

Fine Woodworking

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CELEBRATING

50
YEARS

Anniversary Issue

June 2025 No. 317

- Tool timeline
- Kentucky cabinet
- CBN wheels
- Managing miters



Makers shaping the future of the craft, p. 26

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**640
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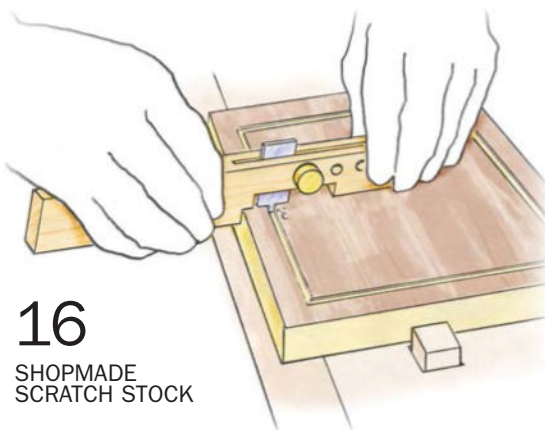
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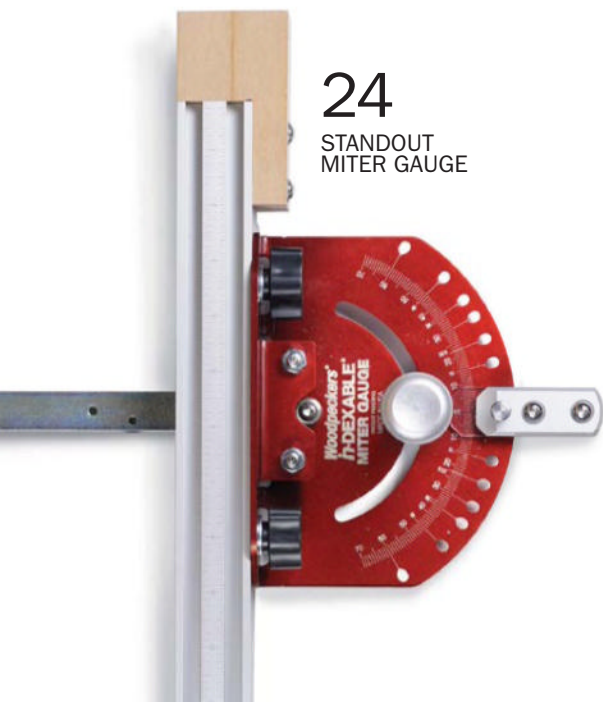


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Online extras

Visit finewoodworking.com/317

I recently had the pleasure of chatting with Rick Mastelli, an editor from the early days of the magazine and one of the driving forces behind bringing video to *Fine Woodworking*. It's safe to say that thousands of woodworkers have enriched their skills because of that move.

As far as I can tell, project-based videos didn't hit the website until 2005, with a full push seeming to start in 2012—which was about the time I discovered *Fine Woodworking* and became one of its devotees. Since that time there have been many videos that changed my personal woodworking journey, and to celebrate *Fine Woodworking's* 50 years, we thought it would be fun to highlight some of the videos that were released on the website. I have watched these series multiple times, and I guarantee I can quote lines from them all. A few of them I had the honor of watching from behind the camera, but each is a must-watch in my book.

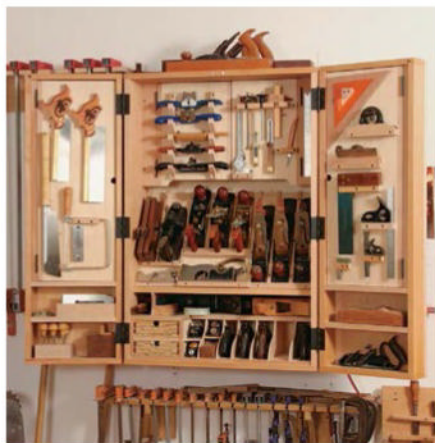
—Ben Strano, editor, *FineWoodworking.com*



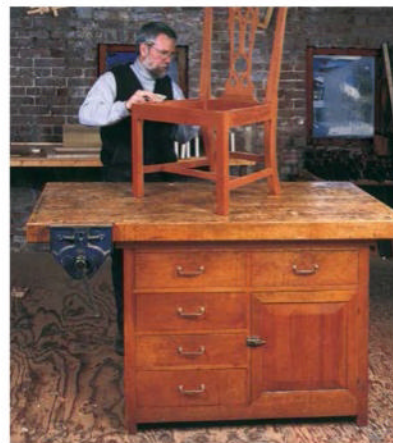
FEDERAL SIDE TABLE
with Steve Latta



WALL CABINET
with Garrett Hack



TOOL CABINET
with Mike Pekovich



WORKBENCH WITH BUILT-IN STORAGE
with Phil Lowe

FREE ART PRINT

To celebrate *Fine Woodworking's* 50th year, deputy art director John Tetreault carved a wood-block print in mahogany. The initial drawing for the block was inspired by the opening photo in "Camber: The Secret to Perfect Planing" (Handwork, FWW #222). Digital prints of this work are a gift to anyone who loves woodworking. Go to FineWoodworking.com/317 to download a copy.



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FLOATING-TOP TABLE
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contributors

Peter Marcucci ("Charles Rohlf's Umbrella Stand" and Designer's Notebook) has always worked with tools. His father was a tile setter and tile contractor, and all of his uncles had businesses in the building trades. As a kid, he spent many hours on construction sites and helping with home-building or renovation projects. While dating Jody, who is now his wife, he was inspired by some of the furniture pieces that her father had built and wanted to eventually build furniture for their home. "When we purchased our first home in 1980, I established my first home workshop and built my share of coffee tables, bookcases, desks, and dining tables. Every Saturday afternoon, I would watch Norm Abram's *New Yankee Workshop* on PBS. Looking back, I am surprised at how many of Norm's projects I built." His career as a mechanical engineer, manager, and corporate executive limited his time in the woodshop, but being able to come home and work with his hands was a welcome change of pace. Retired since 2012, Peter lives and builds furniture in Wasaga Beach, Ont., Canada.

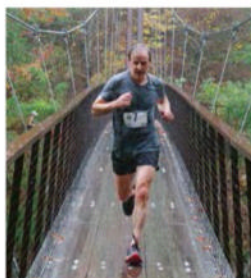


Erik Curtis (Fundamentals) began his woodworking journey in 2012 when he attended the nine-month comprehensive program at the Center for Furniture Craftsmanship in Rockport, Maine. From there he apprenticed under Rob Hare and Paul Downs and was a member of the Hudson Valley Furniture Makers collective. After teaching at craft schools and at Moorestown Friends School, Erik left teaching in 2021 to appear as the team carpenter on Netflix's hit show *Instant Dream Home*. He is now a full-time independent woodworker.



Chris Gochnour ("New Breed of Grinding Wheels") is a longtime contributing editor to *FWW* who lives and works in Murray, Utah, a suburb of his native Salt Lake City. Gochnour started his woodworking career in his grandfather's basement, where he built custom skateboards to sell to local board shops. After earning an English degree, he returned to woodworking and began building handcrafted furniture. He also teaches woodworking at Salt Lake Community College, the Marc Adams School of Woodworking, and his own studio.

Jonathan Binzen ("Looking Forward") first took note of furniture when a wood crate arrived from his grandmother in Australia. It contained a beautiful Australian-bean dining table designed by her architect father, Robin Dods. The table, however, wasn't the main attraction—that was the crate, which provided outstanding material for fort-building. Since joining *FWW*'s staff in 1993, Jon has pursued stories about the craft of woodworking, logged many hours behind a computer screen and a camera lens, and run quite a few early morning miles.



We are a reader-written magazine. To learn how to propose an article, go to [FineWoodworking.com/submissions](https://www.FineWoodworking.com/submissions).

Fine Woodworking

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Fine Woodworking (ISSN: 0361-3453) is published bimonthly, with issues in Feb., Apr., June, Sep., Oct. and Dec., by the Home Group of Active Interest Media HoldCo, Inc. Subscription rate: \$34.95 per year. Single copy price: \$12.99 U.S., \$14.99 Canada. The known office of publication is located at 2143 Grand Ave., Des Moines, IA 50312. Periodicals postage paid at Des Moines, IA, and additional mailing offices.

Postmaster: Send all UAA to CFS. (See DMM 707.4.12.5); NON-POSTAL AND MILITARY FACILITIES: Send address corrections to Fine Woodworking, PO Box 1477, Lincolnshire, IL 60069-9829

Canada Post: Return undeliverable Canadian addresses to Fine Woodworking, c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7.

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From the Editor

CELEBRATING
50
YEARS

Looking back, looking forward

The more things change, the more they stay the same. Anything that has endured for 50 years, as *Fine Woodworking* has, definitely has survived a lot of change. And that is worth a celebration.

However, I don't think the simple fact of being around for 50 years is what we should be celebrating. More exciting to me is the nature of the craft and the magazine's mission to create a place for discourse, a



Emerging makers, p. 26

place to be inspired and get the information necessary to make the things you want to make. A key reason *Fine Woodworking* has remained relevant is that the magazine provides a clearinghouse for ideas, from the wisdom of masters who have dedicated their lives to the craft, to the insights of thoughtful, curious, impassioned amateurs toiling away in

their shops. Together our voices create a community, one that has been thriving far longer than the connectivity afforded by the internet and social media.

In writing this letter, I struggled to make it more than just a personal reminiscence. But as I thought about our 50 years, I concluded that the personal connection each of us has to the magazine is the essence of its enduring value. When I was an aspiring furniture maker in college, *Fine Woodworking* identified what I hoped to be. It embodied the ethos that was so difficult to articulate to others when trying to explain why I was making sawdust in college rather than pursuing a business degree.

Our founder, Paul Roman, knew the value of that personal connection. Rather than rely on an editorial

staff to create content, Paul looked to fellow woodworkers for the information that had been so hard to come by when he was learning the craft. Because of this initial vision, the identity of the magazine continued to evolve as more woodworkers contributed their insights and experiences. It's odd to consider that I have been involved with *Fine Woodworking* for over half of its lifespan, and yet I have never stopped being surprised by how much the craft has to offer. There is always something else to learn, some new technique to explore. And with every new author featured in its pages, the magazine reinvents and renews itself.

The fact that *Fine Woodworking* is a reader-written magazine means that all of us, whether we are veterans or new to the craft, have a voice to lend to the conversation. And in that dialogue, the magazine has been able to move forward while staying firmly linked to tradition—creating a timeline and a family tree that includes us all.

Here's to 50 more years of reinvention and renewal, whatever they may bring. I extend my sincerest thanks to everyone who has contributed to the magazine, from the current staff to past editors, and the countless authors who have generously shared their knowledge. You are the reason why I am still excited to get to work every day.

—Michael Pekovich



A timeline of tools, p. 64

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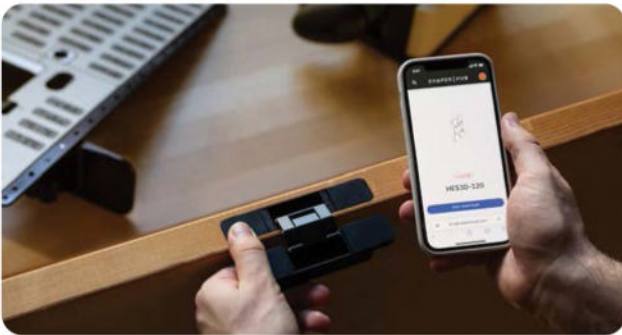
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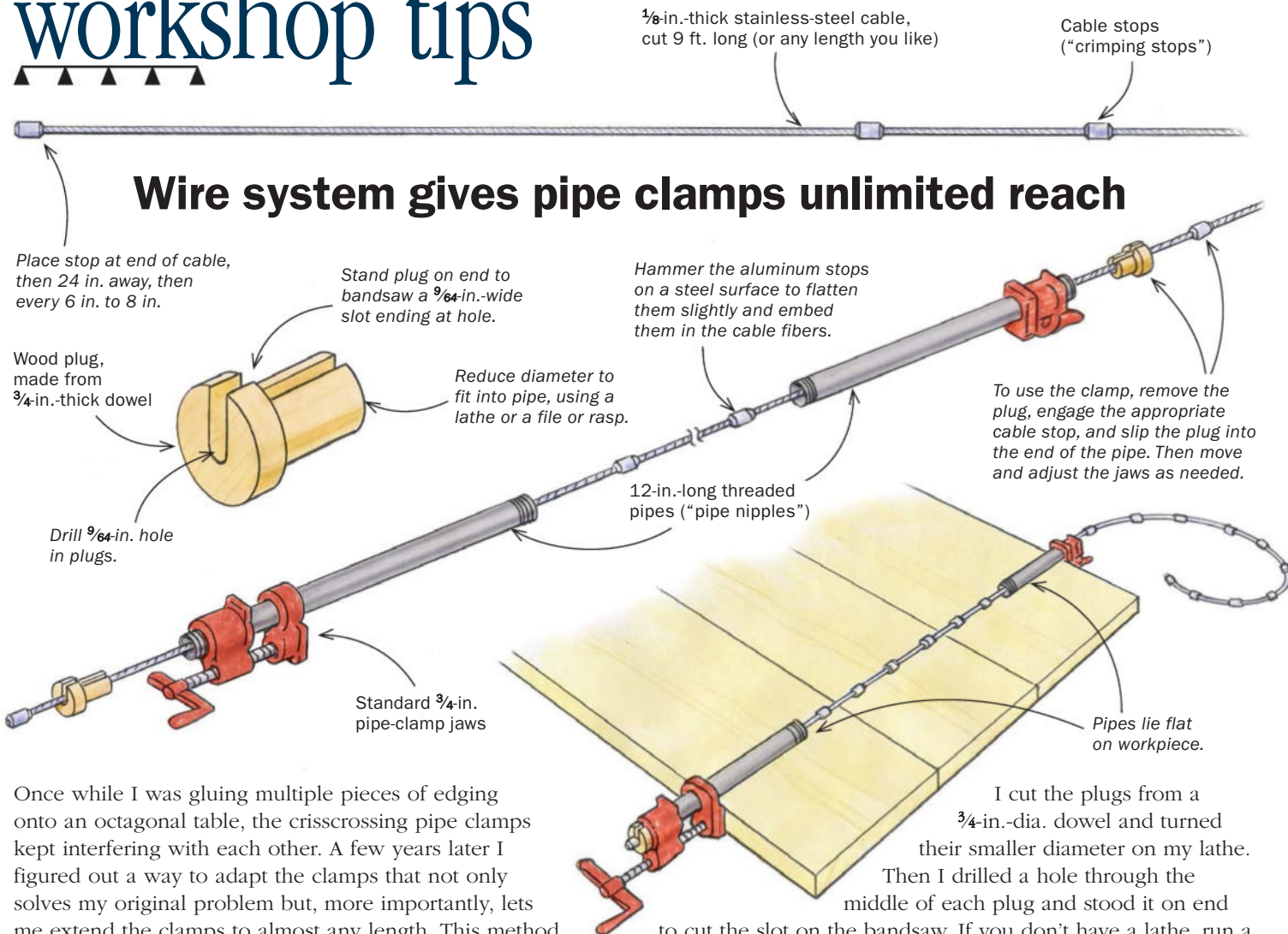
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workshop tips



Once while I was gluing multiple pieces of edging onto an octagonal table, the crisscrossing pipe clamps kept interfering with each other. A few years later I figured out a way to adapt the clamps that not only solves my original problem but, more importantly, lets me extend the clamps to almost any length. This method allows just a few clamps to replace a whole stack of pipes of different lengths. And the whole system fits into a shoebox.

I mounted the jaw assemblies from the original clamps on shorter pipe sections and connected those with 1/8-in.-thick steel cable. Then I attached cable stops at intervals along the wire, locking them in place by swaging them (flattening them slightly) with hammer blows. To capture the stops, I turned wood plugs that fit into the ends of the pipes. The length of the clamps is adjusted by sliding a cable stop behind a plug and then tightening the clamp screw as usual.

I cut the plugs from a 3/4-in.-dia. dowel and turned their smaller diameter on my lathe. Then I drilled a hole through the middle of each plug and stood it on end to cut the slot on the bandsaw. If you don't have a lathe, run a centered screw into the end of the plug, cut off its head, chuck the screw in a drill press, and use a file to reduce the diameter.

I used old garage-door cable for my clamps, but I recommend that you use new stainless-steel cable. You can find it on Amazon, along with the "steel-cable stops," which are made of aluminum and are also called "crimping stops." The length of the cable is up to you.

The pipes are 12 in. long, threaded on both ends, and sold as "pipe nipples." The length gives you plenty of room to slide the fixed clamp jaw back and forth.

—RICHARD TENDICK, Lakeville, Minn.

Best Tip



After serving in the Air Force as an explosives disposal technician, Richard Tendick earned a degree in industrial education and went to work as a shop teacher. When the student population declined in his rural town, he worked as a plant engineer. After retiring, he took a job as a freelance editor for *American Woodworker* magazine. He also served on the board of directors for the Minnesota Woodworkers Guild for 23 years.

A Reward for the Best Tip

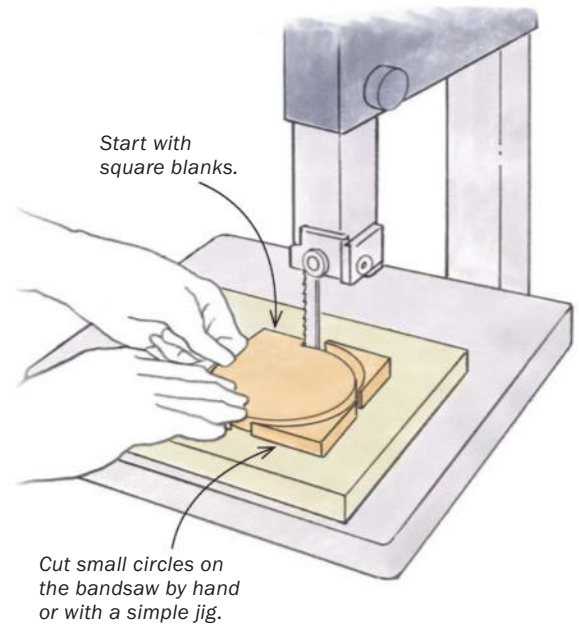
Send your original tips to fwtips@taunton.com. We pay \$100 for a published tip with illustration; \$50 for one without. The prize for this issue's best tip was an IBC Mortise Chisel set of 4 sizes: 1/2 in., 3/8 in., 1/4 in., and 3/16 in.



Circle scraps make interesting knobs

It's fun to make your own knobs for furniture or shop use. Here's one of my favorite approaches. Starting with square blanks, I use a simple bandsaw jig to cut circles in them. The jig is just a board with a nail or pin sticking up, which the blank pivots on. Instead of using the circles as knobs, I use the scraps, combining them as shown. To make the knobs more useful and attractive, I add sticks in the middle, joining them with a simple lap joint. Once the glue dries, I do some shaping to make the knobs more comfy and appealing. For shop and jig knobs, you can drill a hole through the middle and attach them with a bolt. To attach them to furniture, you can run a screw into the back of the knob. The center strips can be made with the same wood as the circle scraps, or the parts can be made from contrasting wood.

—JOHN BURKE, Northfield, N.J.

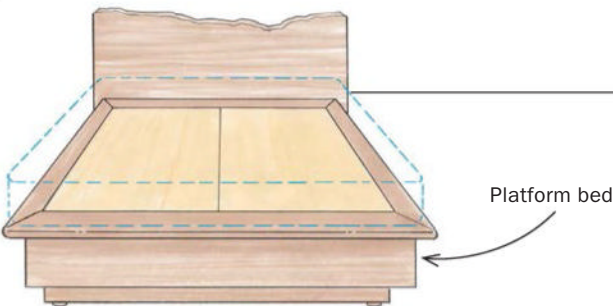
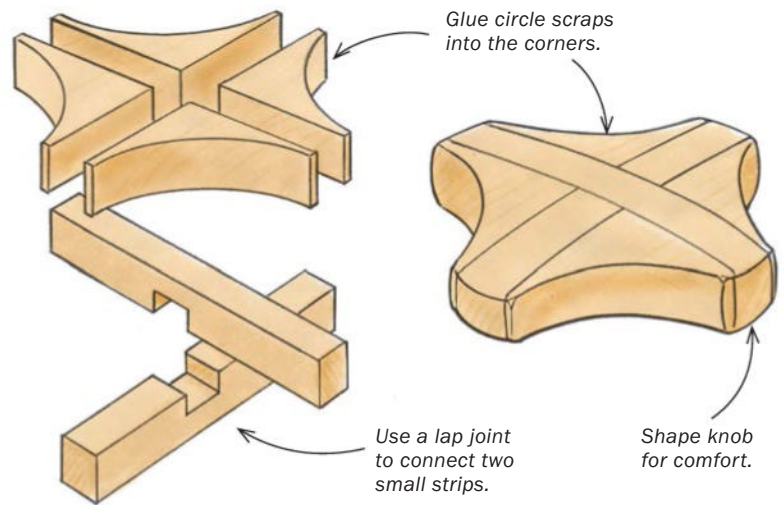


Quick Tip

Use an online optimizer for sheet goods

When breaking down sheet goods for cabinetry projects, I've found that an online optimizer helps a lot. Try the free one at cutlistoptimizer.com. The program lets you add the kerf thickness for the blade you are using, but I always use $\frac{1}{2}$ in. for that value to leave me a little extra material for trimming the parts to final size.

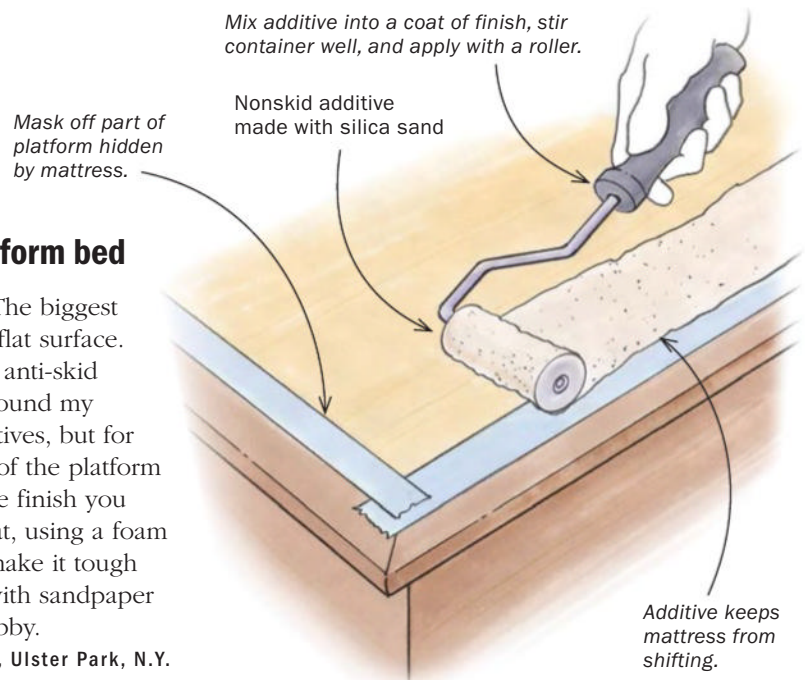
—DAVID LEVENBERG, Elizabeth, N.J.



Mix sand into finish to stabilize mattress on platform bed

As a pro woodworker, I've made quite a few platform beds. The biggest problem has always been the mattress sliding around on the flat surface. One day when I was working on the deck of a boat that had anti-skid compound added to the painted finish, I realized that I had found my platform-bed solution. There are a few types of nonskid additives, but for beds I like the type made with silica sand. Mask off the area of the platform that falls under the mattress, mix the additive into some of the finish you used on the bed, stir the container well, and apply a final coat, using a foam roller. If the sand ends up feeling a little too sharp, it might make it tough for the customer to tuck in sheets comfortably. Hit it lightly with sandpaper and the surface will be more user-friendly but still plenty grabby.

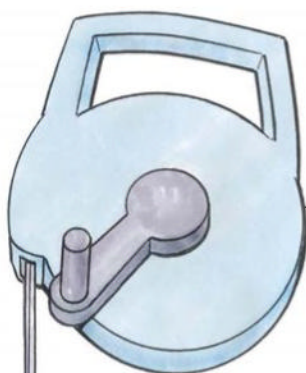
—ROB HARE, Ulster Park, N.Y.



Make your own scratch stock

I use a simple scratch stock to cut grooves for stringing. It's especially useful on small table tops, table legs, and jewelry boxes, where a router might be unwieldy. Tiny router bits also have a tendency to break. I made the blade from a short section of an old bandsaw blade, which was about $\frac{1}{32}$ in. thick, and used my bench grinder and a file to form the narrow tooth. It helps to color the blade with a marker and draw the tooth shape on it with a scratch awl before grinding. After shaping it, flatten the cutter on a sharpening stone to remove any burrs. The holder is made from maple, with a slot bandsawed into it. A small thumbscrew is used to tighten the slot, holding the cutter in place. I threaded the maple to hold the thumbscrew, but you could also screw it into a threaded insert, or simply use a common wood screw to apply the clamping pressure. To use the tool, tilt it backward at first, like a scraper blade, and lower it until it just scores the wood. Make additional passes as needed, gradually bringing the cutter up to 90°.

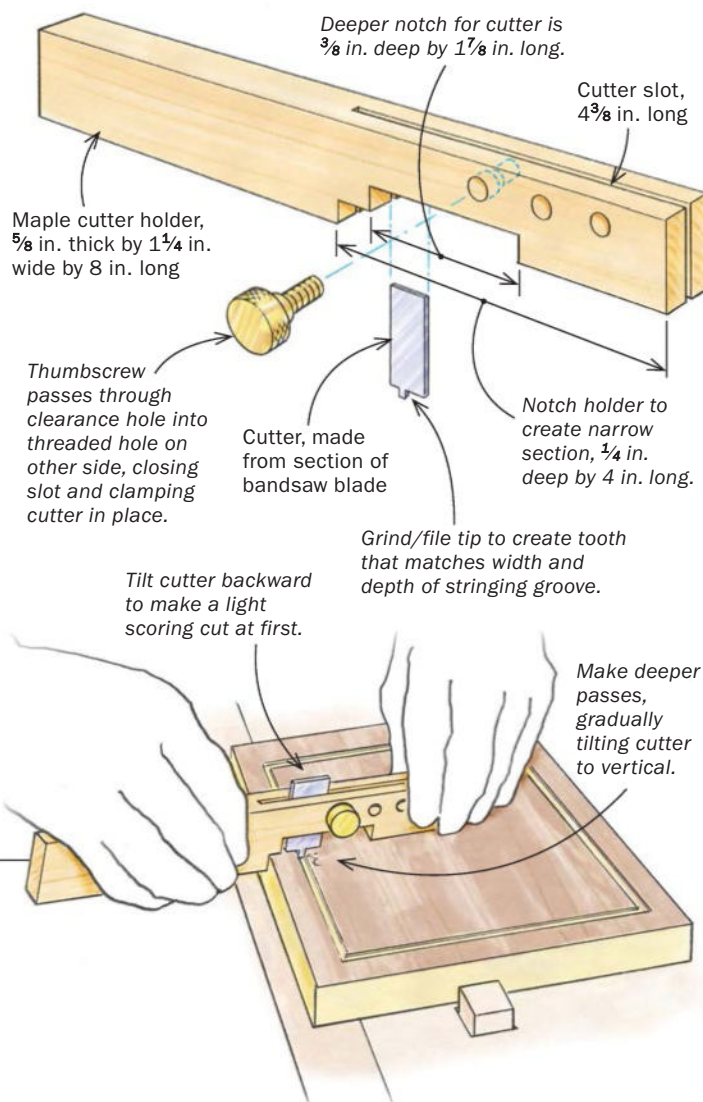
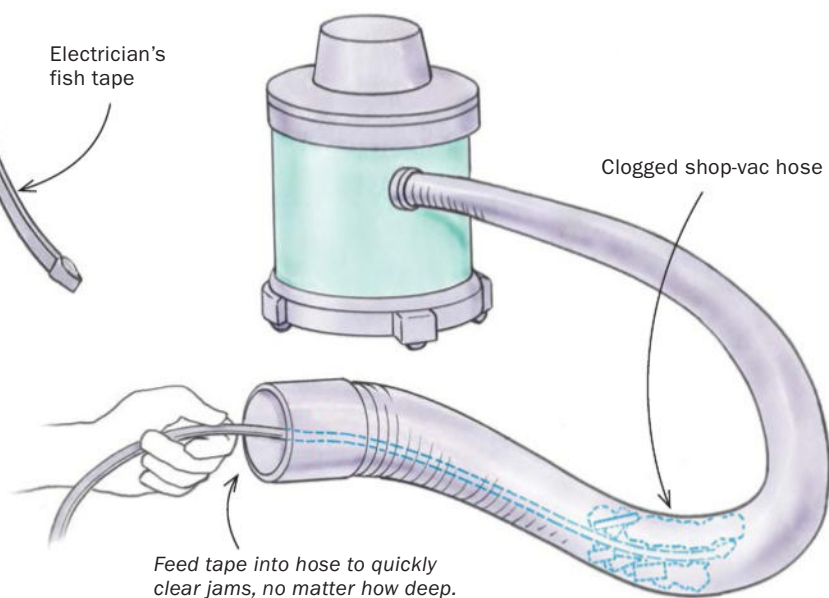
—CHARLIE JAMES, Williston Park, N.Y.



