of the ebony, I tend to use the bandsaw, handsaws, and handplanes to cut pieces to size, rather than the tablesaw or jointer. I've never sent ebony through a planer for fear of it blowing up, quickly dulling my blades, or both. I will occasionally use the jointer to straighten an irregular edge. I've also turned ebony, with beautiful results, as the material is able to take the finest detail.

Hand-shaping the wood requires sharp tools and some finesse. When planing the long grain, fine tearout is common because of ebony's hardness and interlocking grain. I've had success with both standard and high bevel angles. Just start with a super-sharp blade and expect to resharpen frequently. For best results, set the plane for a fine cut, with a tight throat. I clean up any fine tearout with a scraper.

When working end grain in these brittle woods, chipout is common, so I prefer to use a low-angle plane, taking a light cut with a tight throat and skewing the plane acutely.

To shape the material, I often use scratch stocks and sand occasionally. Though carbide router bits work, I avoid using a router with ebony because it creates more dust (a problem for some) and

Photos, except where noted: Thomas McKenna; drawings: Jim Richey

Tricks for working with ebony

Thin blades save material. *To get the most yield from the rough ebony chunks, in this case Macassar, Hack uses a bandsaw. He flattens the slices with handplanes and returns to the saw later to cut parts to size, though sometimes he uses fine handsaws to cut smaller parts.*

Plane to thickness. *When thicknessing small ebony parts, Hack prefers hand over machine. He often uses a jig to ensure that all parts are uniform. It's simply a piece of plywood with thin runners that the plane rides on. A brad in front works as a stop.*

tends to produce clunky profiles. For other shapes, say for pulls and finials, you can use rasps and files.

The black dust migrates, so sand before assembly

The dust created while sanding ebony can foul mating surfaces. For the bandings and inlays I make of holly and ebony, bold and bright contrast is my goal. In my experience, sanding to level them after they're glued in turns the holly gray. Planing and scraping cuts the cleanest and preserves the sharp contrast I'm after. With any ebony element, sand before assembly if at all possible.

Though ebony has a reputation for being highly toxic to some people, I have not had issues with it.

It's surprisingly bendable

Despite ebony's toughness, it actually bends well, when both steaming and laminating. To make bent-laminations easier I cut the plies thinner than I normally would, closer to 1/16 in. thick than 1/8 in.

Scuff before gluing

Both Gabon and Macassar ebonies contain oils that can migrate to the surface and can ruin a glue bond. To avoid problems, I glue parts right after they've been handplaned, and I scuff the freshly planed surfaces with 220-grit paper. I'll even wipe parts with acetone to remove any oil that's built up on the surface.

It deserves a shine

When it comes to finishing ebony, I've had great success with shellac and oil/varnish. Being both dark and naturally shiny, ebony shows defects easily, so careful surface prep is a must. Regardless of the finish you choose, build up enough coats to make the prized ebony stand out. Using no finish is an option, too, but be sure to burnish the wood to a high polish with shavings. □

Garrett Hack is a contributing editor.

Shape with a scratch stock. *Machines can cause wicked tearout on the brittle ebony, so Hack uses scratch stocks to shape the material. Here he shapes a bead applied to a door frame.*

Keep the contrast. *When bringing an ebony inlay flush to a surface, a sharp handplane or scraper is your best bet. Avoid sanding these elements, because it often embeds the fine black dust into the surrounding surfaces.*

No shame in faking it

If you are troubled by true ebony's sustainability, or its pricetag, ebonizing a less-expensive, more common wood is a great alternative. Use water-soluble aniline dye powder to transform common woods into jet-black faux Gabon ebony. Finish it well, and it's hard to tell it isn't the real thing. Woods that mimic Gabon well are rift- or plain-sawn cherry and pear, and to some extent walnut. And you might want to try ebonizing oak or ash, where the grain remains dominant, but turns deep black. Any surface to be ebonized must be carefully prepped beforehand, sanding, raising the grain, and sanding again (up to 320 grit) until it is polished. Ebonizing is only skin deep and you can sand, plane, or scrape through it if you're not careful. So it is not appropriate for fans or inlays, nor small beads or other small moldings that will be planed, scraped, or shaped after installation. Minor sand-throughs can be touched up with a black felt-tipped marker. If you're using a waterborne clearcoat, seal the dye with dewaxed shellac.

—G.H.

CREATE CONTRASTING DETAILS

Ebonizing is easy, and opens up lots of design possibilities. The water-soluble dye powder dissolves in warm water and can be brushed or wiped on. Build up coats until you get the appearance you want.

Faux black top. *You can use your ebony efficiently by saving the real thing for small details and ebonizing larger surfaces. On this piece, Hack ebonized the top and used real ebony for the beads, banding, and pull.*

Divide and conquer. *Masking tape won't block the dye from spreading. Instead, knife a fine line to divide the sections (above). Use a chisel to further define it (below), but don't press hard—a gentle touch will do.*

Stay within the lines. *Use a fine paintbrush to apply the dye right up to the knife line. A wider brush can be used in the larger area.*

Careful strokes. *When ebonizing part of a molding, such as this bead, it needs distinctly defined transitions. Otherwise, the dye will roam. The black bead on this crown adds a delightful contrast, breaking up the broad butternut surfaces.*

Perfect Profiles on the Router Table

Shims are the secret to clean, accurate profiles and joinery cuts

BY ALAN TURNER

PRECISE PROFILES

ACCURATE JOINERY

MULTIPLE MOLDINGS

3 SITUATIONS WHERE SHIMS MAKE SENSE

On a tabletop edge (top right), the round profile needs to align perfectly. Use a test piece to dial in the fence's final setting, but then add fence shims to make the actual cut in a series of passes, for cleaner results. Shims also ensure that joinery cuts, like a raised panel (middle), will fit perfectly. When making narrow moldings (bottom), you get a better cut if you rout the profile on a wide board. Shims let you rout in a series of passes, rip the molding away, and then repeat, without losing that perfect fence setting.

This short article is a follow-up to "Speed Up Your Work with Spacer Blocks" in *FWW* #226. The basic concept is the same: You set your fence and/or stop block just once, and then use precisely sized wood blocks to make subsequent cuts in other positions. It works great for joinery, especially when doing a number of identical parts. In this case, your ultimate goal is just one good cut—a clean, precise profile on the router table—and instead of blocks, you use shims.

Because this technique is a little different, and because it is so helpful for a wide variety of router-table work, *FWW* decided to give it its own showcase here.

Router profiles are deceptively difficult. Router bits don't do well at removing a lot of material at once, so for cleanest results you need to make several passes, moving the fence each time and leaving just a light cut for the final pass. The trouble is that you are often trying to end up at a precisely sized profile. So you dial that in on a scrap piece, and then proceed to move your fence for the preliminary passes, losing that perfect final setting.

Shims are the answer. You set the fence for the perfect profile, and then add the fence shims you need for the preliminary passes and a light final one. I use various materials for fence shims, including 3mm (⅛ in.) and 6mm (¼ in.) Baltic-birch plywood, taking heavier cuts at first and then lighter ones as I near the end. Your final pass should be about 1/16 in. This is especially important if you are working with a wood that is prone to tearout, such as oak. So make that last shim from a piece of thin plastic laminate. If you are still getting tearout on the final pass, try a climb cut (holding the workpiece firmly) followed by a normal push cut to clean up any bumps. □

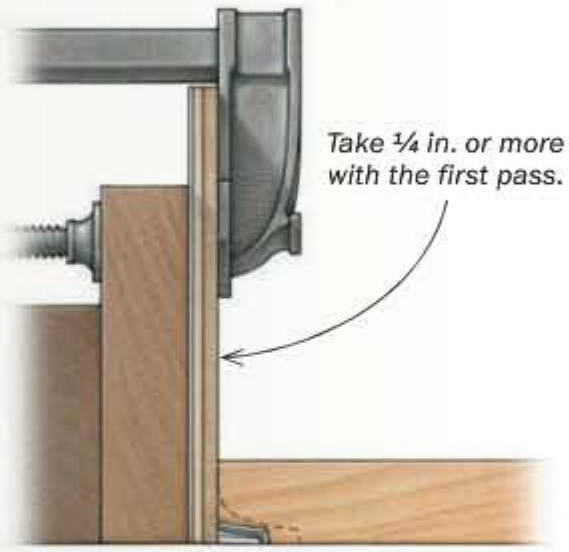
Alan Turner teaches at Philadelphia Furniture Workshop.

Photos: staff; drawings: Christopher Mills

FIRST PASS

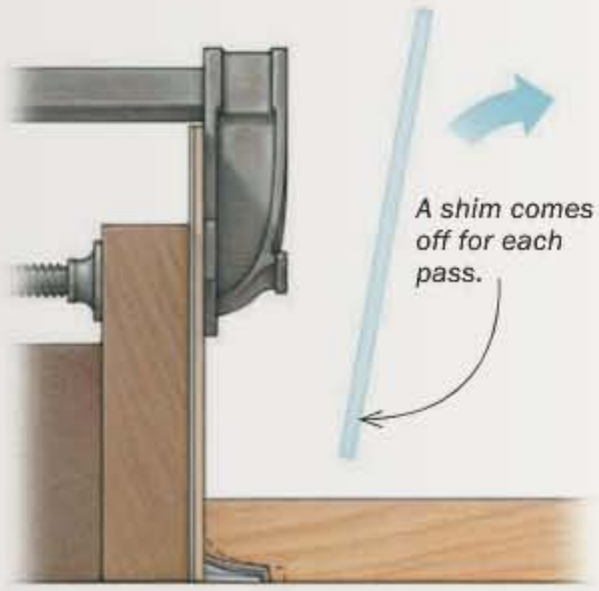
Pile on the spacers. *After making test cuts on a scrap piece and finding the perfect final fence setting, clamp on the spacers for the preliminary passes.*

Heavy lifting. *On most profiles, you can take a full ¼ in. or more on the first pass, since any vibration or burning will be removed later. But with some, like rabbets, you want to just nick the edge on the first pass, to prevent chipout there later.*



INTERMEDIATE PASSES

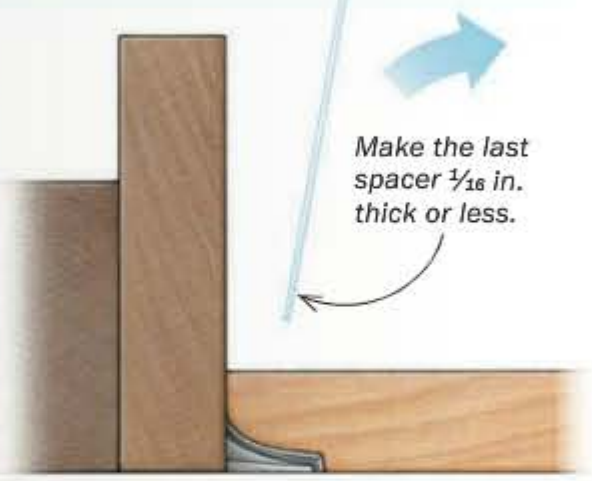
Quick change. *Different profiles will require different amounts of shims, but they go on and off quickly.*



Thick to thin. *The basic idea is to go from heavier cuts to thinner ones as you get close to your final profile. The shallower the cut, the cleaner, and you don't want to leave behind any deep burns that the final pass won't remove. This is a ⅛-in.-deep cut.*

FINAL PASS

Last pass is against the fence. *Since you dialed in the final fence setting right at the start, your last pass will be exactly as deep as you want it.*



Perfect finish. *If you leave a very shallow cut for the final pass, you'll be surprised at how clean the surface will be. The goal is to avoid heavy sanding, which is slow and tends to blunt a profile's crisp edges.*

Secrets of Segmented Turning

Clever tips and jigs unlock these puzzles in the round

BY ART BREESE

It was golf that drew me to Sun City West, a huge active-retirement community outside Phoenix. But there are only so many rounds a guy can play, and I soon wandered into the woodworking club there. An amazing sight awaited me: 7,000 square feet of first-class equipment and bench space, and dozens of people working away happily.

