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- Counter stools
- Birch-bark containers
- Secret drawers
- Shaker round table
- Using shellac



Masterful puzzle furniture, p. 22



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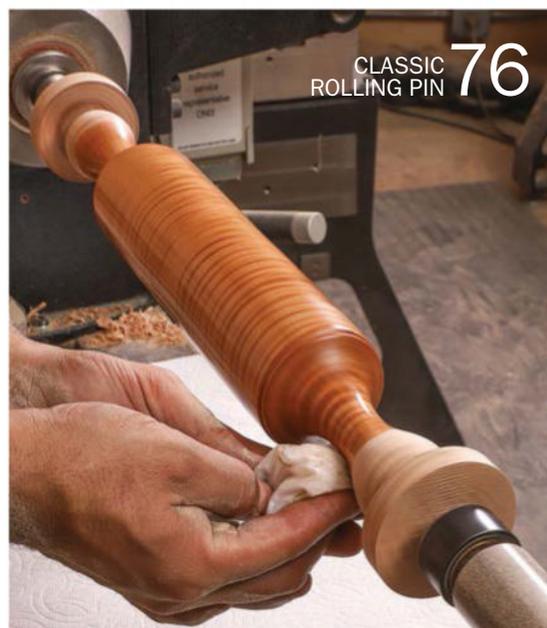
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Tides and Timbers



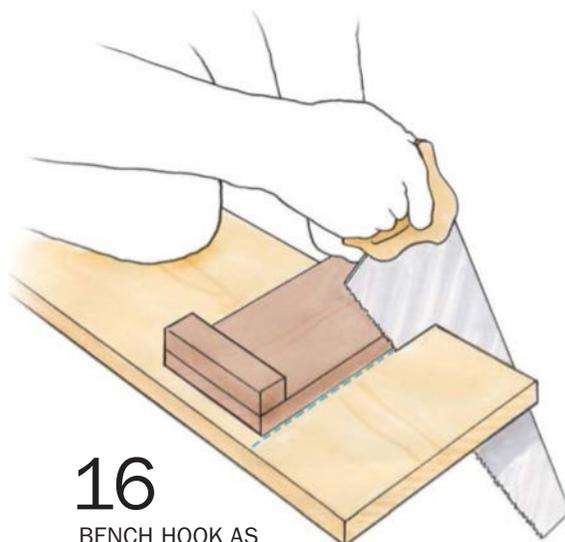
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STORAGE CASE



CLASSIC
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VIDEO

Beads, dowels, and bevels

Jeff Miller shows off three shopmade jigs he uses while building his Shaker round table.

VIDEO

Shaping a seat

Blending hand and machine methods, Tim Coleman shapes the scooped top and covered underside of his stool seat. And he shows how to cut the scoop with a bandsaw of any size.

VIDEO

Barking up the right tree

Cook Inlet Tribal Council's Design Alaska Club shows how to responsibly harvest birch bark for making projects like Peter Follansbee's birch-bark containers.



VIDEO

Back to shellac

Mike Mascelli presents his tips and tricks for mastering this timeless finish.

VIDEO WORKSHOP

Building a cabinet on stand

This intimate video series follows legendary woodworker Tim Coleman as he designs and builds a cabinet on stand—a timeless form made famous by his teacher, James Krenov. The series captures the making of a career-defining piece that embodies both tradition and innovation.

- Build up lumber core panels
- Create gunstock mitered legs
- Make visually interesting panels using grain orientation



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contributors

In 2014 **Craig Thibodeau** (“Secret Latches for Drawers” and Designer’s Notebook) switched his focus from standard furniture and cabinets to complex, mechanized puzzle furniture, supported by a worldwide network of collectors. Today he is the foremost practitioner of this unique multimedia craft, which requires complex mechanics and impeccable woodworking. The career turn was made possible by Thibodeau’s early experience as a mechanical engineer and product designer, and by the beautiful veneered pieces he built during his subsequent woodworking career. Several years ago he relocated his family from San Diego to rural Virginia to cut costs and improve his lifestyle. He is very happy he made the move.



Growing up in Phoenix, **Matt Monaco** became passionate about playing drums and studying modal-jazz drummers. When he discovered the lathe in his late teens, he found another medium that rewards manual dexterity and creative spontaneity. Woodturning quickly became his career, though his devotion to music endures in an extensive collection of recordings on vinyl. He is also an avid cook, and his article in this issue (Turning) is the third of a trio on turned items made for the kitchen, following a pepper grinder (FWW #311) and a serving platter (FWW #316). Bon appetit!



Tim Coleman (“Eye-Catching Counter Stools”) makes custom furniture in the shop he built a few paces from his house in Shelburne, Mass. He has been designing and creating one-of-a-kind furniture for 40 years since apprenticing in Seattle with Curt Minier and studying at the College of the Redwoods under James Krenov in the 1980s. Coleman’s manuscripts are as well-crafted as his cabinets, betraying his college major in creative writing at St. Lawrence University.

It’s been four decades since **Jeff Miller** (“Shaker Round Table”) swapped the life of a classically trained freelance musician (he played the trumpet) for that of a self-taught independent craftsman. The author of six woodworking books and dozens of articles, he has also taught extensively—at his shop in Chicago and at schools across the country. His career as a maker began with woodwind instruments and flowed into many years of furniture making. This past year he circled back toward musicianship and built an acoustic guitar. (You can see it and hear it being played at FineWoodworking.com/322.)



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Fine Woodworking

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Spotlight



Sometimes buying top quality isn't enough

When a woodworker spends thousands on a quality table saw with a quality miter gauge or buys a quality aftermarket miter gauge—recommended by *Fine Woodworking* (“Miter Gauges,” *FWW* #306)—then why would they go to the trouble of making a wooden sled? Surely technology and manufacturing improvements and standards count for something!

—KONRAD PLACHTA, Bathurst, Australia

Editor's reply: *The need for a crosscut sled in addition to a miter gauge is a subject I'm happy to address. However, it raises the broader topic of just what tools we need in order to accomplish our work, and why they may differ from person to person.*

Last fall I had the good fortune to participate in a woodworking tour of England hosted by Fine Woodworking (we're heading back this fall!). At one of our stops we toured the Snowden School of Furniture. The facilities were outfitted with the aim of instructing students at the highest levels of the craft. Walking through the machine shop, I saw a very nice table saw but no miter gauges or crosscut sleds. When I asked Nick Wright, the school manager, about this, he looked a bit puzzled. He explained that the school's table saw was set up precisely and used only for rip cuts. He said he'd read about crosscut sleds and such but didn't find a need for them. It wasn't that the students didn't attempt the joinery work I accomplish in my own shop at the table saw; it's just that they had a different way to go about the tasks. Crosscuts, for example, are handled at a well-tuned miter saw.



This isn't the only shop I've come across without a crosscut sled. I have visited several authors' shops that lacked crosscut sleds or some other tool that I deemed essential. The consistent theme behind why tools and machines vary from shop to shop seems to be that our processes dictate the tools and machines we own and, conversely, that the tools and machines we own often dictate our processes. It's something I've learned to take into consideration whenever I'm asked about the need to own any specific tool. If it happens to be something I don't own, there was a time I would have been tempted to answer that because I don't have it, you don't need it. Today I'm more apt to explain how I get by without it, but then to offer reasons why it might be of use to you anyway.

To answer your original question, I can speak only of the reasons why I make use of both miter gauges and crosscut sleds in my shop. In short, I see them as two different tools that serve different functions. With a miter gauge, the stock is in contact with the tabletop, where a sled acts as a carriage to support the stock as it moves across the blade. Because of that, I find that a sled is more versatile; it allows me to perform a number of joinery tasks in addition to the crosscuts that give it its name. I find a miter gauge useful when cutting tenons with a dado blade because I can use a rip fence in conjunction with the gauge as a stop.



One more lathe adjustment?

Did I overlook it, or did Andrew Finnigan (“Upgrade Any Lathe,” *Tools & Shops*, *FWW* #320) not include information on how to fix misaligned headstock and tailstock centers?

—JAY LINTHICUM, Post Falls, Idaho

Andrew Finnigan replies: *There are a couple of reasons I didn't cover that in my article.*

1. People tend to get hung up on misalignments. Alignment is critical in metalworking, but in woodturning, outside of boring or headstock-mounted facework with tailstock support, I consider misalignment to be more of an inconvenience than a problem.

2. Aligning headstock and tailstock centers could make a good article, but that would require a great deal of mathematical thinking, an explanation of physics, the detection and assessment of any number of distortions over different planes, and a ton of patience.

Reorientation is necessary

I'm sure I'm not the only person to write, but the article in the November 2025 issue (*FWW* #319) on making a chessboard shows the chess pieces incorrectly placed on the board. The white square is always positioned at the lower right corner of the board.

—JON WHITNEY, Thompson, Ill.

It doesn't have to be new

In his editor's letter in your recent *Tools & Shops* issue (*FWW* #320), Mike Pekovich says, “Setting up a shop can involve a big financial investment.” In my experience you can save significantly by buying used equipment. For example, I was able to get a DeWalt 746 table saw with sliding table for under \$700.

Perhaps you could have an article on the dos and don'ts of buying major equipment used.

—MILIND M. LELE, via email

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Add a strip for a smoother template

If you've ever tried to make a curved routing template by cutting close to the line and then sanding, you know how difficult it is to create a smooth, fair surface without any bumps or dips. I've discovered a method that makes this task much easier but doesn't take much more time.

Start by laying out the curve on your template material, using your preferred drawing tools. Now cut the curve right on the line, using your bandsaw, jigsaw, or whatever.

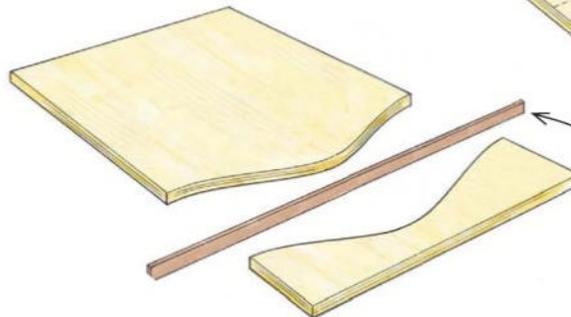
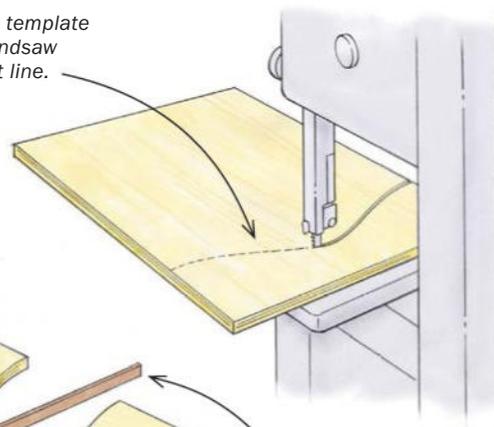
Cutting on the line is easier than trying to cut beside it while attempting to maintain a consistent distance from it. Save the cutoff piece—you will need it for clamping.

Now rip a 1/8-in.-thick piece of solid wood or hardboard so its width matches the thickness of the template material. This strip will be added to the edge of your sawn template. To glue it on securely, use the piece that you cut off the template as a clamping caul. As you add clamping pressure, clamp the pieces lightly to your benchtop to keep them from buckling.

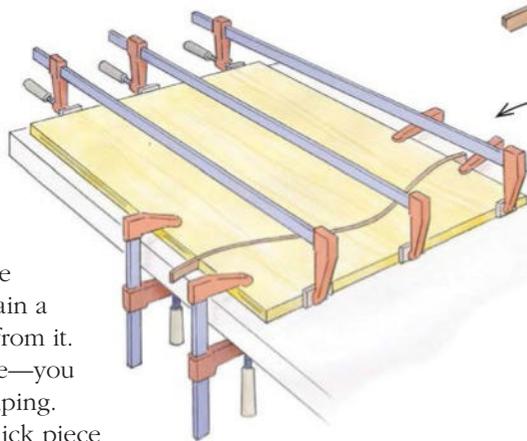
Wait to remove the clamps until the glue has dried hard. You now have a finished template with a perfectly smooth edge. Use it to lay out the curve on your workpiece. Saw close to the line, and then use the template with a bearing-guided router bit to produce a smooth, fair curve.

—ROD TAIT, Lexington, N.C.

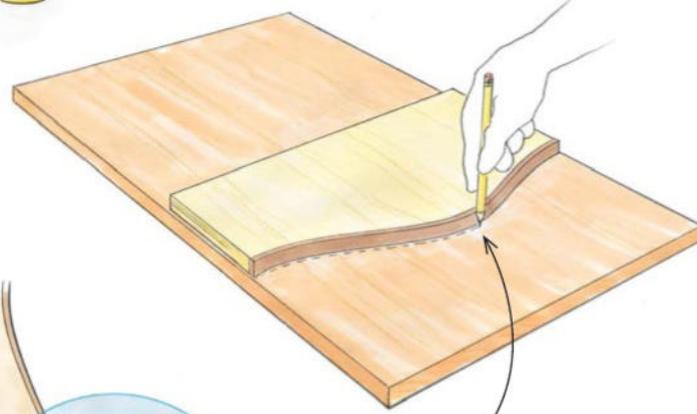
Lay out curve on template material, and bandsaw directly on layout line.



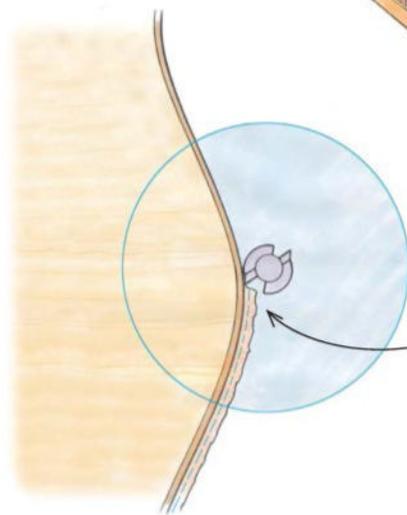
Strip of 1/8-in.-thick solid wood or hardboard



Use cutoff from sawing to glue and clamp strip to template edge.



Use template to lay out workpiece, and bandsaw close to line.



Use template with bearing-guided router bit to rout a smooth curve.

Best Tip



Rod Tait started woodworking 40 years ago, shortly after he got married. He was inspired by his father-in-law, who taught high-school woodshop and told him, "What one person can do, another person can learn." Tait's first tools were simple, but he managed to make a nice set of cabinets for his laundry room. His skills, tool collection, and workspaces have grown since then, and he has built an impressive array of finely crafted furniture.

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 a Veritas Low-Angle Jack Plane.



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Artist brushes make better glue brushes

While many woodworkers use cheap flux brushes for glue-ups, I use artist brushes, which have stiffer bristles and come in a variety of sizes. To keep a brush ready for the next day, I store it in a water-filled vitamin bottle with a hole cut in the top. Before the next use, I swish the brush in the water and shake out the excess. When the project is done, I swish and shake the brush again and let it dry. My larger brushes have been in use for years, and the water lasts for months.

—JAY WOOD, Fairfax, Calif.

Quick Tip

Use an N95 mask as a shellac filter

I like mixing my own shellac from new flakes, which requires filtering to remove unwanted particles and impurities. My favorite shellac filter these days is an N95 face mask. Many of us still have a lot of those lying around from the pandemic. The mask sits nicely in a plastic funnel and will retain its shape and integrity when filled with liquid. It takes just a few minutes to filter 10 oz. to 15 oz. of shellac, yielding a clear solution.

—PAUL WILLIARD, Providence, R.I.

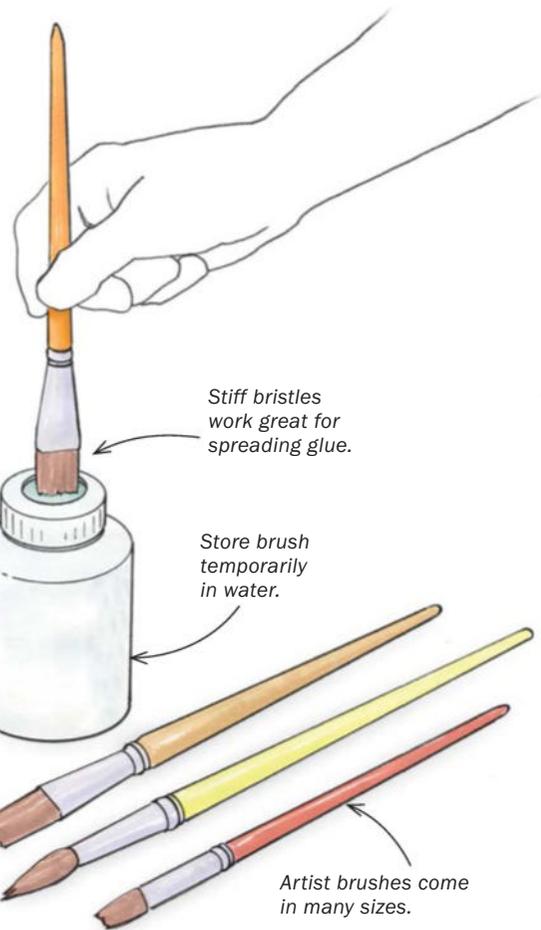
Vitamin bottle, with hole in lid and water inside

Stiff bristles work great for spreading glue.