Use electrician's fishing tool to clear vacuum hose

How many times has your shop-vac hose become clogged with debris? When that happens deep inside a long vac hose, the jam can be tough to clear. I use an electrician's wire-fishing tape to quickly clear these jams. The tool is often sold as "fish tape," and a 25-ft. reel is just \$15 on Amazon. After a few pokes with the end of the tape, the clog falls out of the hose.

—PETER SZUTU, Castro Valley, Calif.



Quick Tip

Save repair dust in test tubes

Like many woodworkers, I mix sawdust with a little bit of glue to create a filler for small gaps and nail holes and such. But most of the dust I make is sucked up into the shop vac or dust collector, or drops on the floor, where it gets mixed with chips from a variety of species. So I ordered 10 test tubes with screw-on tops, for less than \$10 on Amazon, and labeled them for the woods I most commonly use. Whenever I sand any one of those woods by hand, I save the dust in one of the tubes. I made a little stand to hold the tubes, but you can buy such stands inexpensively online.

—TRICIA FIELDS, Liberty, Ind.



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■ ACCESSORIES

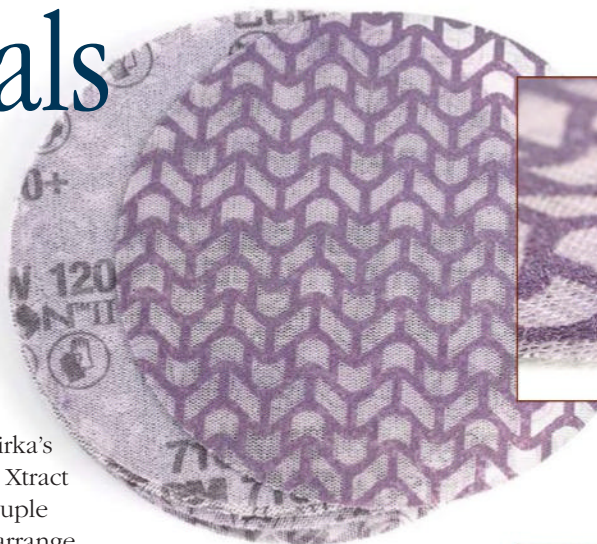
Head-to-head: High-tech sanding disks

Everyone wishes sanding were faster and easier, so I jumped at the chance to try out two fairly new disks: Mirka's brand-new Ultimax Ligno and the somewhat similar 3M Xtract Cubitron II Net Disk 710W, which has been out for a couple of years. Both include high-tech ceramic abrasives and arrange their abrasive grains in clusters, with gaps between them. The clustered abrasives are intended to cut more aggressively, and the gaps to funnel air between them, which keeps the sanding process cooler and allows more-efficient dust collection. The 3M disks use a porous net material as the substrate, while Mirka's disks are solid, with a universal hole pattern called "Multifit." Dust collection was very good with both.

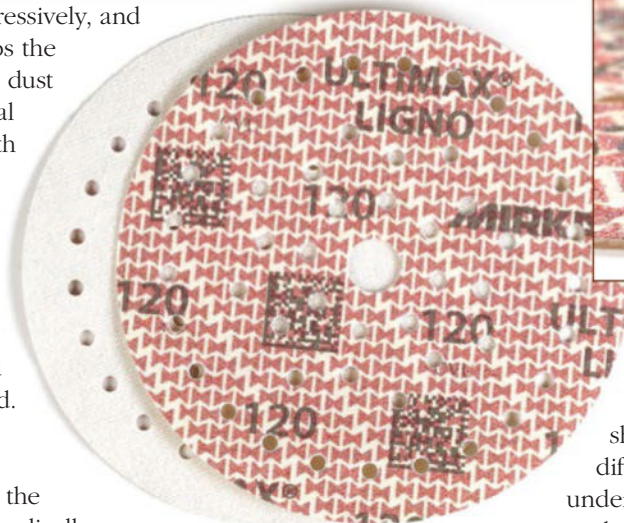
I compared the disks to each other and to two more-standard types of disks: Festool's Granat line and a budget-friendly option called Dura-Gold Premium. In my tests for the rate of material removal (efficiency), the 3M disks stood out significantly, sanding away 28 grams of wood. Mirka removed 12 grams, and the Festool and Dura-Gold disks removed 10 grams each.

To test surface quality, I prepared both sides of the same maple boards for finishing by sanding methodically through the grits: 120, 180, 220, and 320. Then I applied two coats of hard-wax oil to one side and a coat of stain to the other.

The surfaces prepped with the Mirka disks had a much higher sheen and smoother surface than those produced by the 3M disks. There were no problems with the stained sample surfaces, though they displayed the same differences in



**3M Xtract Cubitron II
Net Disk 710W**
\$0.50 per 5-in. disk



Mirka Ultimax Ligno
\$0.65 to \$0.80 per
5-in. disk

sheen. To find out if those differences would matter under a film-forming finish, I sprayed the samples with lacquer.

As I expected, once I built up a film, the differences disappeared.

I plan to keep both of these new disks on hand—the speedy 3M disks for use with film finishes, and the fine-polishing Mirka disks for penetrating finishes.

—Adam Godet is a pro woodworker in Washington, D.C.



3M wins on speed. Using 120-grit disks, Godet sanded freshly milled maple boards for 10 minutes and weighed the boards before and after. The 3M disk removed 28 grams of wood, while the Mirka removed 12 grams.



Mirka is better for oil finishes. Godet sanded each sample up to 320 and applied a penetrating oil finish. The Mirka sample (shown here) had a beautiful satin sheen, while the 3M sample was much duller.



Film finishes erase the differences. Both the fully prepped boards looked great after a film-forming finish was applied. So 3M's big speed advantage makes it the disk of choice for these types of finishes.



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■ POWER TOOLS

Cordless track saw is smooth and powerful

A track saw is one of those tools that is much easier to use without a cord dragging behind, catching on corners and edges and preventing smooth, continuous cuts. The new Metabo HPT track saw matches a powerful 36V battery with a brushless motor and a 6½-in.-dia. blade capable of cutting 2½-in.-thick material at 90°.

When I placed the saw on its track, I found that I could adjust the sliding action with one simple knob—a nice touch. The same knob locks the saw in place for setting the bevel angle, which is done with another easily accessible knob. And the bevel angle can be pushed one degree past 0° and 45°, which comes in handy when fitting angled pieces. Setting the depth of cut was just as easy and intuitive.

The track has one of those sacrificial strips along one side that gets trimmed by the blade and then tames tearout. The strip is trimmed at exactly the same point for 90° and 45° cuts, meaning that it remains effective for both.

The saw is very well balanced in use, and the brushless motor is smooth and powerful. My initial cuts were great, both at 90° and 45°. When I cut some hardwood-veneer plywood, however, there was slightly more chipout than I am used to. I replaced the stock blade with a higher-quality model and the problem disappeared completely. Stock blades tend to be a weak point on most saws, so I wasn't surprised.

The 36V battery offers plenty of power and run time. It managed 144 lin. ft. of cuts in ¾-in. Baltic-birch plywood. After I recharged the battery, the saw made 75 ft. of cuts in a thick maple board.

—Mark Edmundson
is a pro woodworker
and cabinetmaker in
Sandpoint, Idaho.

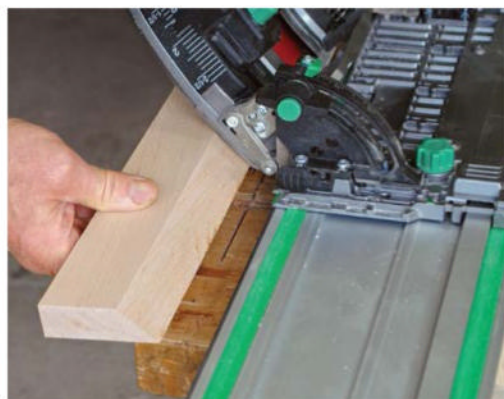


Break down plywood. Well balanced, the saw plunges easily and makes smooth, accurate cuts.

Plenty of juice. The saw managed 144 lin. ft. of cuts in ¾-in. Baltic-birch plywood on a single charge.



Easy adjustments. The bevel-setting knob is easy to access. Other adjustments are just as simple and intuitive.



Smooth bevel cuts too. The saw is capable of very smooth cuts in all sorts of materials—even wide bevel cuts in maple, like this one. (The other half of the maple workpiece is hidden under the track.)

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Aside from their excellent filtration properties, RZ masks are easily adjusted for a comfortable all-day fit. I like how the nose piece is lined with foam and the head straps have a silicone bead running along their inside faces to prevent them from slipping.

Once I fine-tuned the adjustable nose piece, I couldn't get this mask to fog my glasses or safety goggles (or both worn together). This was due both to the

mask's adjustment features and its one-way breath vents.

While the initial cost of an RZ mask can be higher than that of other models, the main part of the mask is a one-time purchase; the disposable filters are separate and easy to change out when they eventually get old and clogged.

Additional filters are \$5 each.

I worked for long stints with the RZM3 mask. It felt so light, comfortable, and stable that I nearly forgot I was wearing it.

—Roland Johnson is a contributing editor to FWW.



No dust, no fogging. Thanks to its adjustable head straps, adjustable nose clip, and one-way air valves, the RZ mask fit Johnson's face closely and didn't fog his glasses or goggles.



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Successful bandsawing requires a sharp blade, and standard blades go dull surprisingly quickly. Resaw cuts are especially hard on these blades, as are cuts in tropical woods, many of which contain silica, an abrasive material. Carbide-tipped blades, on the other hand, stay sharp many times longer than their bimetal or carbon-steel cousins.

Starrett's new Woodpecker CT features triple-ground carbide teeth with a backing blade made from a high-strength alloy. The blades are designed for high-volume cutting, and they can be resharpened when the teeth finally do lose their edge.

I ordered a ½-in.-wide, 0.032-in.-thick blade with three teeth per inch (TPI)—a great size for general work on my 14-in. bandsaw—and I put it through a battery of tough tests. It did a beautiful job resawing wide veneers, making straight, clean cuts. And it worked just as well on rip cuts and on curves with a radius as tight as 5 in., in a variety of wood species.

The initial investment for a high-quality carbide-tipped blade like this is relatively high—but the amazing durability of carbide means that the blade will pay you back many times over. Woodpecker CT blades are available in a range of widths, lengths, and thicknesses, at both 1.3 and 3 TPI, and custom lengths can be ordered for any bandsaw.

—R.J.



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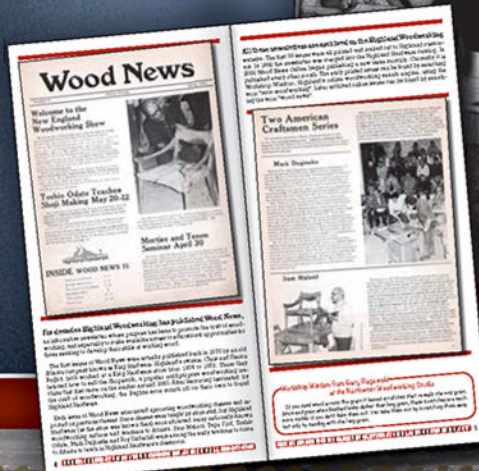
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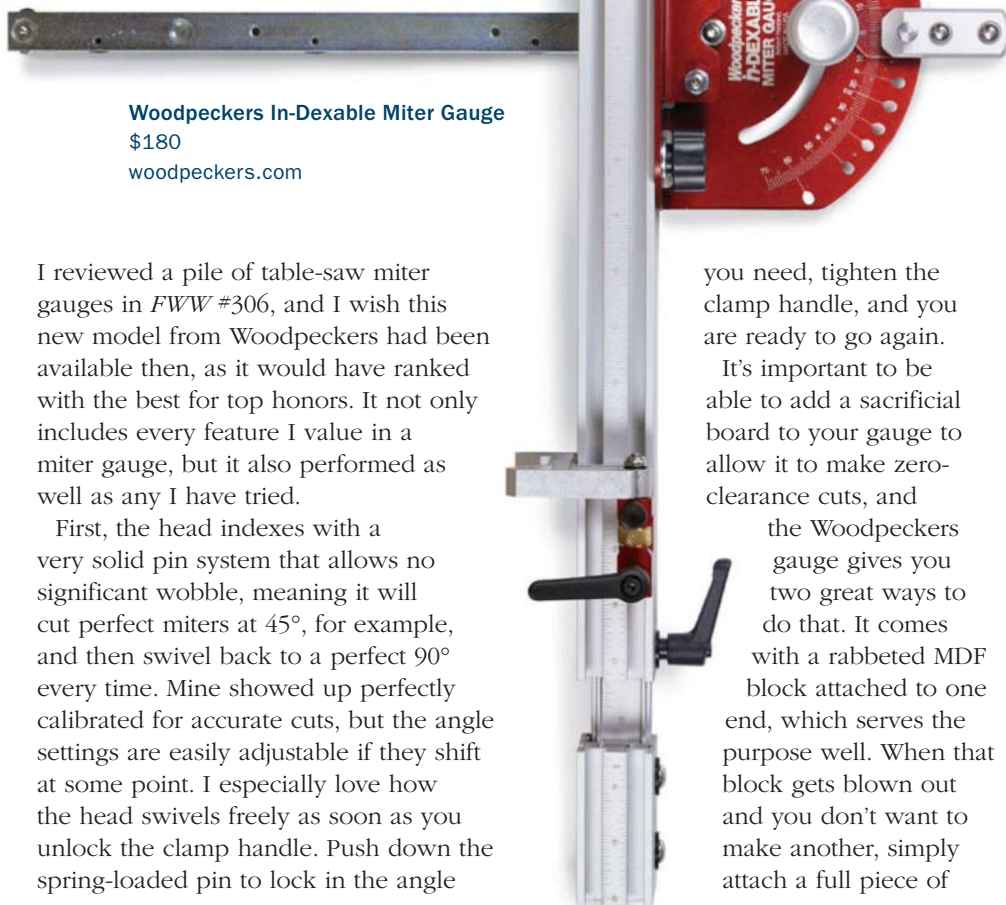
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■ ACCESSORIES

New miter gauge is among the very best



Woodpeckers In-Dexable Miter Gauge
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I reviewed a pile of table-saw miter gauges in *FWW* #306, and I wish this new model from Woodpeckers had been available then, as it would have ranked with the best for top honors. It not only includes every feature I value in a miter gauge, but it also performed as well as any I have tried.

First, the head indexes with a very solid pin system that allows no significant wobble, meaning it will cut perfect miters at 45°, for example, and then swivel back to a perfect 90° every time. Mine showed up perfectly calibrated for accurate cuts, but the angle settings are easily adjustable if they shift at some point. I especially love how the head swivels freely as soon as you unlock the clamp handle. Push down the spring-loaded pin to lock in the angle

you need, tighten the clamp handle, and you are ready to go again.

It's important to be able to add a sacrificial board to your gauge to allow it to make zero-clearance cuts, and the Woodpeckers gauge gives you two great ways to do that. It comes with a rabbeted MDF block attached to one end, which serves the purpose well. When that block gets blown out and you don't want to make another, simply attach a full piece of



Smart features. The micro-adjustable flip stop includes a small tab that engages with the front of the fence to keep pointy miters from sliding past it.

MDF to the front of the gauge and shift the flip stop forward on the fence to accommodate the additional 3/4-in. layer of material.

The flip stop is excellent, by the way, with a handy micro-adjuster, no wobble, and a little tab that fits into the front of the fence to stop the tips of pointy miter cuts from sliding past (photo above). The stop also slides smoothly onto the fence extension, which can be pulled out to index crosscuts as long as 31 in. I love the little bolt that stops the extension bar from falling out of the fence, a common problem with other gauges. The product engineers thought of everything on this excellent accessory, and it's a bargain at \$180.

—Asa Christiana is *FWW*'s editor at large.



Big, accurate crosscuts. The fence extension and rock-solid flip stop allow repeat crosscuts up to 31 in. long. The spring-loaded indexing pin in the head guarantees that those cuts are square.



Miters are just as precise. The fence pivots easily from one angle setting to another and locks in each position securely and accurately.

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Looking Forward

Makers charting the future of the craft

BY JONATHAN BINZEN

As our staff looked ahead to assembling this anniversary issue, I spent a lot of time looking back—paging slowly through *Fine Woodworking's* early issues to take the pulse of the magazine when it was young; skipping around from decade to decade to find furniture that particularly impressed me in the articles where I had discovered it; reading stray bits at random that drew me in a second time. All that looking back eventually impelled me to turn forward again and assemble an

article filled with work by a range of woodworkers whose careers have launched in the last decade or two. I ended up identifying so much superb work that we've had to split the article in two; a second batch of makers will be featured in an issue later this year. It's a delight to share work I so admire—and to know from experience that this is but the tip of the tip of the iceberg and that I'm likely to find more inspiring woodwork right behind the next workshop door.

Álvaro Aramburu

Álvaro Aramburu makes furnishings in a quiet village in central Sweden, but he grew up amid the bustle of Madrid. His grandmother was a painter, and his school notebooks were always full of drawings and paintings. Making them, he says, “would completely transport me elsewhere.” He studied industrial design at the Technical University of Madrid, but the school's engineering mindset felt constraining. “I started wondering if I wanted to do something on a smaller scale, something more focused on moving from material to concept rather than from concept to material.”



Then he discovered the small, craft-based, wood-oriented furniture program at Gothenburg University in Sweden. He had little experience working wood but decided to go anyway. Soon after arriving he

fell in love with wood and began to free himself from the old-school engineering mindset. “I found a more personal and introspective approach to design,” he says. Working these days in a diverse design collective with other Gothenburg graduates, he finds himself integrating engineering and craft.

Color and natural light are primary concerns as Aramburu develops his designs. “Like all woodworkers,” he says, “I can get mesmerized by a piece of wood.” But using color lets him add “a bit of play” to a piece. He defines shapes and details with chiaroscuro, the combination of light and shadow. “I work by a window, because I like focusing on the way natural light falls on a piece,” he says. “I’m always wondering how I can make something that is subtle and simple but still conveys a lot.”



Playful patchwork. The seat of Aramburu's bench features inlaid and stained patches of pine and spruce, randomly placed in a plank of Swedish pine. The legs and stretcher, also solid pine, are coated with milk paint.



Traveling table and stools. The side table in ash, with milk-painted stretcher and tusk tenons, was made to be flat-packed. Tapered sliding dovetails join its thin legs and top. The jaunty stools with staked legs are a mobile take on a traditional milking stool.



Alison Croney Moses



Coopered curves.

Working with multiple layers of veneer, Croney Moses deploys coopering and bent lamination to create shell and pod forms. An early breakthrough came when she realized you don't have to close a coopered vessel; she's been exercising that flexibility ever since.

Craft and kids are two constants in Alison Croney Moses's life. When she was a kid herself growing up in North Carolina with her parents, both originally from Guyana, her home life was infused with craft. "I have so many memories from childhood of making things and having constant support," she explains.

At Rhode Island School of Design, where Croney Moses studied furniture making, a class in bent lamination with Don Miller opened the door to an aesthetic exploration of shell-like shapes that she continues nearly 20 years later. Some of her teachers encouraged her to more clearly address function in her pieces, but she resisted, continuing to follow a more sculptural muse. Even so, pure aesthetics weren't her only aim. "I was also thinking about how to use my skills to produce things that have a little larger impact than what happens in the woodshop," she says. For her senior thesis, she developed a project that involved working with high school students to design soft plush furniture for an elementary school.

In 2013, teaching and making came together for Croney Moses when she took a job teaching woodworking to middle schoolers at the Eliot School of Fine and Applied Arts in Boston. She spent 10 years there, teaching, administrating, and making her own work in the school shop.

Several years ago, with her sculptural career taking off, she decided to leave her job at the school; since then she has been working full-time in her studio. But with a six- and an eight-year-old at home, she's still teaching.



Interlaced. In describing her recent wall piece *When We Are Together* (above), made with veneer and a bending iron, Croney Moses says, "Our time is brief, but when we get together, who knows what happens?" The curved staves of her featherlight, bent-laminated *Shell* (left), each composed of multiple layers of Italian beech veneer and one interior layer of walnut veneer, emerged from a very heavy MDF bending form.

Beatriz Zuazo



Like many other woodworkers, Beatriz Zuazo took an indirect path into the field—hers perhaps a bit more indirect than most. Raised in southern Spain, she studied translation in university, specializing in Russian and English. Then she lived for five years in Russia. She worked for part of that time at the Spanish consulate in Moscow, where she did written translation and some simultaneous interpreting. After returning to Spain, she translated for various agencies and for a Russian newspaper, but eventually she realized she had hit a dead end. What to do?

Restoring furniture for her apartment in Barcelona sparked an interest in furniture making. Finding no suitable training available in Spain, she considered traveling to England or elsewhere, but that was too expensive. In the end, she took a local furniture design course, though it didn't provide the building skills she wanted. A three-year stint of computer drafting for a large furniture company followed. She was in the right field, but at a desk instead of a bench. She'd been sharing a shop with friends and using it after work, and then one day she decided to leave the desk and become a full-time woodworker.

To hone her hand skills, Zuazo took classes with Germán Peraire at his workshop in the countryside an hour from Barcelona. Some years later, that connection blossomed into a work partnership. Peraire had seen Zuazo develop her skills in marquetry, and when he decided to build his tall cabinet (facing page, top right), he asked her to do the marquetry for it. Zuazo, who typically works small, had to find a way to create such a large marquetry sheet on her scrollsaw. Luckily, the design provided the solution: She simply divided it into sections by cutting along the branches that run from edge to edge.



Finding an intimate format. Zuazo has built a range of furniture but feels most at home making boxes and embellishing them with marquetry or parquetry. The marquetry designs on these boxes, created with natural and dyed veneers using the double-bevel technique, were inspired by urban photographs taken in Mexico by Guillermo Rodríguez.



A home for one's things. For this jewelry cabinet, Zuazo made the marquetry on the drawers with shop-sawn veneers and left them in their natural tones to harmonize with the olive ash back panel.



Germán Peraire

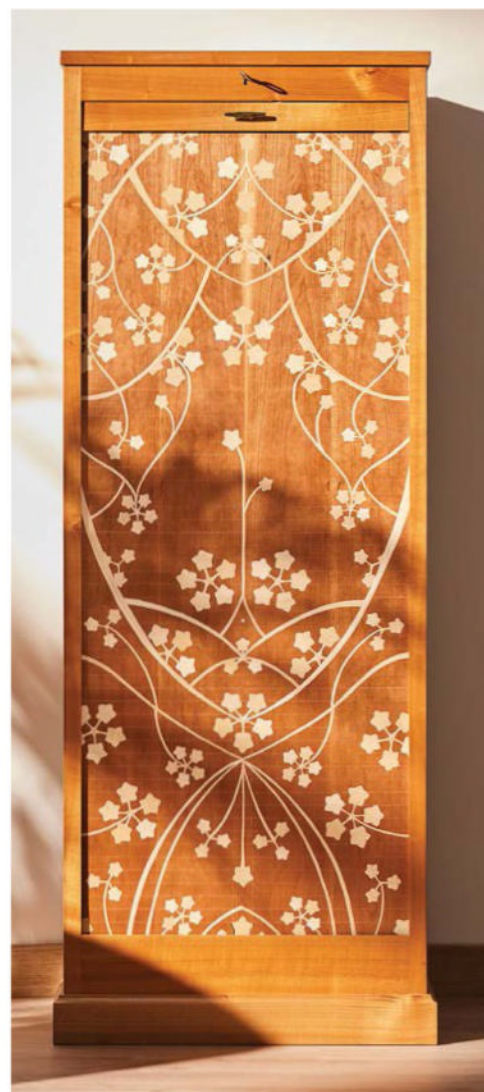
Germán Peraire became a teacher almost as soon as he became a maker. After taking a stab at photography, he realized at 26 that he needed to reinvent himself. Attracted to fine furniture making but finding no appropriate makers or programs nearby, he began immersing himself in the craft through English-language books, magazines, and videos. When he mastered a skill—dovetails, for example—he began teaching what he knew, first to friends and soon to others in small groups at his shop. Before long he was teaching weekend workshops.

He continued making furniture on commission, although the market was tough and the pieces he really wanted to build were the challenging ones that demanded skills he had yet to acquire. “What really takes my fancy,” he says, “is investing 400 or 500 hours in one piece. I wouldn’t be able to sustain myself just selling furniture, but it turns out I have a knack for teaching.”

Peraire now teaches weekend workshops year-round (except January and July) as well as 10- to 14-day intensive classes three or four times a year. Classes are held in the timber-frame shop he built overlooking a wheat field an hour outside his native Barcelona, and students are provided with meals and sleeping bungalows. It’s a successful business and an enjoyable one. “So in a way,” he says, “life has told me, ‘You should be teaching more than building.’” But he won’t stop building. “At core,” he says, “I am an amateur. I remember very well my beginnings and this amazing sense of freedom that you get when you are alone in the workshop putting all of your attention into only one task. So I’ve been always looking for that experience and trying to deepen it as much as I can.”



Tea times two. Peraire’s slant-front desk and mating wall cabinet in olive ash, white ash, and cherry were built to contain the herbs he likes to collect for tea infusions from the forests near his workshop outside Barcelona. He used modified violin tuning keys as drawer pulls. The bow-front wall cabinet below, also made to house a custom tea set, has a quatrefoil pierced carving in its hard maple door.



File cabinet takes a sublime turn. Peraire’s freestanding cabinet (above), with a locking tambour door that slides down from the top and rolls up in the base, is derived from a utilitarian file cabinet common in Europe in the 19th century. The originals were typically unadorned, but Peraire and Xènia Garrofé adapted a carved design by Spanish furniture maker Gaspar Homar and asked Beatriz Zuazo to render it in marquetry.

Mette Bentzen and Lasse Kristensen

When Mette Bentzen and Lasse Kristensen opened their workshop in Denmark in 2011, their ambition was to make “the best of the best” freestanding furniture. The company's early work was purely functional and designed in the Danish modern vein, which was only natural, since they had both trained and worked for years at Copenhagen's P. P. Mobler, the shop renowned for building the most challenging of Hans Wegner's iconic chairs.

But several years into their new venture, on a visit to Art Basel/Miami, the pair saw a flamboyantly expressive table by Joseph Walsh of Ireland, and the experience shook something loose in them. The next table they designed (top right), with its arched and branching legs, was a turning point for them, a bridge from conventional furniture to something more sculptural.

They soon were building stack-laminated pieces and carving them in shapes depicting or interpreting forms from nature: melting glaciers, icicles, and stalagmites, the face of the moon. “Working this way,” Bentzen says, “set our work free from mid-century Danish design.” The carving, Kristensen says, which is accomplished with angle grinders, files and rasps, and countless hours of hand-sanding with custom sanding blocks, “is inspired by the raw beauty of nature but also lets us express the grain of the wood. We strive for you first to see the shape alone. Then when you get closer, you say, ‘Oh, it's wood!’ and enjoy that.”



Ideas from above. Long devoted to expressing closely observed melting-ice forms in their sculpted furniture, Danish makers—and avid hikers—Bentzen and Kristensen recently bought a house in far northern Sweden for simpler access to glacial terrain. Another recent purchase, a telescope, keys into their ongoing series of wall sculptures lit from within that depict the moon behind a scrim of clouds.



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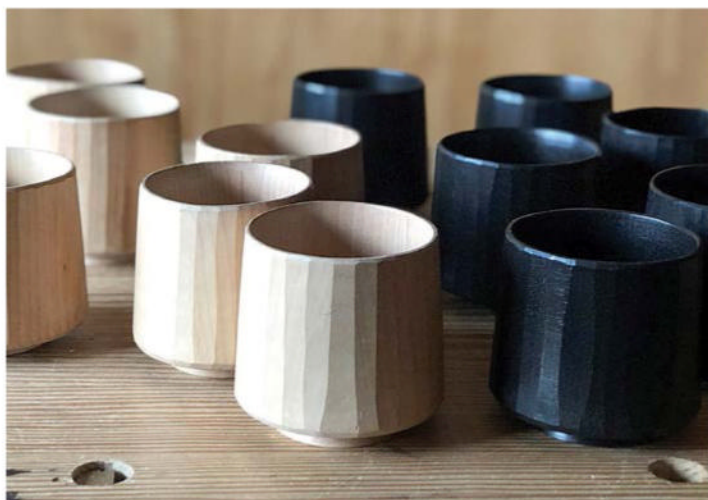




Dawson Moore

About a decade ago, Dawson Moore was doing some mildly illicit farming in Southern California when he happened to take a woodcarving class. He was soon attempting acanthus leaves and ball-and-claw feet, then learning about flatwork cabinetmaking and acquiring hand tools for it. One day he read a blog about spoon carving. “I carved a spoon and was immediately hooked,” he says. “All my Lie-Nielsen tools started gathering dust.”