After doing a few projects on my own, I noticed a couple of people making segmented bowls, having fun and sharing knowledge. They were extremely helpful in getting me started.

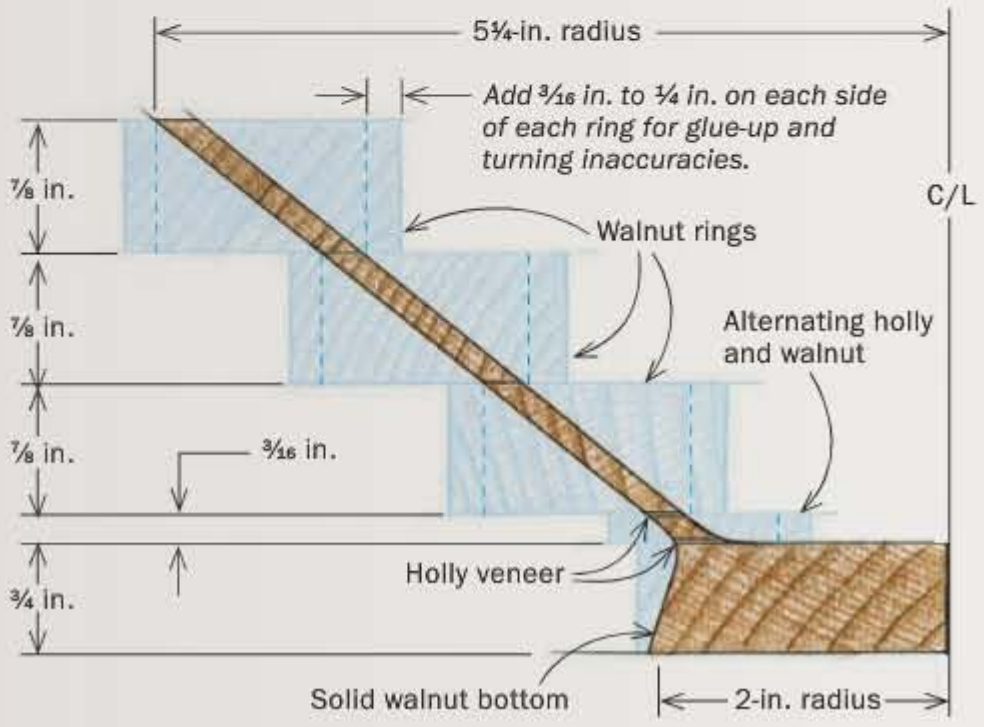
I quickly became an addict. When you make segmented

Photos: Asa Christiana

Design stage is critical

START WITH A SIDE VIEW

A full-scale cutaway side view of your bowl will give the thickness and width of each ring. Then there are a number of ways to generate the length of each segment needed (see right).



turnings you are never in full control. You can sketch out a perfect plan for the segments, angles, and glue-ups, but you don't know exactly what you are going to see until the last surface is sculpted. In our shop, we think of a first attempt at any design as a prototype, knowing we can improve on it the next time. That's the fun: striving for perfection, never quite achieving it, but always showing improvement.

And you don't need a big lathe or special accessories to do it. A combination disk/belt sander is very helpful, though.

Start with a precise plan

Obviously, an almost infinite array of glue-ups can produce an infinite variety of patterns. But there are two main types of assemblies, rings and staves, often combined in more complex vessels. I'll stick with the ring method here. It is the most basic approach, yet very versatile.

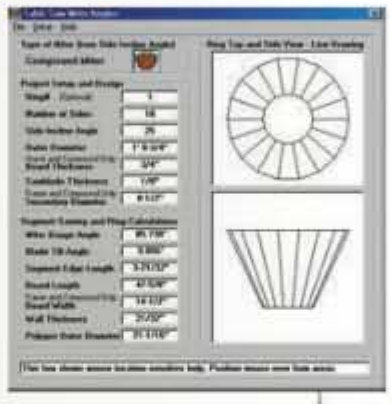
The first step is to decide on the patterns you want in the finished turning. You can base your design on photos of other people's work, or on your own brainstorming and sketches. Then you need to make a scale drawing to sort out the rings and segments needed. The segment angles are pretty standard. You just divide the number of segments into 360. However, to get the length and width of the segment blocks, you need an accurate cutaway side view of the bowl (see above). That will show you the width and thickness of each segment, but you still need the segment lengths. The simplest way to determine that is to take the circumference of each ring (π times its diameter) and divide by the number of segments. That will get you close enough, but the two methods at right are a bit more precise.

I chose an understated yet elegant walnut bowl for

TWO WAYS TO SIZE THE SEGMENTS

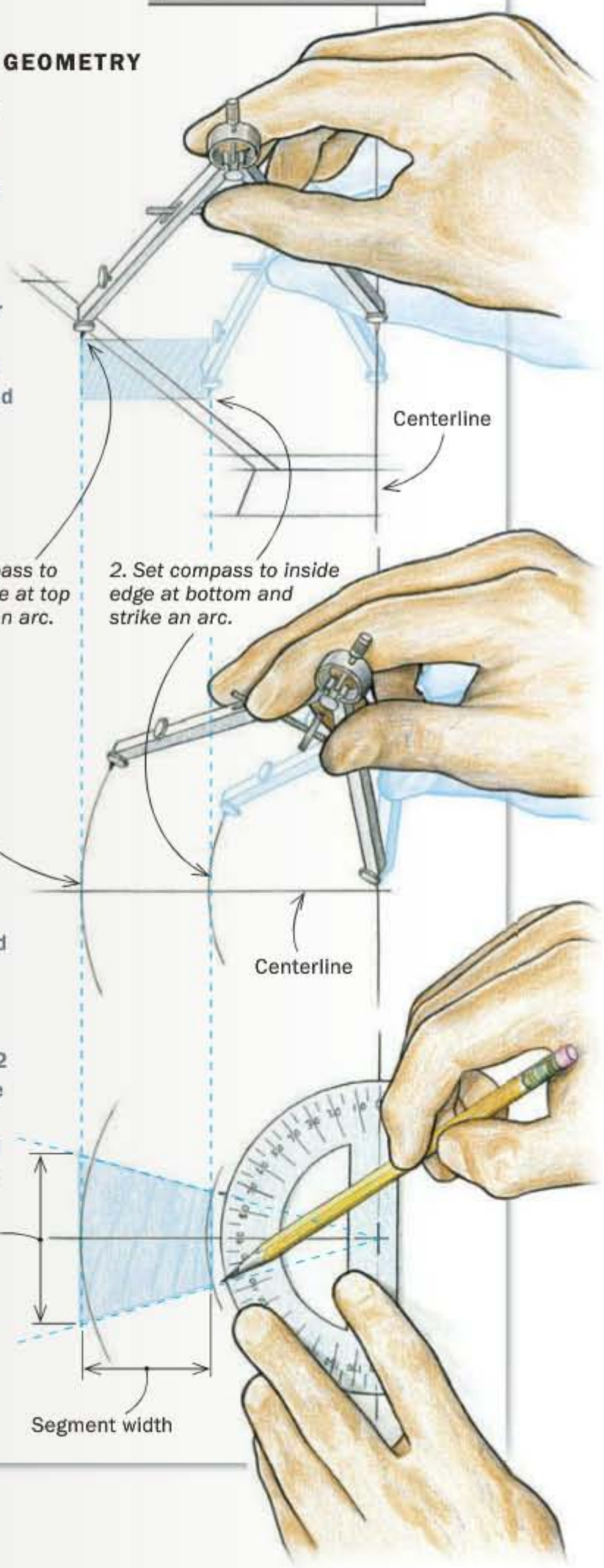
DOWNLOAD SOFTWARE

To get the size of any type of segment in any type of vessel, Breese recommends using a computer program. He and his friends use Table Saw Miter Angles ($20 at TurnedWood.com).



OR DO SOME GEOMETRY

Here's a graphic way to create a top view of the segments in this basic bowl. Set a compass to the inside and outside diameter of a particular ring (right). Then swing arcs around a centerline (below).

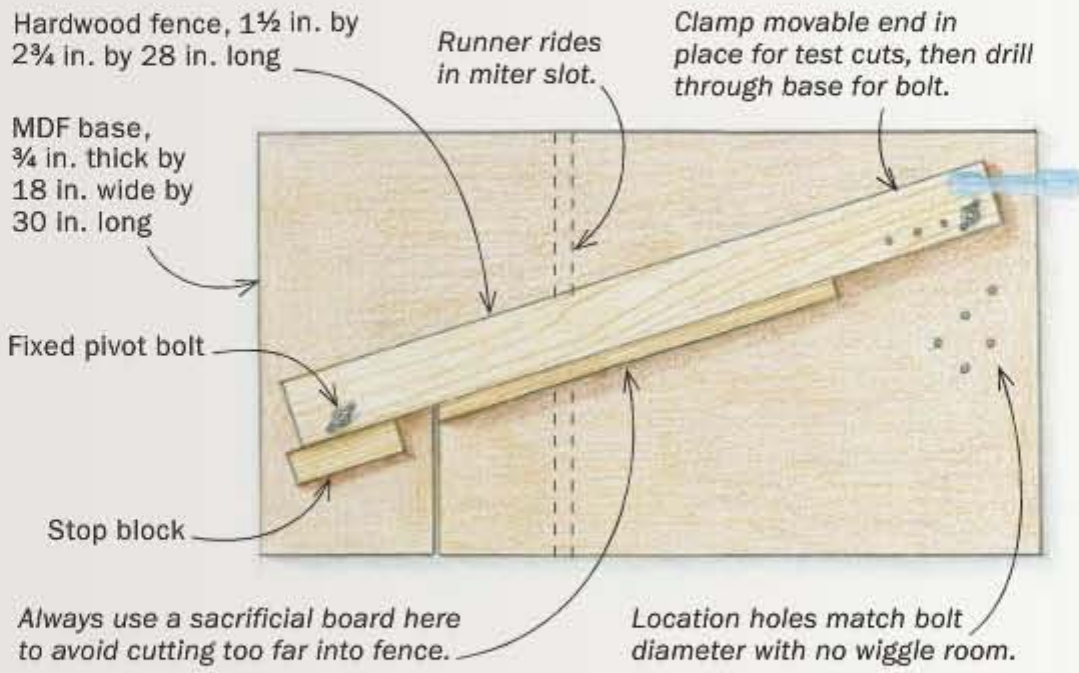


Drawings: John Tetreault

Tablesaw sled produces perfect segments

LOCK IN THE FENCE FOR VARIOUS ANGLES

The fence on this sled has a fixed pivot point, with precise holes drilled to bolt down the other end at common segment angles. To figure out a hole location for a specific angle, clamp the fence temporarily and cut test segments until you get a perfect ring, and then drill a hole through the fence and base at the same time to lock in that angle for the future.



HOW TO USE IT

Cut one clean edge. *After setting the fence at 15°, the first step on the sled is simple. Move the stop out of the way and cut a clean angle on the end of the stock.*

Set it and forget it. *Now you can flip the workpiece and set the stop for the length of the outside of the segment. The stop stays put: You just flip the stock between cuts. Breese's clever hook-like holddown keeps the segment safely in place against the stop.*

Check your work. *To check the angles, dry-fit all 12 segments and pull them together with a hose clamp.*

this introduction to the craft, throwing in a bit of contrasting holly to add flair: alternating segments in the lowest ring, outlined by holly veneer above and below, and more holly veneer sandwiched between the other segments, highlighting them with a fine contrasting line. So you'll need to subtract 0.030 in. from the length of each segment to account for one thickness of veneer.