Store brush temporarily in water.

Brushes will last years with proper care.

Artist brushes come in many sizes.

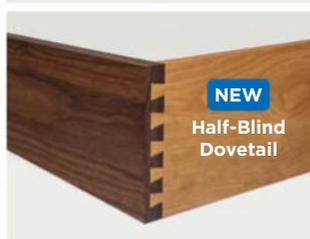


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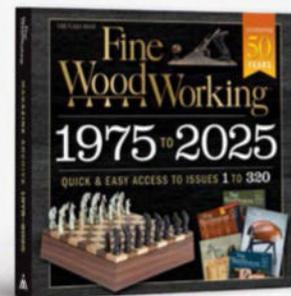
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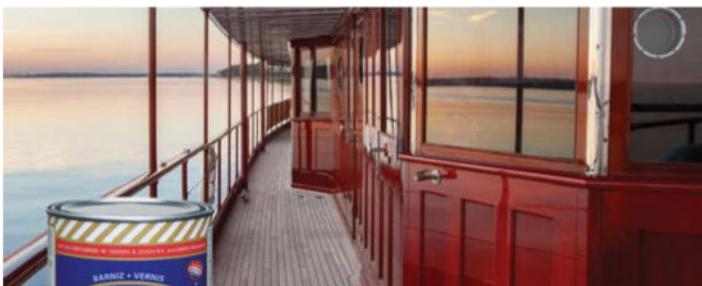


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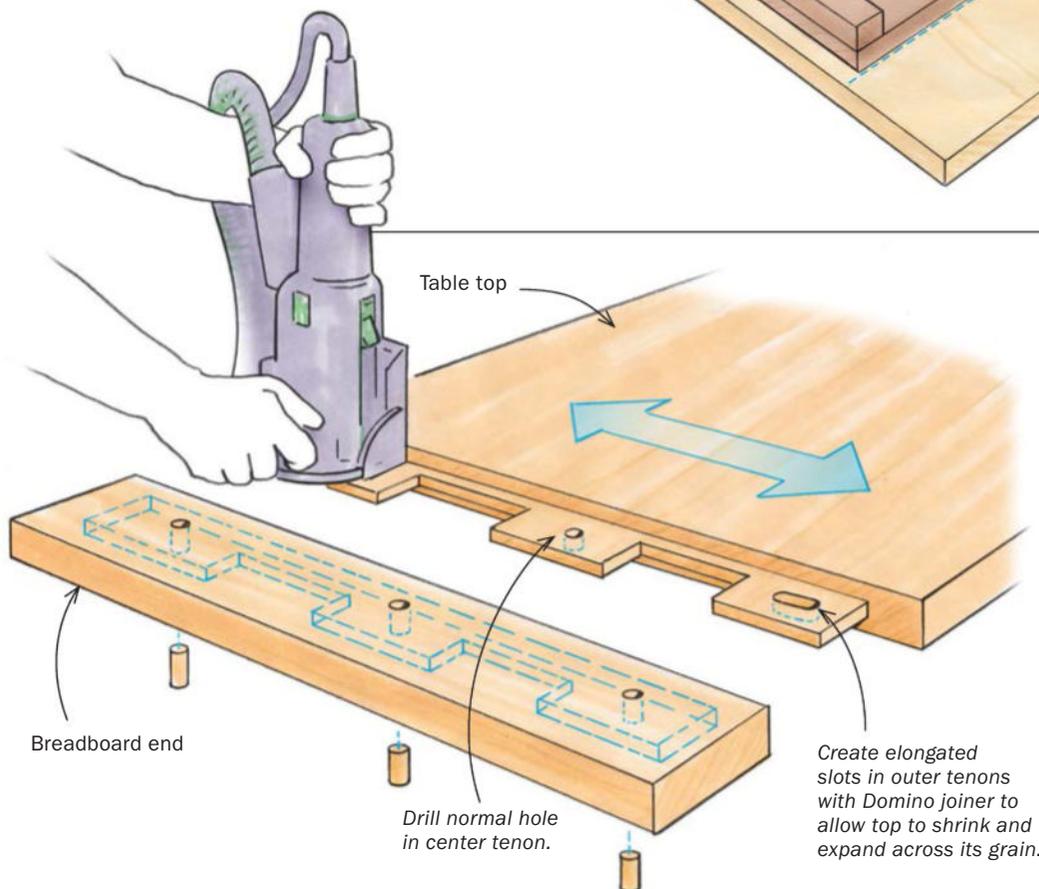
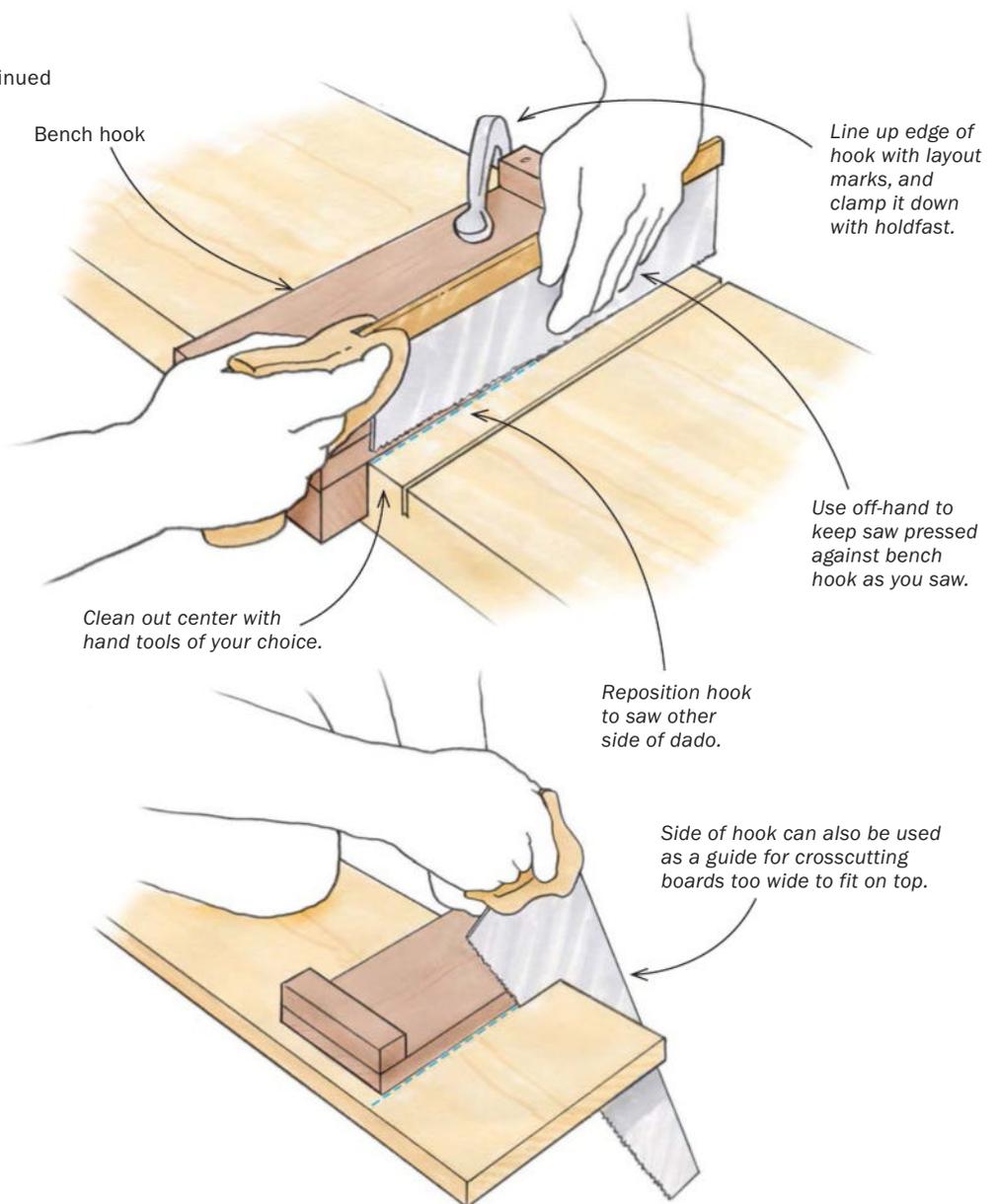
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Use your bench hook for sawing dados

You are probably familiar with the typical use of a bench hook for joinery cuts and general crosscutting, with the workpiece registered against the back cleat. If the long sides of your hook are square to the front cleat, you can use the bench hook to guide dado cuts as well. Align the side of the jig with one of your dado sides, and secure it with a holdfast. To keep the saw plumb and square as you saw, use your off-hand to press it against the side of the jig. Saw the two sides of your dado, clean out the middle with a chisel and/or router plane, and you are good to go. By the way, I use the bench hook the same way for crosscutting boards that are too wide to fit on top of it.

—MATT CIANCI, Warwick, R.I.



Domino makes elongated slots for breadboard pins

Here's one more great thing you can do with a Festool Domino joiner. On a recent dining-table project, I was using drawbored pins to hold breadboard ends in place. This requires that the pin holes in the outside tenons be elongated to accommodate wood movement across the top. It occurred to me that my new Festool Domino would do the job faster and easier than alternative methods like drilling or routing. I was right.

—HARVEY BROTMAN, Lyme, N.H.

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■ MACHINERY

Big-saw features in a small-shop size

THE NEW LAGUNA 10-IN. BANDSAW HAS A HOST OF FEATURES that make it an excellent choice for a primary small-shop bandsaw or a great auxiliary saw in any woodworking shop. The V10 features cast-iron wheels whose inertial weight helps keep blade speeds steady and helps provide smooth cuts in hardwood. Combined with a 1hp motor, this saw can take full advantage of its 5 $\frac{3}{4}$ -in. resaw capacity. The saw also has two speeds, allowing it to cut nonferrous metals at the lower speed.

The saw offers a switched work light that illuminates the upper guide area and has a 120V outlet on the saw housing for additional lighting if desired. There is also a master switch on the saw that controls the motor, light, and accessory outlet. An acrylic dust-collection chamber, held in place beneath the throat-plate area by magnets, connects directly to a 2-in. vacuum hose. That arrangement, combined with a perforated throat plate and a secondary collection port at the lower corner of the blade housing, produces dust collection that is quite good.

Traditional roller guides offer tool-free adjustability and good blade support. The upper guides have a rack-and-pinion height adjustment that moves easily and accurately and locks securely. The fence is dual height: $\frac{7}{16}$ in. and $3\frac{3}{16}$ in.

Available options include a stand, locking casters for mobility, and an outfeed roller assembly. The basic saw retails for \$650. The stand and the casters both run about \$100, and the outfeed rollers are about \$50.

I have sawn quite a bit of material with the Laguna, and its smoothness and power make it a worthy little big saw.

—Roland Johnson literally wrote the book on bandsaws.



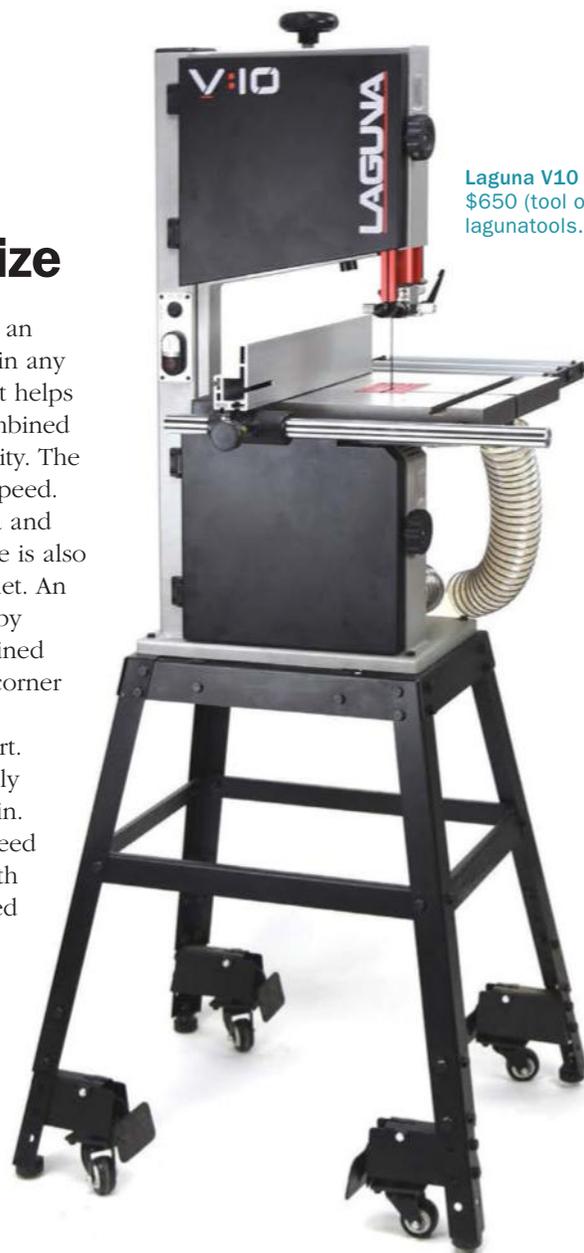
Y? Because. Adding a Y-adaptor onto the two ports of the V10 allowed Johnson to use both ports simultaneously, providing very good dust collection.



Momentum. The heavy cast-iron wheels on the V10 have more angular momentum, allowing for higher energy storage and therefore smoother and more consistent cuts through heavy stock.



Simple to adjust. The V10's guides are easy to adjust, don't require the use of hex keys, and lock securely into place.



Laguna V10
\$650 (tool only)
lagunatools.com



Pencil here. When trimming chair legs to length, Madden uses the the Deluxe Scriber armed with a pencil.



Blade there. When installing cabinetry, Madden uses the marking wheel to crisply cut through painters tape, leaving a scribe line anyone can see.

■ HAND TOOLS

A compact scribe with broad capabilities

DURING MY DAYS AS A CABINET INSTALLER, I tried countless tools and techniques for scribing. In any given installation, there are multiple materials in multiple orientations, which can make it hard for a single tool to do the job. There will never be one scribe to rule them all, so versatility reigns supreme in the limited space of the toolkit.

This scribe from Tooley Park is compact and easy to adjust, and its pivoting tool holder and the no-slip knurled knobs make it a step above the rest. I'm impressed by the range of scribes available from Tooley Park and the level of customization they offer. There is a tool holder for every marking device you could imagine: carpenters pencils, permanent markers, and even your favorite bright green mechanical pencil. What really jumped out at me is the drag-free bearing surface that glides over finished walls without leaving a scuff, which will keep you in the painter's good graces.

This tool really shines with the addition of the chairmaker's marking wheel. Out of the box, this wheel is razor sharp and can be swapped out in seconds, giving you a scored line instead of a mark. Using the wheel creates a crisp, accurate line to cut directly to. At first it feels a little awkward setting the angle for the wheel using the hex wrench, but you will be thankful when your scribe line doesn't wander.

—Owen Madden is the assistant editor.

Tooley Park Scribes
Deluxe Scriber, \$50
Chair Maker's Marking
Wheel Holder, \$31
tooleypark.com



■ ACCESSORIES

Template routing for small tasks

FOR YEARS I HAVE WATCHED WOODWORKERS painstakingly excavate intricate inlays for small hardware by routing freehand or using chisels and gouges because the work was simply too small to accommodate a template and a flush-trim bit. That's why I was intrigued when I came across Amana's $\frac{3}{16}$ -in. and $\frac{1}{4}$ -in. flush-trim bits. These bits open the door to using templates in situations where that simply wasn't possible before.

Functionally they behave just like any pattern bits. Because their shanks are so narrow, shallow cuts and a conservative feed are necessary. Used correctly, however, these flush-trim bits make template routing possible for small-scale tasks—and once you try them, you may wonder how you ever worked without them.

—Ben Strano is the editor of *FineWoodworking.com*.