Around that time, Moore and his wife moved back to his native Michigan and built a house on a forested farm that has been in his family for six generations. While building the house, they stayed in the family homestead. There he had the prime ingredients for a serious spin into spoon carving: “some free time, a really nice porch, and tons of great wood.” Before long he was devoting himself full-time to woodwork. “It was a very spoon-centric practice for a long time,” he says, “and I certainly was into carving in volume.” Production carving was necessary for Moore to make a living, but it also suited his temperament. “There is a contingent that talks down on production,” he says. “I push back on that. The process bumped up my skills and dexterity in ways that never would have happened otherwise. And, counterintuitively, it boosted my creativity, because there was nothing between me and a new idea—the skills were getting out of the way.”



Cups, turned and carved. At the lathe, Moore turns the foot and a rough profile for three or four of these cups on a single long blank. Then he does the exterior carving with a drawknife at the shave horse. Finally, he separates the cups to hollow their interiors.

Chair study. When Covid hit, Moore set aside spoon carving to pursue an awakening passion: “For a year and a half I pretended I was doing an MFA in chairmaking.” These red oak chairs serve as his thesis. He drew inspiration from Danish modern designs and from a range of specific makers, including Tim Manney, Brian Boggs, Curtis Buchanan, Pete Galbert, and Jennie Alexander.



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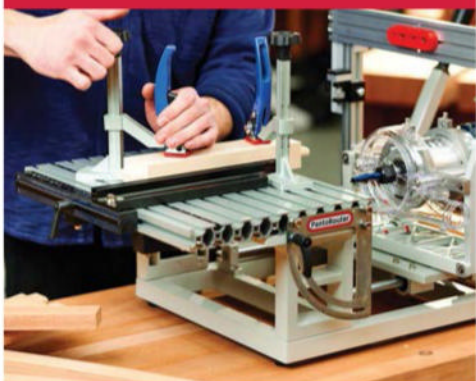
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Justin Nelson



When Justin Nelson started Fernweh Woodworking in Bend, Ore., in 2014, he was coming off four years in the Marine Corps and then a season on a Forest Service Hotshot crew fighting wildfires. Making tobacco pipes was the only woodworking he had done. “I didn’t know what the business would look like,” he says, “but I liked the idea of independence after government jobs.”

He got a quick table-saw lesson from his brother-in-law and started out, as he says, “making knick-knacks, learning on YouTube, and blundering through, working 70 hours a week.” A couple of years in, he was introduced to Sam Maloof’s work. “It boggled my mind,” he says. And it convinced him to turn his business toward furniture.

He came to love designing and building furniture. These days, as he works with four others in a 2,000-sq.-ft. shop, furniture is his primary product. Chairs are a particular fascination. Drawn to the work of master 20th-century chairmakers Hans Wegner and Finn Juhl, Nelson toured shops in Denmark where Wegner’s furniture is still made. He was struck by the craftsmanship and teamwork there and the blending of manual and mechanized approaches to furniture making.

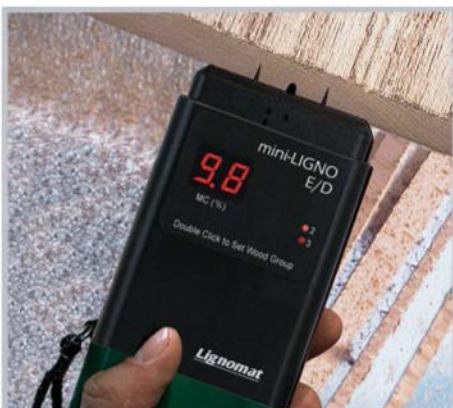
Nelson is keen to foster a similar ethos at Fernweh. “It’s a team of woodworkers,” he says, “and I’m somewhere in the middle.” Asked about the company name, he explains, “*Fernweh* is a German word that means roughly, ‘to be homesick for somewhere you’ve never been.’ To me, it’s the feeling I get when we’re working on a new design.”



Triangular diversification. When Covid ended and sales ebbed, Nelson searched for ways to diversify. His nesting coffee tables and triangular bowls and trays, all products of that moment, were meant to provide an accessible entry point for customers.



Production piece. Nelson’s tripod table, the first piece of furniture he designed with production in mind, was, he says, “heavily inspired by Sam Maloof’s joinery.” When the legs are turned to a taper, a chunk of the blank is left unturned where the joint occurs. After they are joined with slip tenons, the junction is shaped with a grinder and rasps. The tabletop, originally routed with a circle jig, now gets relieved by CNC.



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George Sawyer

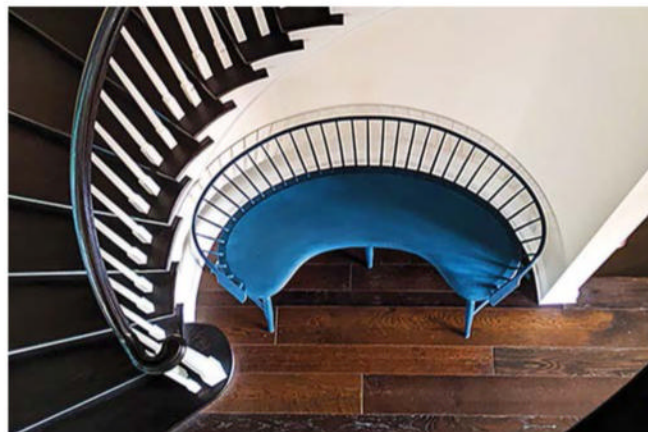


George Sawyer was home-schooled in chairmaking. His father, Dave, a pivotal figure in the renaissance of green-wood and Windsor chairmaking in the United States, was building pared-down Windsors in his one-man home shop in Vermont all throughout George's childhood. Dave, an MIT-trained mechanical engineer who taught himself to build chairs—making hundreds of ladderbacks in the 1970s before switching to Windsors in 1982—was famously generous with his knowledge and became a mentor to scores of aspiring chairmakers. George, however, was not originally among them. He spent “tons of time” in his father's shop as a kid working on all sorts of projects—but none were chairs. After studying product design at Rhode Island School of Design and working for an architect on the West Coast and then for the inventor of a wood-fired steam-powered generator, George circled back home and learned the craft of chairs from his father.

George's company, Sawyer Made, has absorbed his father's example but takes Windsors in a different direction. For George, the appeal of the Windsor is less its craft background than its design parameters and possibilities. “My pieces are transitional—clearly rooted in the traditional but bringing more modern design language into the forms,” he says.

With a team of four in the shop, Sawyer Made is making many more chairs than Dave did, and production efficiency is a key factor in the design process. “We've gone from all hand tools to a blend of hand and power tools,” George says. “But no robots yet!”

He does embrace digital technology in the design process. After sketching ideas by hand, he moves to CAD modeling software. “That really helps me get the geometry right before building,” he explains, “and it cuts out a lot of the frustration.”



Bending tradition. George Sawyer's Windsors embody the DNA of traditional chairs like those made by his father, Dave, but with their unexpected size, shape, and color, they're animated by a dash of modern daring and dazzle. The blue bench, built to fit an elliptical stairwell in California, was made during Covid and sized to a tracing of the space made by the customer.



Windsor gone rogue. After building some Windsor benches of extreme length and others that turned corners, George began to populate his sketchbook with unorthodox ideas, including one for Wayward Bench. “I don't know what the Shakers would think,” he says, “but I like it.”



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Capturing a unique Arts & Crafts style

BY PETER MARCUCCI

My interest in Charles Rohlfs's work began in 2012 when I saw pictures of his tall back chair and 1898 desk chair. I thought that they were the most beautiful chairs I had ever seen. (A copy I made of the tall back chair appears in Gallery, *FWW* #291.) I'm attracted to the artistic and eclectic nature of his work. I also like his unconventional nature. He was a bit eccentric, and I suppose that appeals to me too. He is quoted as saying, "If I make a chair, I am a chair."

I've been researching and re-creating Rohlfs's furniture for more than a decade to understand Rohlfs from a woodworker's perspective and to uncover the construction details.

Charles Rohlfs (1853–1936)

At the beginning of the last century, Charles Rohlfs achieved national and international acclaim as one of the world's most innovative and artistic woodworkers. His furniture contains



Rohlfs reproductions. Attracted to their unique blend of styles—Arts and Crafts, Art Nouveau, and East Asian furniture—Peter Marcucci recreated these three mahogany pieces.



many Arts and Crafts elements but is set apart by its unique shapes, artistic ornamentation, fretwork, and carving details, which have Art Nouveau, Asian, and Gothic influences.

Like many woodworkers, Rohlfs started building furniture for his home, working in a rudimentary attic workshop. He then began to take furniture commissions for friends and acquaintances. Around 1899 he transitioned from struggling actor to furniture designer. For the next decade he continued making furniture in his Buffalo, N.Y., workshop. Rohlfs's works gained national prominence following publication of a January 1900 *House Beautiful* article.

Defining characteristics

While his furniture is wildly different from other work of the time, there are some common aesthetic and construction threads running through much of it.

Rohlfs's work was made occasionally from mahogany but mostly from oak or ash with a dark, matte-brown finish sometimes tinted with green or black. His distinctive carvings ranged from

relief work with the sweeping curves and swirls of rising smoke to others inspired by the curves of a fiddlehead culminating in an ever-tightening spiral. Fretwork motifs with stylized shapes of plants and trees are found in much of his work.

Rohlfs's construction methods were also unconventional. I measured an original version of his swivel desk and have seen photographs of the hall chair. Rohlfs routinely used screws as part of his joinery. The screw holes were covered by protruding faceted plugs. For example, the stiles, rails, and stretchers of the hall chair are joined with screws.

His larger pieces of casework and even some of his chairs feature tusk-tenon joinery with carved decorative wedges.

Before becoming a furniture maker, Rohlfs was a pattern maker in a foundry and a stove designer. As I was constructing the swivel desk, I got the sense that Rohlfs had used some of the techniques from metal fabrication to build his furniture. For example, the body of the swivel desk is an internal structural frame. The side panels are purely decorative and are screwed on.



2D meets 3D. Marcucci uses *InkScape* to make scaled drawings of the decorative fretwork and carvings. He imports a photograph, digitally traces the pattern, makes adjustments, and prints it. After noting any changes, and with a prototype as a guide, he builds the final piece. As he builds, he makes $\frac{1}{4}$ -in. scale drawings, keeping detailed notes and pictures.

Mocked up. A full-size prototype, made from a combination of MDF, plywood, and solid wood, helps Marcucci confirm proportions and dimensions and understand the joinery. Any mistakes are made on the prototype. Prototyping also provides Marcucci the opportunity to practice cutting the fretwork. He makes the carved elements from more forgiving basswood before attempting them on the final piece.



Recreating Rohlfs

I start with pictures sourced from books and the internet. Auction websites often include very useful photographs. If possible, I visit a museum to see firsthand the work I want to reproduce. With basic information, I draw a simple plan by scaling a photograph. If I have the height, width, and depth, I can dimension the other parts. Raised plugs indicate screw locations. If I get stuck, I glean clues from plans of other pieces of furniture from the Arts and Crafts era.

Swivel desk

The swivel desk is part of a collection known as the “Graceful Writing Set,” which also includes a hall chair and a waste container. Surviving examples of the set are in the decorative arts collections of many U.S. museums. I saw the swivel desk at the Nelson-Atkins Museum of Art in Kansas City and the hall chair at the Los Angeles County Museum of Art. I had close access to an

original swivel desk and took detailed measurements and photographs.

A conventional designer would build a fixed desk and a swivel chair. Rohlfs did the opposite. Rotating the desk allows access to the drawers and door at either end and to the angled back, which can be used to display a book or artwork.

To create the swiveling action, three small wheels are set into the top of the base. They are placed at 120° from each other and an 8½-in. radius from the central pivot point. The desk’s middle section connects to the pivot point with a bolt and rotates on the three wheels. The fretted front panels are screwed to an inner structural framework.

The desk’s top section sits on the middle case. Its pointed-arch sides overlap the middle case at the bottom and attach with screws. Where there is smoke there is fire: A rising-smoke carving decorates the front of the desk, and the top is finished with flame-shaped carved finials.

Hall chair and waste container

The hall chair was first constructed in 1899. Variations of the chair feature different fretwork patterns, and differently shaped and adorned crest, side, or front rails. My reproduction is based on the 1904 version. Its pierced and carved back panel is one of the most elaborate of Rohlfs’s carvings.

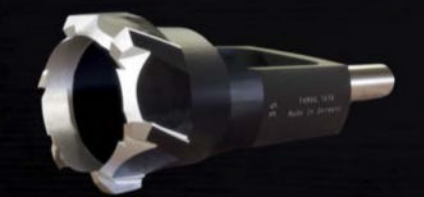
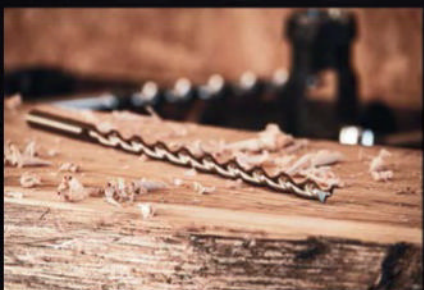
There are no surviving examples of Rohlfs’s waste container, and the only information I had is from a photograph. Fortunately, it is easier to reproduce than the desk or chair. I estimated the dimensions in proportion to the size of the swivel desk. The decorative elements were simple enough to sketch from the photograph. I reimagined the waste container into an umbrella stand (see “Charles Rohlfs Umbrella Stand,” p. 74).

Peter Marcucci is a woodworker in Wasaga Beach, Ont., Canada.



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Glass-Door Shaker Cabinet

A study in dovetails, dadoses, and dividers

BY CHRISTIAN BECKSVOORT



A few years ago, I chanced across a photo of a diminutive walnut cabinet at the South Union, Ky., Shaker community. The size, the glass doors, and the interior shelf and divider intrigued me. The cabinet's purpose was unclear; perhaps it was used to store herbs, medicinals, or

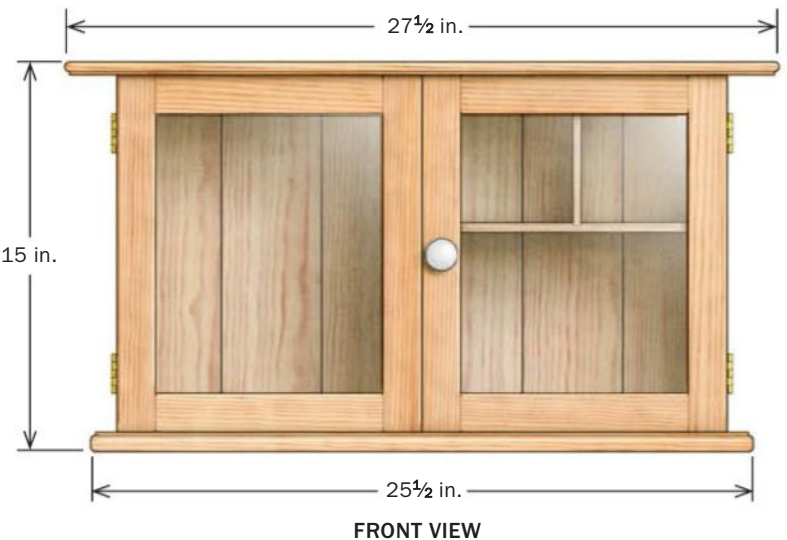
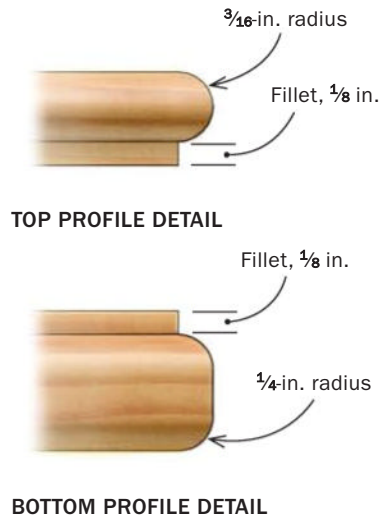
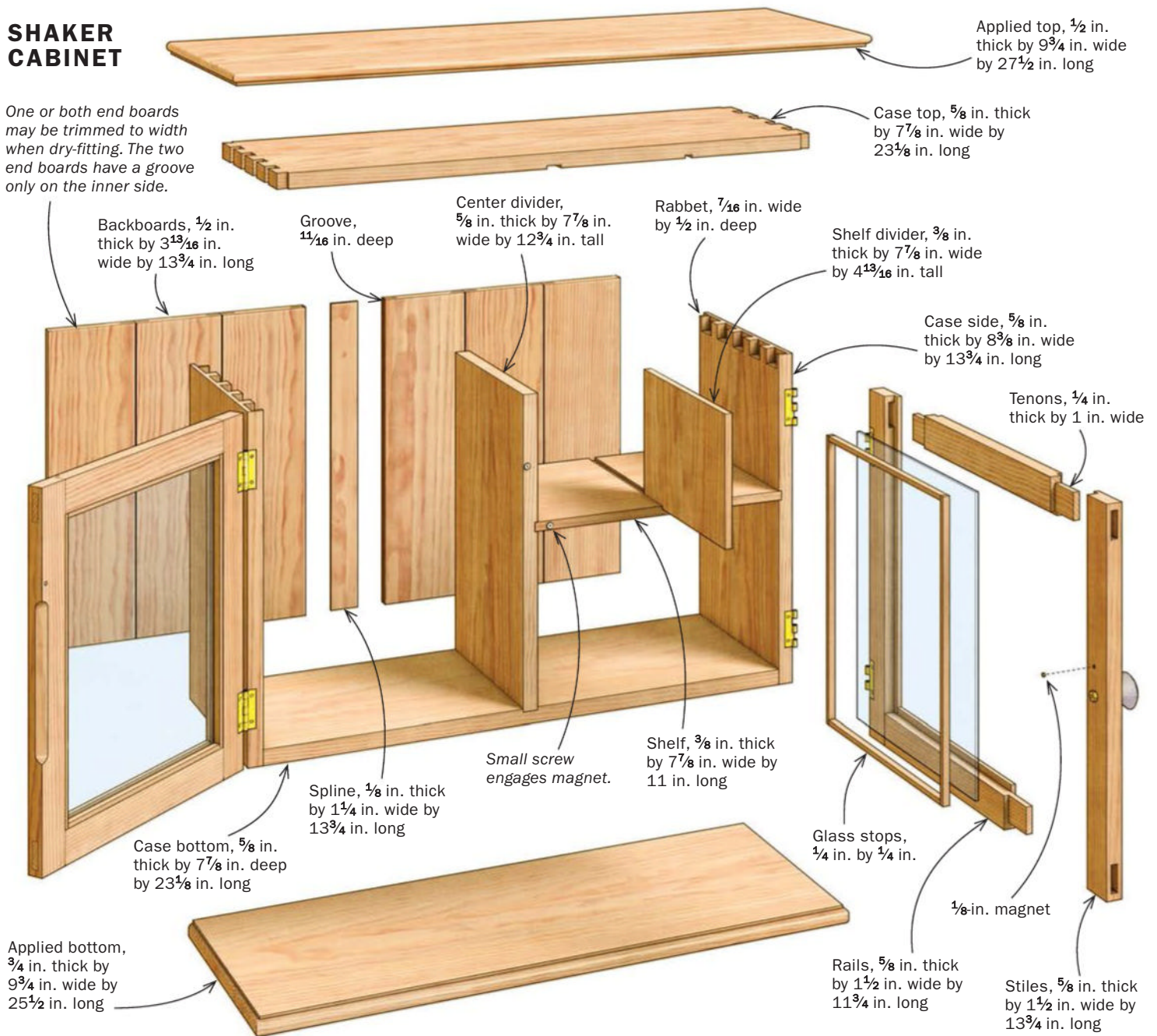
sewing notions. The glass doors suggest that it was made after 1850.

Without actually having seen the cabinet, I was hazy about the construction details. I do know a few things: The dovetailed case gets applied top and bottom boards glued to it after assembly. The vertical backboards bypass the case

top and bottom, so the end grain is visible until the applied top and bottom boards are added. Also, it appears as if the bottom may have been added later, because it is shorter and thicker than the top and has dadoses or cutouts on the sides. If I were making a strict reproduction, I would follow all

SHAKER CABINET

One or both end boards may be trimmed to width when dry-fitting. The two end boards have a groove only on the inner side.



Dovetails keep it together

Half-blind dovetails join the case sides to the case top and bottom. Later, profiled top and bottom boards will be applied to the case.

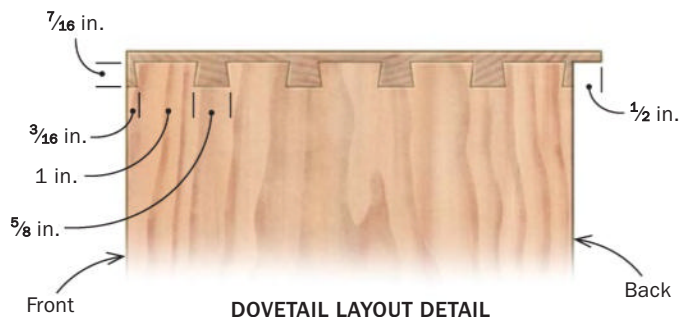
Always tails first for Becksvoort.

Start by laying out and cutting the tails on the ends of the top and bottom boards, then place the chisel in the scribed baseline and begin with light mallet blows. Cut out a shallow chip. Repeat. The mallet blows should get harder and the chips thicker. Move halfway through, flip the board, and finish wasting material away between the tails.



Transfer and

cut. With the pin board (the case side) vertical in the vise, use a knife to transfer the tails to it. Then use a handsaw to cut between the baseline and the half-blind line.



Chopping pins. As you did with the tails, start with light chisel chops on the scribed baseline. Then remove a thin chip by paring from the front. The next chops along the baseline are deeper. Follow those by removing thicker chips. You can split the chips to remove them, because they will be wider at the bottom than the top. Pare along the cheek of the pins, and refine the flat at the half-blind line.



Dadoes before gluing up. Use a table saw and a dado blade to cut the dadoes for the center divider in the top and bottom case boards. The center divider is the same thickness as the case parts— $\frac{5}{8}$ in.—so that's the dado's width as well.



Glue in the nooks and crannies. Spread glue quickly in and around the dovetails on the tail boards as well as the pin boards. Then tap the case together.

of those details, but as a project for myself, I opted to make a few changes: The two end backboards sit in rabbets in the sides; I used cherry instead of walnut; I made some slight adjustments to dimensions; and I had to guess and use my best practices where details were not visible.

The case: All things not equal

The four case boards are flush at the front, but the case sides are wider than the top and bottom boards and are rabbeted along their back edge to receive the back. The case top and bottom end at the rabbet, allowing the backboards to overlie them.

After cutting the dovetails, rabbets, and center divider dadoes, glue and assemble the case. Then focus on cutting the dadoes for the shelf and the shelf divider.



Tighten things up. Once you tap all the dovetails home, add cauls and clamp pressure until the glue dries. Check for square and adjust the clamps if necessary.

Interior infrastructure

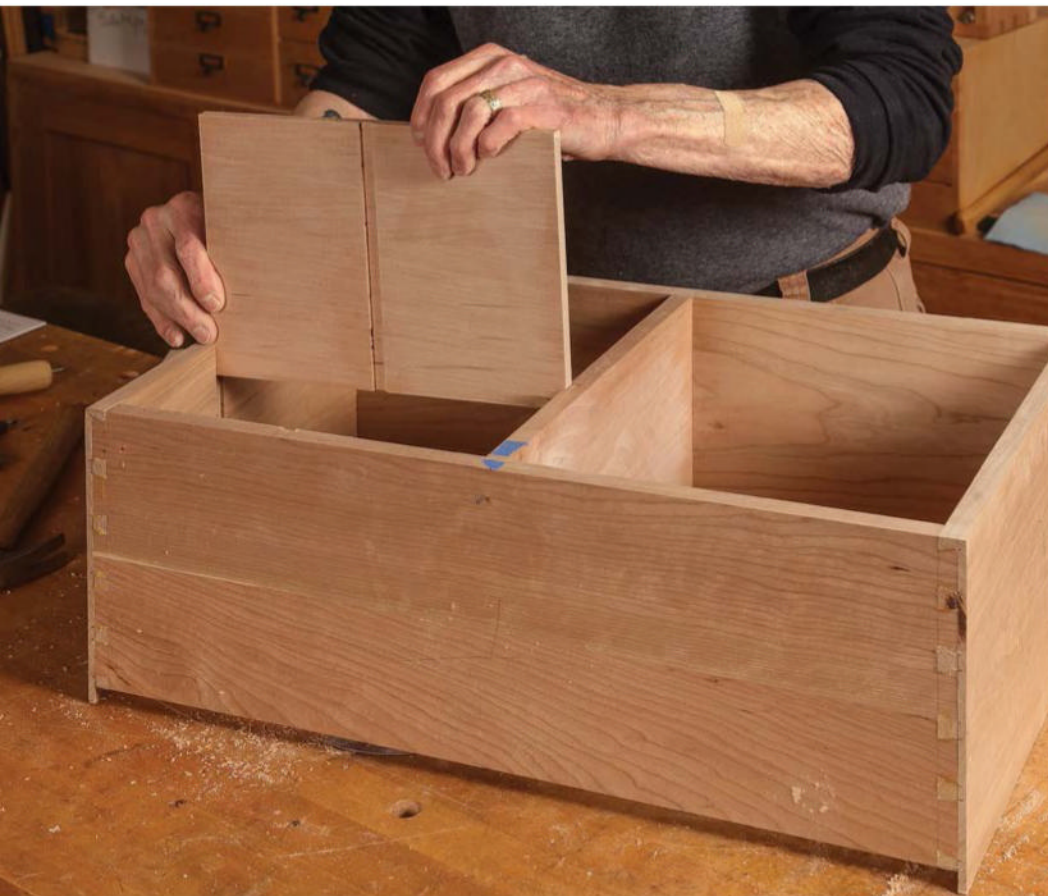
A lot of dadoing must be done to create the interior compartments. A center divider gets dadoed into the case top and bottom, a shelf gets dadoed between the center divider and the side of the case, and the shelf gets a small vertical divider dadoed between it and the top.



Secure the center divider. Slide the center divider in place, drill a pilot hole on each end, and tap in brads to make sure the divider doesn't move while you're routing dadoes in it.



Two more pairs of dadoes. To cut dadoes for the shelf, use a trim router and a double-fence jig. Cut the dado in the right side of the center divider, then flip the case and cut the dado on the inside of the right case side. Perform a similar operation to cut the dadoes for the shelf divider.



Assemble the dividers. Once all the dadoes are cut, you can install the shelf and shelf divider. First, drill a pilot hole through each dado (near the front of the case) to locate where the brads will go; this will prevent errant brads from poking through in unwanted places. Next, slide the shelf and shelf divider in place, tap in each brad, countersink it with a punch, and fill the hole with putty.



Dry-fit the center divider, and mark it and the right case side for the shelf, then rout dados in both. Set the shelf in one dado, then mark its length in the other dado. Cut it to size and dry-fit the shelf in place. Mark the center point on the shelf and transfer the mark to the top. Then with the shelf removed, rout both the case top and the shelf to accept the shelf divider. When everything fits correctly, all the dividers and the shelf can be glued or tacked into place.

Atypical back work

The six vertical backboards are next. I joined them with splines in $\frac{1}{8}$ -in. wide grooves. The boards will need to be wider if you decide

Not-so-common backboards

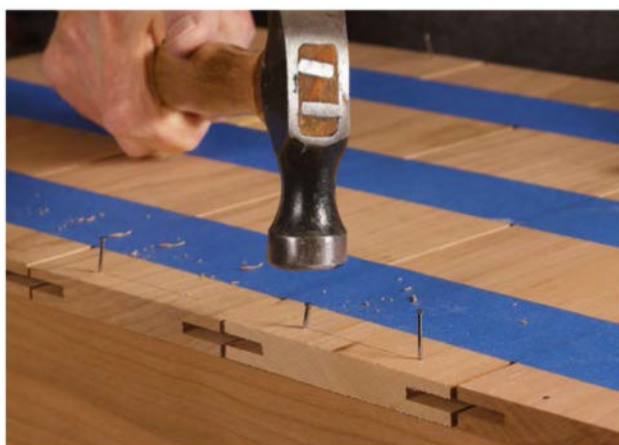
The grooved backboards sit in rabbets cut in the case sides, but, unusually, they overlie the case top and bottom. The backboards get nailed in place, and splines are slotted into the grooves.



Getting groovy with the backboards. The six backboards are grooved for splines at the table saw. The two end boards are grooved only on one side; the rest get grooved on both sides.



Start at the ends. Put all the backboards in place dry to be sure they fit, and trim the end boards if needed. Apply glue to the rabbets, put the two end boards in place, drill pilot holes, and drive nails. Set the final four backboards in place dry, making sure they are flush with the top and bottom boards.