Precise jigs produce precise segments

Once you know the dimensions of the segments and you've chosen woods and decided how the grain should run, prepare the stock. Prep enough for a few extra segments. This is pretty standard woodworking, though you need to get everything perfectly straight and square, and be certain that all the stock for a given ring is planed to precisely the same thickness. The tricky part, as you might imagine, is getting all the angles right.

My main jig for cutting angles is a tablesaw sled, with a fence that can be set at common segment angles. With a sharp blade and an accurate sled, you can get good glue surfaces right off the tablesaw. If you are having trouble, or if you are using a lighter wood that shows glue joints more obviously, you'll want another helpful jig for segmented turnings: an angle jig for the disk sander. I'll include that one at FineWoodworking.com/extras.

Be sure to cut a few extra segments and deburr the

Online Extra

Having trouble getting perfect joints off the tablesaw sled? Go to **FineWoodworking.com/extras** for another handy jig for segmented turnings: an angle jig for the disk sander.

edges of each segment so they'll join cleanly.

Assembly starts with the base blocks

The first assembly step is screwing the waste block to the faceplate and then doing some light turning to clean it up. Start with the outside diameter. You'll do this for all the layers, which will help you keep them concentric and the vertical gluelines aligned nicely. Now turn the critical glue surface on the face. I use a round-end scraper to turn it as flat as possible, before relieving the center about ⅛ in., leaving just a 1-in.-wide ring around the perimeter. This gives the excess glue somewhere to go when you rub the joint together and put it into the clamping press. It also makes the bowl easier to part off later. Last, I press a board covered with sandpaper against the face to ensure it is dead-flat. I do this each time I am truing up a new layer on the lathe.

Now glue on the first layer of the bowl, the solid block that will form the bottom. On this and all the rings that follow, the glue face must be dead-flat, which I take care of on a belt sander (see photo, right).

To glue on each new ring, I turn to a setup that resembles a small veneer press. These can be made pretty easily from wood or metal. You can also use clamps and cauls, but you'll have to be very careful to balance the clamping pressure.

After a half hour or so for the glue to set up, you can turn that block to get it ready for the first ring. Again, clean up the outside diameter, turn the face flat, turn a shallow depression in the middle, and then apply the sanding block to ensure flatness.

For this design, the first layer of holly veneer goes on now. I cut it to size by placing what I've turned so far on a sheet

Rub joints make rings

These angled pieces would be difficult to clamp tightly, but rub joints work wonderfully.

Two at a time. *Glue up one pair at a time. Put glue on all mating surfaces (including the holly veneer between the upper segments), put the pieces down on a flat, non-stick surface, and start rubbing them firmly together. When the joint tightens, align the corners before setting the assembly aside. When it's dry, join the pairs until you have half-rings.*

Sand the halves flat. *This removes excess glue and any unevenness. Breese does this on a stationary belt sander using a light touch. (The pencil lines are for the next step.)*

Now sand the edges. *The disk sander ensures that the final rub-joint is gap-free. Watch the pencil lines to track your progress.*

After joining the rings, sand again. *Breese spins these lightly on the belt sander, but if you don't have one you can do your flattening on a big piece of sandpaper stuck to a flat surface as shown.*

Build from the base up

Waste block goes on first. *Screw a block of solid wood onto the faceplate and then prep its face for gluing. True up the outside diameter, and then skim the face with a round-end scraper before turning some relief (as shown) in the middle for glue squeeze-out.*

MAKE A SMALL PRESS

To glue the rings together evenly and accurately, you'll need a small press like the one Breese and his friends made. Theirs is welded steel, but you can easily make one from hardwood and melamine, using a press screw.

Add the bottom of the bowl. *This is a solid block of walnut, sanded flat. Always rub layers together first to create a thin glueline before clamping them in the press.*

Now a layer of holly. *Holly veneer frames the ring of alternating holly and walnut. Trace around the turning onto the veneer, cut out the disk leaving about ⅛ in. of excess, and then glue it on using the press.*

Trim the veneer. *A quick touch with a gouge removes the excess.*

of veneer, tracing around it, and then cutting it out with scissors. Then I clamp it in the press and let the glue cure for an hour or so.

Build the rings, segment by segment

It would be next to impossible to clamp all the angle blocks together accurately to form the rings. The solution is the humble rub joint. If your surfaces are clean, these joints are very strong, and they also leave extremely thin gluelines, which look best. These tight joints also cure quickly, reducing downtime.

The key here is keeping each little assembly flat so the glue joint will be good, and the segment corners aligned so you ultimately get a round ring. If it isn't round, it will be impossible to align the segments vertically in the various rings.

My trick for ensuring flatness and alignment is simply holding the pieces against a 12-in.-by-12-in. granite plate as I rub them together. You could use any flat surface for this, such as MDF or melamine. You align the corners at the same time.

For the first ring, you'll be alternating holly and walnut segments. Put a layer of glue (I use Titebond II) on both mating surfaces, press them down on the plate, and rub them together until you feel the joint begin to grab. Be sure the corners are aligned before putting them aside to cure for 20 min. or so. Then join sets of pairs, wait, and so on until you have two halves of the ring.

Before joining the halves, they need some prep work. Sand their bottom face to remove the excess glue, and then bring them to the disk sander to sand both ends at once. This is another great trick from my friends at the woodworking club. Even if your segment angles were a little off, sanding the halves ensures that the final glue joints are tight. The trick here is to scribble on the ends with pencil, and then sand until the lines disappear.

Now you can rub the final joint together to complete the ring, and after one hour (to

let the glue cure more fully), re-sand the bottom side of the ring to be sure it is still flat.

The only twist with the other rings is the little pieces of holly veneer that go between the other segments. You'll need to cut the pieces in advance (about 1/32 in. oversize is fine) to fit the glue faces of the segments, and then bond a piece between each segment as you rub them together. Don't worry, the veneer won't prevent you from eyeballing the corners of the segments to align them.

True up each ring as you go. *Turn the outside to make it concentric, and then flatten the face with a round-end scraper again. Breese also sticks sandpaper to a board and uses that as a last flattening step.*

Keep them aligned. *It is critical that each ring stay centered and aligned properly in the press. Breese marks centerlines on the ring and then traces around the turned assembly to be sure it doesn't shift.*

Turn the inside first. *Turn until you have a smooth wall, and then check your progress with a simple template made from your drawing. You want to be sure you don't go too far and that the angle is right.*

One layer at a time

You might be tempted to glue all the rings together at once, but don't do it. The pieces will slide around as you apply pressure and you'll never get them to stay aligned. Put on the layers one at a time, as we have been doing: letting each joint set up, and then cleaning up the outside of each one to get ready for the next.

At this point, the holly veneer is flat as is, but the outside diameter still needs to be trimmed on the lathe. After doing that, the "feature" ring (alternating holly and walnut) goes on. Use the rubbing action to remove the excess

Now the outside. *Just use a caliper to keep the wall thickness even, and your bowl should be perfect.*

Keep it on the lathe. *Sand and finish the top of the bowl, outside and in, while it is still spinning on the faceplate.*

Part it off. *Breese got some help here from a white-gloved friend, who let the bowl spin in his hands and than caught it when it came free.*

glue, and then put it in the press. Remember that one more layer of holly veneer goes above the feature ring.

As you add layers, pay careful attention to the vertical alignment of the segments in each successive ring. To be sure I bisect each segment, I mark centerlines. Then I position the ring properly and trace around it to be sure it doesn't shift as I am rubbing and clamping.

Each ring only needs 45 minutes or so to set up, but let the whole assembly cure fully overnight before turning the bowl.

Turn it and see what you've got

Start with the inside when turning the bowl. I recommend using a template, made from your drawing, to make sure you are turning close to the right angle or curve. You don't want to go too far and not have enough left outside to produce an even wall thickness. Then you can turn the outside, using a caliper on the walls.

As for sanding and finishing, I go from P150-grit up through 600, finishing up with 0000 steel wool. Apply your finish before separating the bowl from the faceplate and waste block. I use five or six coats of Minwax Wipe-On Poly, using the 600-grit paper or 0000 steel wool between coats.

The bottom of the bowl is still attached to the faceplate, so the last step is to part the bowl off the waste block and finish turning the bottom. There are a number of ways turners hold a bowl in the reverse position. I use a vacuum chuck at our community shop, but I'll demonstrate a lower-tech method using a shopmade plate. I hollow my bases to help prevent rocking, and add a few decorative details.

After you sand and finish the base, you are done. There are lots of steps, but none of them hard, and once you get set up to turn segmented work, you'll become as addicted to it as I am! □

Art Breese is a retired engineer living in Sun City West, Ariz.

Reverse turning. *You need to flip the bowl around to finish off the bottom. A vacuum chuck will hold it nicely, or you can make a simple faceplate as shown. Breese turned a channel in MDF to fit the rim of the bowl exactly, then screwed on small wood tabs to hold it in place.*

Works like a charm. *The bowl spins true and holds fast, allowing Breese to face off the bottom, hollow its center a bit, and then turn a few nice details before sanding and finishing this last area.*

Revive a Finish

Don’t rush to strip; a simple cleaning and renewal can work wonders

BY JEFF JEWITT

READY FOR REVIVAL

After 30 years, the original penetrating oil finish on this table is still intact but has become dull and is obscured by a layer of dirt and grime. The fix isn’t refinishing, but cleaning and renewing the finish.

Stripping a piece of furniture must be the nastiest finishing task. Not only are the fumes unpleasant, but it’s messy and requires cumbersome safety equipment. Yet for many, stripping is the first thing that comes to mind when they see a piece of furniture whose finish is worn or damaged. However, stripping is the nuclear option of refinishing.

In many cases, if the finish is just worn but still in good shape, you should consider cleaning and reviving it. This approach is used extensively in the antiques and museum trades and uses simple materials and surprisingly few tools.

I’ll show you several no-strip methods for refreshing different

Evaluate the finish

Is it beyond repair?

To see if any finish is worth reviving, wipe it down with some paint thinner or mineral spirits. Wetting the surface not only helps you preview what the piece will look like under a revived finish, but more importantly, it reveals any major flaws in either the finish or the wood that can be fixed only by stripping the piece.

MISSING FINISH

You can't revive a finish if it's missing. The mineral spirits will darken areas with no finish.

DAMAGE TO THE WOOD

Cracks and blisters in veneer make reviving a finish pointless. On solid wood, if long, deep scratches and gouges have gone through the finish into the wood, cleaning and reviving may make them look worse.

BLACK/GRAY AREAS

Cleaning and reviving will not remove gray or black areas. These problems usually indicate water damage to the wood and not the finish.

STICKY FINISHES

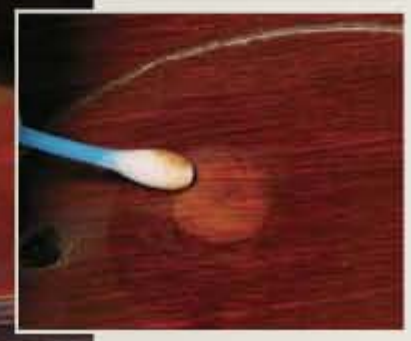
Finishes around pulls that are routinely in contact with skin will become sticky over time. If you press a cotton swab on the finish and parts of the cotton remain, go right to stripping. Cleaning and even putting new finish over a sticky finish will never harden it.

ALLIGATOR SKIN

Some finishes that have been applied thickly become brittle and crack as they get older. The resulting finish is rough and bumpy. Don't bother trying to clean or revive these finishes.

Which type are you dealing with?