**Amana Miniature Flush-Trim
Template Bits**
 $\frac{1}{4}$ in., \$44
 $\frac{3}{16}$ in., \$46



■ ACCESSORIES

A smart, practical upgrade

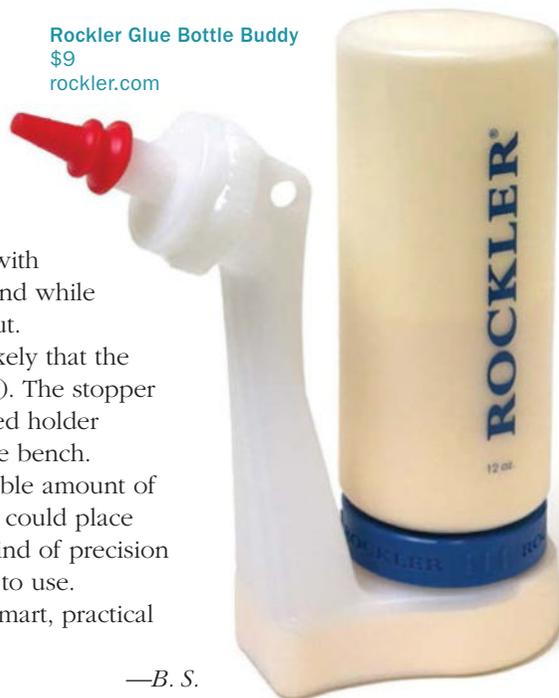
I HAVE A LOVE-HATE RELATIONSHIP WITH GLUE BOTTLES. I prefer buying glue in small bottles, but I've never been thrilled with the bottles that come with small amounts of glue. Recently, I tried Rockler's 12-oz. Glue Bottle Buddy, and while no glue bottle is going to change your life, this one is clearly well thought out.

With the bottle's wide mouth, filling it couldn't be easier. Even better, it's likely that the bottle your glue came in will screw directly onto the top (or is it the bottom?). The stopper fits snugly on the nozzle—without being difficult to remove—and the molded holder includes a dedicated spot to park the cap, so everything stays together on the bench.

What really stood out, though, was the level of control. Applying a reasonable amount of glue accurately into mortises is usually a bit hit-or-miss, but with this bottle I could place glue exactly where I wanted and dispense only as much as I needed. That kind of precision was a little surprising. One note is that the fuller this bottle is, the easier it is to use.

If you're picky about glue bottles—and I am—the Glue Bottle Buddy is a smart, practical upgrade that does a simple job exceptionally well.

Rockler Glue Bottle Buddy
\$9
rockler.com



—B. S.

■ TOOL NEWS

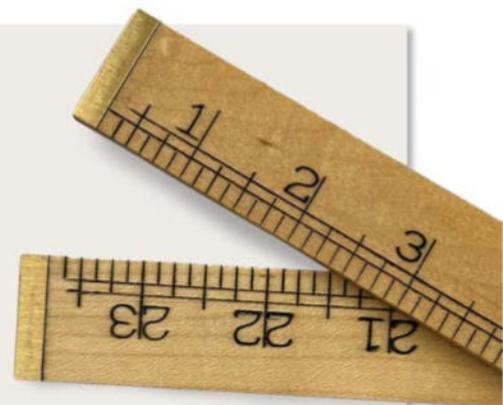
New to the market



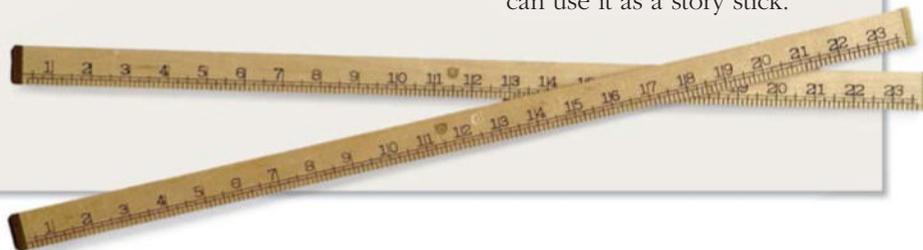
The folks at **PantoRouter** are always looking for ways to improve their already impressive machines, and their newest accessory, the **Depth Stop Pro**, is sure to make many of their users happy with an easier-to-read scale, larger reference surfaces, and a fine adjuster that allows for $\frac{1}{32}$ -in.-per-turn precision.



Grizzly's T34615 hollow chisel mortising sharpening kit includes everything you need to hone the chisels of your mortiser in a convenient case and, better yet, at a very affordable price of around \$25.



Leave it to Christopher Schwarz and his cohorts to throw out the parts of a ruler you likely don't use and definitely don't need. Based on rulers found in the late 18th or early 19th century, **Crucible Tool's Joiner's Rule** is a brass-bound 24-in. ruler sized to fit in tool chests and has only the measurements you likely need most of the time—no sixteenths to clutter your work (and mind). The backside is blank so that you can use it as a story stick.





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The magical world of puzzle furniture

A JOURNEY IN THE FOOTSTEPS OF DAVID AND ABRAHAM ROENTGEN

BY CRAIG THIBODEAU

A few years ago I completed a mechanical puzzle desk inspired by the 18th-century furniture of David and Abraham Roentgen, whose work was renowned for its ornate marquetry and hidden mechanical features.

The Roentgen Puzzle Desk took me a total of 12 months to build, spread out over three years, and it currently waits in a climate-controlled storage unit until my client's new home is ready to receive it. Like many of my customers, he is an avid puzzle collector.

This piece represents a milestone for me. Like all of the pieces I've made over the past decade or so, it has a wide variety of puzzles built into its structure, which must be solved in a specific order to unlock a final prize hidden within. Some clues and puzzles are hidden in plain sight; others are concealed under layers of detailing. In my opinion, this desk pushes the intricacy and imagination of puzzle furniture to a level not seen before—an accomplishment that I hope will

A new direction. About 10 years ago, Thibodeau began focusing exclusively on mechanical puzzle furniture, supported by a worldwide network of collectors. This 2025 project, a clock with a cracked-ice veneer pattern, has the impeccable craftsmanship and complex mechanics that his work is famous for. The clock hands contribute to the solution, as do the "ice" pieces, some of which are movable.



live on after I'm gone, as the Roentgens' work has.

The piece will likely take my client four to six months to solve. Some of the mechanical puzzles require outside investigation to figure out, including research into star charts and the use of an astrolabe.

As you might imagine, I can't share all of my tricks, and I need to hide the solutions for a few current pieces. But this article and the video links will give you plenty of examples.

I've also put together a companion article in this issue (pp. 54–63) about secret magnetic catches for drawers and doors that you can use in your own work.

My days as a furniture maker

My parents had a well-used workshop for making and repairing things, and the image of working with your hands and being able to build things stayed with me into adulthood. When it came time to pick a major in college, I decided to study mechanical engineering.

My engineering degree landed me a job doing product-design work, which involved a lot of 3D modeling. That experience helps tremendously with my current work, which is too complex and layered for 2D drawings.

While working as a product designer, I began making furniture for people in whatever space I had available, whether that was a garage or the living room of my apartment. Soon I had more furniture work than I could fit into my nights and weekends, and I was forced to make a decision.

I made the transition to full-time furniture making in 2000, with about 10%





Crowning achievement

Completed in 2022, the Roentgen Puzzle Desk is Thibodeau's most ambitious project to date.



Massive desk holds scores of secrets. The 6-ft.-long piece took roughly 12 months to build, spread out over three years. Behind almost every veneered and gold-plated element lurks a puzzle waiting to be solved.

cabinetry work mixed in. I was especially drawn to veneering, teaching myself at first and then taking marquetry classes from Patrick Edwards and Paul Schürch. Veneering and marquetry allowed me to decorate my furniture with intricate geometric patterns and floral displays, things that not many others were doing at the time. Looking back, I realize that I've always been drawn to fussy, complicated work. Something about it holds my attention.

My experience with veneering also ended up being essential for my puzzle-furniture career. One of my main challenges these days is humidity and wood movement, which can make a complex mechanism work one day and then fail the next. Compared to solid wood, veneered parts and panels are very dimensionally stable, which is critical for the complex mechanics and tight gaps in my puzzle pieces.

The Automaton Table started it all

Around 2014 my work took a turn, one that reinvigorated my love for furniture making and gave me a new world to explore. It all started with a generous client who had seen a series of YouTube videos about David Roentgen produced by New York's Metropolitan Museum of Art. He wanted something mechanically automated but designed in an Art Deco style.

In response I created my first automated piece of furniture, the "Automaton Table." Start there on my YouTube channel, and I think you'll get a sense of how my veneer and marquetry work made my puzzle pieces possible. I hope you'll also see why I became so intrigued with secret catches and compartments, and smooth, captivating types of movement.

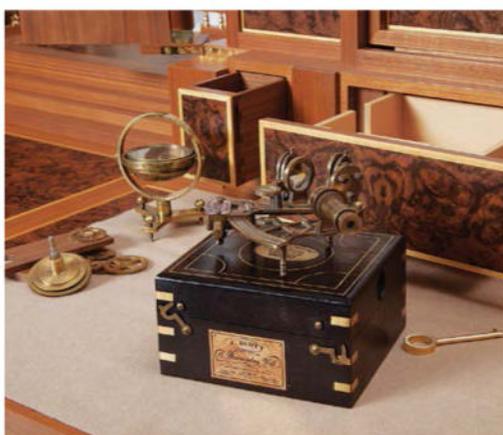


It starts with a story. Inspired by movies like *National Treasure* and *The Da Vinci Code*, Thibodeau has begun building stories into his pieces. The logbook and map hidden in this piece tell of a ship's captain in the 1780s who steals the treasure hordes of several European countries in order to disrupt the world order. The book must be read and the magnetic ship maneuvered on the map to unravel the mysteries hidden in the desk.

Crowning achievement continued



Museum-quality cargo. The user must find and use a wide range of period-correct items—a naval dagger, lantern, sextant, astrolabe, flintlock pistol, skull with a “magic” eye, and much more—to solve the puzzle and discover a small treasure trove.



The client bought the Automaton Table for \$25,000, and my YouTube video of the piece went viral. It has been seen and shared many millions of times at this point.

Thanks to that first video, similar clients began to find me, proving that there are people willing to pay for the time and expertise it takes to create this type of work. Since then I've built 23 puzzle-oriented, mechanically automated pieces—each taking between two and 12 months to complete. My goal is for each new piece to be different, better, and more interesting than the last.

Most of my puzzle-furniture clients don't know what their final piece will look like when they commission it; instead, they prefer to be surprised by the outcome. I love the creative freedom, but it's also a challenge. There's nothing like a blank piece of paper to freeze the creative juices. I've gotten better and better at brainstorming in CAD, and each new design builds on past ones.

I've completed a number of projects since the Roentgen Puzzle Desk, including another ambitious desk with another really fun theme. It's designed to help my client perform magic tricks for friends. Among the mechanical features are moving magnets for coin tricks, card-swapping mechanisms, and a video camera that lets the operator see inside a drawer to preview a card that someone has picked.

Puzzle boxes: Frustrating but interesting

I prefer making furniture-scale puzzle pieces—for a number of reasons. There are a lot of makers already focusing on small

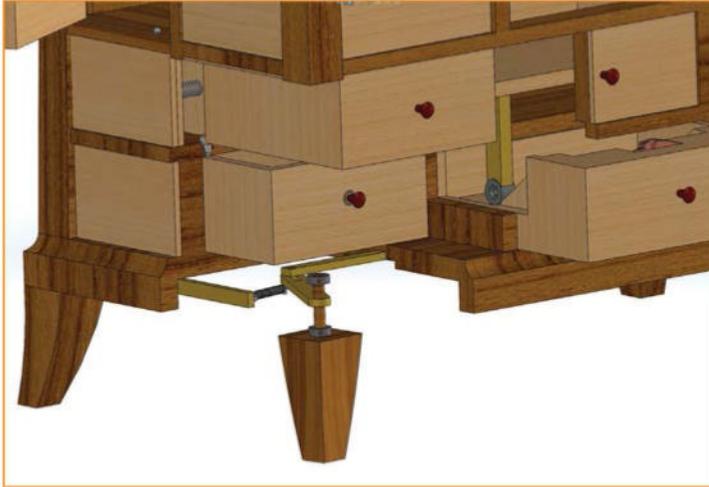


Mechanical connections are everywhere. As in Thibodeau's earlier pieces, almost every drawer and decoration, including relatively nondescript elements, must be manipulated to progress through the puzzle.



Leaning on his past

Thibodeau's time as a product designer—as well as his years of furniture making, veneering, and marquetry work—paved the way for the intricate, elaborate projects he is building now.



CAD design. Thibodeau earned a degree in mechanical engineering and worked as a product designer, which required 3D modeling. After figuring out the overall design of a piece and the puzzles within, he builds a detailed CAD model to work from. This is the base of his Aspen Puzzle Cabinet (see p. 28).

puzzle boxes. Also, furniture gives me more room to make things happen, which not only increases the complexity but also boosts the perceived value.

Although a puzzle box might take just as long as a cabinet to build, I'm able to charge more for the latter. Building a puzzle box always feels like trying to cram 10 lb. of complexity into a 5-lb. container, especially near the end of a project when I can't fit my fingers into a tiny opening to adjust something.

That being said, I've built several unique puzzle boxes, and each one has expanded my bag of tricks. More importantly, I don't want to turn down requests from the small but passionate group of collectors who support my work. And the boxes are big hits on social media, which helps to attract new customers.

Spinning Puzzle Box—After the Automaton Table, the next one of my puzzle pieces to go viral was the Spinning Puzzle Box, which I built for the Canadian magician Chris Ramsay. I built it as a showpiece, making it even more fun and interesting than he expected. I knew that Ramsay would demonstrate how to solve it on his popular YouTube channel, showing all of its tricks to a massive audience.

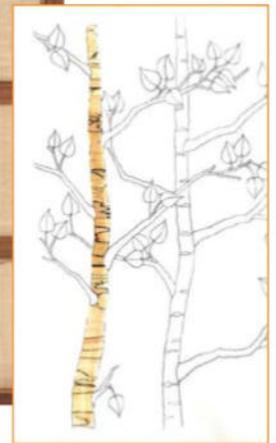
The rectangular box is filled to the brim with little dovetailed drawers that move in a variety of directions, interacting with each other to unlock spring-loaded panels and make magnetic connections. One of them holds a magnetic playing card (veneered in holly), which unlocks another secret area. On top, the client's monogram must be rotated to make it all work.



Veneered parts. In 2015 (FWW #247), Thibodeau showed how he veneers over a sandwich of lumber-core plywood and MDF. The resulting parts and panels are very stable, which is critical for the fine tolerances and tricky mechanical workings of his puzzle pieces.



Impeccable marquetry. From the outset of his pro career, Thibodeau's work has included high-end marquetry. This panel is also part of the Aspen Puzzle Cabinet.

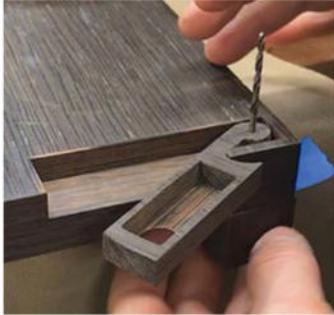


All of my recent puzzle boxes have their roots in the Spinning Puzzle Box. Each one has the client's logo or monogram in the top, and each features hidden areas that must be opened in a particular sequence in order to reveal a secret, final treasure such as a special deck of cards or some other gift for the solver.

The Podium—Ramsay's video on the Spinning Puzzle Box generated a number of new projects, and I ended up building another project for him, a display cabinet called the Podium. This cabinet has a "Quest for the Holy Grail" theme, with a

From woodworking to metal to mechanics

As his puzzle pieces have developed, Thibodeau has continued to supplement wood parts with metal ones. He outsources more-complex metal parts to a CNC-equipped machinist.



Wood wizardry. Thibodeau works on a pivoting key holder in the base of his Oak Puzzle Box (see p. 27).



Cogs and wheels. Thibodeau salvages gears from old clock movements. These are for the Roentgen Puzzle Desk. He machined the brass rods himself.



Gold-plating. Visible metal parts are sent out for gold-plating to protect them from oily hands and oxidation. This is the base of the Podium (see p. 29).



Motors and mechanisms. This is one of the many complex mechanisms Thibodeau built for his cracked-ice clock.

golden chalice on display that drops out of view when you remove its glass cover.

Cabinets multiply the possibilities

With larger-scale pieces, I can move things several feet up, down, or sideways, making all sorts of interesting things happen along the way. Those are the types of pieces I focus on whenever possible.

Wisteria Puzzle Cabinet—As the largest and most complex piece of puzzle furniture I had made to that point, the Wisteria Puzzle Cabinet was another milestone in my career. I designed it for a collector who is a big fan of burl veneer. I have a lot

of experience with burl, and I managed to create an interesting palette of colors. Although I typically prefer to use only three or four different woods in my pieces, I was able to incorporate a wide variety in this piece without making it look overdone. There are nine main wood species, including maple burl, walnut burl, mahogany, amboyna burl, laurel burl, fiddleback sycamore, walnut, olive ash burl, and butternut, with a variety of other woods appearing in the marquetry.

Where it all began

After seeing videos about the work of David Roentgen, a celebrated 18th-century builder of mechanical furniture, a client requested an automated piece in the Art Deco style. Thibodeau's video of the finished piece went viral, launching his puzzle-furniture career.



The Automaton Table. While it doesn't include any puzzles per se, the Automaton Table features several types of automated movement and a variety of hidden drawers and compartments, along with waterfall veneering and decorative marquetry.





Puzzle boxes pack in the fun

While Thibodeau prefers to work in the more expansive spaces provided by cabinets and full-size furniture, his puzzle boxes have taught him valuable lessons about working in very small spaces.