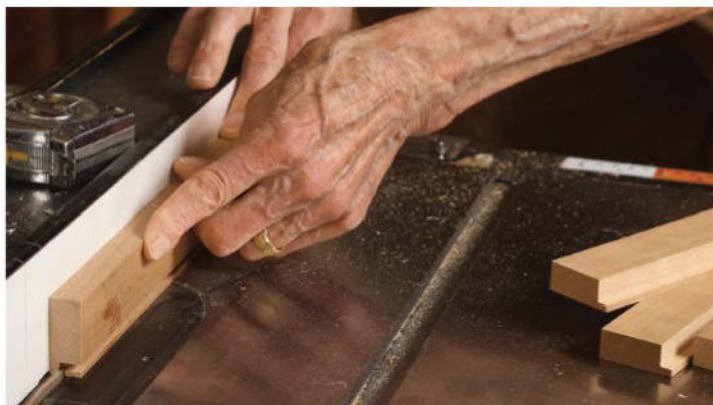


Tape, nail, and insert. Tape across the backboards and over the sides to keep the boards from shifting. Drill pilot holes and nail the boards in place, avoiding nailing into the spline grooves. Slide the splines into their grooves. When the top and bottom boards are added, they will be trapped in place. Leave a small gap between the backboards (about $\frac{1}{16}$ in.) as well as in the spline recess to allow for wood movement.

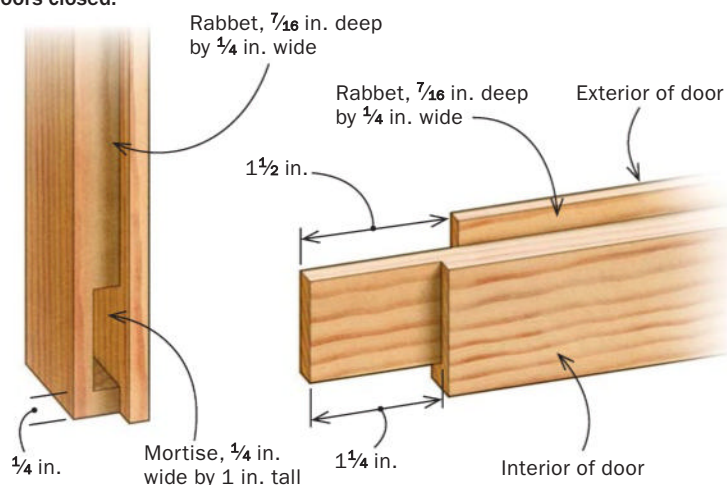


Mortise-and-tenon door frames

The glass doors are attached with butt hinges. One door has a porcelain pull, while the other has a stopped cove as a finger pull. Simple magnet catches hold the doors closed.



Run door rabbets. The rails and stiles get rabbets to house the glass panes. You can cut them at the table saw with two rip cuts per piece. The first cut is with the inside face against the table, and the second cut is with the outside face against the fence.



DOOR FRAME DETAIL



Tenons. Cut the cheeks on the table saw. The rip fence is the stop for the shoulder cut. The shoulders are offset, so you'll need two fence settings.



to make them tongue-and-groove or shiplapped instead. The left and right end backboards are glued to the lips of the rabbets; the other pieces are fitted dry and tacked to the case top and bottom.

Double down on the glass doors

After milling the door rails and stiles, rabbet all eight pieces to accept the glass panes. The through-mortise-and-tenon joints are centered to match the rabbets.

Once you've glued up the door frames, you can hinge them. I use



Square up your mortise. If you cut the mortises with a router, drill press, or any bit that leaves round ends, you will have to square them up before fitting the tenons.





Hinge the doors. Lay out, rout, and chisel the hinge mortises in the door stiles. Once you install the hinges in the doors, set them on the case and transfer the hinge locations. Then cut the hinge mortises in the case sides.



The perfect fit. With the doors installed, fine-tune their fit. Use a straightedge and a pencil to mark any places where you want to remove material with a block plane. As a general rule, Becksvoort leaves "a dime fit at the top and a nickel fit at the bottom—because hinges never move up."

a combination of a trim router and chisels to get the job done. When they are hinged, you can fit the doors, leaving about a $\frac{1}{32}$ -in. gap at the top, about a $\frac{1}{16}$ -in. gap at the bottom, and a strong $\frac{1}{16}$ in. between the two doors.

With the doors removed, drill for the porcelain knob (mine is from vandykes.com) and the magnet catches, and rout a stopped cove as a finger pull on the inside of the left door stile. Before rehanging the doors, install the glass, making thin strips for stops and using tiny brads. To add a bit of historic authenticity, I use old or restoration glass.



Integral pull. The right-side door has a porcelain knob, but the left side has a relief on the inside of the stile for the fingers to grab when opening. Cut the stopped cove pull with a quarter-round bit at the router table.

Shape and apply the top and bottom

An applied top and bottom overhang the case on the front and sides. The profile is slightly different for the top and bottom, but both are done the same way. One bit and two cuts set at different heights create the roundover with a fillet on each board.



Two cuts per profile. The applied top gets a roundover with a fillet on the underside. With the board face up, use a $\frac{3}{16}$ -in.-radius roundover bit raised to cut the fillet as well as the curve, and profile both ends and the front edge. For the second cut, flip the board bottom side up and lower the bit to cut only the curve. Follow the same steps for the applied bottom board, but switch to a $\frac{1}{4}$ -in.-radius roundover bit and cut the fillet on the top face of the board instead of the bottom face.



Orient the applied top and bottom. After applying finish to the case (having masked off glue surfaces), position the top and bottom so the side overhangs match, and pencil some marks to guide realignment later.



Glue on the top and bottom. With the case on its back on bar clamps, skim a layer of glue on the top and bottom boards. Position the boards on the case, and use spring clamps to hold them in place while you tighten the cam clamps and bar clamps.

Glass installation

After applying finish, Becksvoort installs old or restoration glass in the doors. It has a subtle wave to it and is in keeping with the original. The stops get tacked into the frame.



Preload the stops. Set the glass in the rabbets. Before you put the stops on the glass, drill pilot holes and set brads. Then place the stops on top of the glass against the frame.



Two ways to set a brad. Lay a thick piece of paper on the glass to protect it while you tap the brad in place with a hammer. Alternatively, you can use an adjustable wrench to slowly squeeze the brad home.



Top to bottom

Once the case is assembled, the applied top and bottom boards can be profiled. The front and end edges of the top get rounded over, with a small fillet on the underside. On the bottom board, the front and ends get a heavier roundover, with a fillet on the top. I wait until after I've hinged the doors to the case to attach the top and bottom.

Before gluing on the top and bottom, apply finish to them and the rest of the cabinet. Be sure to tape off the parts first to prevent finish from getting on any glue surface. When the finish is dry, glue the top and bottom in place on the case, leaving a $\frac{3}{4}$ -in. overhang on the front and a 2-in. overhang on the sides. You can use C-clamps or cam clamps in the front, bar clamps in the back, and cauls with bar clamps on the sides if needed.

Finally, reinstall the doors and add the magnets in the doors and two small screws in the case to catch the magnets. □

Christian Becksvoort is a furniture maker in New Gloucester, Maine.



The final hinging. With the glass installed, it's time to rehang the doors on the finished case.



New Breed of Grinding Wheels

Not just for turning tools, CBN wheels work wonders on chisels and plane blades

BY CHRIS GOCHNOUR



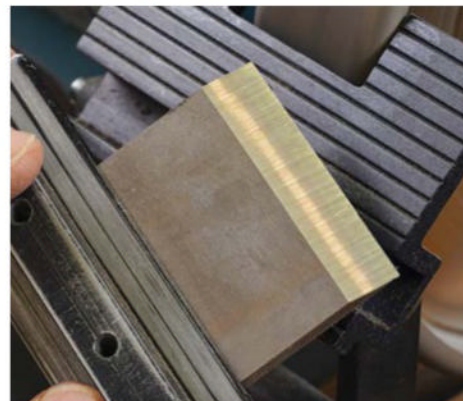
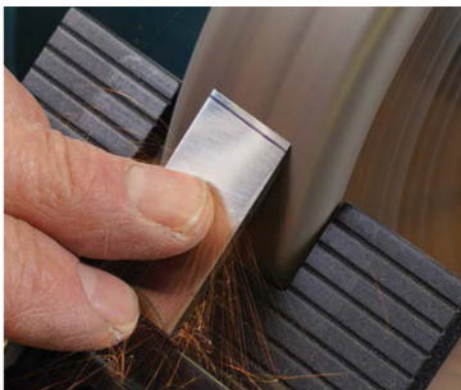
Smooth and cool. CBN wheels run true and smooth, and they make it nearly impossible to overheat edges and remove their hardness. Even the finer-grit wheels remove material rapidly.

I have a wood-turning friend who teaches an occasional class at my Salt Lake City workshop. He brings a number of bench grinders with him each time, which are equipped with CBN wheels. These work beautifully on turning tools, which tend to be made with high-speed alloys that are tough on traditional wheels.

CBN stands for “cubic boron nitride,” an industrial abrasive that’s second only to diamond in hardness. The CBN particles are electroplated onto a steel or aluminum wheel, and they have an almost unlimited lifespan for woodshop use. Unlike traditional

A host of benefits

Gochmour's testing revealed a wide range of benefits of CBN grinding wheels, and no drawbacks.



Fast material removal. Gochmour tested three CBN wheels (80, 180, and 350 grit) against his standard 40-grit wheel, timing how long each took to remove $\frac{1}{16}$ in. of material. The finest CBN wheel tied the 40-grit stone wheel, and the two other CBN wheels beat it.

No burning. The traditional grinding wheel began to burn the tip of a chisel after eight seconds of continuous grinding (top). The 180-grit CBN wheel (Gochmour's favorite grit) would not burn the steel at all (above).

Good for all tool steels. The CBN wheels were equally effective on all sorts of steels used for woodworking chisels and plane blades, including vintage tool steels, 01, A2, and PMV-11 steel from Veritas.

molded grinding wheels, CBN wheels run perfectly true and never have to be dressed, a process that reduces the size and longevity of a traditional wheel. That means you won't have to adjust your tool rests to accommodate a wheel that gets smaller over time. It also means you don't have to fuss with wheel dressers.

I had also heard that CBN wheels cut faster than traditional wheels. Perhaps most importantly, they were also reported to run cooler than their old-school counterparts, which can overheat tool edges, removing their hardness and temper and forcing you to grind past the damaged area to get back to hardened steel.

Being primarily a furniture maker rather than a wood turner, I was interested to find out how these new wheels would fare with chisels and plane blades, which tend to use slightly softer steels than turning tools. Those materials include 01 steels, the type used in traditional woodworking tools; tougher A2 steels; and PMV-11, a proprietary powdered steel used exclusively in Veritas tools, sold by Lee Valley.

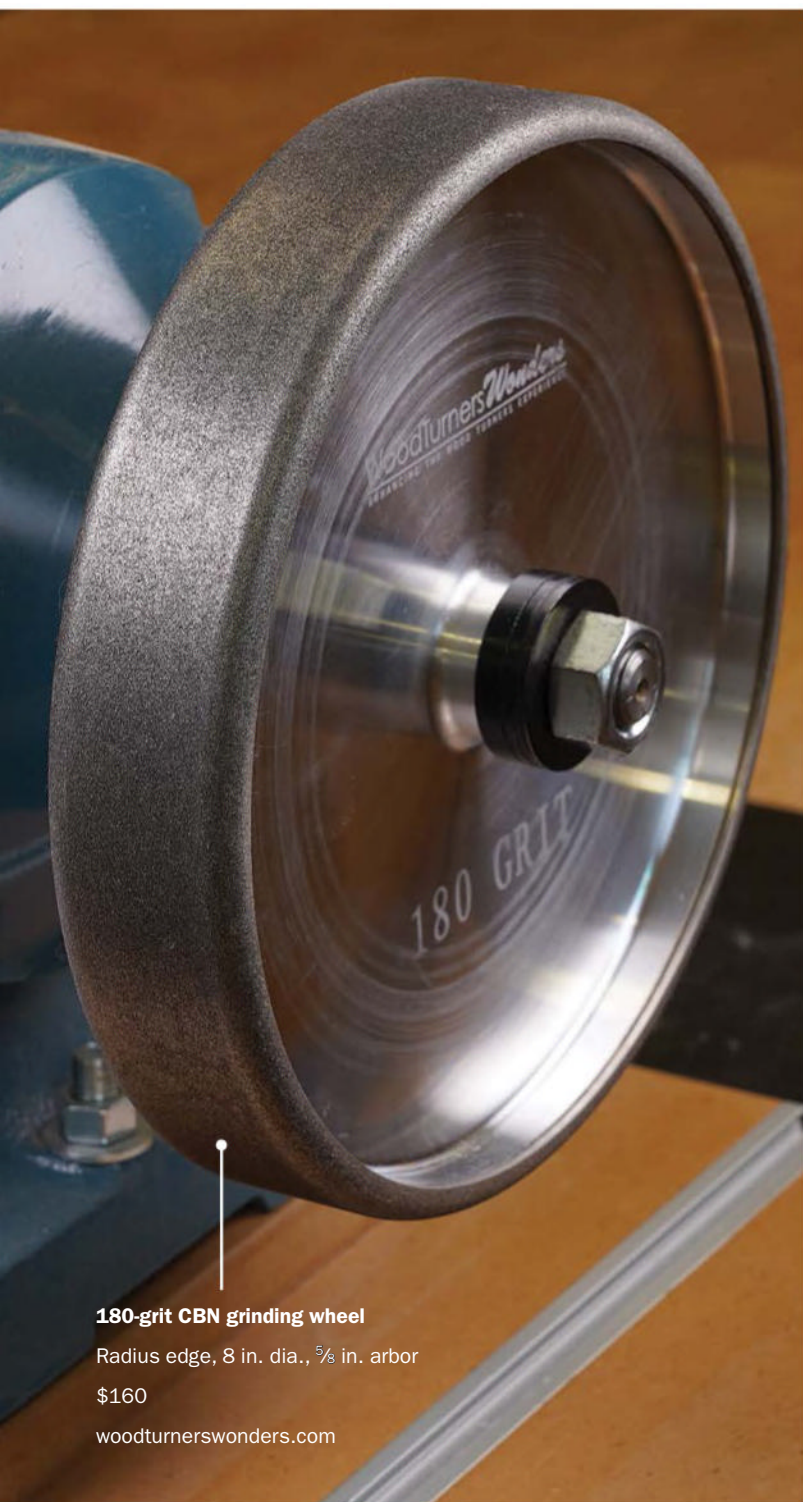
My worry, however, which was shared by my wood-turning friend and others, was that these slightly softer steels would stick to the CBN wheels, clogging (or "loading") their abrasives. If there were no way to dress them and expose fresh abrasive grains, as

No loading. CBN wheels were adopted first for grinding lathe tools made from high-speed steel. Gochmour feared that they would become clogged after grinding softer tool-steel varieties, but his testing showed no signs of that.



Our favorite wheel

Gochmour tested wheels in a variety of grits, with both square and round edges, on a range of high-quality chisels and plane blades. Below is his favorite, along with his reasons for picking it.



180-grit CBN grinding wheel

Radius edge, 8 in. dia., $\frac{5}{8}$ in. arbor

\$160

woodturnerswonders.com

We have a winner. The 180-grit wheel offered the best combination of grinding speed vs. depth of scratches (shallower scratches are easier to remove during the honing stage). Round edges made it easier to work wide blades back and forth across the face of the wheel. Wheels like this are available for all bench-grinder sizes, from a number of retailers.

with traditional wheels, the CBN wheels would become less effective, and possibly even be ruined.

Now, based on my own testing and that of others, I can confirm that this worry is unfounded, which leaves woodworkers free to enjoy all the benefits of these exciting new wheels.

The bottom line is this: After 35 years as a professional woodworker, I'll be changing my grinding wheels to CBN.

Sorting through the many options

To help me better understand CBN technology and its capabilities, I collaborated with Ken Rizza, the founder of Wood Turners Wonders (WTW), one of the leading retailers of high-quality CBN wheels. Rizza has a number of helpful videos on the company's website (woodturnerswonders.com), which convinced me that these wheels might work just as well on traditional tool steels as they do on more exotic alloys.

CBN wheels are sold in a variety of shapes, sizes, and grits, so my first step was deciding which ones to try. Rizza helped me identify best bets.



Fast enough for heavy shaping too. The 180-grit wheel is great for refreshing an angled bevel, but it also works fast enough to do heavy reshaping, such as grinding past the damage on this vintage chisel.



You can skip a stone! The 180-grit CBN wheel made scratches that were significantly finer than the ones made by Gochmour's traditional wheel. This let him skip his coarsest waterstone when honing the edge and go right to his 1,000-grit stone before moving up through the finer ones.

A few more tips

While working with CBN wheels over a number of months, Gochnour discovered a few other helpful facts.



Self-aligning spherical washer

\$6.75

woodturnerswonders.com

Tame the wobble. CBN wheels are machined, not molded like traditional wheels, which helps them run true, avoid vibration, and grind more efficiently. But that only works if your grinder runs true. These nesting washers will self-align to help a CBN wheel run true on a wobbly arbor.

CBN wheels are pricier than traditional grinding wheels. For example, my favorite for a standard bench grinder costs about \$160, compared to \$50 or \$60 for a high-quality traditional wheel.

My goal was to settle on the one wheel that would work best on a common bench grinder, whether slow-speed (roughly 1,725 rpm) or standard (3,450 rpm, more or less). I did that, and then did the same for my Tormek grinder (see p. 56).

Testing reveals big benefits

Woodworkers aren't always aware of this, but traditional molded wheels are often out of true side to side and become somewhat oval in shape with repeated dressing, which makes them out of true front to back as well. This creates vibration in both directions, making grinding rougher and less efficient.

A CBN wheel is machined, on the other hand, and therefore runs true (as true as your grinder does anyway). As a result, the face of a CBN wheel feels like a solid surface in use, and the tool feels very steady in your hand. That also makes grinding more efficient. This is partly why the CBN wheels beat my traditional wheel on raw grinding speed, despite their big differences in grit sizes.

After the speed test, I was leaning toward the 180-grit CBN wheel, so I took the edges that I ground on that wheel to my



Wonder Slick-Stick

\$13

woodturnerswonders.com

Lubrication helps a little. This all-natural lubricant sped up material removal by roughly 10 percent in Gochnour's testing. Apply just a dab to keep it from building up too much. It will spread itself around the wheel.



Cleaning is easy. You can't dress a CBN wheel to expose fresh abrasives, but you don't need to, because the CBN abrasives last almost indefinitely. If the wheel loads up with either lubricant or metal flakes, clean it by spraying on PB Blaster and scrubbing with a steel brush.



Coarser wheel for faster material removal. If you work with a lot of vintage tools and need to reshape bevels and grind past damage relatively often, consider adding an 80-grit CBN wheel to your arsenal.

They work just as well on Tormek grinders



Speed test. Gochnour compared two CBN wheels to the standard Tormek wheel. The 200-grit CBN wheel (above) removed material roughly 20% faster than its 600-grit cousin, but twice as fast as the Tormek wheel (right).



The Tormek was the first grinder of its kind, but there are a number of similar systems on the market. They feature a wider, finer-grit wheel that runs through a water bath at a very slow speed, ensuring that it won't burn tool edges.

Tormek-style machines also have a handy tool holder built in, which holds chisels and plane blades at a fixed angle for effective sharpening. They include a leather stropping wheel, which can put a finely honed edge on a freshly ground tool, making the system an all-in-one sharpening solution. That said, some woodworkers prefer to use the grinding wheel only and jump to flat stones (usually waterstones) for honing.

To make sure we had all our bases covered, I ordered Tormek-style CBN wheels in two grits, 200 and 600, and compared their performance to the standard Tormek wheel.

Wood Turners Wonders recommends that its CBN Tormek wheels be used dry, or at least dried off after each use, to

prevent corrosion of the abrasive material. I used the wheels both ways and found no advantage to running the wheels wet. Further, I did notice mild, orangey oxidation when I left the wheels wet after use.

I did the same speed test with the Tormek wheels that I conducted on the bench-grinder wheels, marking a line on the top edge of a chisel and measuring how long it took to grind to the line. The 600-grit CBN wheel removed material 20% slower than the 200-grit CBN wheel.

The standard Tormek wheel can be “graded” (abraded with a specialized wheel dresser) to create a coarser or finer surface, so I graded it coarse for speediest material removal. Even so, it placed a distant third to the CBN wheels, taking twice as long as the 200-grit CBN wheel to remove the same amount of material.

Next, I wanted to see if there was an advantage to using the finer CBN wheel in the honing process that followed. So I used both wheels to grind a fresh edge on a chisel, stropped each one on the leather

wheel to see if I could produce a truly sharp edge, and took notice of how long it took to do so in each case.

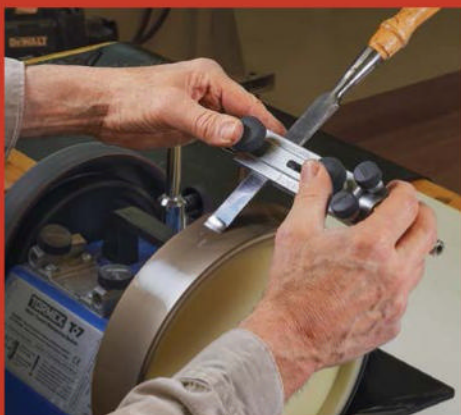
I was able to go straight from both of the CBN wheels to the stropping wheel and produce an edge sharp enough to shave hairs off the back of my hand and cut clean, thin shavings off the end grain of a pine board—an even tougher test. Furthermore, even when I used the coarser (200 grit) CBN wheel, it didn't take significantly longer to produce that sharp edge on the stropping wheel.

The same held true for honing on flat stones. I started with my 1000-grit stone and progressed up through the others. While the deeper scratches from the 200-grit wheel took more time to eliminate than those made with the 600-grit wheel, I would still go with the 200-grit wheel for a Tormek-type grinder.

I like the speed advantage, and I was able to strop and hone the bevels it created with no problems.

—C.G.

Use it dry. The manufacturer recommends using the Tormek wheels without water, but Gochnour tried them both ways to test that recommendation. Dry worked as well as wet, without the light oxidation left behind on the wet CBN wheel.



Hone-ability. After grinding with the CBN wheels, Gochnour honed the edges on the leather Tormek wheels to see how long it took to remove the grinding scratches and produce a sharp edge. He did the same on flat waterstones. There were no problems.



Tough test. Whether honed on the leather wheel or waterstones, the CBN-ground edges shaved end-grain pine beautifully, which is always a tough test.

waterstones for final honing and found that I could skip the first stone I usually use and jump right to my 1,000-grit stone, with no loss in honing efficiency. This is a big benefit for hand-tool users. As for burning, it took just eight seconds of continuous grinding on my traditional wheel to begin to darken the steel at the tip of the tool. On the 180-grit CBN wheel, I ground continuously for a minute, with no sign of darkening and burning. The tool became too hot to hold at that point, but there was still no burning present.

This virtually eliminates the main danger associated with traditional grinding wheels. You won't have to grind with such a feather-light touch on CBN wheels, and you can probably get rid of your little cup of water too, the one you dunk the tip of the tool in every five or 10 seconds to keep it from burning.

During the few months I've been using the CBN wheels, I can't say that I've noticed any significant loading of metal between the abrasive grits. I did load up the wheel with Slick-Stick, however, when I applied it too liberally. But it's easy to scrub off.

Closing thoughts

Used correctly, a bench grinder offers the fastest way to create a fresh bevel. If you've had bad experiences with bench grinders in the past, a CBN wheel will give you all of their benefits without the downsides. And unlike traditional grinding wheels, CBN wheels don't need to be dressed, saving you even more time. □

Chris Gochnour is a contributing editor to FWW.



Gochnour's favorite CBN wheel for Tormek-style machines. The 200-grit wheel removed metal faster than the 600-grit wheel and presented no problems at the honing stage. So 200 grit is the way to go.



Graceful Little Boxes

Use offcuts to perfect your box-making skills

BY JOSHUA STERNS

These boxes are very loosely based on the form of a traditional Japanese toolbox. However, while those toolboxes are a utilitarian triumph of form meeting function, nailed together and sized to perfectly hold the required tools, these little boxes were designed to be built with offcuts and to practice an exacting joint, the wedged through-tenon. The joinery is certainly overkill for a box of this size, but it is satisfying to execute well and pleasing to look at. I use a mixture of handwork and machines, but this project could also be done entirely by hand for an additional challenge.

Milling material

The dimensions of the box should be determined by the size of the pieces available, as it is intended to be built from interesting scraps. While the length and height of your available wood may

Prep the sides of the box

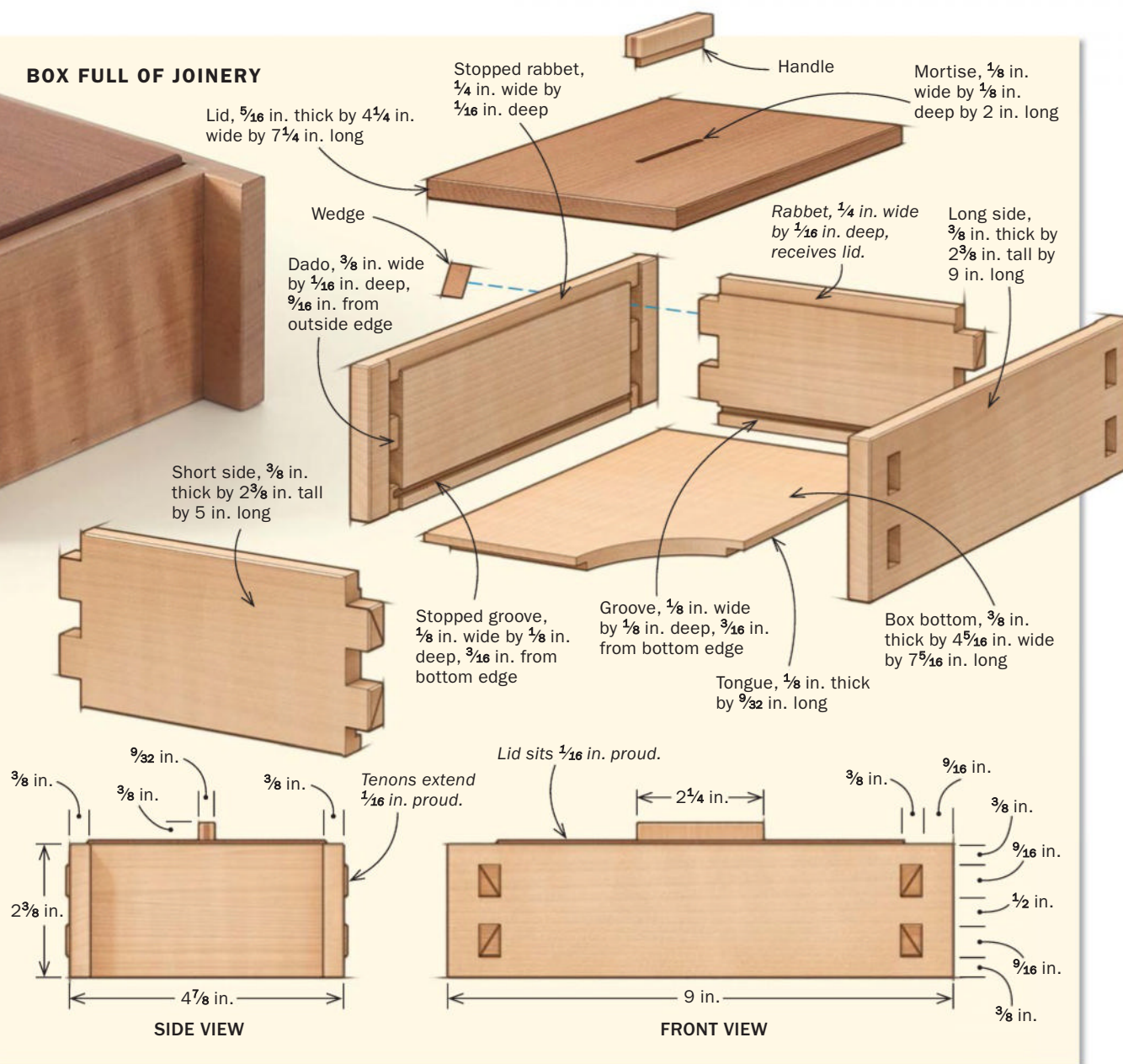
The long sides of the box get dadoed and mortised, while the short sides get tenons that will be wedged in place.



Cut the dados. Sterns cuts the dados in the long sides at the table saw with a dado blade. Then he cleans up the cuts with a router plane and test-fits the short sides into the dados.



BOX FULL OF JOINERY



Measure off the dado. To lay out the mortises in the long sides, set a marking gauge to the wall of the dado.



Mark out the mortises. Having penciled in the location of the mortises in the width of the part, use the marking gauge set first to one wall of the dado, then the other, to score both ends of the mortises. Then use the gauge to cut over the pencil lines.



Mortising methodology

There are so many roads leading to a mortise. For this box, Sterns takes the one that combines the drill press and hand tools.



Drill first. Remove the waste with a Forstner bit on the drill press, being careful to stay inside the dado.



Clean up. Insert a sacrificial strip of wood in the dado to avoid blowout during chopping. Use a chisel to square up and clean out the walls of the mortises.



Transference. With the mortises cut and cleaned up, insert a short side into the dado, and use a pencil to transfer the mortise locations to the end of the short side.

vary, I do find $\frac{3}{8}$ in. to be a good thickness for the sides of a box shorter than about 1 ft. in its longest dimension, which is what I will focus on here. Begin by milling your stock slightly over thickness and letting it rest for a day or two to acclimate if a lot of material was removed.