Oil finishes are easy to spot, but a film finish could be a number of things. Rub a cotton swab soaked in lacquer thinner on an unobtrusive area. If the finish comes away, it is lacquer. If it doesn't, try denatured alcohol to see if it is shellac.



kinds of finish. I'll discuss which finishes respond well and which don't. Go ahead and experiment on an old piece. You'll most likely be amazed at the results, but if you aren't, you can always strip it afterward without having invested a great deal of time.

Evaluate the damage and determine the finish

Woodworkers usually get to finish new furniture, but there are a couple of reasons why it is good to know how to refinish a piece. The finish on your early creations may have deteriorated; or perhaps you own an heirloom or two, or couldn't resist a flea-market bargain. The first step is to see if the finish has damage that puts it beyond reviving (see photos at left).

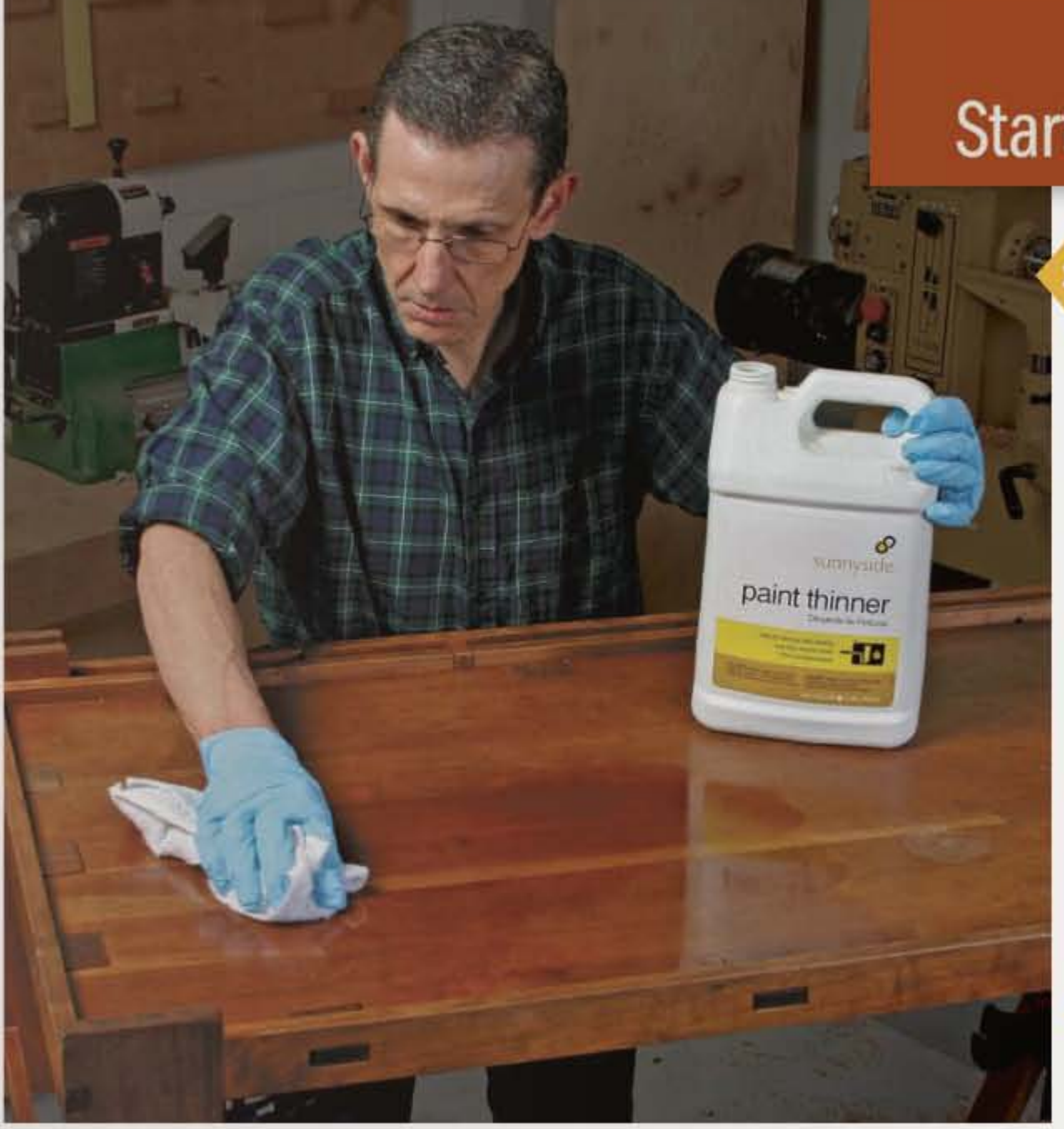
If it looks like a good candidate for reviving, the second step is to see what type of finish you're dealing with, because this determines the method. The best finishes to clean and revive are old oil, oil/varnish, shellac, and lacquer finishes. The first two types are generally wipe-on, penetrating finishes with little to no surface build and will have a flat, dull look when old. You may even have applied them yourself when you built the piece.

With a film finish, test to see if it is lacquer or shellac (above). If the finish responds to neither solvent it is probably oil-based polyurethane, a waterborne finish, or a high-tech catalyzed finish, none of which revive very well. However, you can still put these finishes through the two-step cleaning process explained below.

A good cleaning reveals the finish

First, remove any loose dust from the surface. Next, take a rag, ideally with a little texture such as terrycloth, and wet it with

Photos: Mark Schofield



Start with a two-step cleaning

1 ***Remove the wax and grease.*** *Dampen a cloth with paint thinner, and rub the surface. This will take off any residual wax polish.*

2 ***Now clean the surface.*** *Warm water and dish detergent remove the accumulation of dirt from sticky fingers, spilled food and drink, and any leftover paint thinner.*

mineral spirits or paint thinner. Rub the surface in small circles, paying attention to crevices and corners that might contain old wax as well as areas that get contact with hands and fingers, such as around knobs and pulls. I often wear a respirator when using either solvent indoors, but if you work in a well-ventilated area (as I am above) you can probably get by without one. Or you can substitute odorless mineral spirits (Klean-Strip is one brand) or naphtha, which evaporates faster and doesn't have a lingering solvent odor.

If you don't see a lot of grime on your rag when you do this step, all that means is that the finish probably wasn't waxed often or exposed to oil-based products such as lemon oil. However, if there's some grime on the surface that doesn't seem to be coming off with the cloth, you can use a piece of 0000 steel wool.

For the second cleaning, put about ½ oz. of dish detergent in a pint of lukewarm water. I like to use Dawn because it contains grease-cutting chemicals known as surfactants. Dampen a cloth (don't get it dripping wet) and wipe the surface in the same manner as before. Most of the grime and dirt is removed with this second step because the soapy water pulls off the oily residue from the first step and also removes water-soluble grime like sugary food spills. Change the cloth frequently to a clean part. When you're done, lightly wipe the surface using distilled water to remove any soap residue.

How to revive a wipe-on, oil-based finish

One of the most popular finishes used by non-professional woodworkers is some type of an oil finish. This includes pure tung oil or boiled linseed oil, one of the Danish oils, a wiping varnish, or an oil/varnish mix. All these finishes are popular because they penetrate deep into the wood, accentuate figure and detail, and provide a very natural, low-luster finish that woodworkers like.

A downside of these in-the-wood finishes is that over time they get dull and the wood loses its luster. The steps below are a good way to really liven these finishes back up. This was probably the first finish you used, and luckily for you, it is among the easiest to revive.

Wet-sand to remove minor scratches—You're bound to find minor surface scratches on pieces that have seen normal household use, but this next step should repair them. You'll need some type of wiping varnish such as Seal-A-Cell, Waterlox Original, or Minwax Antique Oil. If you know the original finish was a pure tung or linseed oil and you want to avoid adding any kind of film finish, you can substitute Danish oil.

Pour a small puddle of the finish onto the surface and then use a small piece of wet-or-dry sandpaper (600-grit CAMI or P1000-grit FEPA) to wet-sand in circles or with the grain. Sand until any slight scratches are gone and the surface looks uniform. Remove the excess with a dry cloth and let it dry at least six hours.

These penetrating finishes aren't usually used with dyes or glazes so you probably won't need to touch up any missing color (see p. 71), but if you do, let any color repairs dry for about an hour and then apply a coat of the same finish you used for wet-sanding. Using a small piece of paper towel or old cotton T-shirt, I apply just enough to make the surface look wet and then allow it to dry. Apply another coat or two if you want a deeper luster to the wood

Restore an oil finish

Thin, wipe-on finishes don't offer much protection, so over the years the surface becomes scratched. Fortunately they are easy to revive.

Step 1. Wet-sand and wipe

Pour on a liberal amount of a wiping varnish and then sand the surface with fine sandpaper. This removes most of the scratches and leaves an even sheen. Once you've sanded the whole surface, wipe off the extra finish and let the piece dry.

or more protection. As a final step, you can apply and buff out a coat of paste wax.

Sand and wax shellac or lacquer

Reviving a shellac or lacquer finish is even quicker, because you don't have to add finish. You could, of course, as new shellac or lacquer will melt right into old, but it's easier to level what is already there than try to brush on a new, level coat. Do the two-step cleaning process, then instead of wet-sanding, dry-sand the finish lightly with P600-grit stearated sandpaper like Norton 3X or 3M Fre-Cut. If the finish is slightly crazed (rough and cracked), sand it back as much as you can without sanding through to the stain or bare wood.

Touch up any missing color—If the piece was originally dyed or stained, or if you sanded through to lighter wood underneath, you may need to repair some colors. I mix dry furniture powders with SealCoat dewaxed shellac. You can blend a custom color and it dries very fast, so you can proceed to the next step without waiting. Use a No. 4 artist's brush (from art and crafts stores) and

Step 2. Wax and buff

Dark wax can enhance a dark wood by concealing minor scratches and not leaving a cloudy residue. If left a little heavy in corners, it can add an aged look. Buff the wax to leave the restored piece looking beautiful again.

play with the colors on a piece of white paper until you get a reasonable match to the wood. Apply it sparingly, just enough to disguise the problem. Avoid the temptation to make it perfect, because you are more likely to make the touch-up obvious.

Instead of more finish, I find that a coat or two of paste wax works better and is a lot easier. It adds a bit of luster and lends that silky feel that old furniture gets over time when it has been cared for. If you deliberately leave a little dark wax in corners and crevices, it adds an antiqued look. Always use tinted paste waxes on dark finishes. Clear wax can dry whitish and look bad on open-grained woods like oak.

Thick film finishes can only be cleaned

Film finishes like oil-based polyurethane, waterborne finishes, or high-tech, two-part finishes often found on kitchen cabinets don't revive very well. If you try to sand them, you are likely to go through a layer of finish and leave a witness line that can only be covered up by applying a new topcoat to the whole surface. However, these tough finishes are harder to damage, so there is a good chance that after the two-step cleaning they will be ready for many more years of useful service. □

Jeff Jewitt is the owner of Homestead Finishing Products in Cleveland, Ohio.

Revive lacquer or shellac

These thicker film finishes can be sanded smooth and then just waxed. Although unsightly, most surface scratches and dull areas are only skin deep.

Step 1. Sand it smooth

Use 600-grit sandpaper to remove the damaged surface of the finish, leaving a more even appearance.

Step 2. Retouch missing color

Any old piece that was originally dyed or stained is likely to need the color touched up. The edges of pieces are often worn down, revealing bare wood. A single brush stroke of color instantly restores their look. Combine different shades of furniture powders and some dewaxed shellac on a piece of white paper until you get a good match.

Step 3. Finish with wax

After sanding away the damaged finish, apply a coat of paste wax and then polish it to an even sheen.

readers gallery

BEN HOBBS
Hertford, N.C.