Spinning Puzzle

Box. This box was built for Chris Ramsay, a professional magician. To reveal a special deck of cards, drawers must be moved in all directions, and Ramsay's monogram must be rotated in various ways.



Always something new. Thibodeau works on the Spinning Puzzle Box. He tries to make each piece better than the last, which ensures an endless series of new challenges—the thing he loves most.

The Wisteria Puzzle Cabinet also contained my first automated rising lift system, which opens a set of doors as it rises, revealing a small chest of drawers with more secrets inside. Also hidden inside the piece is a small clock with no hands. Those must be discovered elsewhere in the piece, placed on the clock, and turned to various times of day to unlock compartments in the small chest of drawers. The hands then come off and combine to make a key that unlocks other parts of the cabinet, and the fun continues.

Collaborating on concepts and mechanics

I collaborate with other makers in two major ways. The first is at the design stage. The second is during construction, when I occasionally outsource metal parts I can't produce on my own.

A brainstorming partner—For a long while I've been working through the design stages with another puzzle maker, Robert Yarger. Our first collaboration was requested by a client, who wanted us to design something neither of us would have come up with on our own. The result was the Wisteria Puzzle Cabinet.



Oak Puzzle Box. A modernized version of a campaign trunk, this box includes an automated vertical lift and a number of interlinked lock mechanisms, with a variety of objects hidden inside.

Furniture is even more fun

Compared with boxes, cabinets allow Thibodeau to make more magic happen, so he likes to focus his efforts on larger furniture.



Wisteria Puzzle Cabinet. Designed for a fan of burl woods, this cabinet contains an automated lift system, which opens a set of doors as it rises.



Yarger is known for his unique puzzle designs and small puzzle boxes, and I welcomed the chance to work with him. We've put our heads together on 19 of the pieces I've built, and we have a list of projects ready to go as soon as I

complete my current one.

In our brainstorming sessions, we discuss the overall concept for the piece, and the theme, if there is one. Then I do a rough CAD drawing of the overall design as I see it, at which point we reconnect to talk about which kinds of puzzles might work in the piece.

We go back and forth daily as things get refined and rejected, until we both have a clear vision of the design. At that point, I incorporate all of that design work into a more detailed CAD model, including all of the moving parts, before I start building anything.

Outsourcing parts I can't make in-house—Many of the mechanical parts I use must be made of metal. I use brass in most cases, plated with gold if I need to prevent tarnishing.

While I've been developing my metalworking skills and adding to my machinist equipment for a long time, it's often necessary to send out more-complex metalwork to a local CNC-equipped machinist. One example is the bases and capitals for the columns on the Roentgen Puzzle Desk.

If I can make parts myself, I do. I have a number of small metalworking tools: lathe, vertical milling machine, bandsaw, and some special sanders for polishing parts. When I can find the time, I plan to take a formal class in machining so I can learn how to use my tools more efficiently. I'd also like to set up a separate room for my metalworking to keep the metal dust and oil away from my woodwork.

The Roentgen Puzzle Desk—and beyond

I met the client for the Roentgen Puzzle Desk at a workshop tour I hosted several years ago during an annual gathering of puzzle collectors and puzzle makers that just happened to be held in San Diego that year. (I spent most of my life and career in that city but relocated to Virginia a few years back.) We were able to chat in person and became friends that day.

The client contacted me several months after the shop tour, requesting something that would be very complex and interesting and take him months to solve. I took the design much further than he was expecting, for several reasons.



Aspen Puzzle Cabinet. This small cabinet features fall-themed marquetry. Press the correct leaf, and one of the doors opens. As in many of Thibodeau's puzzle pieces, the final treasure includes personalized coins from him and his design collaborator, Robert Yarger.



During the three years I worked on the desk, off and on, the video and photos I was sharing with the world began to take on a life of their own. So I kept making the puzzles more intricate and the automated movement more exciting until I was finally forced to stop in order to get started on the next piece. In the end, I had created the largest piece of puzzle furniture ever built, as far as I know.

Themes and stories—One of my current goals is to give my pieces themes and/or stories so that they feel like much more than a series of puzzles. The Roentgen Puzzle Desk is the best example yet. I worked with Yarger to create the storyline—a tale of war, treasure, and politics set in the 1780s.

Yarger and I wrote a logbook to explain the desk's creation and help with its solution. It tells the story of a ship's captain, William Sackett, and his attempt to rid the world of toxic wealth by plundering the treasure hordes of several European countries and hiding the riches for all time. The logbook is required reading for anyone attempting to solve the puzzles inside the desk and find the final treasure.

Audience participation—I also love that my clients can show off the cool mechanical features in their pieces to anyone interested. You can play with many of the features of the Roentgen Puzzle Desk without having to go back through all the puzzle solutions.

The future of my work

As long as this type of work keeps paying the bills, I'll keep walking into the shop every day to build pieces that are compelling and interesting to both me and my clients.

Whatever path you choose, try to create things that are unique and interesting to you. Get out into the shop every day, and keep improving your skills. You never know where the journey will lead.

Craig Thibodeau makes puzzle furniture and puzzle boxes at his shop in Virginia.

Online Extra

To see videos of Thibodeau's pieces in motion, plus solution videos made by some of his clients, go to FineWoodworking.com/322.



Puzzle-in-a-Puzzle Display Cabinet. When you open the glass door, the cube-shaped puzzle drops down into a safe. The downward motion of the cargo recharges the lift, and it rises automatically to its starting position when the final puzzle is solved.



The Podium. This piece has a Holy Grail theme. When the glass cover is removed, the chalice drops down into the cabinet and doors snap shut above it. The cabinet must be manipulated in a wide variety of ways to get the chalice to rise again so the user can hold it at last.



Lifts get more and more complex. One of Thibodeau's favorite challenges has been improving and refining his lift mechanisms.

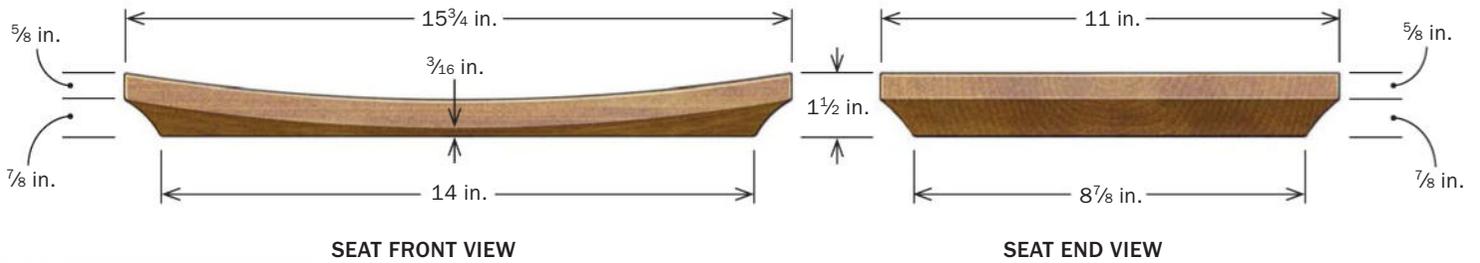
Eye-Catching Counter Stools

I make a lot of cabinets and tables, and usually just one at a time. But when a commission for seating furniture comes my way, it gives me a chance to think and work in a different way. Seating almost always comes in multiples, and setting up machines for producing stacks of identical parts can be time-consuming, but I enjoy setup-focused work. There is logic and certainty to it. Yet I also like the freedom and connection to the material that I feel when I am sculpting and carving.

Building a set of counter stools recently allowed me to work in both worlds, combining the efficiency of shared machine setups with shaping work that is best done by hand. Machine setups produced the stools' mortise-and-tenon joinery and the preliminary sizing of all the parts; after that, nearly all of the complex shaping of the legs, stretchers, and seats was accomplished with freehand bandsawing and a range of hand tools.

Beauty in a blend
of handwork and
machine work

BY TIMOTHY COLEMAN



FRONT VIEW



END VIEW



Leg mortises

I find a detailed full-size drawing essential when building seating furniture, especially for establishing setups. Sometimes all it takes is a front view and a side view.

On these stools the leg is the starting point; everything flows from there. I begin the build by making two templates for the leg out of thin plywood—a front view and a side view. In front view the leg is curved, and in side view it is a straight taper. The side view template is crosscut at a 4° angle at the top and bottom; this angle creates the rake of the legs. On the front-view template,

the top and bottom are cut at 90°. (The legs' splay is created by their curvature.)

While the leg blanks are still square, I cut the mortises for the stretchers. I always cut the mortises before the tenons, and I cut several additional mortises in scrap for test-fitting the tenons. I use a hollow-chisel mortiser to make the cuts.

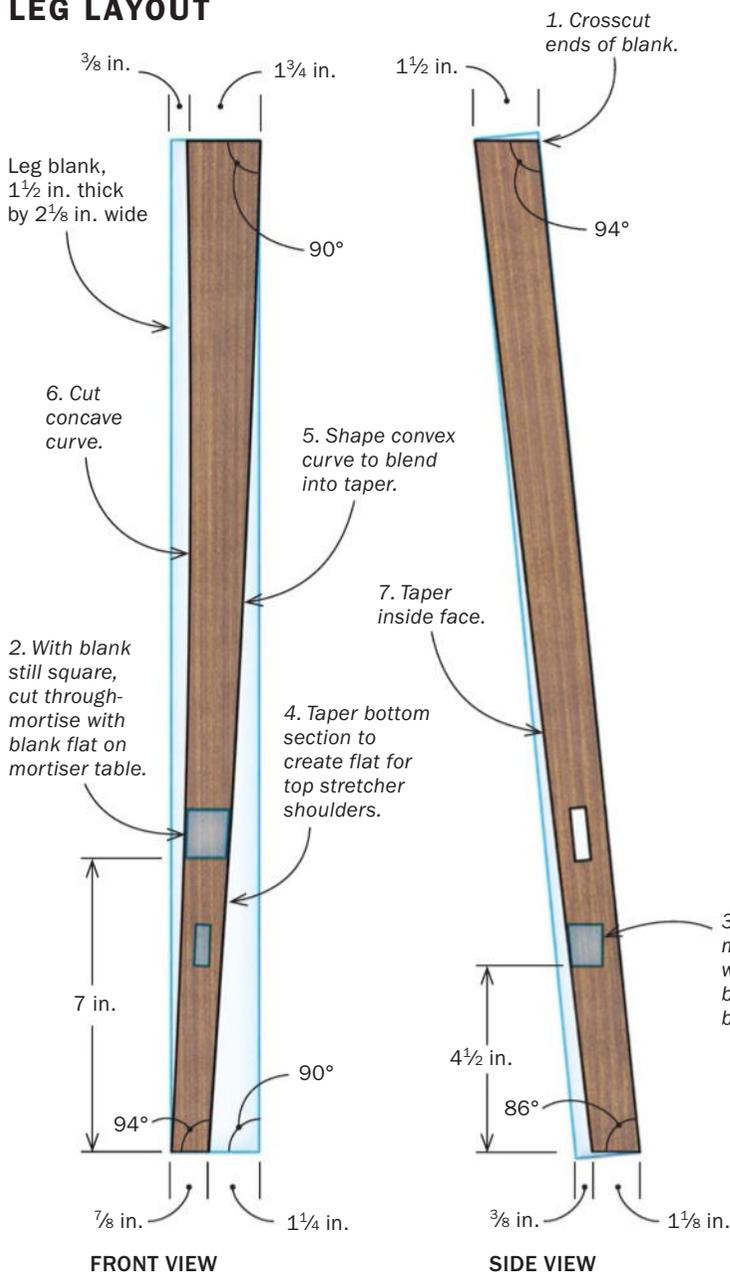
The mortises for the front and rear stretchers run all the way through the legs. I can cut stopped mortises now; they'll become through-mortises when I cut the outer face of the leg to a curve.

Legwork



Templates for leg layout. To lay out the legs, make a pair of templates—one representing the front view and the other the side view—and trace them on the leg blanks.

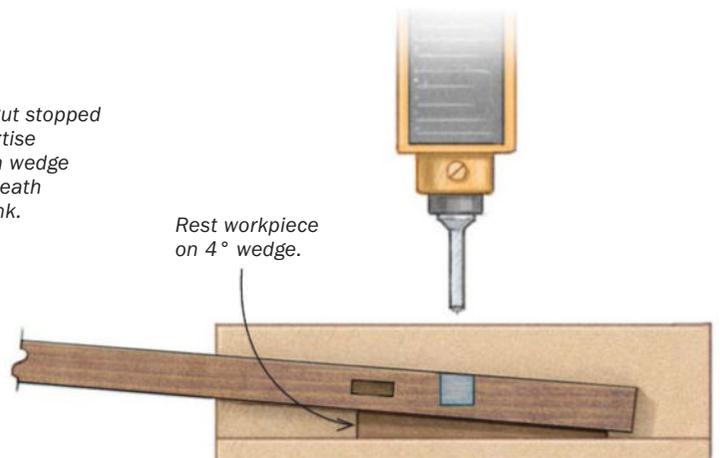
LEG LAYOUT



Through-mortises. With the leg blanks laid out but still square, chop the mortises for the front and rear stretchers. They needn't be chopped all the way through; they will become through-mortises once the leg is sawn from the blank.



Side stretchers need a lift. When mortising for the side stretchers, place a 4° wedge beneath the leg blank. This creates a mortise in line with the stretcher, which is parallel with the floor.



A flat for the footrest. Begin shaping the legs with an angled cut on the bandsaw. This will create a flat area to meet the stretcher tenon shoulders.



Follow up on the flat. At the workbench, plane the bandsawn surface flat and square.

The mortises for the side stretchers are stopped, and they need to be cut at 4°, the same angle at which the leg is raked. I create this angle by making a 4° wedge, which I place beneath the leg on the mortise table. I position the wedge with its narrow end toward the bottom of the leg.

Shape the legs

Leg shaping begins with creating a flat where the shoulders of the front and rear stretchers will contact the leg. To make the flat, I bandsaw about two-thirds of the leg to a straight taper, then clean up with a hand plane, being sure to keep the joinery area square to the adjacent faces. Next, without disturbing the joinery section, I use a disk sander or hand plane to give the upper part of that face its gentle convex curve.

Then I cut the leg's opposite face to its shallow, concave curve, following the layout lines at the bandsaw and cleaning up with a compass plane or spokeshave.

With the two curved profiles complete, I cut the full-height taper that appears in side view. The leg will be 1½ in. at the top and 1⅛ in. at the floor. I cut this taper at the bandsaw and clean up the surface with a block plane. Alternately, a tapering jig at the table saw works well. If I have a lot of parts to run, I sometimes use a router jig with a flush-trim bit and a template instead of a hand plane for final cleanup.

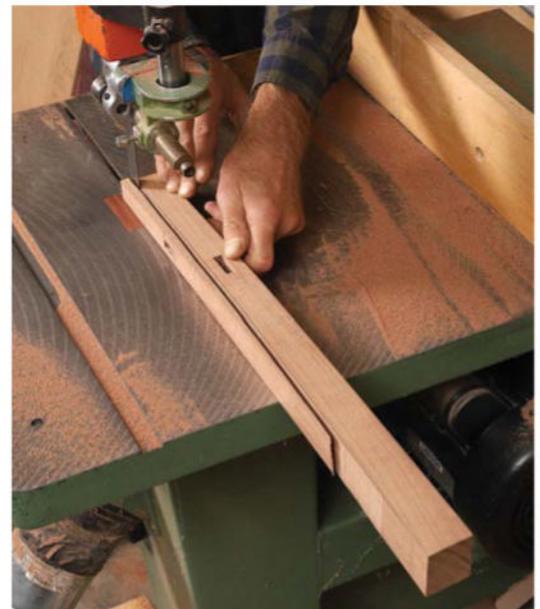
Once assembled, the base of the stool will be joined to the seat with floating tenons. But prior to assembling the base, I use a slot mortiser to cut mortises for the floating



Abrading the curve. At the disk sander—or with a hand plane—shape the part of the leg above the flat to a slightly convex curvature. Be sure to stop shy of the joinery area.

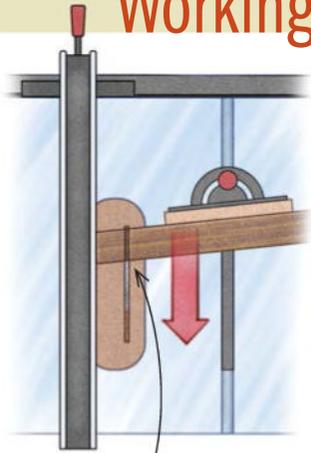


Cut the companion curve. The opposite face of the leg from the one you've just shaped gets a sweeping concave curve. Saw it out on the bandsaw and clean it up with a compass plane, scraper, and sandpaper.



Straight taper for the side. The leg face that is mortised for the side stretcher receives a straight taper along its full length. Make the cut at the bandsaw or table saw, and follow up with a plane.

Working the stretchers



Cut ends and shoulders at 4° or 5°.