Wedged through-tenon joinery

The joinery starts with cutting dadoes in the long sides. These dadoes will house the short sides, which should be slightly oversize in thickness. I mill the dadoes at the table saw with a dado stack and then clean them up with a router plane, but they can also be done with a router if preferred. After cutting the dadoes, hand-plane the short ends to fit very snugly, accounting for material that will be removed by sanding.

Next, lay out the mortises. The sides of the mortises are flush with the sides of the dadoes, so a marking gauge set to the edges of the dado can be used to lay out the mortises on the outside of the box. Once the mortise layout is completed, drill out most of the waste and pare the sides square with a chisel.

Now the tenons can be laid out. Insert the short ends into the dadoes, making sure the top and bottom edges are flush. Use a very sharp pencil or a knife pressed to the inside walls of the mortise to mark the end grain of the sides. Mark the depth of the tenons around the ends of the sides with a marking gauge. Setting the gauge to the thickness of the sides will allow the tenons to protrude $\frac{1}{16}$ in. when the joint comes together.

Carry the marks delineating the tenons around the sides with a square, then cut the tenons at the table saw on a crosscut sled. First, saw the top and bottom of each tenon, then remove the waste between the tenons with multiple passes. Next, turn the piece 90° and cut the waste at the shoulders. I leave the knife line and then take the last slice of wood with a sharp chisel.

Rabbets and grooves

Once the mortises and tenons are cut, mill the rabbets to hold the lid and

Tackling the tenons

You can cut the tenons on the table saw in four steps.



Cut the outside cheeks. With one stop setting, make both outside cheek cuts on one end, then flip the part to make the same cuts on the other end.



Cut the inside cheeks. Reposition the stop block and then make four cuts on each workpiece as you did in the last step.



Between the tenons. Remove the stop block and make multiple passes to clean out the waste between the two tenons.



Trim the outside shoulders. Set a stop just shy of the shoulder line. Make multiple cuts until you reach the stop. Clean up to the shoulder line with a chisel.

the grooves to accept the bottom. These are done at the router table with a straight bit. Both the top rabbets and bottom grooves can be run through on the short sides, but they must stop at the dados on the long sides.

The router table can also be used at this time to chamfer the top and bottom edges of the sides. On the long sides, the chamfers must not run into the dados. Stop them short now, and complete them with a chisel with the box dry-assembled. For chamfering the ends of the sides and the top, I prefer to use a block plane.

Detailing the joinery

Among the main visual features of this box are the proud tenons. They protrude past the sides of the box, but not far enough to easily work on after glue-up. Use a chisel to cut small, crisp chamfers on the edges of each tenon. Next, cut kerfs in each tenon for the wedges. Use a small handsaw, cutting the kerfs vertically or diagonally through the tenons.

The wedges can be cut by hand, but when making many for a batch of boxes I prefer to use a simple jig on the bandsaw. The jig consists of a piece of wood with a notch the same shape and size as the wedges you need to cut. The notched side is lined up with the bandsaw blade, with the other side of the jig running on the fence. The most appropriate woods for wedges are hard, long-grained species such as oak or hard maple. A piece of the correct width and thickness is fit into the

Turn your attention to grooves and rabbets

The raised-panel bottom of the box gets captured in grooves during the glue-up, while the lid sits in a rabbet in the inside face of all the sides.



Run rabbets. The stopped rabbet on the long sides goes from dado to dado. At the router table, pivot the long side in at the dado on one end and out at the dado on the other end.



A groove holds the bottom. While the grooves on the short sides run straight through, the grooves on the long sides end at the dados.

Assembly

This box's diminutive size and straightforward joinery make glue-up a breeze. Still, for extra security, Sterns makes custom clamping cauls with cutouts for the through-tenons and wedges. Their contact points are cushioned with thick card stock.



Kerf the tenons first. Before gluing the box together, use a handsaw to cut diagonal kerfs for the wedges.



Glue it up. Apply glue to the mortises and tenons, and then assemble the two short sides to one long side. Slot the bottom into place and add the final side.



notch and run through the saw, leaving a perfect wedge in the jig. Flip the wedge blank with each pass to ensure the grain keeps running parallel to the face of the wedge. A zero-clearance throat plate keeps the wedges from falling into the saw.

Raising the bottom

The bottom of the box is solid wood. To determine its length and width, assemble the box sides, then set them on the bottom piece and trace the inside dimension of the box onto the bottom. Add the depth of the bottom grooves to this and trim the bottom to size. Plane and sand the bottom to produce a finished surface, then with a straight bit at the router table, raise the panel to fit in the groove. Finally, use a hand plane to trim a bit more than $\frac{1}{32}$ in. from each long grain side to allow for wood movement.

Prefinish and glue up

Almost none of the surfaces are accessible once the box is assembled, so the final step before gluing up is to sand to 400 grit and



Clamp, wedge, and clamp again. Use clamps to seat the joints, remove them to insert the wedges, and then reclamp. To install the wedges, tap them in, alternating side to side so they go in evenly.

Online Extra

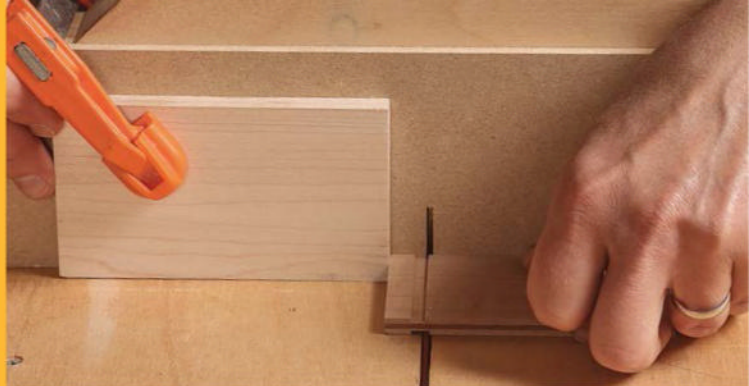
To see how to build and use a wedge-cutting jig, check out "Five Essential Bandsaw Jigs" by Michael Fortune, available at FineWoodworking.com/317.

Topping it off

The lid's handle is composed of three thin layers sandwiched together, with the box wood on the outsides and the lid wood in the middle.



Make the handle blank big. Laminate three sheets of thin stock to create a blank that is significantly oversize so you can safely machine the handle.



Create the handle. At the table saw, set a stop block to cut the shoulder of the tenon. Move the stop block and take additional crosscuts to lengthen the tenon. Then use a handsaw to cut the handle free from the stock.

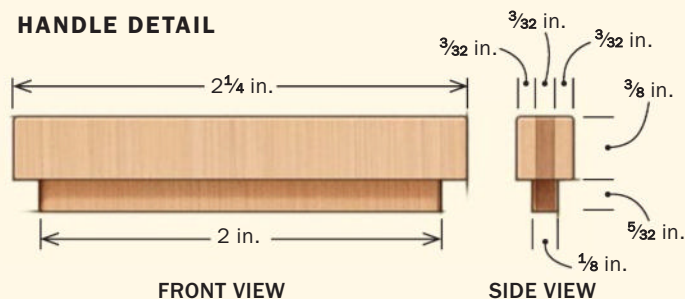


Groove the lid. At the router table, starting and stopping at layout lines on the fence, cut a groove in the center of the lid.



Secure the handle in place. You'll have to round the tenon or square up the mortise to fit the handle into the lid. Once you've done that, add glue and clamp the handle to the lid.

HANDLE DETAIL



prefinish with shellac. Once the finish has dried, dry-fit the box one final time and lightly apply wax to the ends of the tenons and sides around the mortises, as well as any inside corners. Be careful not to wax any glue surfaces. This precaution will ease squeeze-out cleanup and help protect the finished surfaces. Glue up the box with the bottom installed. Clamp the box to seat all the parts, remove the clamps to insert the wedges, trim them enough to get the cauls on, and reclamp the box. After the glue is dry, remove the clamps and carefully trim the wedges flush with a sharp chisel.

A lid with a laminated handle

The lid, made from wood of a color complementary to the box wood, drops into the top rabbet. Mill it slightly oversize, then fit it to the rabbet with a hand plane. The box may not be perfectly square, so start by fitting adjacent sides, then complete the fit on the remaining two sides.

Once the lid is fitted, the handle can be made and installed. Start by resawing the material $\frac{3}{32}$ in. thick. It's easier and safer to mill these small handles from a large blank, so begin with oversize pieces. Clean up the resawn surfaces and glue them together. Once the sandwich has dried, true up the end grain on one end with a block plane.

Mill a tenon at the table saw by cutting grooves on both sides of the material. Separate the oversize handle with a handsaw and trim to the desired length. At the router table, cut a mortise in the center of the top of the lid with a $\frac{1}{8}$ -in. router bit, making it $\frac{1}{8}$ in. shorter than the final length of the handle. Use a file to round the ends of the handle tenon, and fit it to the lid mortise. Sand and finish both pieces before gluing the handle on. □

Joshua Sterns is a woodworker and instructor in Fort Bragg, Calif.

A Timeline of Tool Innovations

Game-changers and gizmos from 50 years of *Fine Woodworking*

BY ASA CHRISTIANA

When I joined *Fine Woodworking*, in 2000, the 25th-anniversary issue (FWW #146) was one of the first I worked on. Now, 25 years later, I'm writing a retrospective article for the magazine's 50th. I'm proud to have worked on the magazine for half of its history.

Many techniques have stayed the same over the years, but when it comes to the tools we use, quite a lot has changed. The explo-

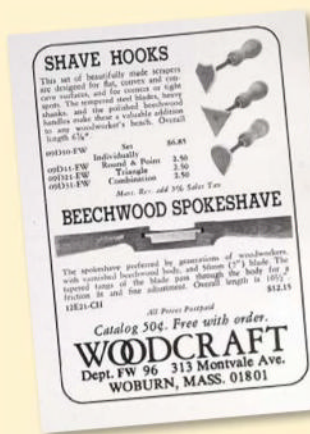
sion of interest in home-shop woodworking touched off a wave of innovation in tools and supplies, one that is still rolling today. In that sense, we're the luckiest woodworkers in history.

The early years: *Fine Woodworking* and Garrett Wade

We have a world of fine hand tools to choose from these days. That wasn't the case in the early 1970s, when hand planes, hand-

The early years: Where woodworkers bought tools

Hardware stores were the main sources of woodworking tools in the 1970s, and their selections were limited. As woodworking grew, specialty catalogs arrived that brought a new world of tools to workshops across the United States.



Woodcraft was first. The Woodcraft catalog, which would become one of FWW's first advertisers, came on the scene in the 1960s.



Better hand tools. The Garrett Wade catalog made top European hand tools—like this E. C. Emmerich Primus 711 smoothing plane, made in Germany—available to U.S. woodworkers.



1960s

1970s



Garrett Wade changed the game. Garrettson Wade Chinn, an investment banker turned woodworker, launched the Garrett Wade catalog in the summer of 1975, just a few months before the first issue of FWW was published.



Swiss combo machines. Garrett Wade was also the exclusive U.S. distributor of Inca woodworking machines. These compact, finely engineered tools were perfect for small shops, both amateur and professional. Inca's table saws and combination jointer-planers were especially popular.

saws, and chisels tended to be contractor-grade. To find better options at that time, you had to dig into the vintage market.

Luckily for the first readers of *FWW*, just months earlier another important publication had launched: the Garrett Wade tool catalog.

The Garrett Wade story—Garrett Wade's founder, Garretson Wade Chinn, was a New York City investment banker who had caught the woodworking bug, like so many others at that time. He was frustrated that he couldn't find the top-quality hand tools he had used as a kid, and he was sure others were too. So he dropped out of the corporate world and began tracking down sources for hundreds of products, mostly in Europe. His first ad, in a woodworking/DIY magazine, received 5,000 responses, and the first Garrett Wade catalogs went out in mid-1975 for \$3 apiece.

Other catalogs enter the marketplace—The Woodcraft catalog had been around since the 1960s, and it grew immensely through the 1970s and 1980s. Rockler was already there too, in the form of a small mail-order business called the Minnesota Woodworkers Supply Co. After the woodworking boom, in 1996 it became the Rockler we all know today.

The first Lee Valley woodworking catalog was assembled in 1978, on Leonard Lee's kitchen table in Ottawa, Ont. Lee partnered with Garry Chinn in order to get started in Canada, and the Lee Valley catalog business grew rapidly. In 1985 the company added its own manufacturing business, Veritas Tools.

In the late 1990s, all of the big catalogs went online, making fine tools and accessories more accessible than ever.

Innovative jigs and fixtures

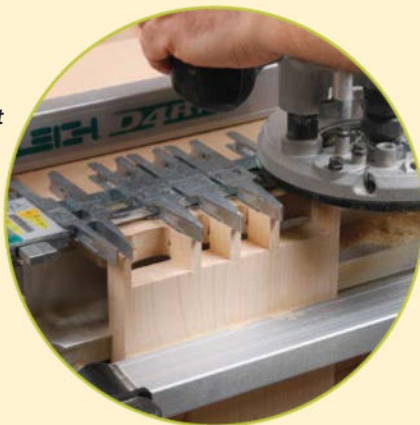
By the 1980s, the fine-woodworking movement was fully entrenched, and woodworker-inventors began dreaming up helpful jigs and accessories—aftermarket miter gauges, for example. Here are just a few headline grabbers. All of these items are still available in some form or other, and all are still among the best of their kind.

Router jig cuts dovetails with variable spacing—In 1980, frustrated with cutting dovetails by handsaw and chisel, Ken Grisley built the first infinitely adjustable router jig for dovetailing. He sold the initial 12-in. model, the Leigh TD515, which cut through-

Innovative jigs and fixtures

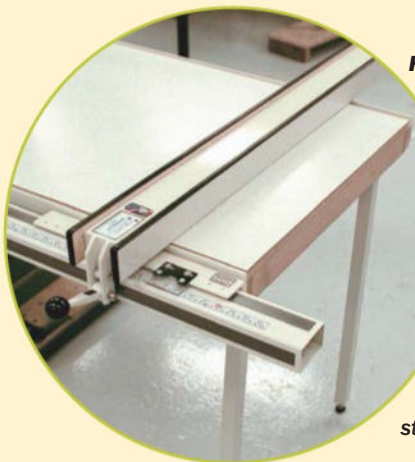
Woodworker-inventors met the need for better jigs and fixtures, designed to improve existing tools and make fine joinery easier to achieve.

Router-cut dovetails.
Ken Grisley built the first Leigh jig in his garage. It allowed infinite custom spacing and was an instant hit. Today's models, like the Leigh D4R Pro (left), are still among the best of their kind.

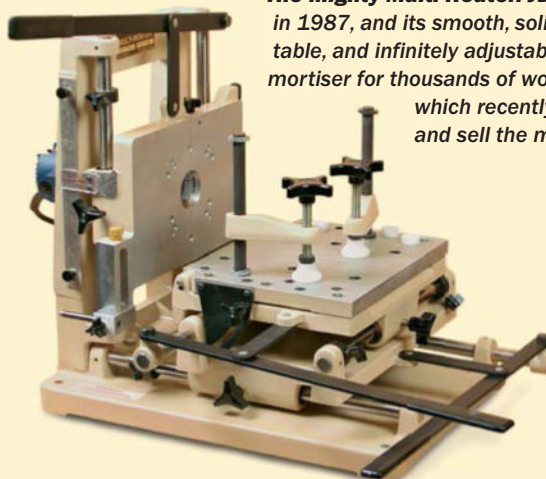


1980s

Rock-solid rip fence.
Before Ken Biesemeyer developed the T-square-style rip fence, table-saw fences tended to be fussy to adjust. Strong, accurate, and easily adjustable, with slick faces on both sides, the Biesemeyer-style fence is standard on almost every cabinet-style saw sold today.



The mighty Multi-Router. JDS debuted the Multi-Router in 1987, and its smooth, solid, X-Y-Z motion, pivoting table, and infinitely adjustable stops made it the go-to mortiser for thousands of woodworkers. Woodpeckers, which recently bought the rights to make and sell the machine, retails it now.



dovetails, out of his garage workshop in a British Columbia logging town. Many other excellent models have followed.

Biesemeyer fence ends decades of frustration—Although Ken Biesemeyer developed his first T-square-style rip fence in the late 1970s, the product didn't really take off until the 1980s. Tired of existing rip fences, which were fussy to adjust and wouldn't clamp reliably parallel to the blade, Biesemeyer developed the simple, solid, smooth-sliding system we all use today.

By choosing not to defend his patent, Biesemeyer gave his fence concept to the world, and almost every saw manufacturer adopted it. It's still impossible to beat, with its slick, flat, straight faces attached to both sides of a square steel rail, a solid length of angle iron that slides smoothly on a robust front rail, and the little viewing indicator that glides over an easy-to-read measuring tape. Even SawStop couldn't avoid adopting Biesemeyer's elegantly effective fence system.

The amazing Multi-Router is back—In 1987, the JDS Company debuted the Multi-Router, a robust three-axis routing fixture. At \$3,000 it

wasn't cheap, considering you also had to supply a heavy-duty router to attach to the back. But the smooth motion, solid hold-downs, and adjustable stops meant that you could make accurate mortises in any size, angle, or orientation. Add simple shopmade slip tenons, and you had an unmatched joinery system. An X-Y-Z routing fixture can do a lot more than mortising, of course, and users reported all sorts of new cuts and capabilities, for custom hardware and much more.

After JDS stopped making the Multi-Router, Woodpeckers bought the rights to it and is now offering the same machine at the same price as ever, with some upgrades.

A revolution in power tools

Responding to the home-shop woodworking boom in the 1980s and '90s, manufacturers began rolling out an army of compact machines, with lower price tags and smaller footprints than their industrial predecessors. Innovative power tools arrived as well.

The miter saw replaces the radial-arm saw—Debuted by Rockwell in the 1960s, the portable power miter saw changed

Lie-Nielsen vs. Lee Valley/Veritas

Founded in the 1980s, one in Maine and one in Canada, these two makers of fine hand tools followed different paths to success.

Lie-Nielsen looks backward to move forward. Tom Lie-Nielsen revived and refined great vintage Stanley models that had dropped out of production, turning them into world-class hand planes for a new generation of artisans. He followed a similar approach for the company's fine handsaws and chisels.

1980s

Veritas starts from scratch. In the early 1980s Leonard Lee added a manufacturing branch, Veritas, to his catalog business. Veritas products are designed from the ground up by Lee Valley engineers, who use innovative materials and approaches to make award-winning hand tools.



residential construction. Slowly accepted in woodworking shops in the decades that followed, the miter saw eventually displaced the radial-arm saw, which had been a woodworking staple.

Soon enough, woodworkers were making their finer crosscuts on a new array of table saws, and their rougher ones on miter saws. With a couple of tweaks—a zero-clearance throat plate and an aftermarket blade—a miter saw is also capable of fine crosscuts with zero chipout.

Lunch-box planers bring milling to the masses—Planers became a lot more accessible in the 1980s with the advent of the compact “lunch box” version, debuted first by Ryobi. Like the miter saw, this portable machine was imported from the construction industry. While benchtop models can’t take the whopping ½-in. whacks of wood at a pass the way their industrial counterparts can, they leave an excellent surface with minimal snipe on boards up to 12 in. wide—in short, 95 percent of what we all use.

Random-orbit changes the sanding game—Debuting in the 1990s, random-orbit (RO) sanders soon displaced simpler orbital “finish sanders” that removed material much more slowly and

tended to leave swirl marks behind. Borrowed from the auto-body industry, RO sanders offered a compound motion of elliptical vibration and slow rotation, creating a random vibration pattern that, when used properly, removed material relatively quickly without leaving obvious swirl marks. These affordable tools made it quicker and easier to achieve a beautiful finish.

Router lift makes table-routing easy—JessEm, a family-owned operation in New Brunswick, Canada, put itself on the woodworking map in 1999 with the first-ever router lift, which grabbed just the motor/body of a router and moved it up and down on robust posts and threaded columns.

With JessEm’s Rout-R-Lift, rather than having to screw a router base to the bottom of a piece of plywood and then reach below to make height adjustments—or remove the router entirely to make bit changes—you could make bit and height changes from above. This made table-routing as convenient as using an industrial shaper, and the router lift helped the router table replace the shaper in most woodworking shops. Combined with a dedicated router motor, the router lift is a lot cheaper than those

Better power tools

A host of innovative new power tools came on board, displacing past favorites.

Miter saw kills the radial-arm saw. The miter saw migrated from construction sites into woodworking shops in the 1980s and '90s. The portable, affordable “chopsaw” was perfect for roughing lumber to length and was perfectly capable of finer cuts as well.



A much better sander. Orbital “finish” sanders were the only option when FWW launched, but their simple, circular motion tended to leave pigtail-shaped scratches. Borrowed from the auto-body industry, random-orbit sanders have a dual action (slowly spinning while tightly orbiting) that is more aggressive and leaves shallower sanding marks.



1980s - 1990s



The “lunch box” planer. Benchtop planers cost far less than the old, industrial, floor-standing types, allowing a new generation of woodworkers to take control of their material. The DeWalt DW 735 has long been a favorite.



Router lift changes table-routing. Allowing bit changes and height adjustments from above, the router lift enabled the router table to replace the shaper for many woodworkers, letting them work more safely and spend a lot less on cutters.

floor-standing shapers that came before it, and a lot less scary. In addition, router bits are much cheaper than shaper cutters.

Lie-Nielsen vs. Veritas: A win-win for woodworkers

Among the many companies, small and large, that sprang up to supply the growing army of woodworkers with fine hand tools, two stand out, with unmatched combinations of performance and value. And they did it with diametrically opposed approaches.

Lie-Nielsen: Improving on tradition—Tom Lie-Nielsen founded Lie-Nielsen Toolworks in 1981 by reviving vintage Stanley hand-plane designs, improving them, and manufacturing them to a high standard in his machine shop in coastal Maine.

Simply put, Lie-Nielsen planes were better than anything on the market, and soon they were selling as quickly as Lie-Nielsen could make them. The flagship No. 4 has earned a place in the shops of many woodworkers, who are more than willing to pay \$300 for a plane that makes perfect shavings in the toughest woods. The same goes for the Lie-Nielsen No. 102 Low-Angle Block Plane, a little gem that every user falls in love with.

Lee Valley-Veritas: Design from the ground up—From the beginning, Veritas designed woodworking tools by building and testing original prototypes, before settling on a design that was different from anything seen before. And those innovative hand tools have garnered scores of awards in *FWW* for their combination of innovation and value.

Veritas engineers also borrowed cutting-edge technologies from other industries, like the powdered metal used in aircraft landing gear, which Veritas uses in its super-tough PMV-11 chisels and plane blades, or the fiber-impregnated resin that forms the spine of the company's award-winning handsaws, which sell for half the price of their competitors.

Construction industry gave us cordless tools

By the 1980s, cordless drills with removable batteries were taking over construction job sites. Soon afterward they began showing up in woodshops. The drill was a natural pick for cutting the cord. A handheld drill needs to go everywhere, and its power needs are relatively modest compared to saws and sanders, for example.

The cordless revolution

Like the miter saw, cordless power tools were adopted from the construction industry. As battery technology improved, the power-tool possibilities multiplied.



Drills came first. With its relatively low power requirements and need for nimbleness, the handheld drill was a natural first candidate for cutting the cord.



Cordless router came next. With no cord to manage, you're free to concentrate on making a good cut. Small, nimble routers are the best candidates for cutting the cord.



This driver had a big impact. Savvy woodworkers added cordless impact drivers to their arsenals in the 2000s. These can drive long screws almost effortlessly, without stripping the head.



Track saws and more. With battery technology getting better every year, if your budget allows, you can cut the cord on more of your handheld power tools than ever.

In the 2000s, many of us replaced at least one of our cordless drills with a cordless impact driver, which uses a staccato series of rotational impacts to drive screws almost effortlessly into the toughest woods, without straining your wrist or stripping the screw head.

As battery power and capacity have improved, the industry has cut the cord on piles of other power tools. Trim routers and track saws are two new favorites. Without a cord trailing behind them, dragging and snagging on whatever it can, these tools leave you free to focus on making a safe, smooth cut.

SawStop forces change

In 1999, woodworker, physicist, and patent attorney Steve Gass invented an incredible cartridge device that stops a table-saw blade just milliseconds after it touches fingers or any other body part. That's fast enough to limit the worst cut to a tiny nick, treatable with a single adhesive bandage. No one saw it coming, and it changed woodworking forever.

Gass's original intent was to license the device to all of the major saw manufacturers, but that hit a bunch of snags—prob-

ably inevitable in retrospect. For one, table-saw manufacturers weren't sure the device would work in real-world situations for decades to come. Secondly, it would require that their existing saws be significantly redesigned to build in pivoting trunnions that would allow the blade to swing downward and drop below the table when the cartridge was triggered. And each company would have to rebuild every saw in its line to avoid legal liability for any unaltered models it continued to sell.

So Gass decided to build the new table saws himself. The first SawStop cabinet saw debuted in 2004 and was the biggest news to hit the industry in decades. Gass followed it up with a range of smaller, more affordable models, all of which were just as successful as the first.

Gass designed every part of his saws to perform as well as his blade-braking cartridges, and they now dominate table-saw sales in the woodworking world. There are even portable models for job-site use and for those working wood in very small spaces.

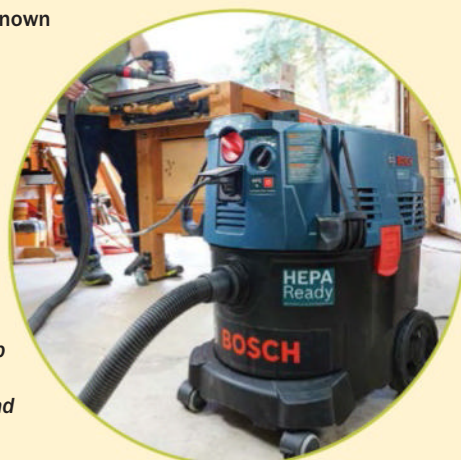
Industry responds with riving knives—While the other saw manufacturers were either unwilling or unable to incorporate the

Industry gets serious about dust collection

After the National Institute of Occupational Safety and Health (NIOSH) placed wood dust on its list of known carcinogens, the industry responded with better filtration on dust collectors and shop vacs alike.



Get a HEPA-rated vac. The best new shop vacs come with HEPA-rated filters. Use a separator or filter bag to keep these fine filters from clogging and choking suction.



Collect dust at the source. The best way to keep dust out of the air is to collect it where it's produced. Modern machines make this easier than ever. Two-stage cyclone collectors work best, but more affordable single-stage collectors can work well too.



Use a cartridge filter. Borrowed from other industries, pleated cartridge filters increase the surface area of fine filters, allowing air to flow more freely. These are easy to retrofit onto older single-stage collectors.



SawStop technology in their own machines, they responded by backing a ruling from the Consumer Product Safety Commission for a safety upgrade that is arguably just as important.

Mandated in Europe long before it was required here in North America, the riving knife is a table-saw splitter that puts the traditional U.S. version to shame. Instead of sitting high above the blade, in a static position, it rises, falls, and pivots with the blade. Better yet, riving knives are available in a low-profile version that sits just below the apex of the blade, so it can stay on the saw for nonthrough cuts and every other type of cut except dados.

That means it is always there to do its all-important job—to sit in the blade kerf and prevent kickback. Contrast that with old-school splitters, which had to be removed for nonthrough cuts and were therefore usually discarded altogether, leading to many thousands of completely preventable, often catastrophic, table-saw accidents.

Riving knives were mandated on all new saws sold from 2012 on, instantly making woodworking safer. When you consider the fact that most hand-to-blade contact is caused by kickback, you'll understand how critical that riving knife mandate was.

Getting serious about dust collection

In 2002, wood dust went from being a nuisance to an official health risk. That's when the U.S. National Institute for Occupational Safety and Health put wood dust on its list of "known carcinogens," linking it to a variety of nose, throat, and lung cancers. Awareness was also growing about wood species that can trigger an allergic response in some people—dangerous for some and annoying for others. Worse, people can become sensitized to certain woods even if they weren't allergic to them to start with.

The woodworking industry responded with a range of helpful products and a better sense of how to keep fine dust out of workshop air. The first step is collecting it at the source, wherever you can, using a full-size dust collector for machines and a shop vacuum for power tools. The industry made this easier by incorporating exhaust ports into more machines, from table saws to disk sanders.

The second line of defense is much better filtration on the back end. Out are the old permeable bags that captured chips but not the most dangerous dust. In are HEPA-level filters that capture

SawStop makes woodworking safer

The first SawStop table saw debuted in 2004 and was an instant sensation. While the rest of the industry was either unwilling or unable to adopt the technology—depending on whom you ask—the other table-saw manufacturers teamed up to mandate the riving knife in the United States, which had an equally significant impact on saw safety.



SawStop changed woodworking.

With skin-sensing technology that stops and drops the blade immediately upon contact, SawStop virtually eliminated the chief danger in woodworking.



2000s



Magic cartridge.

When the SawStop cartridge receives a signal that skin (or metal) has contacted the blade, a spring pushes it into the teeth, stopping them almost instantly.