Each year, Ben Hobbs and his three sons, Calvin, Matthew, and Ernie, get together to work in Ben's shop in what they call "sons' week." Ben, the 2011 recipient of the Society of American Period Furniture's Cartouche Award for excellence in period furniture making, has been making 18th-century-style furniture for over 30 years. He and his sons started these desks, which are reproductions of an original by Thomas White (1765) during sons' week, then took them home to complete the job. The desks (21 in. deep by 39½ in. wide by 42 in. tall) are black walnut with bald cypress as the secondary wood. The finish is aniline dye, shellac, and wax. They took between 300 and 450 hours to complete (Ben was the fastest, they say, and Ernie is still working on his). PHOTO: JEREMY GROVES

MATTHEW HOBBS
Durham, N.C.

PHOTO: MATTHEW HOBBS

CALVIN HOBBS
Overland Park, Kan.

PHOTO: WESLEY LEWIS

RICK TOMKINS
Summerland, B.C., Canada

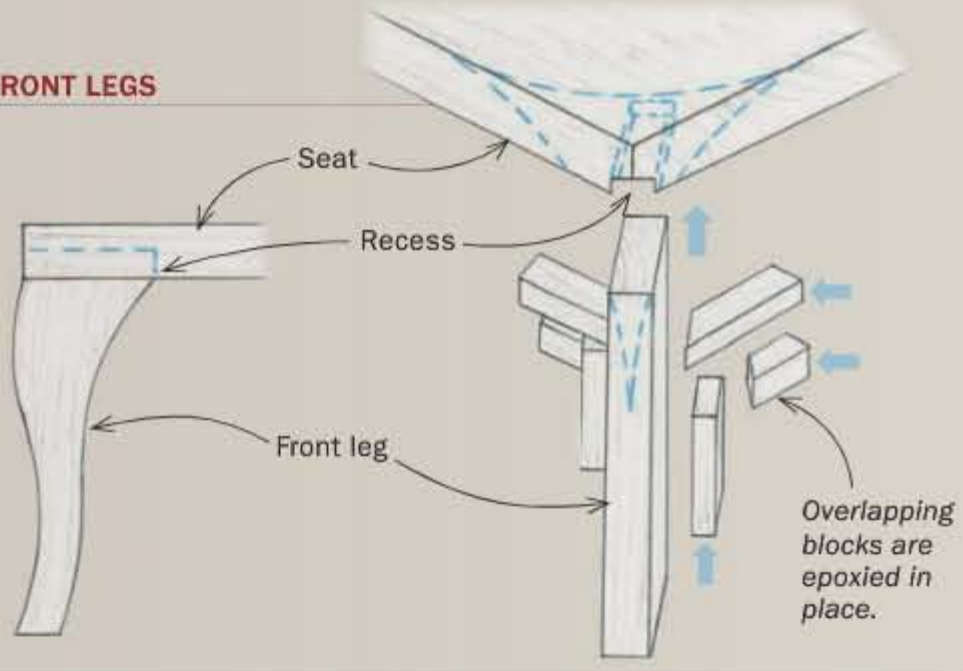
Tomkins built this table (20 in. wide by 47 in. long by 15 in. tall) as a gift for his daughter. He says it's more a tea table than a coffee table, as it was inspired by a teapot she received for Christmas. The woods are African mahogany and Ponderosa pine. The mahogany end pieces on the stretchers were fastened to the leg with a mortise-and-tenon joint; the crossmember was joined with a lap joint. Tomkins roughed out the shape of the breadboard ends with a gouge, checking against templates and doing the final shaping with progressively finer grits of sandpaper. The finish is lacquer and Briwax.

DESIGN SPOTLIGHT

VICTOR DiNOVI
Santa Barbara, Calif.

DiNovi likes to work spontaneously, more like a sculptor than a cabinetmaker. He rarely draws his pieces before building them. But he doesn't take any risks with structural integrity or function. With training as a mechanical engineer and 40 years experience doing custom woodwork, he has developed methods of gluing up his pieces that provide maximal strength at the stress points while giving him freedom in the carving process. Where the leg meets the seat, for example, DiNovi epoxies in a series of blocks in an interlocking pattern, creating a rigid gusset on either side of the leg. The technique DiNovi uses to build up his carving blanks was traditionally used for making carousel horses and religious statuary. He does his carving with power planes, angle grinders, and pneumatic chisels. About working without reference surfaces, DiNovi says, "with the type of work I do, *you* are the fence." His wenge and bubinga chair is 22 in. deep by 48 in. wide by 32 in. tall.

FRONT LEGS



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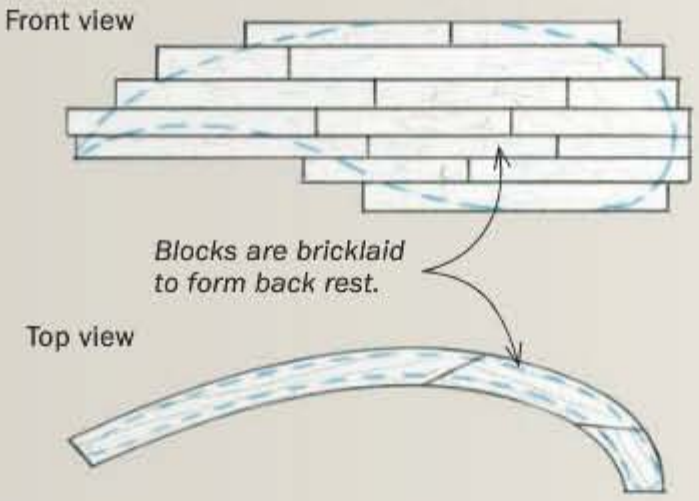


JIM TUTTLE
Marietta, Ga.

A big fan of Shaker furniture and of Garrett Hack, Tuttle based the design of this table on a Hack table featured in *FWW* #104 ("Building a Strong, Light Carcase"). Instead of pear and maple, Tuttle used mahogany for the carcase and legs, spalted maple for the drawer fronts, and maple for the other drawer parts. The pulls are ebony. At 22¾ in. deep by 27½ in. wide by 29¼ in. tall, Tuttle's table is a bit smaller than Hack's. The finish is dye, shellac, and polyurethane for the carcase, and shellac alone for the drawers and pulls.

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com/RG.

Wharton Esherick keeps on giving

When Wharton Esherick died in 1970, he left behind a powerful legacy: his furniture, with its blend of sculptural power and perfect utility, and the extraordinary house and studio he built for himself in Paoli, Pa. (turned into a museum shortly after his death). Thousands of woodworkers have been inspired by them. Now the Esherick estate has bequeathed some wood as well. A tall tulip poplar tree that long shaded his house (left) had to be cut down, and 42 woodworkers and artists were invited to build pieces from it for "Poplar Culture: A Celebration of a Tree," an exhibition in Esherick's honor. The results went on view May 20. We've selected a few of our favorites here. For more, go to whartoneshericksmuseum.org.

Honoring the tree. *The dying poplar was harvested in January 2010. Here, turner David Ellsworth helps divide the tree.*

Online Extra

To watch a video showing everything from felling the tree to the artists at work, go to **FineWoodworking.com/extras.**

KEN BELL
Greenwich, N.J.

A retired music teacher and avid tree farmer, Bell has been making baskets for 22 years. He based the design of this peck basket (10¾ in. dia. by 10½ in. tall) on factory-made produce baskets made from poplar that he saw as a child in southern New Jersey. Bell's piece is more refined than the factory basket, but no less functional—he's been using a similar one as a firewood carrier for two decades. PHOTO: JAMES MARIO

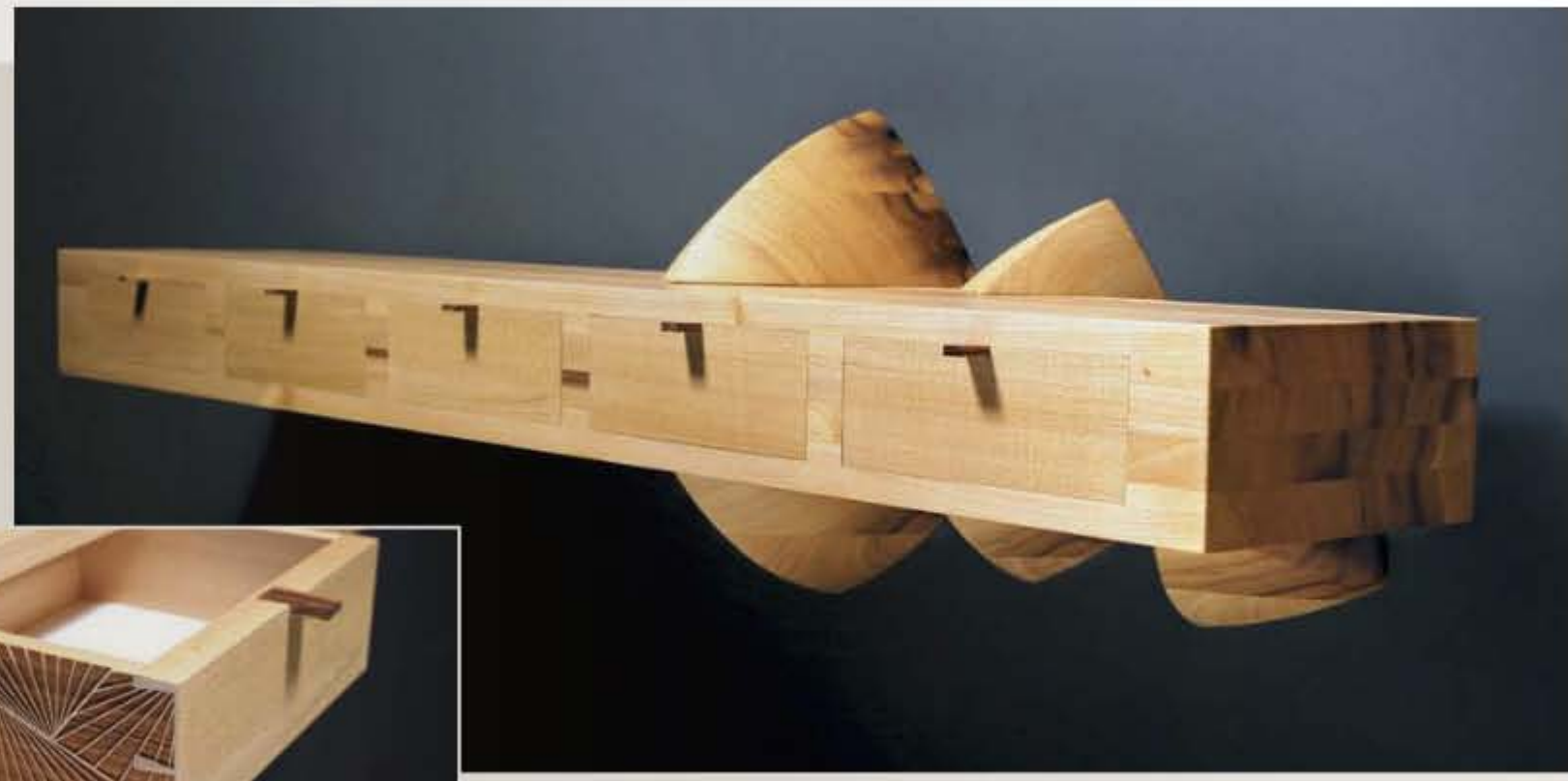
MICHAEL PURYEAR
Accord, N.Y.