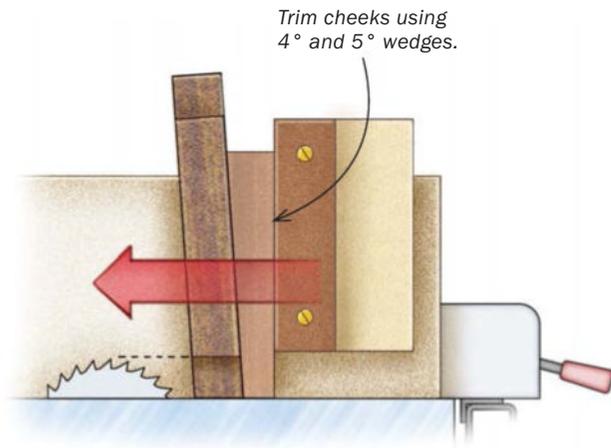


Slanted shoulders. After crosscutting the stretcher blanks to overall length, use the rip fence as a stop while you cut the tenon shoulders. To make the crosscuts and shoulder cuts for the footrest and rear stretcher, set the miter gauge to 4°; for the side stretchers, set it to 5°.



Roughing the cheeks. At the bandsaw, Coleman cuts away waste to within 1/32 in. of the final tenon thickness.

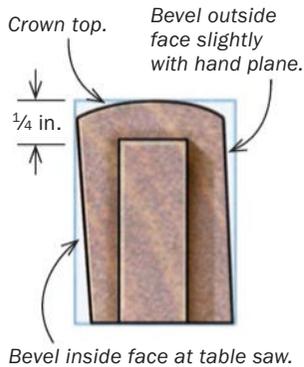
Perfecting the cheeks. To shave the final whiskers off the tenon cheeks, Coleman uses a shopmade tenon jig that straddles a high auxiliary fence. The tenon is centered, so one fence setting works for both cheeks. He uses a 4° wedge when cutting the front and back stretchers, and a 5° wedge for the side stretchers. The wedge is turned top for bottom when the stretcher is flipped.



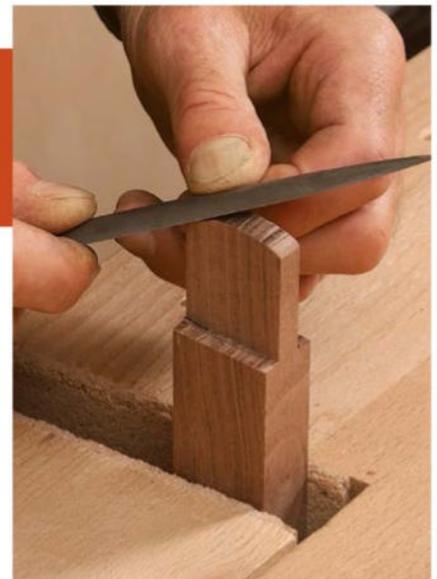
Trim cheeks using 4° and 5° wedges.

STRETCHER ANGLES AND ARCS

SIDE STRETCHER END VIEW



Side stretchers get beveled. Once the side stretchers are tenoned, their inside and outside faces are beveled to mirror the angle of the leg. Then the stretcher's top edge gets slightly crowned; this shaping can be done by machine or by hand.



Sweet sweep. The ends of the front and rear stretchers' through-tenons are shaped to a curve at the disk sander and brought to a polish with a file.

Applied footrest



Grooving the blank. After being milled to size, the footrest blank gets a groove underneath that matches the thickness of the front stretcher.



Parallel curves. Bandsaw to the layout lines to give the footrest its shallow scooped shape.



Another curve across the front. Bandsaw the bowed shape along the front of the footrest, then clean up all the curves with hand tools.

tenons into the end of each leg. I place a 4° wedge on the mortising table beneath the workpiece. Alternatively, these mortises could be routed.

Make the stretchers

After machining the stretchers to width and thickness, I cut them to overall length. The side stretchers are cut to length at a 5° angle; the tenon shoulders on these stretchers will be cut to the same angle. The front and rear stretchers should be cut to length at a 4° angle, and their tenon shoulders should be cut at 4° as well. I cut the tenon shoulders with a miter gauge at the table saw, using the rip fence as a stop.

None of the stretcher tenons are shouldered on the bottom edge, but the side stretchers have a 1/4-in.-deep shoulder on top. This allows for the slight crowning of the stretcher's top edge. To cut those shoulders, I set the table saw's miter gauge at 90° but tilt the sawblade to 5°.

When cutting the cheeks on all these tenons, I cut away all but about 1/32 in. of the waste at the bandsaw, then move to the table saw for a final skimming cut; this avoids any blade deflection and makes it easier to sneak up on an excellent fit. I use a rip blade with a flat-top grind to make these finish cuts, and I use a simple



The footrest meets its mate. After sanding the footrest smooth, glue it to the front stretcher.

FOOTREST

While footrest blank is still square, cut groove through underside of footrest to accept stretcher.



Seat shaping

BOTTOM SIDE

Curved layout.

Use a drawing bow to lay out the paired curves on the front and back edges of the seat and the curves on the underside. Then lay out and cut mortises for slip tenons to the legs.



From bevel to cove.

The coves that wrap the bottom edge of the seat begin as bevels. For the end coves, start by cutting bevels at the table saw (right), then turn them to coves with a coopering plane at the workbench (far right) or with a router.



Tapered bevels front and back.

The double-tapered front and back coves also begin as bevels. First, waste wood with a wide bench chisel, then flatten the bevels with a block plane.



Creating the tapered coves.

After defining the tapered bevels, Coleman uses a wide gouge to rough out the coves. He follows that with a coopering plane and finishes up with a rounded sanding block.

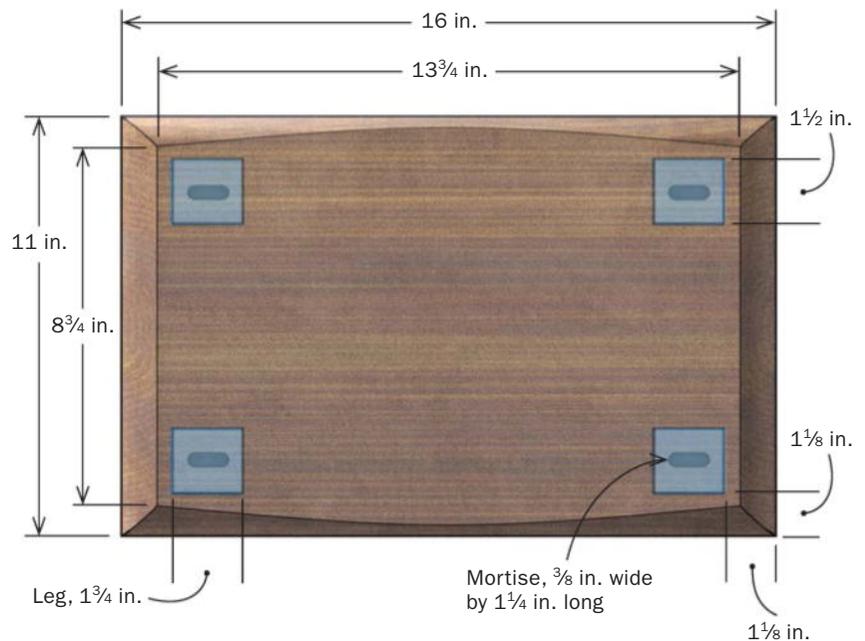


shopmade tenoning jig with a tapered block to hold the piece at the correct angle.

Shaping the stretchers

With their tenons complete, I shape the side stretchers so their wide faces follow the taper of the leg. At the table saw, with the blade tilted to 4°, I cut the stretcher's inside face so it angles inward. Then, using a hand plane, I bevel the outside face so it angles outward; this creates a parallelogram. I use a hand plane because with the inside face angled, a table-saw cut would

SEAT BOTTOM VIEW



be unsafe. Once the faces are beveled, I slightly crown the top of the side stretcher to visually soften this hard edge.

The faces of the front and rear stretchers don't need to be beveled, since the front faces are already parallel to the face of the legs and the rear faces are nearly so.

The footrest

To make the applied footrest, I begin by cutting a groove on the bottom face of the footrest blank using a dado set at the table saw. Then at the bandsaw I cut the convex curve on the bottom face and clean it up with a block plane. Next, I bandsaw a curve on the top face that runs parallel to the curve on the bottom, cleaning it up with a compass plane or spokeshave. Finally, I bandsaw the curve on the front edge and clean that up with a block plane. With the shaping complete, I glue the footrest to the front stretcher.

A place to sit

Layout for the seat shaping relies on a drawing bow. On the underside of the seat blank, I draw straight lines to mark out the coves beneath the ends of the seat, and I use the bow to link those lines, drawing curves that will define the double-tapered coves across the front and back of the seat. I lay out a pair of concentric curves on the front edge of the blank and do the same on the back edge. The last bit of layout is to locate the mortises for the slip-tenons that will join the seat to the base.

With the layout finished and the seat blank still square, I cut the slip-tenon mortises. Doing this after the base has been dry-assembled means I can measure the actual distance between the mortises in the tops of the legs and transfer them to the seat. I cut



TOP SIDE

Kerfs in a curve. After shaping the underside of the seat, move on to the top. At the table saw, cut kerfs to within $\frac{1}{16}$ in. or so of the layout line to prepare the way for bandsawing the saddle curve.

Online Extra

To see a video of Coleman shaping the seat, as well as photos of him making a seat from two boards instead of one, go to FineWoodworking.com/322.



Bandsawing the big curve. With the seat blank fastened to a tall sled with double-stick tape, saw slowly along the layout line. If your saw won't accommodate such a wide board, rip the blank into two narrow ones, saw the saddle curves on the two halves, and glue them back together.



Smoothing the saddle. A compass plane and a shopmade round-bottom plane take the saddle from corduroy to quite smooth.



Fine-tuning. Use a card scraper to finesse the final surface, and ease the corners with fine sandpaper.

Assembly



Start with the side stretchers. An F-clamp and some tapered cauls squeeze the legs and side stretcher together. Use an additional clamp at each joint to apply pressure to the tenon cheeks.

Connecting sub-assemblies.

After the first glue-ups have cured, glue the two side assemblies together with the front and back stretchers.



Slotted cauls.

Special shopmade notched cauls let you apply pressure without contacting the exposed through-tenons.



the seat mortises with my horizontal mortiser using a tall fence, but they could just as easily be routed, cut with a hollow-chisel mortiser, or chopped by hand.

With the mortises cut, I begin to create the underside covers on each end of the seat. These start as 45° bevel cuts made at the table saw. Then at the bench, I use a coopering plane or other hollowing plane to shape each bevel to a cove with a radius of 1 in. or so. Alternatively, a router bit could be used, but it must be in a router table and run at a slow speed.

Then I move on to the double-tapered covs at the front and back. As I did with the covs on the ends of the seat, I start these covs as bevels. I use a chisel to waste away the bulk of the material and follow up with a spokeshave and block plane. To convert these bevels to covs, I use coopering planes, carving gouges, and rounded sanding blocks.

The seat becomes a saddle

I cut the seat's deep, wide saddle at the bandsaw with the board on edge. When cutting such a wide board to shape, it's difficult to avoid some blade deflection. To make the cut more predictable,



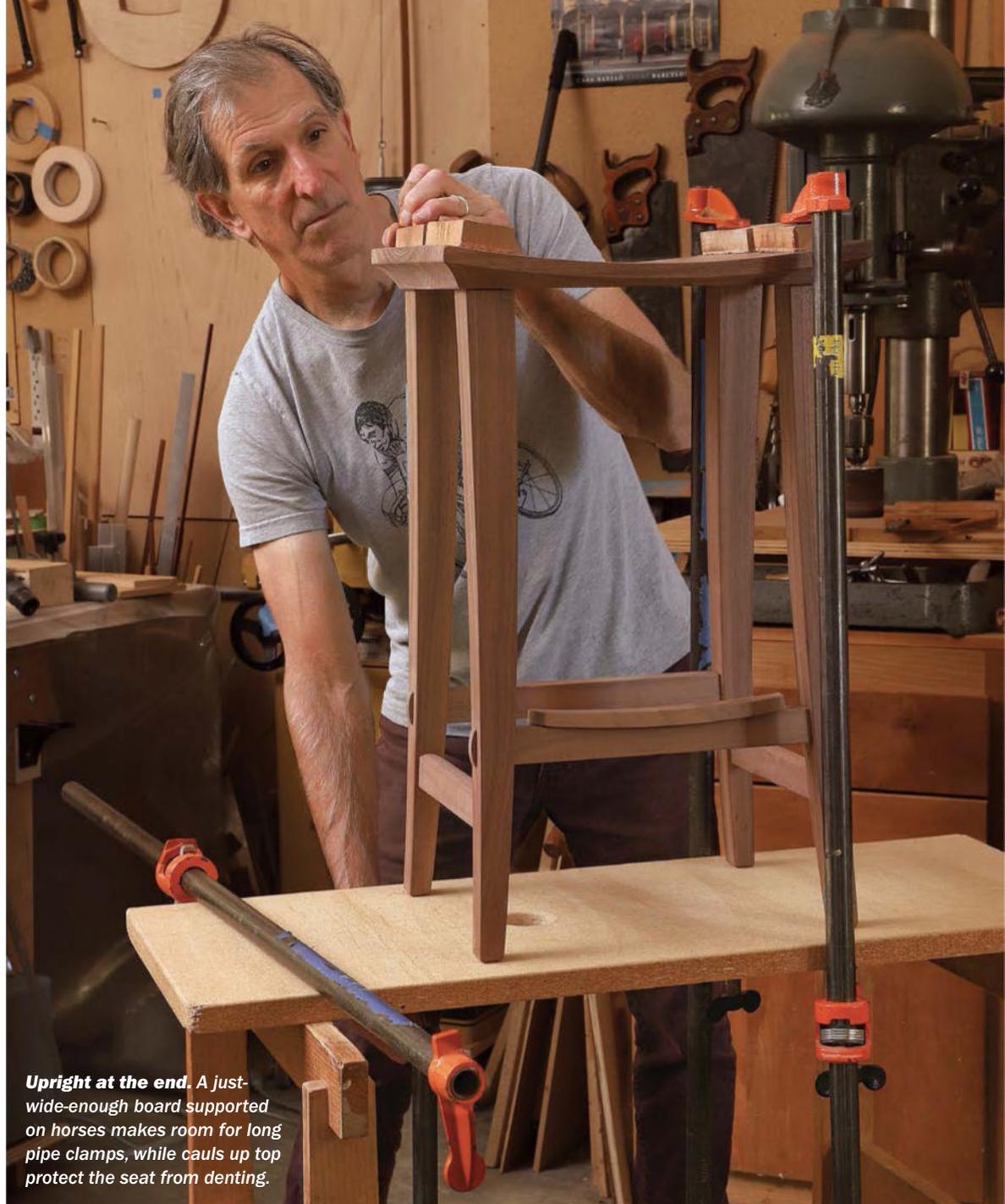
Be careful when clamping. As you clamp up the base, measure the distance between the slip-tenon mortises in the tops of the legs; if necessary, shift the clamps to adjust the distance.



In with the tenons. With the base glue-up cured, glue the slip tenons into the legs.



Slips into the top. At final glue-up, it's simplest to insert the slip tenons with the base upside down. There will be a bit of flex in the legs, which makes matching tenons to mortises easier.



Upright at the end. A just-wide-enough board supported on horses makes room for long pipe clamps, while cauls up top protect the seat from denting.

I first cut a series of kerfs across the width of the seat at the table saw. I space the kerfs about $\frac{3}{4}$ in. apart and cut them just shy of the curving layout line. When I make the cut at the bandsaw, as the blade hits each kerf the pieces fall away so that the blade is never fully embedded in the cut for long.

To fair and smooth the sawn surface after the bandsaw, I begin with a compass plane, followed by a card scraper and sandpaper on a rounded block. A spokeshave can also be used, but the compass plane will make a curve that is more fair.

Assembly from the bottom up

Assembly begins with the base. I glue the side stretchers into their mortises and then, when the glue has cured, join those two side assemblies with the front and rear stretchers. I make a

set of blocks, angled 4° , for clamping the side assemblies. And I make special clamp blocks for the through-tenons. The blocks are angled to match the outside face of the leg, and they have a slot that allows you to apply pressure without contacting the protruding tenon. During these glue-ups, I measure the spacing of the floating-tenon mortises in the top ends of the legs to be sure they correspond with the mortises in the seat. If they don't, I adjust the clamps accordingly.

The last step is gluing the seat to the base. It's OK if the mortises and slip tenons don't meet perfectly. The slight play in the legs will compensate for small discrepancies in spacing—and will accommodate the solid seat's seasonal expansion and contraction. □

Timothy Coleman works wood in Shelburne, Mass.