Industry responds with riving knives.

The riving knife tilts and moves up and down with the blade, and has a low-profile version that stays just below the topmost teeth. This means it can stay on the saw for almost all types of cuts, making it a huge improvement over old-school splitters.



the fine powder that hangs the longest in the air and penetrates deepest into lungs.

Modern game-changers

While innovation has slowed a bit over the past 10 or 20 years, reflecting the fact that most of the needs of modern woodworkers were addressed during the first 30 years of the boom, breakthroughs continue to emerge, some small and incremental, but others almost as big as the first SawStop.

Festool Domino makes joinery quick and simple—In some ways, Festool might be the most innovative tool manufacturer of all. Its multichuck cordless drills are still the best out there, as are its Rotex sander, its track saws, and its impressive array of dust extractors (shop vacuums).

Festool carved out a huge niche in the market by engineering handheld power tools at the same price level where other companies were engineering new woodworking machines. Most of these found their way into the hands of high-end construction contractors, but the smaller world of woodworking received them

gratefully as well. The tools are expensive, but they quickly earn their keep for woodworking pros and prolific hobbyists.

Among all of Festool's innovative products, the Domino joinery system is the most revolutionary. As I reported in early 2007 (Tools and Materials, *FWW* #190), the first Domino DF 500 was one of those true game-changers. The handheld power tool looks and works like a biscuit joiner, but the oscillating bit makes deep mortises instead of shallow slots. There are multiple bit sizes, and the oscillation can be set wider or narrower for different tenon widths. Team that up with the precise slip tenons Festool offers, and you have a complete joinery system that can assemble all of the parts of a table, for example, in less than one hour—and, as a bonus, slot the rails for tabletop clips.

Segmented cutterheads change milling—Byrd Tool invented the first Shelix cutterhead in 1979, but it took a couple of decades for it to migrate into smaller woodworking machines. Once it did, there was no going back.

Instead of the straight, steel knives on traditional planers and jointers, the Byrd Tool cutterhead had small carbide teeth arrayed

Game-changers keep rolling in

Although innovation slowed a bit after woodworkers' main needs were met, it never stopped. Here are just a few of the noteworthy tools and manufacturers that continue to make headlines.



Festool's amazing power tools. The German company continues to turn out the most-innovative power tools in the world. Requiring only a single push, like a biscuit joiner, Festool's Domino joiner cuts deep mortises that fit premade tenons. The larger Domino model, the XL, makes joinery that's deep, wide, and strong enough for a dining-room table.



Byrd ushered in the segmented cutterhead. Jointing and planing changed for good with the arrival of Byrd Tool's first Shelix segmented cutterheads, and similar models soon followed. These have carbide cutters that stay sharp many times longer than the old steel knives. Multiply that by the four fresh edges on each cutter, and you have a jointer or planer head that will make tearout-free cuts for years.



PantoRouter makes fine joinery more accessible. The

PantoRouter uses a robust pantograph mechanism and clever templates to machine perfectly matching mortises and tenons in a broad array of sizes, shapes, and configurations. Templates are available for a host of other essential joints as well.



in a helical pattern. The name “Shelix” came from the fact that the edge of each little insert cutter was ground to a curve to match that same helix, meaning the cutterhead sheared the wood away instead of hitting it head-on like a straight knife. The cutting action was also continuous, which made these cutterheads much quieter as well. The cutters were carbide, able to hold their edges 20 times longer than steel. And they were four-sided, so they could simply be rotated when they did eventually become dull. That made cutter changes much easier than they were with the old knives, which got nicked and dull so much more quickly to begin with.

Later, the industry realized that the edges of the teeth didn’t need to be curved to get most of the benefits of a segmented cutterhead, and it introduced a variety of heads with similar small, carbide cutters that simply can be rotated to present a fresh edge to the work. They aren’t curved for true shear cutting, but they produce similarly tearout-free cuts.

A variety of manufacturers now offer segmented heads on their jointers and planers, and replacement versions are available from

Byrd and others for almost every existing machine out there, large and small.

Innovations keep rolling in

Although most tool manufacturing happens in Asia these days, there are a number of companies in North America and Europe that have kept design and manufacturing at home in order to stay on the cutting edge. Festool, Woodpeckers, JessEm, and PantoRouter are just a few examples.

The PantoRouter story—Individual inventors, without the deep pockets of the big tool companies, can still come up with a big hit from time to time—something that someone else somehow hasn’t thought of before.

The PantoRouter is one of those successes. After being invented in Canada by Matthias Wandel, who featured it on his popular YouTube channel, Kuldeep Singh of Kyoto, Japan, built a more robust and accurate version. Then Mac Sheldon of Oregon City, Ore., dedicated himself to manufacturing and marketing a commercial version, complete with a host of clever joinery templates.

Game-changers continued

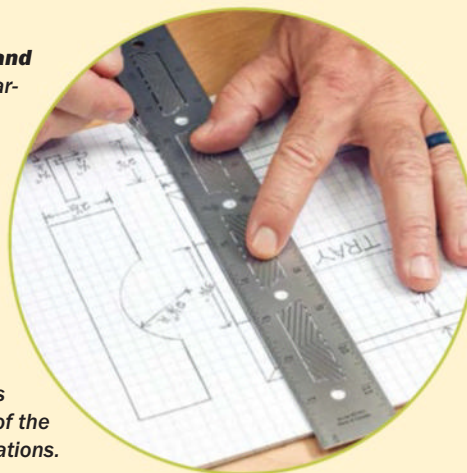


Woodpeckers: American-made accuracy. Woodpeckers made its mark with a wide array of clever squares (above), but that was just the beginning. The company’s innovative jigs and accessories, like the mortising jig at left, continue to garner rave reviews.

2000s



JessEm’s clever jigs and helpers. JessEm’s Clear-Cut roller guides (left) attach to router tables, table saws, and more, guaranteeing safe, accurate cuts. The flexible abrasive tabs on the Canadian company’s new rulers (right) press down on paper or wood to keep them from shifting. This is just a small sample of the company’s many innovations.



The PantoRouter harnesses the pantograph principle, used to reproduce drawings at various scales, to make matching mortises and tenons. The ingenious tapered templates allow you to adjust the tenon size in tiny increments for a perfect fit right off the machine. Dial in one set of joints, and a pile of others can be machined in minutes.

Digital fabrication comes of age

Not all of us want to turn our work over to a computer, but for those who embrace digital tools, computer numerical control (CNC) has ushered in brand-new ways of working wood. Large, table-mounted CNC routing systems are used mostly by woodworking pros and cabinetry manufacturers, but entry-level systems are more affordable and user-friendly than ever. And we now have a hand-held CNC router, made by Shaper Tools (see below).

Digital fabrication is not limited to CNCs. Using a tiny stream of molten plastic—row after row, layer after layer—3D printers create precisely sized objects. If you can design a solid object on a computer, a 3D printer likely can build it. Today's entry-level

models, like the A1 from Bambu Labs (\$490), are better and more affordable than ever.

I know a number of hobbyists and pros who use 3D printers to create all of their routing templates, for mortising and much more. These can be much more complex and customized than you could otherwise construct, and precision is guaranteed. Clamping fences can be built in, or screw holes added for attaching wood fences.

The woodworking renaissance of the past 50 years has driven a surge in innovation. While many of the techniques we use haven't changed, our tools keep getting better, making fine woodworking more accessible than ever. The innovations presented here are just a small sample of the bounty at our disposal. I hope this article makes you feel grateful to be a modern woodworker, with so many amazing tools at your disposal. But always remember that tools exist to help you make things. So go ahead and do that: Make something today. □

Asa Christiana lives in Portland, Ore., where he serves as FWW's editor at large.

Digital woodworking: More accessible than ever

Today's compact CNCs and easy-to-use 3D printers will manufacture whatever you can design on screen, to extremely close tolerances. The possibilities are truly endless.

Table-based CNCs. Traditional CNCs are more affordable than ever, bringing industrial capabilities into small shops.



3D printers are template masters. A far cry from yesterday's finicky entry-level machines, today's affordable models can print router templates in any shape, with built-in fences if you like. Ben Strano designed this support for routing round stock.

Handheld CNC. The Shaper Origin is the world's first handheld CNC router. Its simple design apps and intuitive onboard controls let users do much of what a table-mounted CNC can do, and a few things it can't.



Charles Rohlf's Umbrella Stand

An eccentric design with atypical construction

BY PETER MARCUCCI

I have spent much time over the last few years researching and re-creating Charles Rohlf's furniture. Most woodworkers are familiar with Arts and Crafts makers such as William Morris, Greene and Greene, and Stickley. Charles Rohlf, while popular among art history and decorative arts scholars, has not received the same attention from woodworkers. His work contains many elements of Arts and Crafts furniture but is set apart by its unique structures, shapes, ornamentation, and carving details.

I recently completed a re-creation of Rohlf's circa-1900 "Graceful Writing Set," which included a desk, chair, and waste container (see Designer's Notebook, p. 38). To make it easier to empty the container, I built an insert that can be lifted out. It occurred to me that if the insert were modified, the container could be used as a plant stand or an umbrella stand.

The umbrella stand I made can serve as an introduction to Rohlf's unique style, and I hope it will inspire you to take on the re-creation of some of Rohlf's other works or to incorporate the style into your own designs.

I'll warn you now that Rohlf used screws in the construction of his furniture, so I did the same. However, if using screws in furniture does not sit right with you, feel free to remove each screw, drill a larger hole, and replace the screw with a glued-in dowel.

Start with the base blank

The container consists of a base, six uprights, six fretwork panels, and six feet. Start by gluing up two boards to form a slightly oversize, square blank for the base. You can lay out the hexagon using a compass. First, set the radius of the compass to 9 in. and draw an 18-in.-dia.



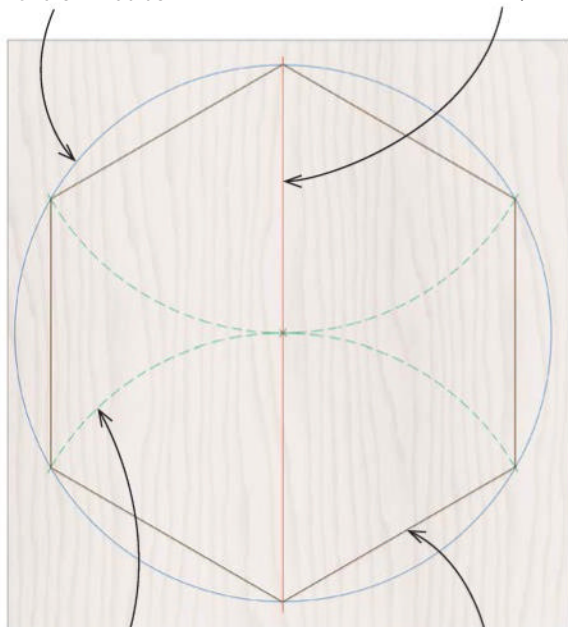
From square to circle to hexagon

The hexagon is the anchor for the entire umbrella stand. The six-sided base holds six uprights, six panels that go between them, and six feet.

LAYING OUT A HEXAGON USING A COMPASS

STEP 1

With a compass, draw a circle with a 9-in. radius.



STEP 2

Draw a vertical line through the center point of the circle that intersects the circumference of the circle at the top and bottom.



One full circle and two arcs. With your compass, draw a full circle. Then draw a centerline that goes through it. Next, keeping the compass setting the same, draw two arcs with the pin of the compass set where the full circle and centerline meet.



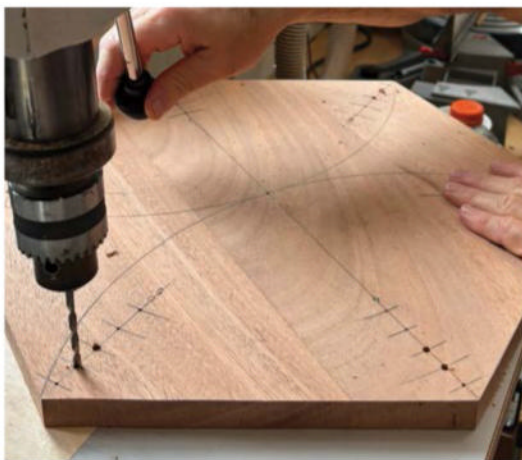
STEP 3

Where the centerline intersects the bottom of the circle (with the compass still set at 9 in.), insert the compass point and draw an arc that spans the circle. Repeat the process where the line intersects the top of the circle.

STEP 4

With a straightedge, connect neighboring pairs of points where the centerline and arcs intersect the circle. Now you have a hexagon.

Connect the dots. The centerline and the arcs will intersect the circle in six different spots. Use a straightedge to connect those points. Voilà—you've drawn a perfect hexagon without measuring a thing.



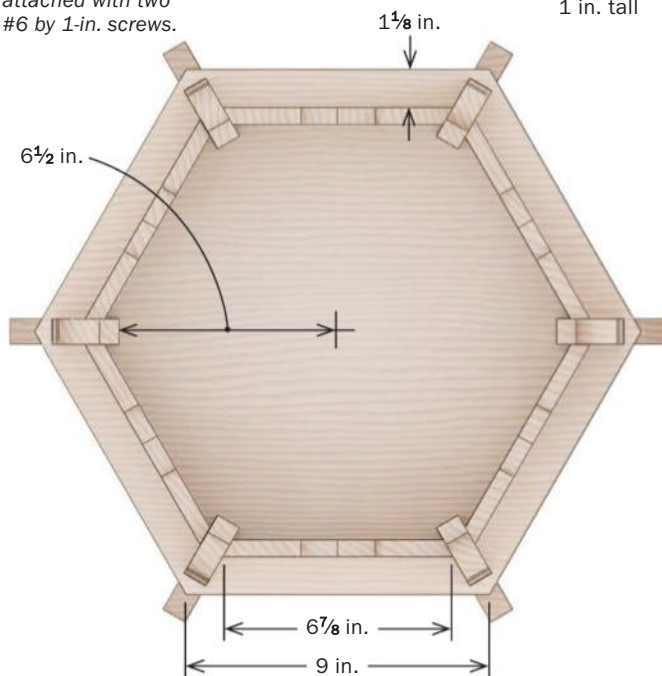
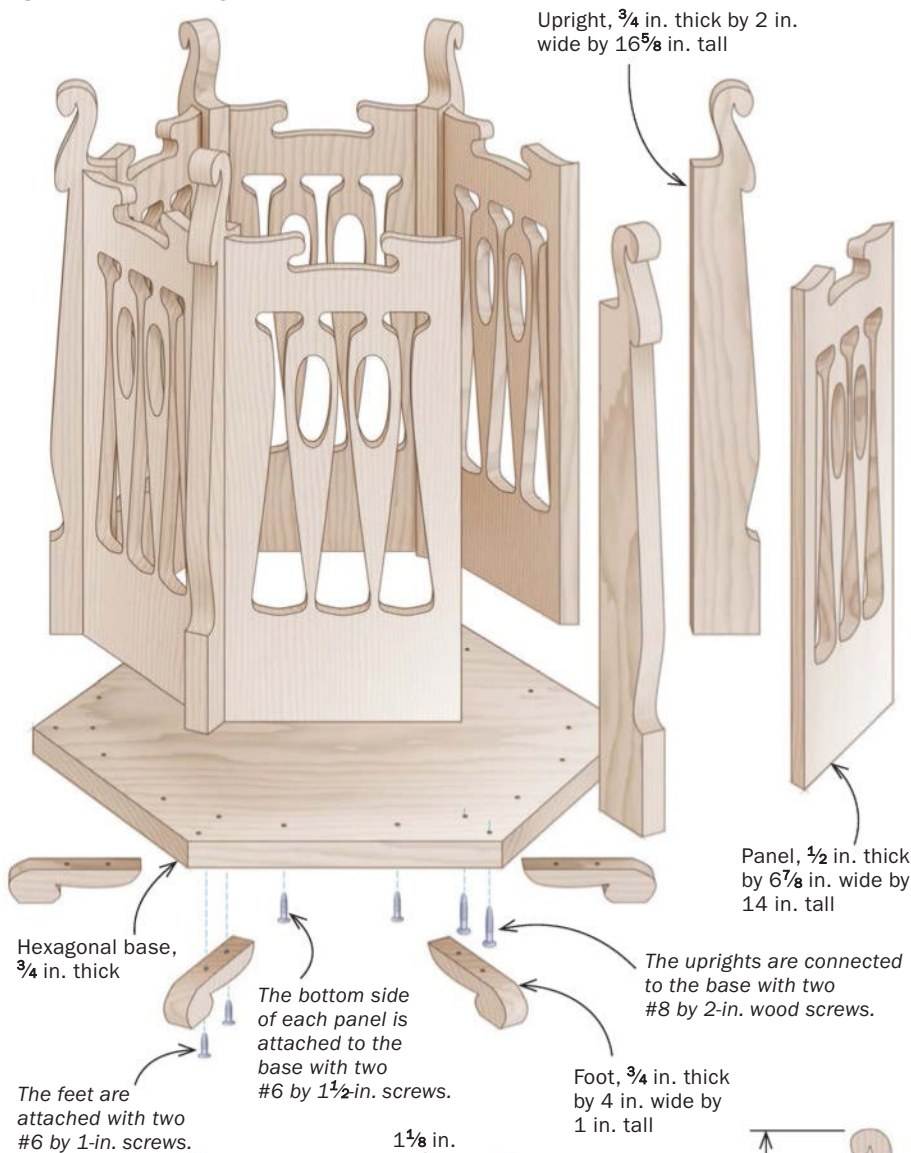
Online Extra

To download the full layout pattern, go to FineWoodworking.com/317.

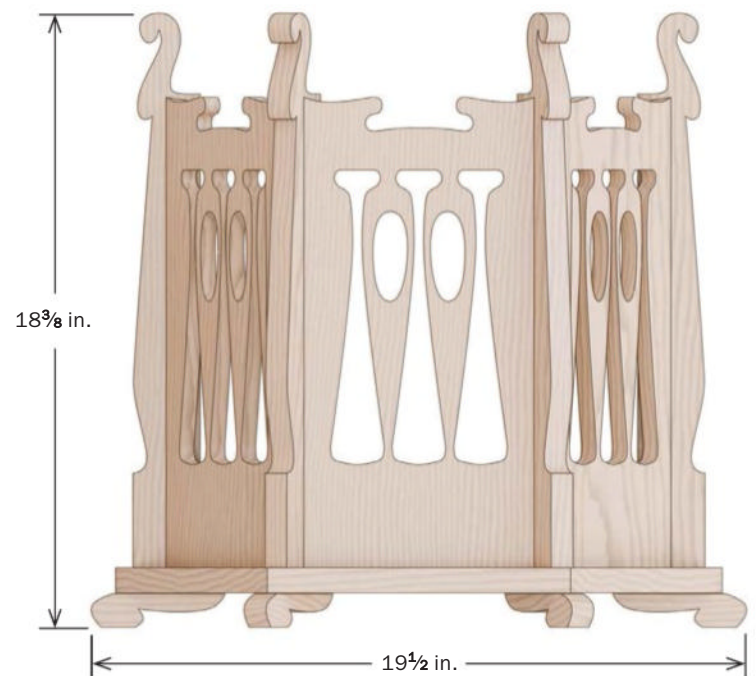
Mark and drill for the uprights. Draw lines that run from each corner of the hexagon to its opposite corner. On one of those lines, measuring from the center point, use a ruler to mark five points. These locate the inner and outer edges of the uprights; the inner edge of the feet; and two pilot holes for screws into the uprights. Use a compass with its point at the center of the circle to transfer those locations to the other five points of the hexagon. After you've cut out the hexagon at the bandsaw, drill the pilot holes for the uprights at the third and fourth points from the center.

Mark and drill for the panels. Pencil in the layout of all the parts on the base, then drill the pilot holes for the screws that will hold the bottom of the panels in place.

UMBRELLA STAND



TOP VIEW



FRONT VIEW

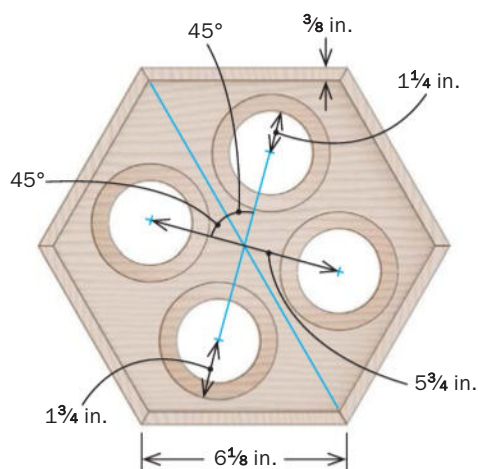
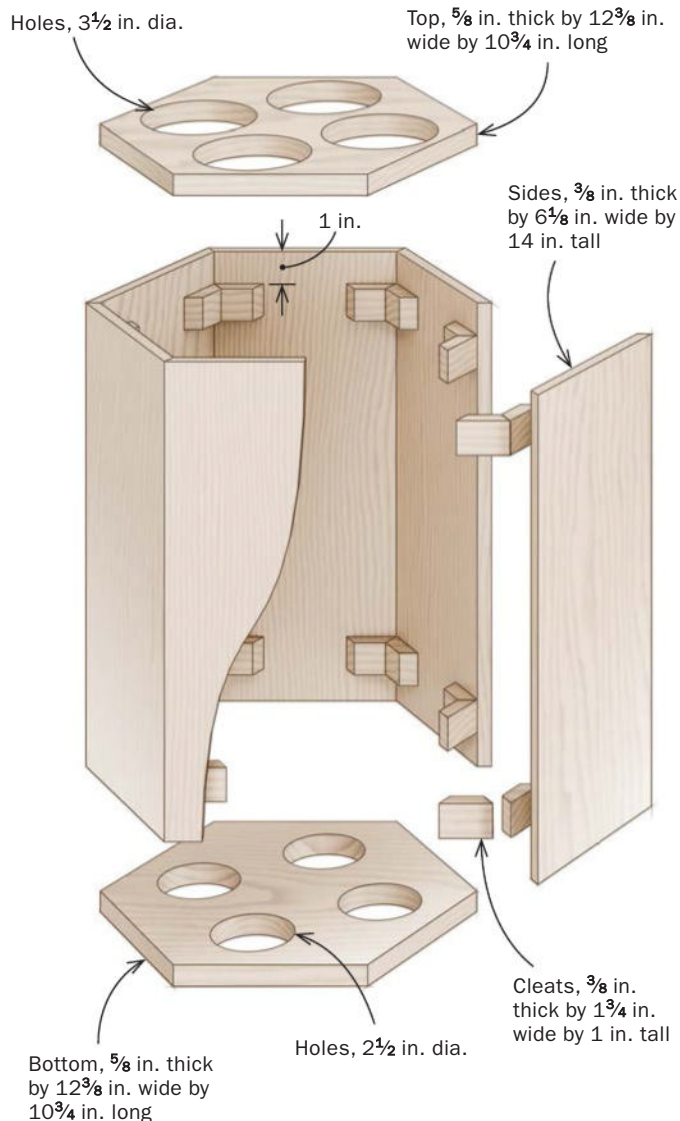
circle. Then draw a straight line through the center point of the circle. Where the straight line intersects the top of the circle, insert the point of the compass—still set at 9 in.—and draw an arc that spans the circle. Repeat this process from the point where the vertical line intersects the bottom of the circle. You should now have four points where the arcs intersect the circle, and two points where the vertical line intersects the circle. With a straightedge, join the intersection points to create six sides, each 9 in. long.

Continue with the base layout

To establish the location of the parts on the base and the pilot holes you'll drill through it, draw a series of five concentric circles within the large one. You can draw these as full circles or just as hash marks across radius lines aimed at each point of the hexagon. The innermost circle marks the inner edge of the feet. The second circle marks the inner edge of the uprights. The third and fourth circles mark the pilot holes for the screws that connect the uprights to the base. The fifth circle marks the outer edge of the uprights.

With the layout complete, cut out the hexagon on the bandsaw. It's necessary to disassemble and reassemble the piece a few times before completion, and with six uprights attached to the points of the hexagonal base, it can be hard to keep track of what goes where. So I number each point of the hexagon, 1 through 6, with a small metal number punch.

UMBRELLA STAND INSERT



INSERT TOP VIEW

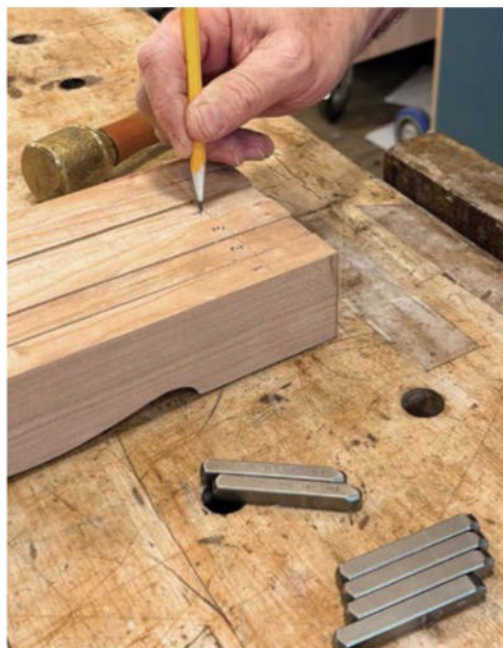
Panels get double numbers. At the bottom of each panel, on the inside face, punch numbers to match the adjoining uprights.

Keep track with numbers

The main stand gets screwed together and disassembled multiple times. To keep track of the parts, mark the base and each upright, panel, and foot. Pencil marks will get sanded away before assembly. Discreetly located number punches filled with pencil survive sanding.



Mark the base. Each point of the hexagon gets numbered 1 through 6. When assembled, the numbers will be hidden inside the stand under the insert.



Sync the uprights to the corners. Each upright gets a number corresponding to its corner. Punch the number on the inside edge of the upright, which will be unseen.



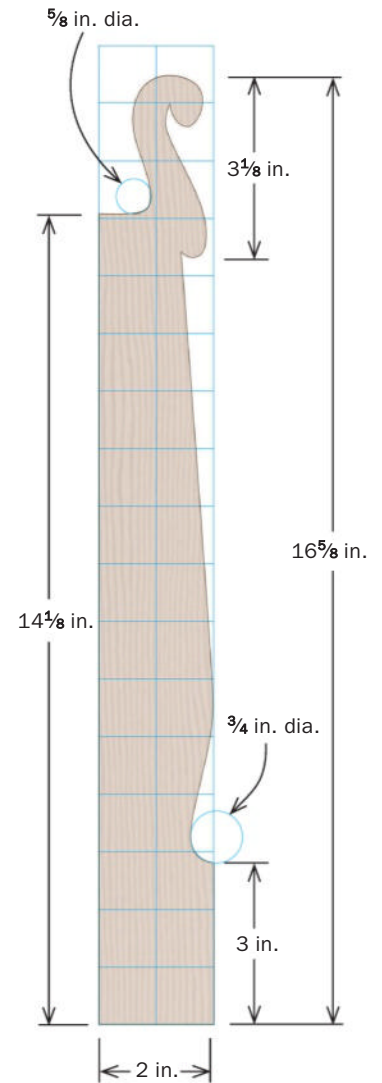
An upright in each corner

Before you locate the six uprights to the base, you must shape them.

Paper patterns. Marcucci lines up the long edge of the pattern with one of the long edges of the upright blank. He attaches it with hot hide glue because it is easier to remove the pattern and any remaining residue.



Shapely uprights. First, use a Forstner bit to cut the tighter curves of the pattern. Then cut the rest of the shape on the bandsaw, and refine and fair the curves with rasps, files, and sandpaper.



UPRIGHT DETAIL



Mark and drill the screw holes. Use the hashmarks on the hexagon to transfer the location of the screw holes to the bottom of one upright. Set a marking gauge to mark the centerline of the uprights; then with dividers set to the marks on the first part, mark pilot holes on the rest.

The punched numbers survive moderate sanding. Later, I number the uprights to match. To complete work on the base, drill and counter-sink the pilot holes for the screws that will connect the uprights and the panels.

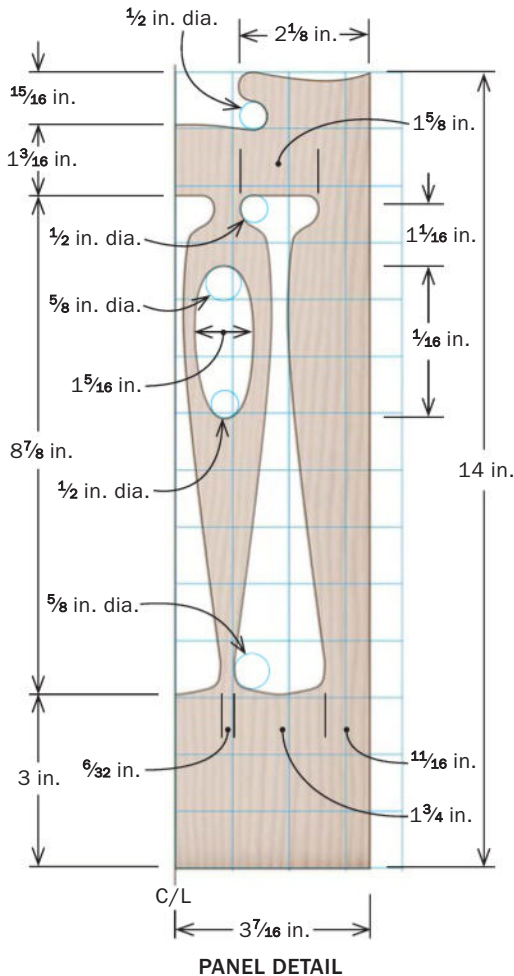
A set of six uprights

There are many methods for shaping the uprights. I don't have a CNC machine, and the router is one of my least favorite woodworking tools, so I used a drill press and bandsaw.