Puryear calls the Wharton Esherick Museum "one of my favorite places—I always tell people to go there." When Puryear selected his portion of the Esherick poplar, the thickest planks remaining were 4/4 and 5/4, and that restriction prompted this bench (18 in. deep by 48 in. wide by 16 in. tall). Puryear liked the grain pattern of his planks but felt the color was bland, so he used aniline dye to impart a golden tone without obscuring the grain. PHOTO: JONATHAN BINZEN

Top photos: James Mario (left), Paul Eisenhauer (right)

JAMES McNABB
Montville, N.J.

As a graduate student in the wood program at Indiana University of Pennsylvania, McNabb has been avidly exploring the possibilities of laser-cutting. He used the technique, which leaves a singed surface where it removes wood, to decorate the drawers of his wall-hung piece (12 in. deep by 43 in. wide by 10 in. tall). The pattern of radiating lines was inspired by a Victrola cabinet designed by Esherick. PHOTOS: JAMES McNABB



JOHN C. STERLING
Millmont, Pa.

In building his asymmetrical cabinet, Sterling left the natural edges on the planks he chose from the Esherick poplar as a way of honoring the tree. Sterling likes using live-edge boards, he says, because it makes each piece of furniture unique and "lets the tree speak in its own language." His cabinet is 13 in. deep by 43½ in. wide by 28¾ in. tall. The door pull and pins are walnut. PHOTO: JAMES MARIO

STEVE LOAR
Indiana, Pa.

Loar, a longtime teacher and turner who is the director of the Center for Turning and Furniture Design at Indiana University of Pennsylvania, was one of the last to select his wood from the Esherick poplar. The larger pieces that remained were afflicted with rot and termites, but he found a crooked branch that interested him. He turned Bird Encased (7 in. dia. by 17 in. tall) from it, preserving the bend in the branch by making a dual-axis turning. The shape of Loar's piece was inspired by the 1923 marble sculpture Bird in Space by Constantin Brancusi.
PHOTO: STEVE LOAR

Q&A

How to avoid twisted doors

Q: The frame-and-panel doors on my last two projects came out twisted, even though the hinge sides are flush with the cabinet. What's causing it and how can I fix it?

—JEFF STREBA, Salt Lake City, Utah

A: BLAME YOUR STOCK, JOINERY, OR CLAMPING for the twist, so keep an eye on all three when you build your next doors. Start by choosing stock for the frames that has reasonably straight grain, and make sure you let it acclimate to the humidity in your shop for a few days before milling it. Properly dimensioned and seasoned stock is critical to making straight frames for doors, so be sure the workpieces have faces that are parallel and edges that are square.

Miscut joinery also causes doors to twist. The tenon cheeks must be parallel with the rails, and the mortise walls must be parallel with the stiles for a door to be flat, so check that your machinery and fences are properly set. Once you've cut the mortises and tenons, you can check for twist by dry-fitting the door and laying a ruler or straightedge on edge across the door in a couple of spots. Or you can lay the door on a tablesaw to see if opposite corners rock. If a corner is high, you can adjust the fit by shaving a bit from the tenon cheek on the side of the frame opposite to the high spot. That should bring the corner of the stile down a little and flatten out the door.

If the joinery and the dry-fit are OK, then your clamps could be pulling the frame out of square. Make sure you keep the clamps parallel and try resting them on a flat surface, like a tablesaw, during glue-up.

If you've checked all of those things and the doors still rock slightly after glue-up, I would just plane the high corners from the show side of the door until the whole front of the frame is dead-flat.

—Christian Becksvoort is a contributing editor.

Check it with a square. *Tenon cheeks and mortise walls must be straight and parallel with the faces, or the whole door frame can twist.*

And a rule. *Dry-fit the door and lay a straightedge over the surface to look for warping in the frame. Check it diagonally as well as across the joints.*

Clamp from above. *Use the clamp bars like winding sticks to help you look for twist in the door frame. It's easier to see high spots under the bars.*

Ask a question

Do you have a question you'd like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.

Photos: staff

Easy-start handsawing

Q: I have a difficult time starting cuts with my backsaw—the teeth dig in and gnash the wood. What am I doing wrong? What's the best way to get a cut started?

—DWAYNE DAVIS,
Amarillo, Texas

A: STARTING A CUT WITH A WESTERN-STYLE SAW can be challenging, especially if the saw, which cuts on the push stroke, is new or freshly sharpened. The teeth cut aggressively and want to dig into the wood. The trick is to build momentum before applying pressure at the start of the cut. Start by just letting the teeth graze the surface, so they don't dig in quickly. Don't drag the saw backward at the beginning of the cut. It creates ruts that the teeth lock into, making it harder to start correctly.

If you're still having trouble with a traditional western saw, you have a couple of options. The first is to give a Japanese-style saw a try. This type of saw cuts on the pull stroke, a design that a lot of people find easier to master. You can also try a progressive-pitch western saw, such as those made by Lie-Nielsen or Pax. They have smaller teeth at the toe and larger at the heel near the handle. The smaller teeth make starting a cut easier, while the bigger teeth keep things moving quickly once you get going.

—Michael Pekovich is FWW's art director.

Ease into it. *Hold the saw unweighted with the teeth just grazing the surface. Using your thumbnail to align the cut, guide the saw forward to build momentum before lowering the teeth into the surface.*

STILL HAVING TROUBLE? TRY ONE OF THESE OPTIONS

1. JAPANESE-STYLE PULL SAW

The pulling action and thinner blades of Japanese-style saws make them easier to start.

2. PROGRESSIVE-PITCH SAW

The smaller teeth at the front of this progressive-pitch saw make cuts easier to start.

Finish sander has limited appeal

Q: What is the difference between a random-orbit sander and a finishing sander? When would you choose one over the other?

—RICK REAVELY,
Madison, Conn.

A: RANDOM-ORBIT SANDERS HAVE LARGELY replaced finishing sanders, also known as orbital sanders, for a number of reasons. The biggest reason is that finishing sanders move in a fixed orbit, so the risk of swirl marks is much higher than with a random-orbit sander. They also work more slowly.

Plus, it's easier to attach and remove 5- or 6-in. hook-and-loop disks than it is to attach the ¼ sheets of sandpaper into the finicky clips commonly found on most sheet sanders.

The lone benefit to having a ¼-sheet orbital sander is that it can get into corners that a random-orbit sander cannot. But in general, a random-orbit sander works better and is far more versatile.

—Teri Masaschi is a professional finisher near Albuquerque, N.M.

Random swirls are better. *Finishing sanders (right) move in a fixed orbit, which can leave visible swirls on a workpiece. A random-orbit sander (left) eliminates that risk, just one reason it's a better choice.*

a closer look

Sandpaper

WATCH HOW IT'S MADE—AND DISCOVER THE BEST ABRASIVE FOR EACH JOB

BY TERI MASASCHI

When sanding is mentioned, most woodworkers groan. But sandpaper achieves results that no other tool can match. Whether it is taming wild grain without tearout, perfecting a curve, or getting a totally smooth surface prior to finishing, you'd be lost without sandpaper. And so would generations of woodworkers.

I'll show you how today's sandpaper can trace its ancestry back 800 years (below), tell you why different types of abrasives work best on different surfaces, and give you a tour of a sandpaper factory. I'll never convince you to like sanding, but you will gain a new respect for this disposable yet indispensable tool.

Modern abrasives go back a century

In 1891, a scientist trying to make synthetic diamonds invented silicon carbide, and a few years later aluminum oxide, today's other main abrasive grit, was invented. The growth in automobile manufacturing, with all those shiny painted surfaces, increased demand for sandpaper, but only dry-sanding could be done as the hide glue used to bind the abrasive to the backing was not water resistant. In 1921, 3M invented the first waterproof paper, and cut down on the problem of dust in factories.

Adhesives have continued to improve, and modern sanding products including sheets, disks, and belts use urea-formaldehyde and phenolic-resin glues. These are not only far more durable but also can withstand the heat generated by machine-sanding. However, you may still find a few sheets of sandpaper, particularly garnet, that are made with hide glue. Hold the paper close to your mouth and exhale on it. If it is hide glue, you'll get a whiff of that distinctive animal smell.

Parchment is no longer used as a backing, but paper still is. It is mostly used for hand-sanding but today's sheets can be treated for better water resistance and more flexibility.

Cloth backing is used for sanding products that need to be more durable but less flexible. Sanding belts are mostly cloth backed, as are disks for heavy, aggressive cutting. The cloth is cotton or polyester/cotton blends.

The right abrasive for the job

The manufacturing of abrasive grains is a science in itself. One crucial step common to all types of abrasive is a very precise

Sand, shells, and sharks

As far back as the 13th century, the Chinese made sandpaper using a variety of abrasives such as sand and crushed shells, glued to parchment with a natural gum. Later, sharkskin was used as a fine abrasive. (The TV series *MythBusters* tested this story and found that sharkskin does indeed work as sandpaper with an abrasive equivalent to between 600 and 800 grit.) By the early 1800s, glass paper was being mass-produced; however, it dulled quickly because it was neither sharp enough nor hard enough.

Photos: Mark Schofield

Guide to the grits

ALUMINUM OXIDE

Whether for power- or hand-sanding, the vast majority of abrasives used on bare wood are aluminum oxide.

LIKE BROKEN TEMPERED GLASS

Grains of aluminum oxide are rather like chunks of broken tempered glass—sharp but not pointy. But they break down easier than silicon carbide, and therefore stay sharp longer on bare wood.

SILICON CARBIDE

When sanding between coats or rubbing out the final finish, wet-sanding with silicon-carbide paper is the rule.

LIKE SHARDS OF REGULAR GLASS

Grains of silicon carbide are much more pointy, rather like broken window glass. They require a hard surface such as a finish to break down and expose a sharp edge.

SUPER-HARD NEW ABRASIVES

Tougher stuff. *Alumina zirconia and ceramic aluminum oxide are mostly used on sanding belts for fast stock removal. They can also be blended with aluminum oxide on disks.*

GARNET IS YESTERDAY'S NEWS

Garnet has a long history in woodworking and retains a loyal, though declining, number of fans. It is a natural mineral that, compared to aluminum oxide or silicon carbide, is relatively soft and fast-wearing. Industry insiders concede that it produces a very even scratch pattern on bare wood, but no better than the latest grades of aluminum oxide. Any money you save buying garnet paper is probably more than offset by its faster wear.

process for separating the different-size particles. The heavier grits are sifted through screens, while the smaller, lighter grains are separated with air in a centrifugal system or by settling out in water.

Be aware that there are two standards for measuring particle size. The vast majority of papers now use the Federation of European Producers of Abrasives (FEPA) scale. FEPA products mostly have a "P" before the grit number. The United Abrasive Manufacturers Association (UAMA) is the successor to the Coated Abrasive Manufacturer's Institute (CAMI). Their scale, based on the American National Standards Institute (ANSI), used to dominate domestic production but is now mostly confined to finer-grit wet-or-dry papers.

Up to 180-grit the two scales are very similar, but above that number the FEPA papers become increasingly coarser than ANSI-graded paper with the same number. If you are uncertain which papers are which grades, stick to one brand.

Aluminum oxide vs. silicon carbide

In the last few years, new abrasives have entered the woodworking market (more on those shortly), but aluminum oxide and silicon carbide remain dominant. While both are

hard abrasives, their molecular structure makes them more complementary than competitive.

Aluminum oxide begins life as bauxite, also the raw material for aluminum. It comes in a range of colors from white to dark brown, but quite often the color is obscured by an adhesive tinted to designate whether the grit is coarse, fine, etc. Silicon carbide, also known as carborundum, is a compound of silicon and carbon. It is naturally dark gray but it has become an industry standard to attach it to the backer using a black resin, giving the sheets and disks a flat, black look.

Industry experts describe aluminum oxide as tough and blocky, while silicon carbide is sharper and pointier. Think of aluminum oxide as being like lumps of broken tempered glass, while silicon carbide is more like the shards from regular glass.