Using Shellac

Take the guesswork out of solvents, colors, and application

BY MICHAEL MASCELLI



In the world of finishing, shellac is magic stuff. It is a natural product made by a tiny insect—the lac bug. It is harvested from trees and for centuries has been processed by hand into flakes and used for everything from pill coating to violin finishing. When mixed with alcohol it forms a coating that will stick to almost anything, and in turn allow almost anything to stick to it. A thin “washcoat” of shellac is still the preferred first application for many finish schedules, as it can seal in contamination or oil and provide a secure base for layers of colors and topcoats. And it can seal or lock in layers of color when used for decorative effects or color matching. It is commonly available in three forms: dry flakes (which must be mixed with alcohol); premixed liquid most widely available from Zinsser as Clear, Amber, or Seal Coat; and

an aerosol spray. The colors can vary from light to dark, and the product can contain naturally occurring wax or can be dewaxed.

So far there are no synthetic formulations that can duplicate these magical properties, but shellac is not perfect. It is susceptible to damage from alcohol and heat, so a whisky glass or a lasagna pan left on a table will leave a mark. However, shellac is also very easy to repair, as new shellac will chemically bond to old shellac almost indefinitely, and being a natural product, it is totally food and kid safe. Shellac can work with other finishes or stand alone, and it is available at box stores, hardware stores, and online. It is one finish that should be part of every furniture maker’s tool kit.

Mike Mascelli teaches finishing and upholstery all over the United States.

From flakes to liquid



Sold online, shellac flakes vary in color from super-blonde (the lightest) to garnet (the darkest) and can be waxed or dewaxed. Blonde shellac goes on clear, while the darker colors give the wood a richer tone. When mixing shellac from flakes, use a coffee grinder to create a fine powder, which will shorten the time for the flakes to dissolve. Then add alcohol. Denatured alcohol (sold as fuel) works fine, but pure grain alcohol from the liquor store (Everclear) works better and, unlike denatured alcohol, has no toxic ingredients. The ratio of flakes to alcohol is flexible and forgiving, but the consistency should be thinner than house paint or varnish. With flakes, start with a mason jar half full of flakes and then fill it with alcohol. With ground flakes, start with one-third of a jar of ground shellac before filling the jar with alcohol.

Online Extra

For sources and buying tips for solvents, go to FineWoodworking.com/322.



Out of a can

The Zinsser canned shellac products Clear and Amber are formulated as “3-lb. cut” and contain wax. Seal Coat is a 2-lb. cut and is dewaxed. The “cut” is a simple measure of the amount of shellac flakes by weight to the amount of liquid alcohol, so 2 lb. of shellac in 1 gal. of alcohol is a 2-lb. cut.

In order to create a wash coat for bare wood or a light sealer coat between layers of color and finish, simply add an equal amount of alcohol to the canned shellac, which will result in a 1½-lb. cut for the Clear and a 1-lb. cut for the Seal Coat. Either of these will dry super-fast and leave a very thin, quick-drying film that will form one continuous coat no matter how many times more shellac is applied.

Make your own dewaxed shellac

Whether you mix your own shellac or buy a premixed product, it is likely to contain some wax, a natural part of the lac bug's secretions. If the wax is not removed, it could cause adhesion problems with some finishes or paints. For most applications, the wax is not an issue, especially if it is well stirred. However, you can create dewaxed shellac by letting the mixture sit for a week or two and then siphoning off the shellac with a turkey baster, leaving the wax behind.



Color coordinating

Because shellac is a natural product, batches vary from year to year and place to place depending on the weather and what the bugs are eating. It is possible to get dry flakes that are very pale or “blonde” and in a range of amber colors all the way up to claret red. For many years, skillful artisans have used the natural colors of shellac for touching up or painting in grain lines in furniture repair, or to simulate the effects of age. It is now possible to use concentrated liquid dyes like TransTint to create virtually any color by simply adding a few drops to the liquid shellac. The possibilities are truly endless.





Brush it on

When brushing shellac, it is tempting to load up a large square-edged paintbrush, but this leads to brush marks and “fat edges” because the coating dries so fast. A great technique is to use a small rounded brush called a Filbert mop (left three brushes above), which holds only a small amount of shellac. With short, quick strokes and good planning, it is possible to create a smooth, consistent coating even on a large surface. For larger surfaces, a good-quality varnish brush (right) with neat tapered or flagged tips can be used effectively with thin shellac, applied with the very end of the brush only.

As a bonus, shellac brushes do not have to be cleaned. After use, gently wipe most of the shellac off the brush with a cloth and let it harden. Then just dip the brush in alcohol for 15 to 20 minutes before use and it is ready to go.



A final finish

Building applications of shellac can be done in rapid succession until the point where the film becomes gummy and sticky. At that point, allow the shellac to rest for a few hours. More applications can then be added, all of which will form one chemically bonded “coat.” There is no need to sand between applications unless there is dust or debris, and when the film is dry, 220-grit or 320-grit sanding will usually resolve it. The thickness of the final film depends on the pound cut of the shellac and the brushing technique, and wear surfaces such as tabletops need more protection than aprons or legs. Five or six applications are needed for a wear surface and perhaps only one or two for legs or the interior of drawers. You can do a final buffing out with 0000 steel wool and wax.



Pad it on

There are also ways to wipe on or apply shellac with a pad that are generally known as French polishing. These require skills that take time to develop. True French polishing involves a rubbing pad charged with shellac and alcohol that is pushed hard on to the surface, creating friction that literally grinds the shellac and wood dust into a super-thin, super-clear mirror finish.

Make a pad by filling a lint-free rag with cotton. Twist the pad closed, and charge it with alcohol, saturating the pad. Pack the pad against your palm to flatten it, and then saturate it with shellac. Pad the shellac onto the wood in straight or figure-8 motions, adding more shellac to the pad as needed.

It is possible to simulate that mirror-finish effect with numerous brush applications, which when fully dry can be gently abraded at 400-grit to 800-grit or even finer, and then waxed or polished.

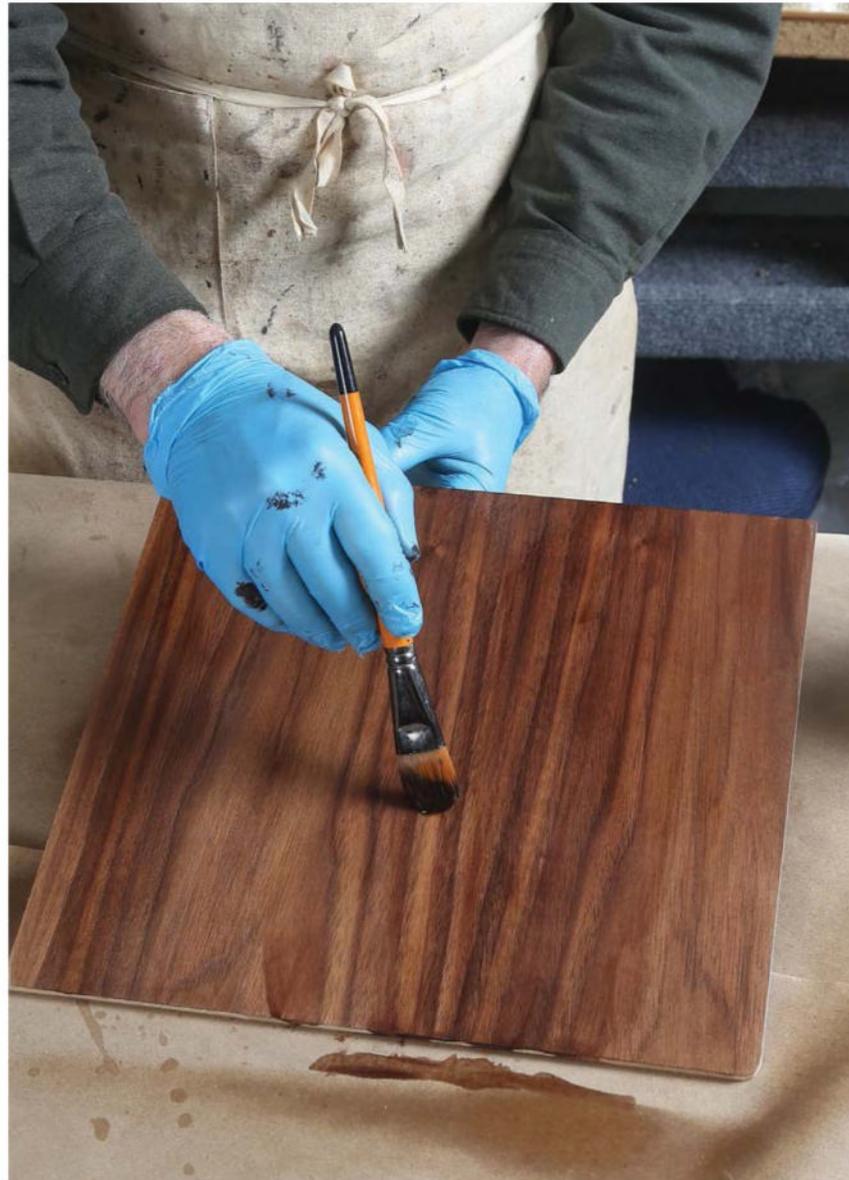
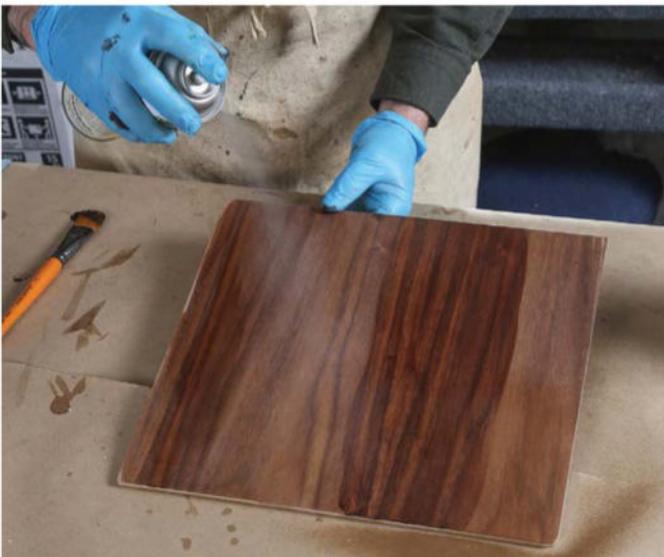




Spray it and forget it

There is only one commercially available aerosol shellac product, which is made by Zinsser. It can be used to seal contamination or oily wood, it can condition end grain so that it does not absorb too much color, and it excels at sealing in spot repairs like wax fill sticks. It can also be a very effective final finish for small projects and for pieces that will need to be repaired or refinished.

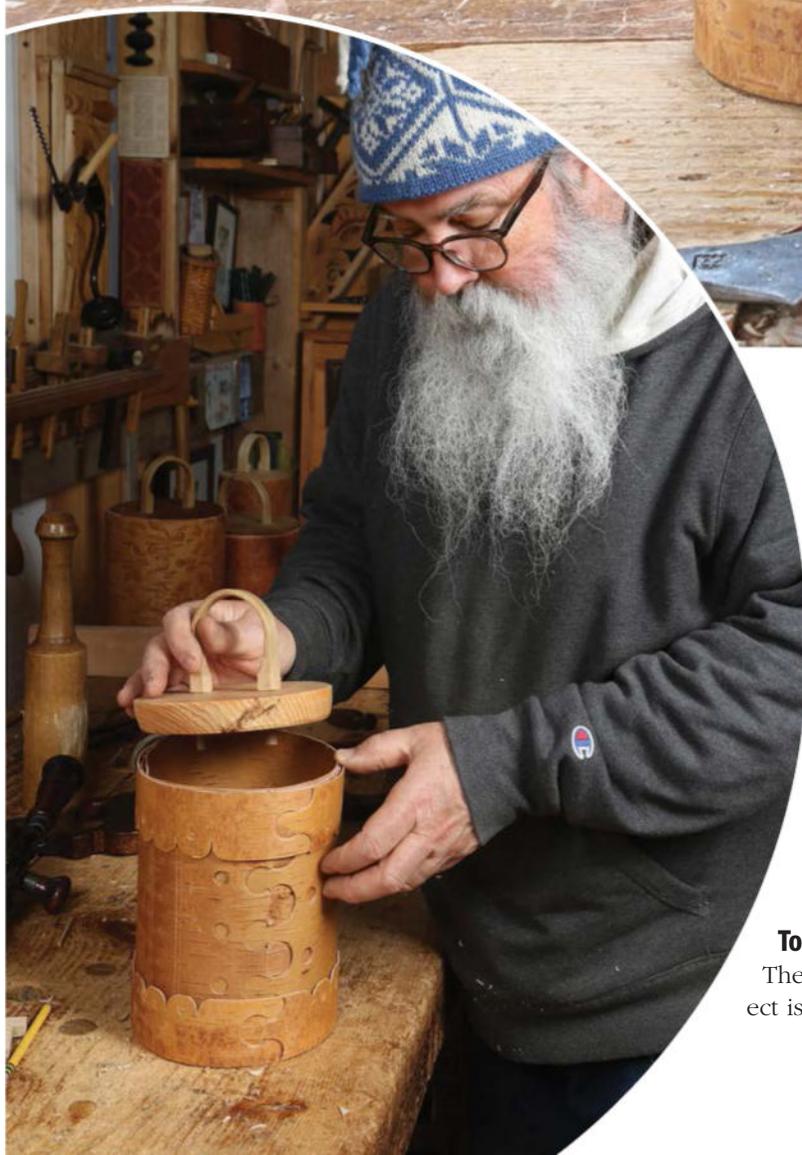
You can also use gel stain and spray shellac to harmonize the color contrast in a single piece of wood. Paint the gel stain onto the light areas, spray the shellac over it to melt the gel stain into the shellac below, and blend with a brush while both finishes are still wet.



Birch Bark Containers

Simple to construct, these canisters offer natural variation and decorative possibilities

BY PETER FOLLANSBEE

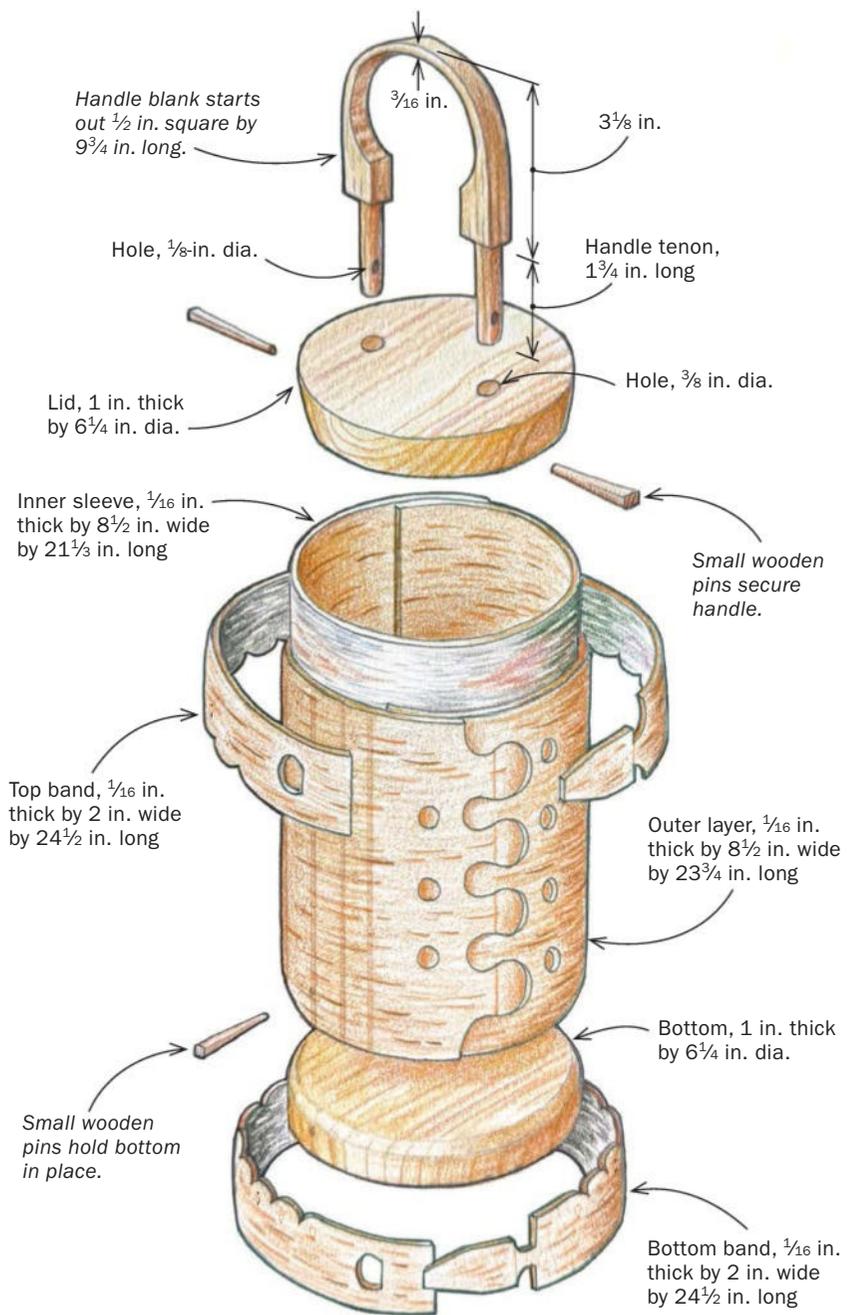


I first learned of these birch-bark containers through my Swedish friend Jögge Sundqvist. They're made in many parts of the world, particularly Scandinavia and Russia. I made one in a class with Jarrod Dahl, then later visited the man who taught him, Swedish craftsman Ramon Persson. Some of the Swedish examples I've seen exhibit a wide range of joint configurations and extensive decoration, often including paint. The best inspiration for these today is the Russian maker Svetlana Koreneva (@korenea_beresta).