First, I printed six copies of a paper pattern and glued one to each upright blank. I began the shaping at the drill press by cutting holes with a Forstner bit at the tight inside curves in the design. I sawed out the rest of the shape at the bandsaw, cutting close to but leaving the lines. Finally, I used rasps, files, and sandpaper to remove the bandsaw marks and fair the curves.

Six panels and six feet

As you did with the uprights, shape the panels and feet before locating and installing them.



To lay out pilot holes for the screws into the bottom of the uprights, make a centerline along the bottom of each upright with a marking gauge. Transfer the spacing of the pilot holes on the base onto one upright. With dividers, transfer the location of the pilot holes from the first upright to the other five. Drill the holes and temporarily screw each upright to the base.

Half a dozen panels and three pairs of feet

You can use the same paper-pattern approach for shaping the panels. Once the patterns are glued onto the panel blank, rip a 30° bevel on both long edges. Start with the panel slightly oversize so you can sneak up on a tight fit between the uprights. Number each panel so it goes back between the same two uprights.

Begin the fretwork by drilling holes with a Forstner bit at tight inside curves, then saw the rest. I used my jigsaw, with a scrollsaw blade



Patterned and mitered. After gluing patterns to the panel blanks, cut the bevel on one side of the panel, then the other, sneaking up on the fit. Test the panel's fit between its specific uprights.



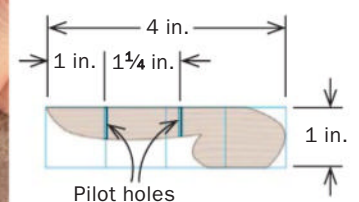
Cutting an ornate pattern. Start by drilling holes at the tight inside curves. Use a 1/2-in. Forstner bit in the tightest curves and a 5/8-in. bit in the others. Use a scrollsaw blade in a jigsaw to cut the rest of the pattern.



Peel it back. To remove paper patterns applied with hot hide glue, generously soak a rag with water, set it over the pattern for about 10 minutes, and slowly peel the pattern off.



Fancy feet. Similar to the uprights, the feet blanks get pilot holes for the screws, paper patterns glued to them, and then shapes cut out and refined.



FOOT DETAIL

Fit and finish

Before final assembly, screw the uprights and panels in place to fine-tune the fit. Then disassemble and apply finish.



One panel at a time. Screw the first two uprights in place. Fit the mating panel between those uprights and screw it in place from the bottom of the base. To define the glue surfaces on the uprights, draw lines on them, tracing along the inside and outside faces of the panel (above right). Work your way around the base, screwing in one upright and panel at a time until you've assembled the whole container.



Tape off glue lines. Before applying finish, make sure to tape off the bevels on the panels and a corresponding strip on the uprights. Take care to apply stain and finish to the inside edges of all the curves and fretwork.

inserted. Clean up the inside edges with small rasps and sandpaper.

Use the same process to make the feet: Attach a paper pattern to each foot blank, drill Forstner holes, cut the blanks at the bandsaw, and clean them up with rasps and sanding.

Dry-fit, finish, and final assembly

You'll have to assemble the piece fully to make sure the panels fit snugly. Start by attaching the uprights to the base. Next, drill two pilot holes through the base for the screws that

will be driven into the bottom edge of each panel. Then screw the panels in place. When you have all the pieces assembled, define the glue surface on the uprights by tracing along each panel, inside and outside, where it meets the uprights.

I next take the pieces apart, give them a final sanding, and finish them unassembled. I've reproduced Rohlfs pieces using oak, walnut, and mahogany. When I use mahogany, as I did here, I apply an English chestnut stain. Then I finish the piece with a few coats of Danish

oil or a couple coats of shellac rubbed down with steel wool and waxed.

The glue-up is very similar to the dry-fit, except now the edges of the panels get glued to the uprights. And I now use a 23-gauge pin nailer to toenail the top of the panel to the uprights and hold it in place until the glue has dried. When the glue has cured, locate the feet on the underside of the base, drill pilot holes through them, and attach them with screws.

Build the hexagonal insert

The insert is made up of six sides mitered together and a top and bottom. To assemble the insert, tape the pieces together, outside faces up, long edge to long edge. Flip the assembly over and carefully run tape along each side of the miter joints. When the joint closes, these will catch any glue squeeze-out. Apply glue to each joint, roll the assembly together, and tape the final joint. (This technique is explained more fully in "Hexagonal Boxes Are Little Gems," *FWW* #285.)

Add a removable insert

Though the original Rohlf's piece didn't have an insert, Marcucci added one to keep umbrellas upright.



Tape, glue, and roll. Before gluing up the hexagonal insert, apply strips of tape beside the bevels on the inside face to make cleanup easier. Then, with the parts laid on the bench side-by-side and outside up, apply a strip of tape along each joint, and back those up with horizontal strips. Apply glue to the inside of the miters, roll the assembly up, and tape it closed.



Mark the top and bottom. When the glue is dry, peel the tape off. Set the insert on the top and bottom blanks in turn to trace the inside shape. Then cut them out on the bandsaw.



Hole saw in a hand drill. Marcucci uses a hole saw to drill the holes in the top and bottom. He drills halfway through, flips the piece over, locates the hole saw in the bit hole, and cuts the rest of the way through.



Glue and tack the top and bottom. After gluing small cleats inside the insert, glue and pin the top and bottom onto the cleats.

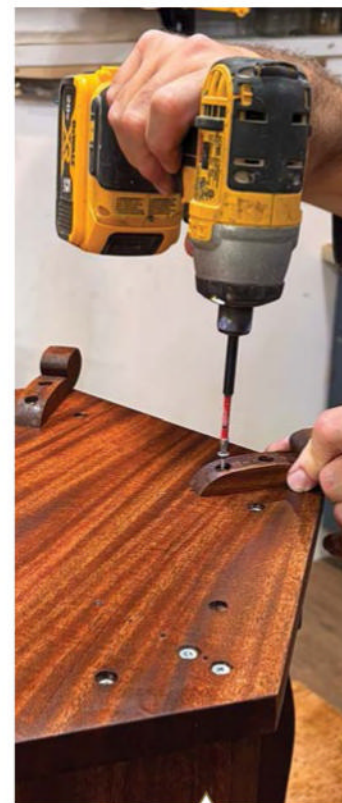
The final assembly



With all the parts finished, it's time to screw everything together for the final time and add some glue to the panels.



Repeat the assembly, almost. Just as in the dry-fit, work your way around the hexagon, installing the uprights and panels for the final time. The difference now is that you'll add glue to the beveled edges of the panels before you place them between the uprights. And after you screw through the base into each panel, you'll use a pin nailer to tack the top of the panel to its uprights while the glue dries.



Add a top and bottom to the insert

To make the insert's top and bottom, trace the inside perimeter of the glued-up sides onto two square blanks. Cut out the hexagonal shape, leaving the line that you traced. Then trim the top and bottom to achieve a snug fit.

To hold the umbrellas, drill four holes through the top and four smaller holes through the bottom. Begin the layout for the holes by drawing a straight line through two opposite points of the hexagon. Then draw two radial lines located 45° from either side of the straight line. Draw a 27/8-in.-radius circle from the center point of the hexagon. This circle will intersect the two 45° radial lines at four points. These intersections mark the center of your circles. This same layout will work for both the top and bottom boards.

To help locate and fasten the top and bottom, I fitted cleats around the inside of the insert. The cleats are glued and held in place with 23-gauge brads. The top and bottom are attached to the cleat with glue and brads. □

Peter Marcucci is a woodworker in Wasaga Beach, Ont., Canada.



Six feet under. Turn the container upside down and screw the six feet in place at each point of the hexagon.

Insert the insert. Gently place the insert into the decorative container and it's ready to hold your bumbershoots and shillelagns.

gallery

Inspiration for our readers, from our readers

In April 2000, a few issues shy of *Fine Woodworking's* 25th anniversary issue, "Current Work" was born. The new department was created not just to showcase the work of our authors and readers (professionals and amateurs alike). We also wanted to provide design inspiration, glimpses of construction details, and camaraderie to a group of passionate, like-minded people who mostly worked alone in their shops either to make a living or to find a hobbyist's comfort in the process. Now at our 50th anniversary we receive thousands of entries per year. Poring through the last quarter century of pieces to pull out a sampling for this issue's look back at the Gallery (formerly Current Work) was not an easy task. The work we showcase—your work—is inspiring. We narrowed over 2,000 exemplary pieces down to the work you see here. We are honored to show your craftsmanship, issue after issue. Keep working at your craft, and please keep sending us photos of your work.

—Anissa Kapsales



45 HANDMADE SPINDLES Issue 205

When building this settee, Greg Pennington shaped the spindles with a drawknife and spokeshave. Pennington says it was "an adventure in problem solving and geometry, which resulted in many hours of fun."

Photo: John Lucas



BENDING RESEARCH Issue 196

This table is the result of Seth Rolland's experiments with steam-bending. He cut the wood partway and then steam-bent it open, holding the pieces apart with dowels.

SPALTING ON DISPLAY Issue 243

Timothy Gorman's turning, affectionately titled "The Chubby One," is one in a series of turnings from a single piece of spalted maple.

Photo: Sarah Whiting



NATURE IN MINIATURE Issue 193

Janel Jacobson finds the inspiration for her tiny sculptures in the natural world surrounding her home. This one is a mere 1¼ in. deep by 5¼ in. wide by 1½ in. tall. She roughed out the shape with a microgrinder and used files and small carving tools to create the details.



TILT-TOP MASTERPIECE Issue 204

David Beach decided to reproduce this mahogany tilt-top tea table after a field trip to the Museum of Early Southern Decorative Arts in Winston-Salem, N.C. He made the top from a single wide mahogany board.



A MODIFIED REPRODUCTION Issue 182

This Arts and Crafts desk, built by Steven Hodgson, is based on an original designed by David Robertson Smith and built by Stickley Bros. for the 1904 Louisiana Purchase Exhibition. The stained glass was made by David Kjerland.



ALTERNATIVE DOOR PANELS Issue 144

Seth Janofsky originally made these door panels as another option for a sideboard that appeared in *FWW* #137. Though he opted for something simpler on the sideboard, these panels were the starting point around which he designed this cabinet.



OPEN DISPLAY

Issue 196

This veneered display stand has five-sided legs, and it tapers to the top, creating tricky angled joinery. Gokhan Doguer says the most challenging part of the piece was the glue-up.

Photo: David Welter

TEAMWORK FOR A CAUSE

Issue 254

William Geyer teamed up with Fred Gilmour, an artist and fellow retiree from the Pennsylvania College of Technology, to make this rocker for an auction at the school. Gilmour designed the chair after seeing original work of Charles Rennie Mackintosh. Geyer made the final pieces from walnut.



A CLASS PROJECT

Issue 149

Timothy McKibben built this William and Mary highboy as a project for Palomar College's hand-tool joinery and veneering classes. It's based on a piece in Jeffrey P. Greene's *American Furniture of the 18th Century* (The Taunton Press, 1996).



FORM MATCHES FUNCTION

Issue 212

After being commissioned to build a jewelry cabinet, Brek Jacobson designed this veneered and solid-wood oval cabinet on a stand.

Photo: Seth Janofsky



A LUMINESCENT FINISH

Issue 225

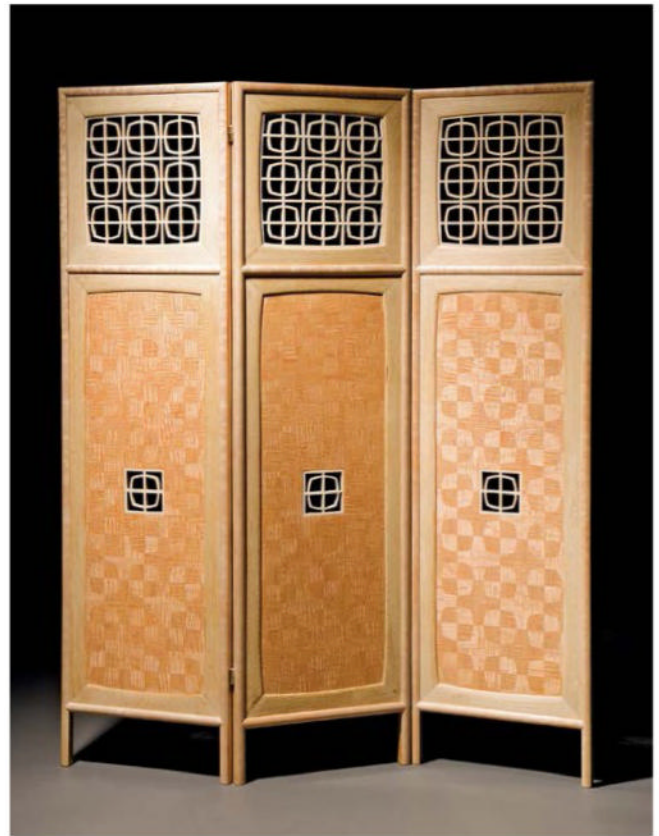
Like many of Michael Allison's turnings, this pierced ash bowl is made from green wood he found near his home. He achieved the color with water-based transparent dye, followed by a high-build, high-gloss finish—in this case, about 14 coats of Minwax Wipe-On Poly.





FLOWERING RUSH CABINET Issue 213

Paula Garbarino worked in a cabinet shop for five years before attending North Bennet Street School. "I finally decided I wanted to increase my skills," she says, and the experience was "the best two years of my life." In the NBSS shop, "there was accomplishment all around you—people pushing the envelope in all directions." She returned to teach at the school for five years in the late 1990s.



REPEATING PATTERNS Issue 204

The design of this screen has a repeating motif: a soft square inside a hard square. Brian David Reid took inspiration from images of the 1950s, such as the shape of old television screens and the cinderblock-patterned screens used in the ranch homes of his childhood.

Photo: Bill Truslow



WAFING AWAY Issue 173

"I like furniture that is light in weight, so light that it looks like it will float off," says Tor Faegre, who got the idea for his floating table when he saw a grove of young cottonwoods springing up in a field. The peeled willow legs are nailed and glued to the pine tabletop.



AMBASSADORIAL FURNITURE Issue 200

Michael Bell collaborated with Susan Zelouf on the design of this sideboard, part of a large commission of furniture for the Irish embassies in The Hague, Netherlands, and Lisbon, Portugal.

Photo: Roland Paschhoff

DROP-FRONT DESK Issue 141

Nina Browne made this as a gift to her husband after two years of long-distance love while she attended North Bennet Street School in Boston and he lived in Brooklyn. The piece is based on an original design made at the Byrdcliffe Colony in 1904.

Photo: Lance Patterson



CONTEMPORARY SHAKER Issue 219

Adam Webb wanted to convey a feeling of lightness and warmth in this contemporary take on a Shaker hall table. The table is 14½ in. deep by 59 in. wide by 34 in. tall. The cherry is finished with Danish oil, the maple with Briwax only.

Photo: Daniel Allen



LOOK MA, NO NUMBERS

Issue 205

To keep his clock as simple as possible, Russel F. Gale Jr. veneered the face with 12 separate sections, eliminating the need for numbers or reference points. The biggest challenge of the project was the beadwork around the dial opening. The movement is a Hermle 14-day coil gong.

Photo: David Welter



HARKENING BACK TO CHILDHOOD Issue 175

Jay Cochran grew up surrounded with English and early American furniture. This influence, combined with his passion for fine woods and furniture making, inspired him to create this claro walnut table.

Photo: Peter Harholdt



HOMAGE TO KRENOV Issue 210

Like many others, Ross Day says his mind was opened by James Krenov's emphasis on technical excellence as well as "leaving your fingerprints" on your work. This chair is simple and light yet strong. Day recognizes its quiet grace as a product of his time studying with Krenov.

Photo: Mike Seid



MONDRIAN IN 3D

Issue 252

More than 400 pieces of wood went into this bar, which has space for bottles and other assorted items. Its maker, Robert Slotterback, who is a school superintendent and former art teacher, says it was inspired by the Dutch painter Piet Mondrian.

Photo: Mike Fager

STAIR-STEPPED ARMOIRE Issue 254

When designing this piece, John G. Eugster wanted to avoid a large, monolithic appearance. It was a complicated build, with lots of hand-cut dovetails, mortise-and-tenons, frame-and-panels, and drawers with wooden runners.

Photo: Diane N. Eugster



Online Extra

For a look at the 25th anniversary issue Gallery, go to FineWoodworking.com/317.



BEECH BLOSSOM LAMP Issue 224

Brett MacLearnsberry wanted the shape to suggest that it had grown out of the wall, and when the lights are on, he says the beech shades seem to come to life. Each shade consists of eight ribs, spanned by a piece of beech veneer.

Photo: David Welter

fundamentals

Tips for gluing up miters

STRAIGHTFORWARD
METHODS FOR
ANGLED ENDS

BY ERIK
CURTIS



BLUE TAPE FOR SMALL BOXES

For light-duty work, tape is all you need to align and clamp miter joints with aplomb.



Tape three of the miters. Orient the workpieces with their outside faces up. Then hold the pieces against a straightedge for alignment while stretching tape across three of the four miters.

Miters may be among the simplest of joints, but making them perfectly is an exercise in patience and care from beginning to end. Cutting the miters is just part of the task. Gluing them up cleanly is its own hurdle, since the joint is prone to slipping and sliding under clamps, and getting clamping pressure square across the joint isn't as simple as just tightening a clamp.

The key to success in gluing up the joint is to apply pressure directly across the miter without letting it move out of place. I glue up mitered boxes and casework using three approaches: tape, band clamps, or glued-on clamping blocks. Which one I pick depends on the size of the workpiece and on whether there are four miter joints, as in a box, or fewer, as on a waterfall table.

Tape for small parts

Let's start with tape, the simplest method. I prefer blue tape; others use packing tape. Both work beautifully on small boxes. I start by lining up all four sides of the



Add glue, then close the hinge. After flipping the parts, apply a bead of glue at the base of each miter. Fold the parts closed to distribute the glue evenly across the joint.



Add a little more glue. Layer on a bit more glue at the base of the miters so the end grain doesn't completely absorb the glue and leave the joint starved.



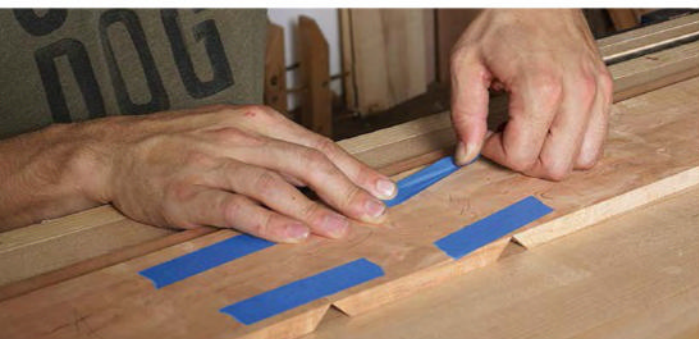
Fold the box closed. Apply glue to the last corner, hinge it closed, and stretch tape across it. You want enough clamping pressure and glue to see a bit of squeeze-out.

BAND CLAMPS FOR CASEWORK

Heavier material at a larger scale requires more clamping pressure.



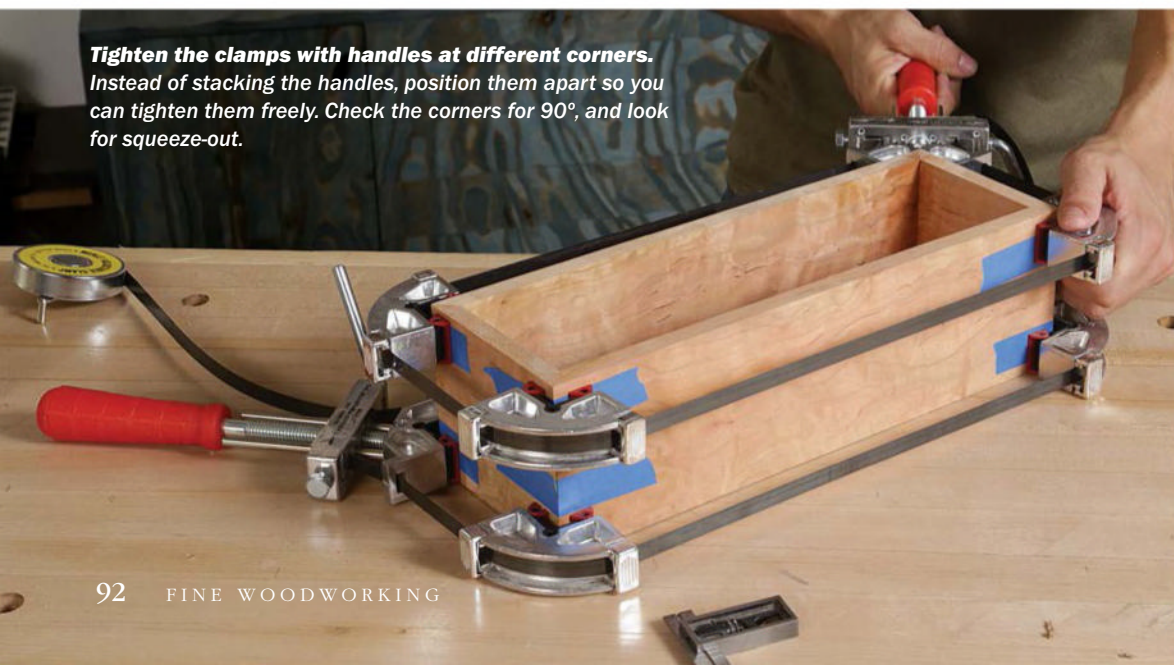
Prepare your clamps. To get them ready for assembly, adjust the band clamps to the approximate size of your box before breaking out the glue bottle.



Blue tape is an extra set of hands. Use the same method as with smaller boxes: Apply glue and tape to three joints, and close those before addressing the fourth. The blue tape keeps the parts lightly aligned as you position the band clamps.



Tighten the clamps with handles at different corners. Instead of stacking the handles, position them apart so you can tighten them freely. Check the corners for 90°, and look for squeeze-out.



box, outside face up, along a straightedge. Working from one end to the other, I apply blue tape to three of the miter joints. I use two fingers to pull the joint together while stretching tape across the seam. I can then flip the entire assembly over and run a bead of glue near the tip of each of the miters.

The blue tape acts as a hinge and a clamp when gluing up. When I fold the box up and pull tape across the last corner, all the miters stay closed as the glue dries. I try to apply enough clamping pressure to get a bit of glue squeeze-out. This ensures a nice, tight joint.

Band clamps

The only issue with blue tape is that it may not be strong enough by itself for midsize and large applications, like cabinetwork. For heavier material at a larger scale, more clamping pressure is needed. This is where band clamps are useful. A band clamp acts as a giant rubber band that puts equal pressure on all four corners. Its steel or plastic corners distribute pressure evenly around the case and close larger miters.

I set up my miters using the same blue tape method, this time to align the parts and hold them in place while I apply the band clamps. Once the band clamps are in place, I ratchet them enough to see glue squeeze-out. You may be able to get away with using one band clamp for narrow boxes, but I find that if a project is big enough to require band clamps, I usually need more than one.

Clamping blocks

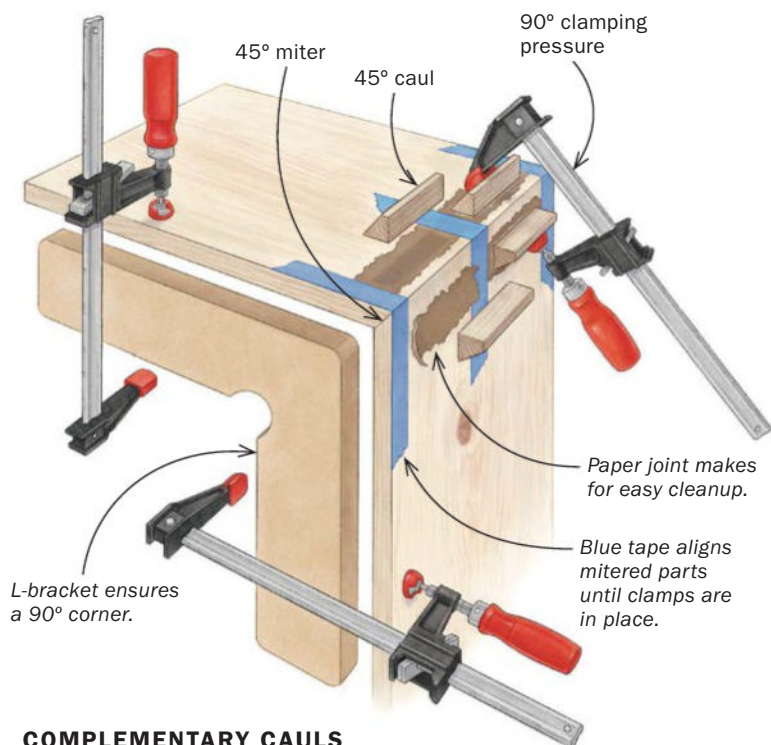
A clamping block is nothing more than a piece of wood

CAULS AND BRACKETS

Angled clamping cauls, temporarily applied, are especially helpful for larger work. An L-bracket inside keeps the parts square.



Mark the middle of your miters. With a combination square set to reach roughly the center of the miter, mark a line for positioning the clamping blocks. Leave the square at this setting, and keep it nearby.



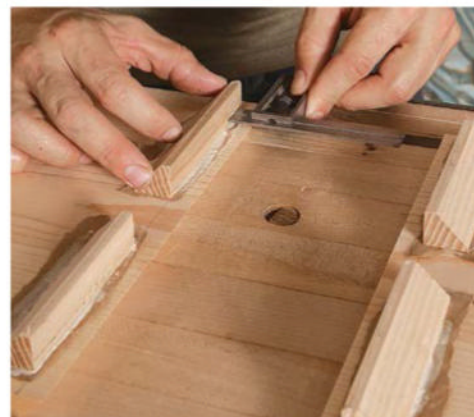
COMPLEMENTARY CAULS



Glue paper to the workpiece. A paper joint is strong enough to resist clamping pressure but simple to remove afterward without a trace.



Place the cauls properly. Use a rub joint to adhere the cauls to the paper. To position them correctly, use your square, still set to the miter's middle. Leave room for blue tape in the next step.



Tape the joint. Use strips of blue tape to align the miter for clamping. Apply glue and close the joint to spread it. It's the same method as with smaller miters, just with more glue.





Use L-brackets for large joints. Shopmade MDF L-brackets hold mitered parts at 90° while the glue dries. A small relief on the L's outside corner keeps you from inadvertently clamping the bracket to the case.



Close the miter by clamping across the angled cauls. Pay attention to the joint as you tighten the clamps. You want to confirm there's squeeze-out on the inside and the outside of the miter.

temporarily glued onto the workpiece that allows me to get perpendicular clamping pressure across the miter joint. The stock for the block is ripped with the blade at 45°, complementary to the miter's 45°, to allow for square clamping pressure. Size the blocks to give your clamps enough room to grab.

I glue a piece of paper between the clamping block and the workpiece. This paper joint provides the shear strength necessary for tightening the clamps, but it will break free with a few light taps of a chisel. The paper left on the workpiece is easily removed afterward.

Handy L-bracket

For larger mitered assemblies where ensuring squareness is difficult, I make L-shaped brackets out of MDF to hold parts at 90°. These useful brackets can be clamped on once the joints are closed and left on until the glue is dry. I create a little relief at the outside corner of the L to avoid gluing it to my piece.

FWW ambassador Erik Curtis makes furniture in Philadelphia.



Remove the cauls and paper. A couple of light taps with a chisel should be enough to pry loose and split away the clamping caul. After that, you can quickly plane, scrape, or sand away the paper.



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An essential hand-tool kit

FLORIDA SCHOOL OF
WOODWORK PUTS THESE
TOOLS AT EVERY WORKBENCH

BY KATE SWANN

Students of all skill levels and experience attend the school I founded in 1997. Because many fly into Tampa to attend classes, it's difficult for some to bring tools. Others are new to the craft and

don't know yet what to purchase. So we created an essential hand-tool kit that hangs in a wall cabinet beside each workbench.

Simple in construction, the cabinet would make a great weekend project. It's made of $\frac{1}{2}$ -in. plywood and assembled with glue and brad nails, and it has custom hangers and holders for each tool. I must tip my hat here to Lou Fuller, a visiting teacher who helped us build the boxes.

Our budget was tight in the early days, so we chose the tools we thought would be most useful. We benefited from observing which tools our instructors reached for most frequently, and we have refined the contents of the cabinet over time. I think our current kits are spot-on.