Both abrasives are "friable," meaning that in use the grains break up and expose fresh, sharp edges as opposed to staying whole and rapidly becoming blunt. But silicon carbide needs a harder surface than most woods to cause it to fracture and expose sharp surfaces. This makes aluminum oxide best on bare wood because by breaking down more, it lasts longer.

Conversely, when sanding between finishes, fine-grit silicon carbide has the sharpness to cut through the hardest finish, while aluminum oxide's blocky texture tends to glaze the surface. Using water or mineral spirits with wet-or-dry silicon-carbide paper prevents the paper from clogging, reduces heat that might damage the finish, eliminates dust, and creates a slurry. This mixture of liquid, abrasive particles, and finish can create a softer scratch pattern than if the paper is used dry.

Two tough new arrivals

Alumina zirconia is a synthetic blend of aluminum oxide and zirconium oxide. Hard, tough, and aggressive, it cuts almost as fast as silicon carbide but is less pointy. Typically found in coarser grits on sanding belts and disks, it is a good choice for fast stock removal on hardwood.

Harder still, ceramic aluminum oxide is made in a similar way to porcelain. It begins as a paste that is fired in a kiln and is then crushed into abrasive particles. Norton uses ceramic alumina on its 3X disks, while 3M uses it on its top-of-the-line products, which are mostly colored purple. If you have a lot of sanding to do and don't want to spend more time than you have to, it is probably worth the extra money to buy this type of abrasive. □

Teri Masaschi is a professional finisher near Albuquerque, N.M.

How it's made

1. PREP THE PAPER

Start with a blank roll. *Sheets, disks, or belts all begin life as a large roll of backing material. The first step is to print on the back what the product will be.*

Ali Industries, maker of the Gator and Shopsmith lines of abrasives, gave *Fine Woodworking* a tour of its facility near Dayton, Ohio. Production is centered on the "Maker," a 130-yd.-long production line with a couple of two-story ovens. Sandpaper begins as a roll of paper or cloth up to 55 in. wide and 10,000 yd. long that forms its backing. Moving at 30 yd. per minute, the back of the material is printed with a description of the product. Glue is applied to the front via a roller. This first application of glue can be colored to designate the company's code for coarse, medium, or fine abrasive.

Now the electrifying part: The grit comes down a chute to a conveyor belt and passes under a metal bar that gives each particle an electrical charge. The backing passes just over the conveyor belt and the grit jumps onto the sticky surface. And that's not the only cool thing: Not only do the particles space themselves evenly, but the blunter end of each grain is most attracted to the backing, leaving the pointier end facing out!

The roll of adhesive and grit then heads to a long oven where it is draped on big steel arms to be baked at 120° to 180°F. The second or "size" coat of glue is applied and baked after the first is cool and hard. This thicker coat comes partway up the abrasive, making it less likely to come away from the backer, without fully coating it and dulling the edges.

After the glue has cured for three days, the roll goes to the flexing machine, which bends and twists the material at sharp angles, creating minuscule fractures in the glue coats to give it greater flexibility and prevent grit loss. Some rolls then receive a stearate coating to reduce surface clogging when the material is used. If hook-and-loop disks are being made from the roll, Velcro backing is applied just after the stearate and then the material is baked one last time. Finally, the cured rolls get die-stamped and sliced into disks, sheets, and belts.

—T.M.

2. ROLL ON GLUE

Color-coded. *The face of the backer has the bottom or "make" coat of glue rolled on. It is often color-coded, yellow in this case, to match the grit size of the abrasive.*

3. SPRINKLE GRIT

Electrifying process. *A hopper with evenly spaced holes in the bottom distributes the abrasive on a conveyor belt (above left). The white abrasive moving from right to left passes under an electrically charged metal rod. This makes each particle stand on end and then jump onto the sticky roll of backing paper when it comes near (below left).*

4. BEND IT

Micro-fractures. *The stiff roll of sandpaper is bent back and forth at 90° and 45° to make it more flexible and to prevent it from cracking the first time you try to bend it.*

5. BACK IT

Add Velcro for disks. *The roll of sandpaper has glue applied to the back and is then mated to the white loop material.*

6. CUT IT FOR USE

Disks galore. *There's nothing random about the precise stamping of these 5-in. random-orbit disks.*

Belts begin as sheets. *Wide sheets, with their ends cut on the diagonal, are wrapped around a form and heat is applied to glue the seam.*

One loop equals four belts. *The abrasive cylinder is spun across fixed knives to create four sanding belts.*

master class

Better way to add stringing and banding

BY CRAIG THIBODEAU

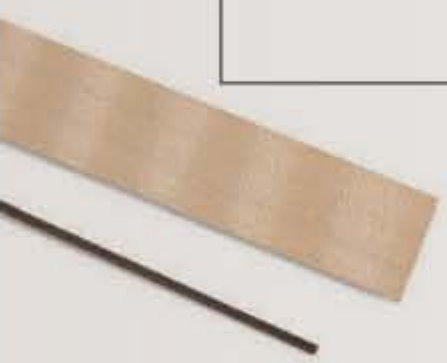
Veneer is the secret. *If the central panel is veneered, you can just add the inlay pieces to the edges of the sheet before laying up the panel, with no wood-movement worries.*

Whether your tastes run traditional or contemporary, learning to do a veneered tabletop opens up all sorts of design possibilities. For one, you now have access to scores of new wood species and grain patterns, all widely available and affordable. Secondly, you can cut and arrange the veneers into beautiful patterns not possible with solid wood. That's just the beginning. My focus here is bandings and borders. Veneer makes those easier, too.

The traditional way to make bandings is to start with a bricklike lamination and slice off layers. Then you inlay them, excavating a channel in solid wood, with issues when you go across the grain. But since my tabletops are fully veneered on a stable substrate using a big vacuum bag, adding beautiful bandings and borders is as easy as cutting out pieces of veneer and taping them to a center field of veneer. After laying up the panel, I add solid-wood edging to protect the veneer and complete the look. Last, I rout a groove along the glueline and inlay the final piece of stringing the traditional way, hiding the glueline and any inconsistencies there. It is a foolproof system.

I also sometimes veneer all the way to the edge of the table, by simply making the bandings wider. I often

Cutting bandings



INLAY: MAKE IT OR BUY IT

Thibodeau buys his stringing, which is the same thickness as veneer. But he makes his own banding pieces.

Start with a straight edge. *After taping a couple of pieces of veneer in a stack, use a veneer saw and an MDF straightedge, with sandpaper stuck to the bottom, to cut one edge straight. Start with a light pass, and then bear down a bit more as you go.*

Simple jig. *Make a cutting board as shown, plus a hardwood cutting guide the width of your desired bandings. Hold the guide and the veneer firmly against the stop on the cutting board. Cut enough banding to go around your panel, plus a few extra pieces.*

Photos, except where noted: Asa Christiana; this page (top): courtesy of the author

Installation is easy

Stick it down. *With a strip of overhanging blue tape on the show face, you flip the sheet over and simply stick on the stringing and banding, pulling it tight against the central field, and overlapping it at the corners.*

Scarf the banding. *Stringing can have butt joints, but where the 2-ft.-long bandings come up short, use an angled cut to hide the joint. Just overlap the pieces, line up the grain, and use a scalpel and steel ruler to cut through both.*

Another angle at the corners. *Use a similar technique to make perfect miter joints at the corners, cutting both stringing and banding at once. Line up the straightedge carefully with the corners of the overlap.*

Tape across the joints. *Pull blue tape across the miter joints, and across the all the edges. Stretch and pull the tape as you apply it.*

Always burnish. *After running long pieces down the joints, burnish down all the tape with a brass-bristled brush for a strong bond.*

Veneer tape next. *Remove the blue tape from the show face, and replace it with ¾-in. veneer tape. Then throw the sheet under a piece of MDF to stay flat. When it's dry, flip the sheet and remove the blue tape on the glue face.*

use crossbanding this way, banding the side of the tabletop with the same veneer for a waterfall effect.

Stringing and banding separate the center field from the edges of the tabletop, and add a dash of both complementary and contrasting color. While you can buy banding in varied patterns, it's just as easy to create your own using small pieces of figured veneer that are too nice to throw away.

A few shopmade helpers

To make all of the bandings in this article, you'll need a freshly sharpened veneer saw (see FineWoodworking.com/extras to learn how I sharpen my saw) and a few simple shopmade devices. First, make a 2- or 3-in.-wide straightedge from MDF to joint edges. Then you'll need a banding-cutting board with a fixed stop that sticks up about ¼ in. to ½ in. The board works in conjunction with a simple cutting guide that matches the width of your desired banding. Both the cutting guide and straightedge need 60- to

Sheet becomes a panel

In the bag. *After laying up the panel (left), you'll need to trim it. To get a first reference edge straight and flush with your banding, you can shim the panel on a crosscut sled (above). Then line up a framing square with that edge, using it to set up a straightedge and router on an adjacent edge. The tablesaw can take over from there.*

Different deal for the last piece of stringing

It is next to impossible to install the last piece of stringing beforehand and then trim the panel precisely flush to it, so Thibodeau installs it after attaching the solid-wood edging to the tabletop, routing a groove right over the glue joint.

Rout carefully. *After the solid edging is sanded flush, rout a 1/16-in.-wide groove that straddles the glue joint. Attach a fence and set the depth at ⅛ in., pivot the router down into the cut, and go slowly so you don't break the tiny bit.*

Square the corners by hand. *Be careful not to rout too far, then finish up the corners with a narrow chisel and scalpel.*

Shopmade stringing this time. *To make slightly taller stringing, which is easier to inlay, Thibodeau rips a strip of ebony on the tablesaw, sizing it to fit the groove, and then rips that strip to height on the bandsaw as shown.*

Need to fine-tune it? *Make a little planing jig like this one, with a low stop, and add pieces of double-stick tape to keep the stringing from bowing as you plane it.*

Pre-fit the pieces. *Mark these at the corner joints (above), using a sanding block or disk sander to make the tiny miters. Thibodeau uses a kids' glue bottle with a narrow tip to inject the glue into the groove, presses in the stringing, and then seats it fully using a small hammer and a wood block (right).*

120-grit sandpaper stuck to the bottom to stop them from slipping. You'll also need veneer tape. I recommend "water gum" tape from schurchwoodwork.com.

Let's start by making ½-in.-wide straight banding of curly sycamore. Cutting any curly veneer along the grain creates interesting stripes across the width. We'll need a ½-in.-wide cutting guide.

For bandings, I stack (and tape) two pieces of veneer and cut them at the same time for greater efficiency. But I don't try to cut bandings any longer than 24 in.; it is hard to cut them straight. If I need longer pieces, I join them with a simple scarf cut that hides the seam.

Adding the stringing and banding is easy

After you have cut and assembled the veneer for the center of the tabletop, usually some sort of bookmatch, be sure all edges are straight, square, and clean.

The inner line of stringing and the shopmade banding go on now, simply stuck down on tape, overlapped at the corners, and mitered with a single cut. For this first line, I tend to use commercial stringing (from originalmarquetry.co.uk). It comes in many widths and colors, and is relatively inexpensive. In this case it is roughly 1/16 in. wide (sold as 1.5 mm), and the same thickness as the commercial veneers I use. The best colors for these thin outlines are black and white. The black is usually dyed, not true ebony. For pure white, holly is best, though maple makes a great off-white stand-in.