These containers have endless uses, and their construction is simple. The body of the canister is two layers of bark, one inside the other. The outside layer has tabs and slots for joinery, while the inside layer has no joinery. Once the bottom and lid are in place, two narrower bands wrap around the top and bottom ends, adding another layer of decoration and enhancing the structural integrity.

Tools and materials

There's little solid wood in these pieces, so the main thrust of this project is bark work. I get my bark in large sheets from the Bark Canoe Store



Ready your birch bark

If you don't want to harvest your own bark, you can buy it in sheets from the Bark Canoe Store (barkcanoe.com), where Follansbee orders his.



Straight and parallel. Before cutting the bark to the height of the container, you must cut one side straight, then measure off that to cut to the final height. It can take a few passes with a utility knife against a straightedge.



Remove potential problems. Peel off and scrape away any loose outer bark or bumps.



Square the ends. The ends tend to curl up and become very hard. In addition to squaring the ends to the parallel sides, trim an extra inch or two from each end.

Joinery: The slots

Use the tabs to locate the slots on the opposite end of the bark. Once the joinery is cut, Follansbee opts to add decorative touches such as piercings, scored lines, and punched shapes.

Roll, mark, and cut. Bend the bark around to line up the tabs and the 2-in. scribe line on the other end. Tick where the necks of the tabs fall. This is where to cut the next set of openings as you did before, but offset from the first.



Decoration by gouge. Small holes cut behind the openings on both ends add subtle visual interest and show the bark underneath. Make sure the tabs, which will slide behind these holes, don't get trimmed too narrow. And be careful not to cut the decorative holes too close to the slots, or the bark can split.



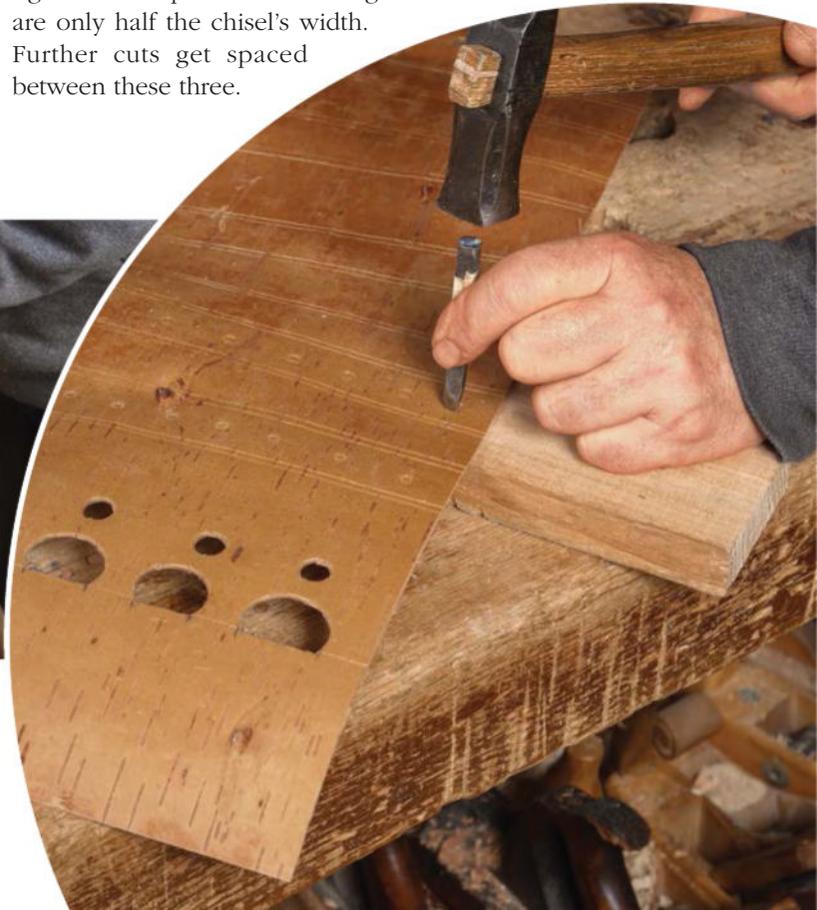
On the strip's outer surface I clean off all the loose bark. Some of it can be peeled off; I abrade away any remaining loose bark with a convex rasp to reduce the thickness and remove any bumps and lumps that would keep the two layers from lying tight to each other. I then thin the bark in a swath about 1½ in. to 2 in. wide at each end of the outer layer to prepare for cutting the joints.

Fingerish joints

With a dull awl and a square, I score a line across the bark about 2 in. from one end. It's just an impressed line I'm after, not a cut.

To make the slots, I start with a ¾-in. chisel. I place it on the scored line and pierce the bark, pushing the chisel through it. The first cut is centered on the bark's height and is followed by cuts right at the top and bottom edges that are only half the chisel's width.

Further cuts get spaced between these three.



Decoration via awl and punches. You can scribe lines, squares, and diagonal diamonds all across the sheet of bark. Here Follansbee scribes columns, inside which he uses wood and leather punches to emboss the bark with shapes. Flowers, crosses, stars—almost anything goes.

A 99% glue-free assembly

The outer layer of bark is held in its cylindrical shape with tabs and slots. The inner layer simply sits inside the outer layer. A tiny dot of glue in the upper corner is not necessary but helps tack the inner sleeve to itself.

Thin it out. Before assembling the outer sleeve, use a convex rasp to thin the inside of the tabs to make them more pliable.



Slightly taper the tabs. Removing the material makes the tabs easier to bend and fit into place. If you cut the decorative holes behind the openings, make sure the tabs are wide enough to show behind the holes when the sheet is connected.

To finish these openings, I switch to a gouge. A deeply swept gouge is excellent for this work; it forms the full half-circle in one move. A less-curved gouge will work too; you just have to step over to finish the cuts.

Next, I wrap the bark around itself to transfer the positions of the openings to the other end. After cutting those openings, I go back to the first set and cut just inside each opening to the end, leaving a long tab centered between the openings with a bit of a shoulder at the end. Some taper the width of those tabs to make them easier to insert when connecting the canister's outer layer. I

use a slight taper just at the end because of the optional, decorative hole I pierce in the outer layer. I want the tabs to show behind this hole.

Thinning these tabs makes them



Wrap the outer layer. Test each tab by bending and flexing to partially insert it. Then push the tabs all the way through until they are completely seated in the slots. If the tabs aren't cooperating, unwrap them and thin the ends some more. Be careful, though; if you're too forceful you can crack the bark at the tabs.

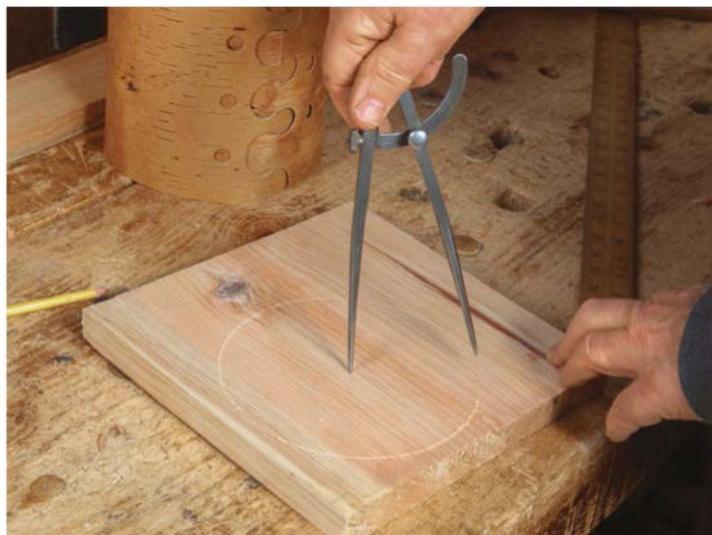


Insert the inner layer. There is no joinery in the inner layer. Simply wind it into a roll and set it inside the outer layer. Thin the ends before doing so, as they will overlap each other. Follansbee makes the overlap fall across from the joints of the outer layer. If the overlap is too long, mark it, take it out, and trim it.

Solid-wood lid and bottom

Before putting on the narrow bands at the top and bottom of the container, make and fit the bottom and the lid.

Round it up and down. Circular bottoms and lids are easier to make and fit than ovals. Get a rough estimate of the size circle to use. Use a compass to mark it out on a piece of softwood, and cut it slightly oversize.



flexible for fitting the joints together. I use a convex rasp or coarse file on the white side of the bark to abrade away a couple layers of the white bark depending on how thick the sheet of bark is. I sometimes fine-tune this thinning with a sloyd knife.

Decorative details

I add a small decorative hole about 1 in. from the gouge-cut openings at both ends. On the finished canister, these show the tabs of the inner layer where the ends overlap.

If you're going to decorate the outer bark, do that while the bark is flat. Incised geometric patterns are one option, and various punches can accent the decoration. The makers I learned from had punches they made from antler and bone. I use my woodcarving punches. Leather punches work too. When I scribe the borders and geometric patterns, I use an awl tilted very low, dragging it along a straightedge. This keeps it from cutting into the bark.

Simple assembly

Assembling the container is easy. I wrap the bark around so I can insert the tabs into the holes. The top and bottom half-tabs twist into place. The others need to be carefully cupped with finger pressure so they can slip through the openings.



Refine and fit. Use a spokeshave to clean up the sawn edges and creep up on the fit. Both the bottom and the lid should fit tightly; a slight bevel on the edges helps. Tap them in place. At this point the bottom doesn't come out again. To get the lid back out, Follansbee drills at least one hole for the handle and inserts an awl to pop it out.



If they're too stiff to manipulate easily, I unwrap the bark and thin the ends some more. (Don't be too forceful or you can crack the bark at the tabs.) Once the tabs are inserted, I pull the joints so the parts meet at the shoulders.

The inner layer of bark has no joints; it's just tapered in thickness where the overlap happens. Once I've thinned both ends, I wrap it in on itself, overdoing it so the whole thing tucks into the outer layer easily. Then I open up the inner layer so it fills the inside of the canister, tugging it this way and that to make the two layers snug against each other. The only place where I might add glue is at the top corner of the inner layer, where a

Banding

With both the bottom and the lid snugly in place, add the narrow decorative bands at the top and bottom. These bands have only one tab and slot and should fit tightly. You should have to work hard to press the tab into the slot.

TOP BAND

Extensive decoration. After cutting the joinery, Follansbee will “decorate the living daylight” out of the bands that wrap around the container’s top and bottom. Using a gouge and two cuts per arch, he establishes a row of arches along one edge.



Band joint. To cut the single joint, create the slot first. Then wrap the band around the container and mark the location of the slot onto the tab side. When you cut the tab, back the cut up about $\frac{1}{16}$ in. to ensure a tight fit.



Wedged in place. A snug fit means the band is stretched a bit as you work it down little by little. Keep rotating the piece as you push the band on.

BOTTOM BAND



Pins, then a band. Bore three small holes through the two sleeves of bark and into the bottom. Add wooden pins to secure the bottom. Then fit the bottom band in place, squeezing the tab into the slot.

small dab will secure the layer to itself. I apply the glue and set a spring clamp on it until it dries.

Before the narrow top and bottom bands go on via a tight fitting tab and hole, I make and insert the wooden bottom and lid. After planing both sides of a piece of softwood, I mark out the bottom with a compass and cut it out a bit oversize with a bowsaw.

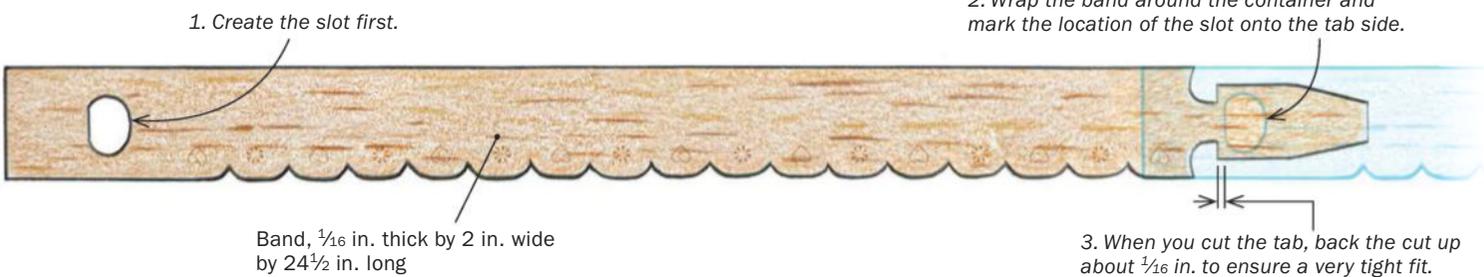
I trim the edges of the bottom with a spokeshave, creating a slight bevel, and force it in place. The bark stretches, so I make it a tight fit. The bottom is fit when it is all the way into the canister and flush at the bottom. I pin it in place with small wooden pegs.

The steps are the same for the top, although often it is made to stand proud of the canister’s rim. If you want that look, carefully trim the bevel so just the amount you want fits inside the canister.

Handling things

Handles finish the canister. This time around I made bent handles of white oak. I split and shaved a piece of fresh white oak using a drawknife and shaving horse. I carefully shave the outer surface so

TAB AND SLOT



Bent handles

You must add a pull or a handle of some sort to the lid. Follansbee opts for a more traditional basket handle, which gets shaped, steamed, and bent to shape. He uses a riven hardwood—white oak, hickory, or ash.

Steam treatment.

After shaving the handle to size and tapering its middle section for the bend, let it sit over some boiling water for about 20 to 30 minutes.



Bend and tie. Remove the handle from the steam and slowly bend it to shape with hand pressure. Bending shows you any thick spots that need correcting. They'll appear as flats or kinks. If needed, trim, reheat, and bend again. Tie the ends and let the piece dry for a few days.



Shouldered and tenoned. With a backsaw, cut shoulders into each leg of the handle. It's tight quarters, but the shoulders aren't very deep. After cutting the shoulders, use a chisel to split and pare round tenons on each leg of the handle to fit into a test hole.



it's completely along one growth ring, which makes it bend better, and then I shave a cutout underneath, where the bend happens.

This piece must be of an even thickness, since any thin or thick areas will make a kink in the bend. I steam the piece over a pot of boiling water and then carefully bend it, tie the ends, and let it dry.

When the handle is ready, I use a chisel and sloyd knife to form round tenons on the straight ends. They're longer than the lid is thick. Next come the mortises (hand-drilled holes) in the lid. I fit the tenons and peg the handle in place at the lid's bottom.

I've taken to wiping the outside of the canister and the lid with flax oil for a bit of a finish. It's not necessary, but it can give the bark a polished look and enhance any decoration. □

Peter Follansbee is an unplugged woodworker in Kingston, Mass.

Attach the handle. After boring $\frac{3}{8}$ -in. holes through the lid, fit the handle and cut a small hole in each leg for tapered pegs that secure the handle in place.





Secret Latches for Drawers

Build fun into your furniture
with three magnetic tricks

BY CRAIG THIBODEAU

In my puzzle furniture (see pp. 22–29), I often use rare-earth magnets to create secret locking mechanisms and other mechanical movements. Given the level of intrigue and enjoyment these devices add, you might be surprised to see how easy some of them are to execute.

Whether you're interested in making a secret drawer to hide valuables or a puzzling lock that adds an element of whimsy to your work, I think you'll enjoy the three options presented here. Creating these locking mechanisms mostly involves drill-

ing accurate holes, and the magnets are readily available from a number of online sources. (I recommend the high-quality magnets sold at kjmagnetics.com.)

The three approaches can be deployed in a variety of ways. I built simple cabinet boxes and drawers for this article to demonstrate the basic how-to. But I've also included drawings that show how to adapt one of the devices to other case constructions. The same trick also works in doors.

As we learned in elementary school, magnets have poles, one positive and one

Fun with rare-earth magnets.

When this drawer (Trick #2) is closed, a pin-shaped magnet drops out of the case top into a hole in the drawer side, locking the drawer closed.

Magnets also attach one of the pulls to the drawer front. When you remove the magnetized pull and place it on an inlay dot, it pulls up the magnetic pin, releasing the drawer.



Accurate drilling is critical. You'll need a drill press, a set of standard fractional drills and Forstner bits, plus two twist-drill bits (letter G and #11, center and right) to bore holes slightly larger than two of the magnets, which are sold in fractional sizes. A centering bit (left) is used before many of the drill bits to ensure accurate hole location.