I'd like to share our essential hand-tool kit both as a guide for new woodworkers and as a wish list for experienced ones. I'll present the tools in order of usefulness, to make the point that they don't need to be purchased all at once. Some also require more skill to use, making them better candidates for later acquisition.

I'll also tell you the specific sizes, brands, and models we chose. While there are plenty of other good options out there, I think you'll find that these models offer



Nice weekend project. A simple wall cabinet like this one keeps each set of hand tools secure yet accessible. Made of $\frac{1}{2}$ -in. plywood and assembled with glue and brad nails, the cabinet is 26 in. wide by 27 in. tall by $3\frac{1}{2}$ in. deep. Hangers and holders are custom-made for each tool.



A set for each student. Cabinets are hung near each workbench at the school. The tools inside represent a great starter set for any woodworker. (A small adjacent cabinet holds a small set of chairmaking tools, used for Windsor-chair classes.)

First purchases

The first hand tools the school bought are the first ones most woodworkers need. We've specified the models the school has settled on over the years.

good value. All do their jobs well, and all are robust enough to serve you for a lifetime.

Next to the main tool cabinet at each bench you'll see a smaller cabinet, which we added later to house a handful of chairmaking tools, including two travishers, a reamer, and a drawknife. These are used during our popular Windsor-chair classes, but they aren't essential for general furniture making.

Hand tools to buy first

Our earliest purchases were the most important. These are the tools that get used in almost every class. I encourage you to buy them as a group, which will cost \$350 to \$400 if you buy new.

Tape measure—Look for something compact, and dedicate it to your workshop. Treat it kindly and don't let anyone borrow it. If you have more than one, label the one you trust most for accuracy.

Combo square—A 6-in. combination square is great for laying out joinery and setting up tools properly. So get something you can trust to be square. We also wanted a nice fit and finish, and a blade that stays locked in place. You won't find a square like this at most home centers.

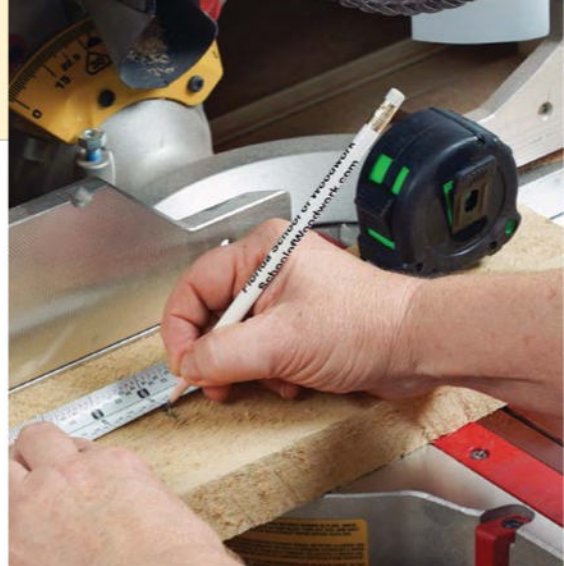
Recently we added 12-in. squares to our kits. These don't get used as much, but they are essential when you need to carry lines across longer surfaces. You might also want to consider a 4-in. square, which fits in an apron pocket.

Marking knife—We used several marking knives over the years before settling on a Pfiel model that is easily handled and holds its edge. Our older

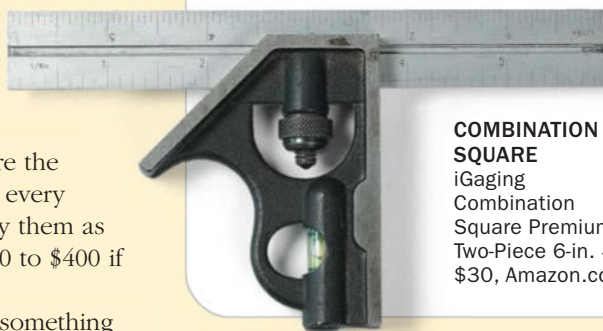
Large measurements. You'll need an accurate tape at the lumberyard and in the shop for marking rough cuts, plywood cuts, and much more. Look for at least 12 ft. of length, with easy-to-read markings.



MEASURING TAPE
Fastcap ProCarpenter
16 ft. PSSR
\$8, Amazon.com



Workshop workhorse. A combination square can be used to set up tools and machines, lay out joinery, and lots more.



COMBINATION SQUARE
iGaging
Combination
Square Premium
Two-Piece 6-in. 4R
\$30, Amazon.com



Fine lines for joinery. A marking knife strikes a more accurate line than a pencil, and it incises the line into the surface, leaving you a place to start your chisel.



MARKING KNIFE
Pfiel Swiss Made No. 4
Chip-Carving Knife
\$25, Woodcraft.com



Fine lines parallel to an edge. A marking gauge scribes precise lines parallel to a nearby edge, making it another essential layout tool.



MARKING GAUGE
Veritas Standard Wheel
Marking Gauge
\$42, LeeValley.com





Chopping and paring. To hand-cut a dado, Swann scribes the edges with a marking knife and then chisels shallow V-cuts up to those lines to guide her handsaw.

BENCH CHISELS
4-Piece Narex Premium
Bevel-Edge Chisel Set
\$72, Rockler.com

First purchases continued



Drive your chisels. Hit your chisel with a mallet for chopping cuts. Here, Swann cleans out the center of the hand-cut dado started earlier.

GENERAL-USE MALLET
Wood Is Good
WD205, 18-oz.
\$55, Amazon.com



models had longer blades, but we found that students tended to flex those by applying too much pressure. The Pfiel knives are sturdy and can be resharpened many times.

Marking gauge—A marking gauge specializes at scribing layout lines parallel to a reference edge. I used to be snooty about these tools, valuing the traditional knife-style over wheel blades. The truth is that a wheel-type marking gauge is easier to use. Also, humble pie is delicious.

Bench chisels—Chisels are essential for forming joints and paring them to fit. While I can't say I absolutely love the chisels we use, they comprise a good starter set at a reasonable price, and the blades have survived a lot of torture by new students.

What you're looking for here are chisels that match common joint sizes, feel comfortable in the hand, and hold their edges. Our set includes 1/4-, 1/2-, 3/4-, and 1-in. sizes. We also have a longer 3/8-in. chisel in our chairmaking kit.

You'll also need a way to keep your chisels sharp. We recommend the



Backsaw stays straight. A Western-style backsaw cuts on the push stroke and has a back spine that helps keep its blade straight in a cut.



Pullsaw is easier to start. While Western- and Japanese-style saws can handle the same tasks, a Japanese pullsaw makes it easier to start a cut, and it binds less frequently.

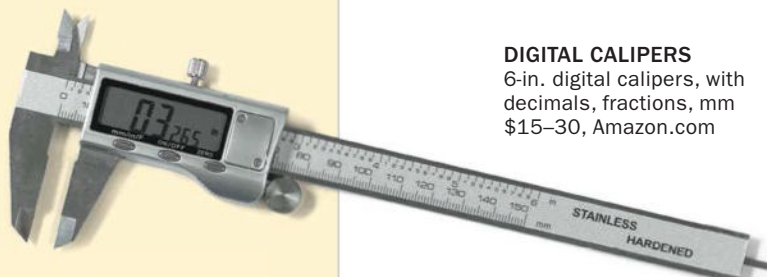
TWO HANDSAWS TO CHOOSE FROM
Veritas Dovetail Saw, Fine-Cut
\$99, LeeValley.com



Suizan 7-in.,
Double-Edge,
Japanese Pull Saw
\$34, Amazon.com

Add these when you're ready

Add the following tools as you need them, or as your skills and budget allow.



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DIGITAL CALIPERS
6-in. digital calipers, with decimals, fractions, mm \$15–30, Amazon.com

book *Sharpen*

This by Chris Schwarz (\$20, Lost Art Press), and *Fine Woodworking* also has lots of great articles on the subject.

Mallet—Like golf clubs, there are mallets for every imaginable purpose. But we use just one, with a urethane head. It's designed to power chisels for joinery and gouges for carving, and it's perfect for those tasks.

Handsaws—Handsaws excel at a variety of tasks, from crosscuts to ripcuts, and from intricate joinery to general cutting. There are two main types: Western saws, which cut on the push stroke; and Japanese-style saws, which cut on the pull stroke.

While you really need only one type in your tool kit, we include both in ours. That's partly because some woodworkers prefer one type over the other, but it's also because we like to let people try both. Both are medium-size saws that are good for a range of tasks, including dovetailing.

Our Western-style saw has a stiff back, making it a little better for precise joinery cuts. Our Japanese saw is a ryoba, which has two cutting edges, one for ripping and one for crosscutting, and is maybe a bit better for general cutting tasks. Quality Japanese saws, considerably less expensive than top-notch Western models, are a good type to try first.

After your skills evolve

Once you settle into the craft, you'll need more hand tools, and your skills will be ready for them. The following list is buy-as-you-need, or buy-as-your-budget-allows. Together these tools enable students to do almost all of their bench work.

Digital calipers—A good pair of dial or digital calipers will add accuracy to



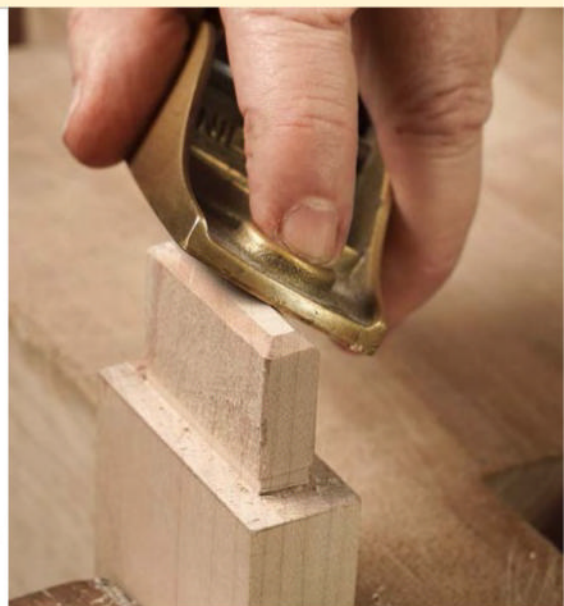
Refine your work. More precise than a sanding block, a block plane cuts clean chamfers, brings one surface level with another, removes machine marks from smaller surfaces, and much more.



BLOCK PLANE
Lie-Nielsen No. 102 Low Angle Block Plane \$160, Lie-Nielsen.com

Leave surfaces smooth and flat. A full-size bench plane removes machine marks from larger surfaces such as legs and panels, leaving them perfectly flat in the process.

BENCH PLANE
Veritas Low-Angle Smooth Plane \$285, LeeValley.com





Smooth and save. A card scraper can smooth any surface, regardless of grain direction, and will save you a lot on sandpaper.

CARD SCRAPER
0.6mm to 0.8mm
thick by 2½ in.
wide by 5 in. (or
6 in.) long
\$8 to \$12,
various sources



perfect thickness when milling, and assist with many other common woodworking tasks.

Block plane—

A block plane is the handiest type of hand plane and the first one most woodworkers buy. Its compact size makes it easy to handle, and it's ideal for fine-tuning and shaping smaller surfaces.

The Lie-Nielsen No. 102 Low Angle Block Plane is impossible to beat. It's a joy to use, and a bargain at \$160.



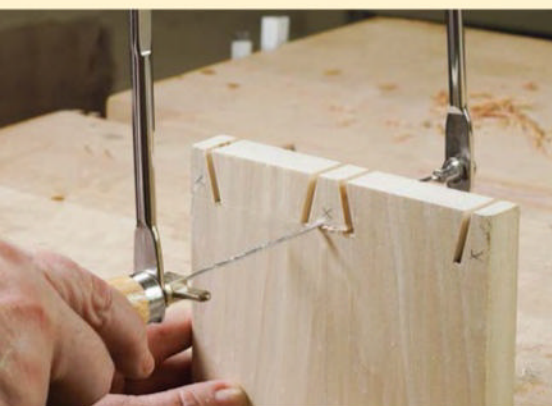
Bench plane—It's easy to fall headlong into the world of plane collecting, but a single bench plane will handle most of the larger surfaces a woodworker tackles.

We tried wood-bodied hand planes in the past, choosing them for their tradition and charm rather than pure performance. We recently switched to a metal-bodied model, which is much easier to adjust and use.



SPOKESHAVE
Veritas Flat Spokeshave
\$165, LeeValley.com

Smooth curves. A flat spokeshave smooths out shallow curves, both concave and convex.



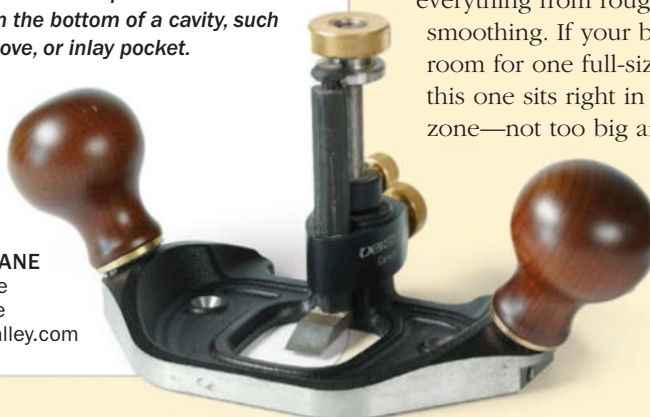
Waste removal. A coping saw is great at removing waste between joinery cuts.

COPING SAW
Lee Valley Coping Saw
\$24, LeeValley.com



Bottom feeder. A router plane can level and/or deepen the bottom of a cavity, such as a dado, groove, or inlay pocket.

ROUTER PLANE
Veritas Large
Router Plane
\$225, LeeValley.com



The Veritas smooth plane can do everything from rough prep to refined smoothing. If your budget only has room for one full-size bench plane, this one sits right in the Goldilocks zone—not too big and not too small.

When you're ready continued

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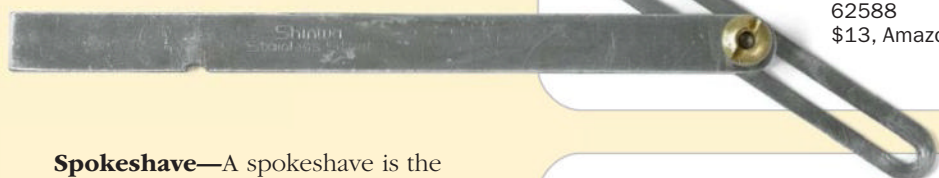


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FineWoodworking.com/new-england

Three more to consider

You might not use these as often as the others, but they are unmatched at what they do.



Transfer any angle. A bevel gauge can transfer an angle from a drawing to a workpiece, or from one workpiece to another. You can also use it to set up machine cuts.

SLIDING BEVEL GAUGE
Shinwa Sokutei
62588
\$13, Amazon.com



Spokeshave—A spokeshave is the best tool for shaping shallow curves, making them “fair” and smooth in the process. I love seeing the pleasure new students take in using this tool, which is a revelation for many.

Card scraper—This inexpensive tool can level and smooth surfaces that a hand plane might tear out. You’ll also need a burnisher—a tool used to form the tiny hook a scraper cuts with—plus a little practice at using it. But after that, you’ll be able to scrape inlay flush, remove tearout and planing marks, and save stacks of sandpaper in the process.

Coping saw—You’ll use a coping saw for making tight curve cuts, cutting out the waste between dovetails, and doing other tasks where you need a skinny blade that can turn a sharp corner. Once you dive into hand-cut joinery, add this tool to your kit.

Our coping saw isn’t the fanciest, but it’s a great deal and very serviceable. If you’re looking for an upgrade, try one of the stiffer, lighter coping saws from Knew Concepts.

Router plane—A router plane helps you to level and deepen the bottom of dadoes, mortises, inlay pockets, and any other recesses where consistent depth is essential.

Three nice additions—Depending on how you work, you might consider the following tools to be just as essential as the others. We don’t have one of each for every student, but there are plenty lying around the shop.

A sliding bevel gauge helps with a wide variety of tasks. Students use it to lay out cuts and transfer angles in a wide variety of ways. That could be

Carry lines around corners. A saddle square lets you wrap layout lines accurately around corners, which is harder to do with a combination square.



SADDLE SQUARE
Veritas Regular
Saddle Square
\$19, LeeValley.com



Does one job well. Buy the marker that matches your favorite dovetail angle. It will mark the angled lines and carry the square ones onto the adjacent face.



DOVETAIL MARKER
Veritas Dovetail
Saddle Marker
\$18, LeeValley.com



transferring an angle from a drawing to a workpiece, from one furniture part to another, or from a drawing or workpiece to a machine setup, like the angle of a miter-gauge fence or miter-saw blade.

A saddle square lets you wrap measurements and layout lines around a corner, from one adjoining surface to another. We use ours most often to knife a square line for handsaw work. But it’s great for pencil lines also.

A dovetail saddle marker is similar to the saddle square, but its marking edge

is set at your preferred dovetail angle. You can use a bevel gauge to mark dovetails, but it’s nice to have a tool permanently set at just the right angle.

The hand tools we provide each student are by no means the only ones they will ever need. But they get used almost every day at our school and represent a great starter kit for woodworkers of all levels and interests.

Kate Swann is the director of the Florida School of Woodwork, in Tampa.

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Moving day

BY AUGUST R. REICHERT III

Paring things down is an ongoing chore in our household. This time, the attic was in our sights. My wife had asked me again to please find another place to store my *Fine Woodworking* magazines. I had resisted this task over the years, offering up one excuse after another: no room in my shop, no safe location, harder to access when I need them. But this time I agreed. Maybe I could find a handy, safe spot for them in the shop after all. I had been thinking about this as a laborious task of lifting, hauling, and organizing. Nothing prepared me for an emotional journey.

I began my subscription in 1984. My high school shop teacher, Mr. Thomas, had subscribed, and I scoured each of his issues. I was in awe of the projects, craftsmanship, and information. Exposure to so many techniques and the sharing of knowledge was inspirational. After graduating, I took out a subscription, and I have never wavered since.

In the early 1990s, in a local farming publication, I found a complete collection advertised for sale by the daughter of a passionate woodworker who had passed on. This allowed me to backfill my library right to issue #1. I was overjoyed at this acquisition.

Years ago I chose to house the collection in shallow plastic boxes to keep them safe from moisture and any rodents keen to make nesting material out of my prized magazines. Now I began piling up the boxes by the back door, where they were to await transfer 150 feet to my shop and their new

home: an old, inherited, single-board blanket chest I had outfitted with casters.

As the shifting of boxes began, so did the sorting and resequencing of issues that I had referenced and never refilled. This is where the gravity of this magazine, a paper storyline of my career and life, started to get a grip.

Since high school, I had earned my living through woodworking, and this magazine was always there to remind me of that passion and keep it burning. As the issues passed through my hands—whether I was counting them, collating them, or returning stray issues to their sequential home—images on the front and back spoke to me of projects and mentors

present and past, and resonated with memories of my life and career.

This publication, a chronicle of woodworking but also of life and times, had changed and yet remained constant. I saw the era of black-and-white issues pass to color, the binding style shift, the size format decrease, the protective dust cover disappear. These were physical changes, but they reflected the passing of time, just as the icons and mentors inside did. From an article on basics by Tage Frid in issue #1 through so many articles by some still with us and others no longer, I witnessed the astounding array of contributors—so many names and faces. And on the back cover—so many projects of wonder. The diversity of work under the heading “Fine Woodworking” was staggering. All these were

resounding in my head as I matched them with my own timeline.

The physical task bogged down in light of this emotional connection to a stack of some 300 magazines, which were so much more—a compelling woodworking narrative that ran parallel to my life at all junctures. But I finally completed the project. All the issues were tucked into their new home. The old chest in my shop seemed a fitting place for them.

With a copy of the digital archive, I now have the entire collection in a format much easier to access. But it doesn't evoke the same sensations. As I hold the issues in my hands I can feel the passage of time, and I revisit the sensation of issues I held over 40 years ago while pondering my future career. For this nostalgic person, it's the physical magazines that awaken these thoughts about time, life, and experience.

August R. Reichert III works wood at Sunnyfields Cabinetry in Baltimore, Md., and at his home shop in Forest Hill, Md.





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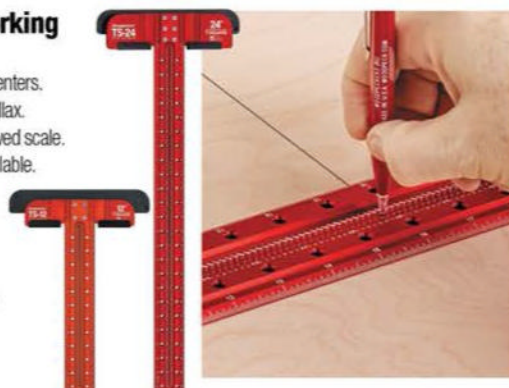
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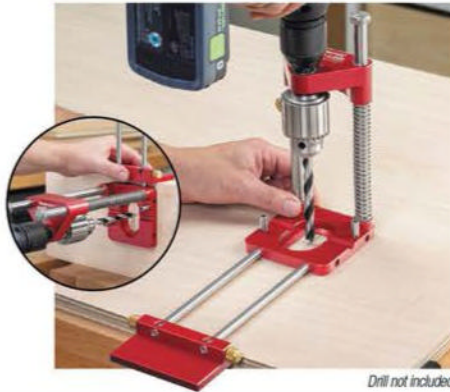
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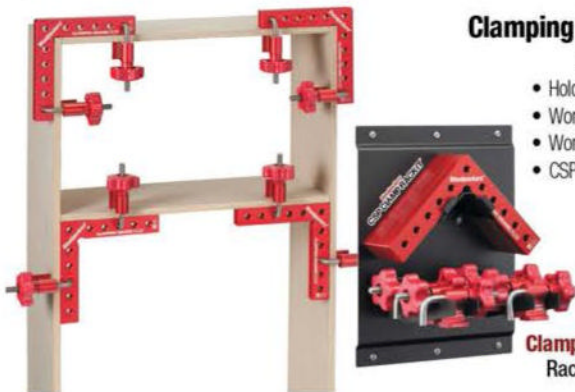


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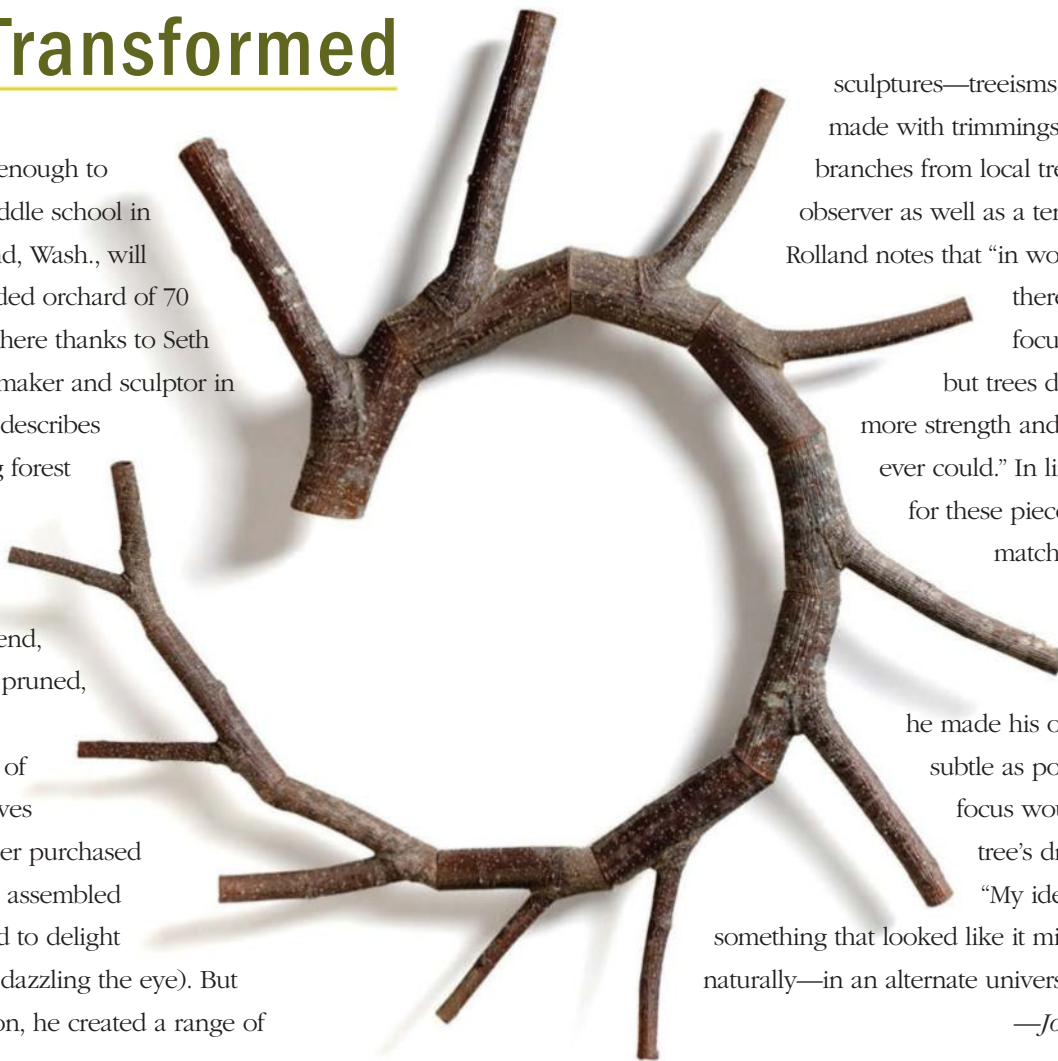
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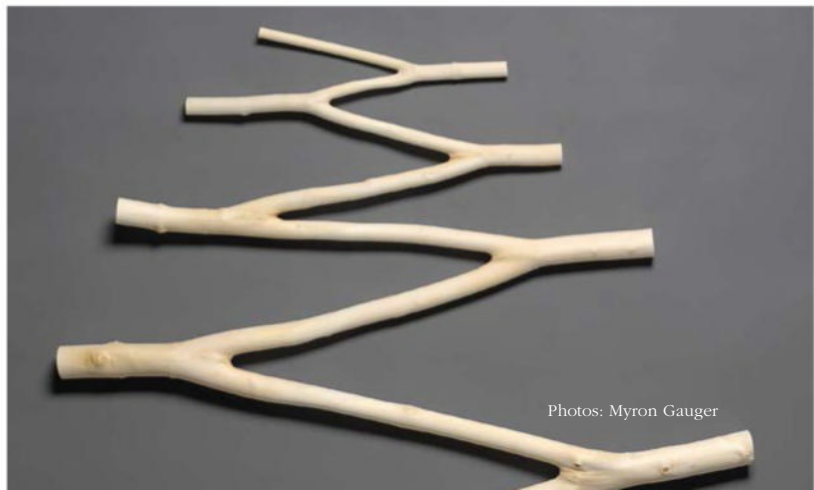
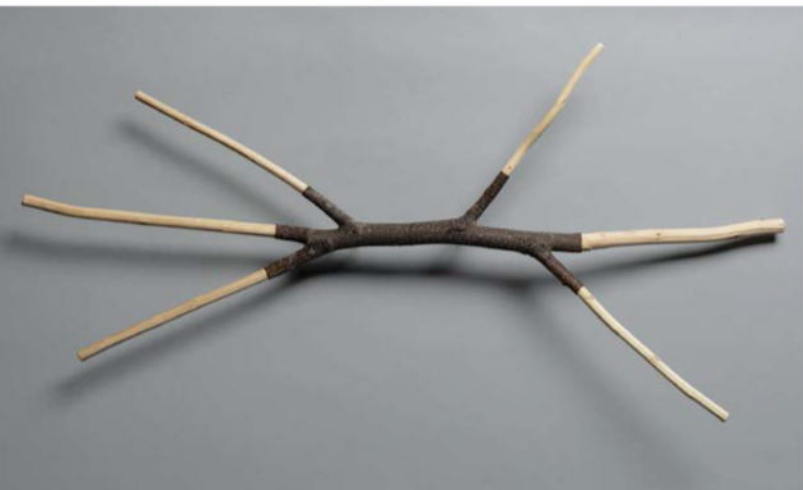
Trees Transformed

Any kid lucky enough to attend the middle school in Port Townsend, Wash., will discover its well-tended orchard of 70 fruit trees, which is there thanks to Seth Rolland, a furniture maker and sculptor in town. Rolland, who describes himself as “a lifelong forest wanderer,” has lived in New York, New Mexico, and, since 2001, in Port Townsend, and he has planted, pruned, and grafted trees all along the way. Most of his woodwork involves planks of dried timber purchased at a lumberyard and assembled in a fashion intended to delight the user (while also dazzling the eye). But for a recent exhibition, he created a range of



sculptures—treeisms, he calls them—made with trimmings and fallen branches from local trees. A passionate observer as well as a tender of trees, Rolland notes that “in woodworking there’s a lot of focus on joinery, but trees do joinery with more strength and beauty than we ever could.” In linking branches for these pieces, carefully matching diameters and cutting mostly scarf joints, he made his own joinery as subtle as possible so the focus would fall on the tree’s dramatic joints. “My idea was to make something that looked like it might have grown naturally—in an alternate universe.”

—Jonathan Binzen



Photos: Myron Gauger