Last piece goes in after glue-up

I use a vacuum press for my veneering, which is wonderfully effective and convenient. The sandwich includes

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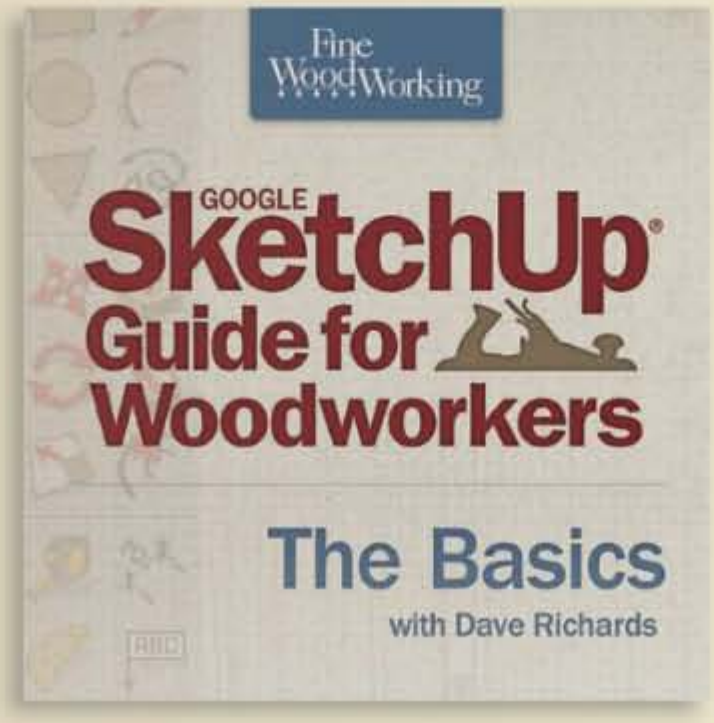

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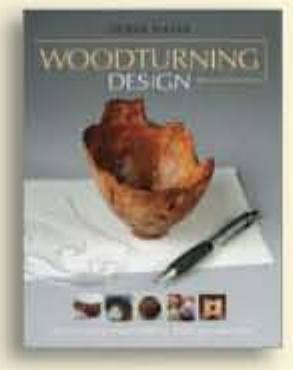

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Crossbanding isn't much harder

Thibodeau likes Macassar ebony for crossbanding, as its striped pattern is eye-catching and hides the seams between the short pieces.

Three good edges. *This time you need to cut the two long edges of the stack parallel before trimming one end square. These crosscuts want to tear out at the near end, so make a small reverse cut there before each pass.*

Back to the cutting board. *Starting at the square end, cut as many strips as you need. As before, make a series of light passes for each cut, with a short reverse cut before each pass.*

evacuation mesh on top, MDF cauls top and bottom, thin plastic sheeting to keep glue off the cauls, the front and back veneers, and of course, the MDF substrate. Yellow glue works fine.

When the panel is out of the bag, trim the edges right to the edges of the border, and add the wood edging. Now the final piece of stringing goes in, covering the glueline and any gaps.

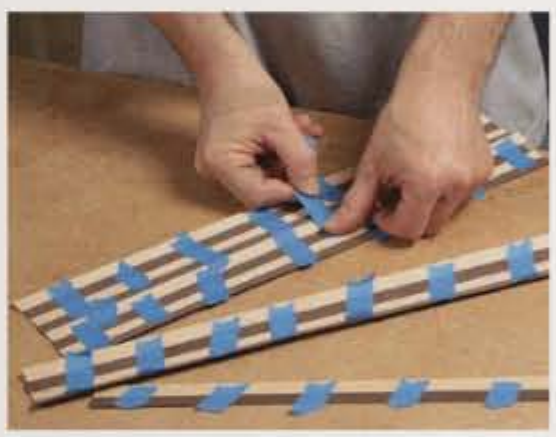
You can use more commercial stringing here, but installation is much easier if the stringing is a bit thicker and easier to handle. I cut these strips from a solid piece of Gabon ebony, making them a fat 1/16 in. wide by about 1/8 in. tall. Now that I have a drum sander, I just bandsaw my shopmade stringing and sand it to size. But before I had one, I did it as shown in the photos. After routing the tiny 1/16-in.-wide groove and installing the stringing (I use bit No. 5152, stewmac.com), wait 24 hours for the glue to dry, and then sand the entire tabletop smooth. Apply a finish and watch the full beauty emerge. □

Craig Thibodeau is a professional furniture maker in San Diego.

Installation starts at the center. *Install a line of stringing first, as before. Then mark the center points of each edge, and start adding the crossbanding there, working toward the corners and flipping each opposite piece as you go for a balanced look.*

Checkered banding catches the eye

Any very dark and light colors work well for this type of banding, in this case maple and wenge.



Start with strips. *Cut six strips of each color, and join them in pairs first by pulling blue tape across the seams. Then assemble the pairs into a full sheet, before putting a strip of tape along every seam.*

Crosscut your bandings. *After squaring one end of the sheet, use the banding jig again. Cut tape-side-up, and make more than enough strips for the job.*

Start at the corners this time. *Overlap dark squares at the corners, then simply remove one of them. To get the rest of the banding to fit, trim a bit off a square or two near the center. No one will notice.*

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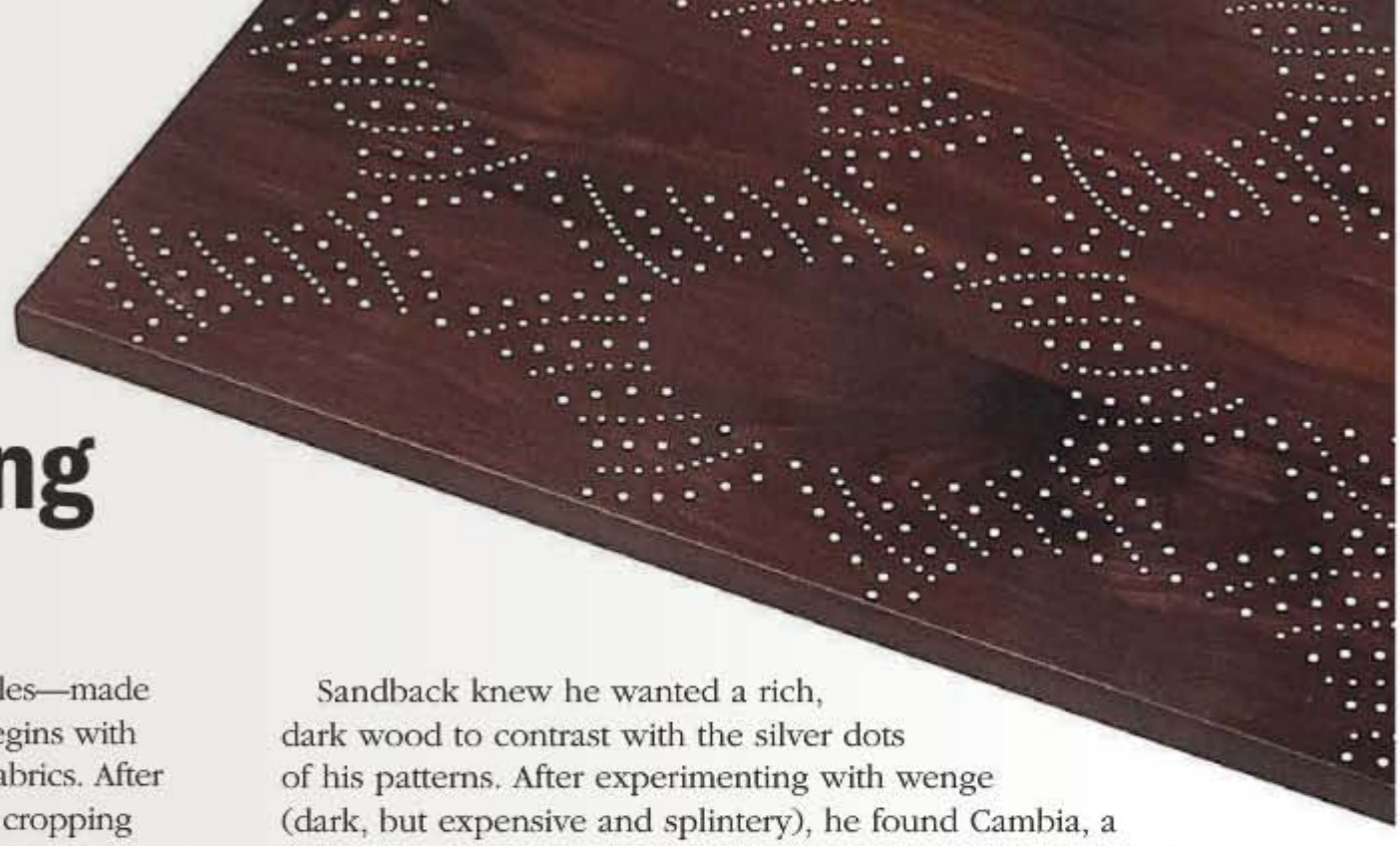

Decorative nailing

BY JONATHAN BINZEN

The decoration on Peter Sandback's tables—made with thousands of aluminum nails—begins with images he finds of old dot-patterned fabrics. After photographing a sample of fabric and cropping the image to the shape of his workpiece, Sandback emails the digital file to his local office-supply store, where for just a few bucks they print it out at any size he needs. That printout becomes a full-size template that guides his drilling.

Sandback knew he wanted a rich, dark wood to contrast with the silver dots of his patterns. After experimenting with wenge (dark, but expensive and splintery), he found Cambia, a line of domestic hardwoods from Northland Forest Products in Kingston, N.H., that are baked to make them decay-resistant for outdoor use. The heating process also happens to darken the wood to a rich brown. This table is heat-treated red oak.

Applying the pattern. *Sandback uses spray adhesive to affix his paper nailing pattern to the tabletop. Working one half at a time, he sprays on the adhesive, then uses a roller to press the pattern flat.*

How to drill a zillion holes. *Drilling thousands of holes with his regular drill gave him a backache, so Sandback suspended a rotary tool over a portable worktable where he can drill sitting down.*

No hammer needed. *After dipping them in polyurethane glue, Sandback presses the aluminum nails into slightly oversize holes. If the holes are too snug, he has learned, the tabletop will warp from the cumulative pressure. For this table, Sandback used nails of two sizes to create larger and smaller dots.*

Mow 'em down. *Aluminum nails are easily cut with an angle grinder fitted with a cutoff disk. Sandback is careful not to dig into the wood. It takes him about five minutes to flush-cut the nails on a tabletop this size (left). Then, starting with 60-grit paper, he uses a random-orbit sander to sand away the paper pattern and smooth out the tabletop (above).*

The pattern pops. *A coat of dewaxed shellac—followed by a topcoat of waterborne urethane—brings the dot pattern into sharp focus.*

Photos: Peter Sandback (top); Jonathan Binzen (all others)

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Nailed It

Taped to the wall in Peter Sandback's New Hampshire workshop is a Calvin & Hobbes cartoon with Calvin pounding nails into his mother's coffee table. While she is not amused, it turns out you can make a living doing just that. For the last several years, Sandback has been decorating his minimalist furniture with elegant patterns composed of thousands of dots: actually aluminum-siding nails that he glues into an array of holes and then cuts flush to the wood surface and sands smooth. One reason the patterns look so good is that Sandback adapts them from samples of old block-printed fabric made with an 18th-century technique called picotage, which involves a printing block studded with metal pins. Unlike Calvin, Sandback has the full support of the women in his life. His wife and three daughters sometimes help him with the time-consuming task of gluing in all those nails.

—Jonathan Binzen

Designing with dots. *Using aluminum nails of assorted diameters, Sandback embellishes his furniture with a wide variety of decorative dot patterns.*

Photos: Peter Sandback

How They Did It To learn how Sandback designs and executes these intricate patterns, turn to p. 90.

Audio Slide Show For a visit to Sandback's New Hampshire shop and to see more of his work, go to FineWoodworking.com/extras.