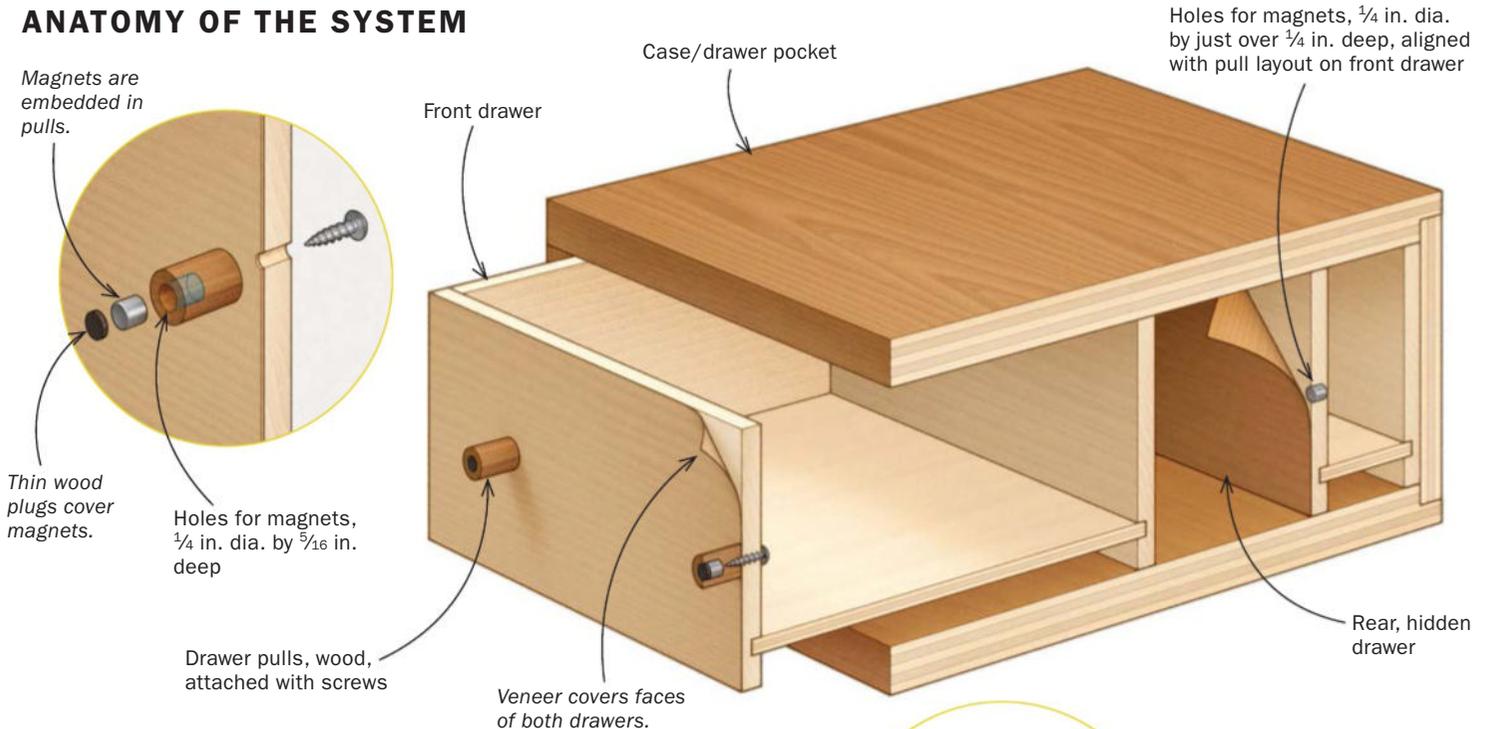
Trick #1

One drawer pulls out another

In this example, the main drawer hides a shallow, secret drawer that shares the same pocket. When you pull out the main drawer, reverse it, and push it back into the case, its magnetized pulls drag out the secret drawer.



ANATOMY OF THE SYSTEM



negative. And when two magnets meet, opposite polarities attract each other and matching polarities repel. We'll be making use of both properties.

Simple veneering—I made the cases out of cherry plywood and the drawer boxes with solid maple. I veneered the front of most of the boxes with maple to hide some of the magnets. You won't need vacuum equipment to do this veneering, just traditional clamps and some pieces of 3/4-in. MDF to act as cauls and spread the clamping pressure evenly.

Telltale inlay—For the hidden mechanisms on my puzzle furniture, I like to create telltale marks and emblems to guide the user. I added a couple to the pieces shown here as a suggestion. Or you can leave no trace at all, which is also fun.

Trick #1: One drawer hides another

For the first system, you can assemble the case and fit the drawer boxes (with-



out their front veneers for now) before you need to start thinking about adding the magnets.

Start with the front drawer

The drawers can have either one centered pull or two pulls. If there are two, both should be magnetized, with corresponding magnets in the hidden drawer. If just one of the two pulls were magnetized, the offset tug on the short, hidden drawer would cause it to jam.

Trick #1

How to do it

As with all of the magnetic systems described here, accurate drilling is vital. Start with the case fully assembled and the drawers fitted to it.

Line up the magnet locations.

Lay out the locations for the pulls on the main drawer and the magnets in the hidden one. These layouts, centered on the height of the drawer faces, should be identical.



Drill the pulls for magnets. Use a $\frac{1}{4}$ -in.-dia. Forstner bit to drill $\frac{5}{16}$ -in.-deep holes for the magnets and wood plugs. Thibodeau uses a shopmade jig, shaped something like a tuning fork, to hold the pulls for drilling.



Drill pilot holes too. Working from the same side of the pull, drill right through with a smaller bit to make a pilot hole for the attachment screw.



Make the plugs.

Thibodeau used ebony for all of the thin wood plugs/dots in this article. Here, for Trick #1, he used a $\frac{1}{8}$ -in.-thick slice of ebony and cut the dots with a sharp $\frac{1}{4}$ -in. plug cutter, pressing lightly.



Insert the magnets and plugs. Mix up some epoxy and use it to glue in the magnets and plugs at the same time. Make sure the plugs end up protruding a tiny bit from the pulls.



Add magnets to the hidden drawer. In the shallow drawer, drill $\frac{1}{4}$ -in.-dia. holes just a hair deeper than the thickness of the magnets. Check the polarities of the magnets (left) to make sure the drawer pulls will grab them (not repel them) before gluing them in with epoxy (right).



The drawer pulls are wood, and they can be any shape or style as long as they are large enough to accommodate the 1/4-in.-dia. by 1/4-in.-thick magnets that go inside them. Thin wood plugs hide the magnets. The plugs can either be of the same wood as the rest of the pull, or of a contrasting species for a decorative effect. I went with 1/4-in.-dia. ebony plugs.

To attach the pulls, I drove screws through the drawer front from inside, eliminating the need for tenons on the pulls.

Holes are drilled to accommodate the magnets and the ebony dots that hide them. If you make your pulls on the lathe, the holes can be drilled on the lathe as well. Or you can use a drill press. I recommend using a Forstner bit so the holes have flat bottoms.

The back drawer has a corresponding magnet (or magnets, in this case) in its face, hidden behind a layer of veneer. The veneer can be either commercial or shop-sawn, but it should match the wood used for the back of the cabinet so that anyone glancing into the empty drawer pocket (if the drawer is ever removed in the first place) might think that the face of the hidden drawer is just the cabinet back.

Be sure to line up the polarities so the magnets in the pulls will attract the magnets in the face of the back drawer. Get them wrong and your drawer will stay huddled in its hiding place.

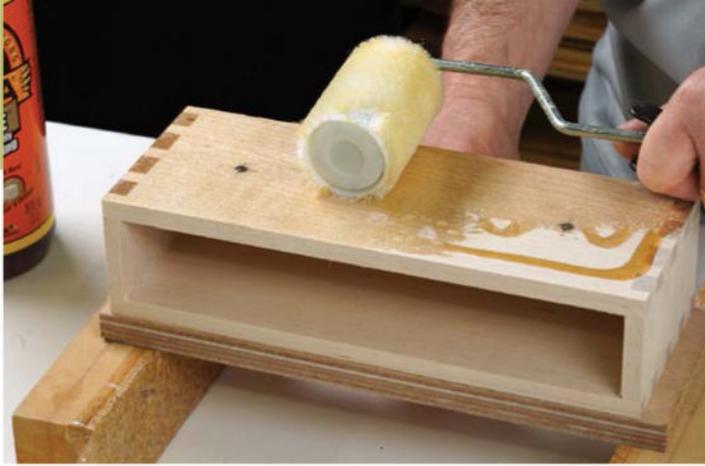
Any woodworking glue will work for applying the veneer, and pressure is applied with standard clamps and MDF cauls. I like to line my cauls with cork to help spread the pressure evenly.

If you find that the back drawer is difficult to pull out due to vacuum pressure, you can drill a 1/2-in.-dia. air-release hole in the bottom of the case. Place it so it straddles the line where the two drawers meet. If your design won't allow this hole in the case, try adding larger magnets to the hidden drawer.

Trick #2: Removable pull unlocks a drawer

This lock can be used in a number of ways. For the article, I built the most basic version (see drawings on next page), in which a rod-shaped magnet reaches through a 3/4-in.-thick panel to lock a drawer below. A magnet in the drawer pull is used to withdraw the rod magnet and unlock the drawer.

The drawer for this secret latch needs a stop to keep it from coming all the way out, which



A layer of veneer hides the magnets. The fronts of all the drawers in this article are veneered, which hides magnets in many cases. Roll polyurethane glue onto a drawer front, mist the veneer lightly with water to activate the glue, and then clamp it into place with cork-lined MDF cauls. Plastic sheeting keeps the cauls from sticking to the veneer.



Trim the veneer. A flush-cut saw or veneer saw does the job nicely.



Sand the pulls flush and attach them. Give the epoxy an hour or more to harden, and then sand the ebony plugs level and apply a finish. The pulls are attached with screws.



Add an air hole to prevent a vacuum. If the drawers are snug in their pocket, the magnets might not be strong enough to pull out the hidden one. Mark the bottom of the case exactly where the two drawers meet, and drill a small air hole centered on that line.



Trick #2

Removable pull is the key

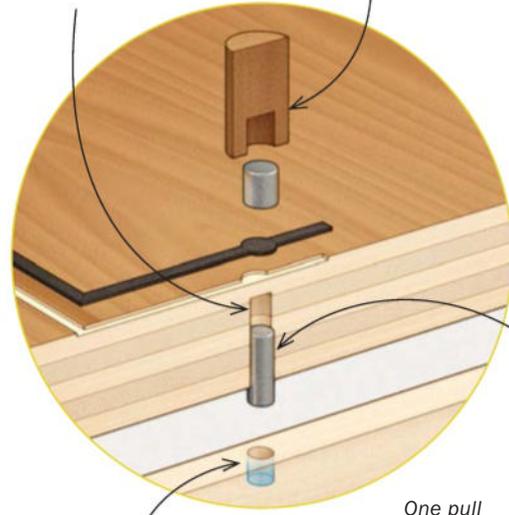
In this example, the right-hand pull is attached to the drawer front magnetically. When you remove it and place it in the proper spot on the case top (marked by an inlay dot), it pulls up a magnetic pin, allowing the drawer to be pulled out.



ANATOMY OF THE SYSTEM

Pin hole in underside of case top, roughly 0.190 in. dia. (#11 drill bit) by $\frac{5}{8}$ in. deep

Magnetized pull, with $\frac{1}{4}$ -in.-dia. by $\frac{1}{4}$ -in.-thick magnet inserted in back



would allow the locking pin to drop down out of its hole and roll around loose in the drawer pocket.

Start with the case—Make the case any way you like, but hold off on the final glue-up until the magnet hole is drilled in the underside of the top panel while that part is still separate.

I typically locate the rod-shaped locking magnet 1 in. or 2 in. from the front of the drawer so that, once unlocked, the drawer can be almost fully opened without the pin dropping down behind

it. I center the rod hole on the thickness of the drawer side.

Make the hole in the case a tiny bit larger than the $\frac{3}{16}$ -in. diameter of the rod. The goal is a hole large enough for the magnet to easily slide up and down but not so large that it allows the magnet to wobble sideways. I've found something around 0.190 in. dia. to be ideal. A #11 bit works perfectly (\$3 at mcmaster.com).

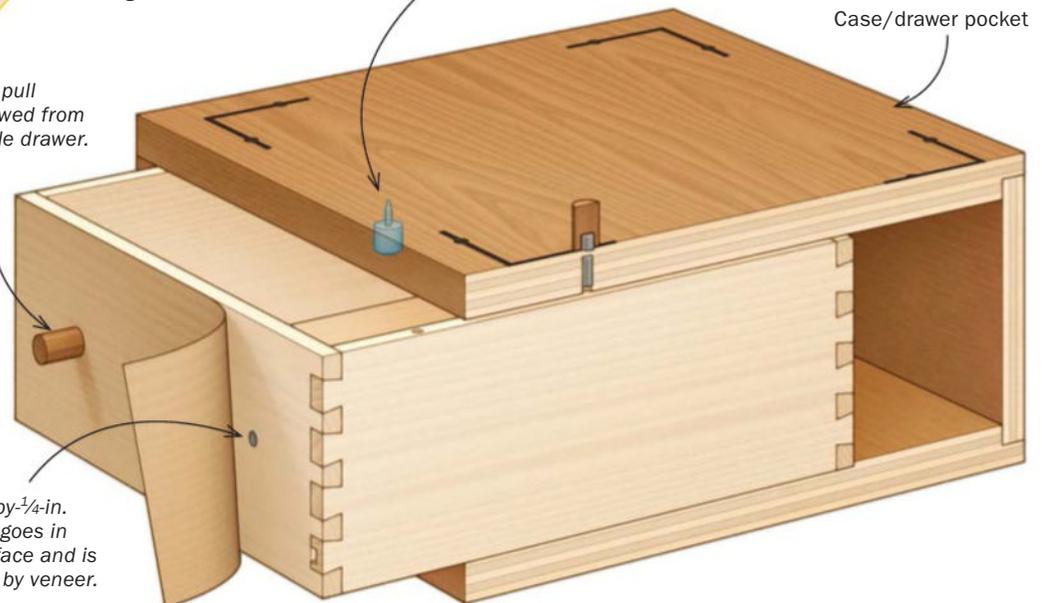
Leave a clue on the cabinet top?—If you like, you can follow my example and leave a location clue on the top of the case.

Locking pin: $\frac{3}{16}$ -in.-dia. by $\frac{1}{2}$ -in.-long magnet

Drawer needs a stop to keep it from coming all the way out, which would allow the magnet in the top to drop out completely.

Pin hole in drawer side, roughly 0.190 in. dia. (#11 drill bit) by $\frac{3}{16}$ in. deep, aligned with pin hole in case top when drawer is closed

One pull screwed from inside drawer.



MAGNETS NEEDED

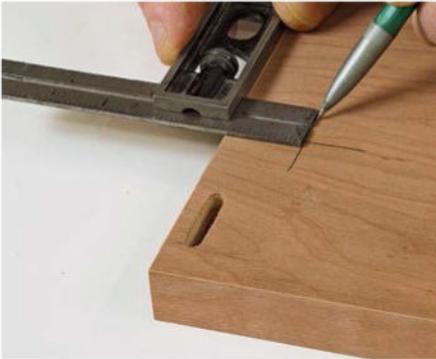
$\frac{1}{4}$ in. dia. by $\frac{1}{4}$ in. thick (2)

$\frac{3}{16}$ in. dia. by $\frac{1}{2}$ in. long (1)



How to do it

For this secret locking system, start by dry-fitting the case parts, but don't glue them up yet. Thibodeau built these cases with Domino joinery, but any type of joint is fine.

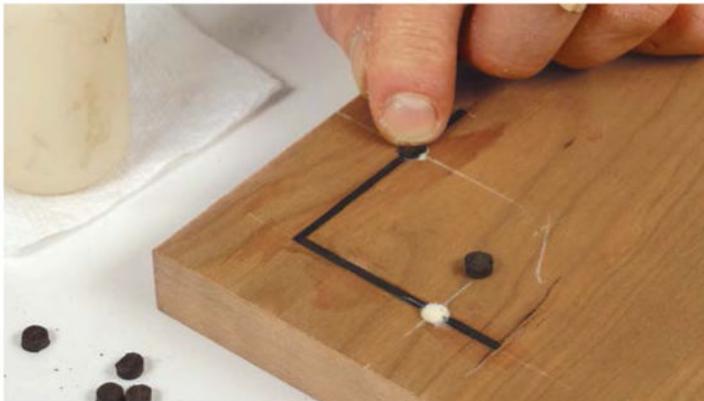


Lay out the hole in the case top. Measure carefully to make sure it will end up centered on the top edge of the drawer side, and set it back between 1 in. and 2 in. from the front edge of the case.



Drill accurately. Start with a centering bit for accuracy and then follow with a #11 bit, which is 0.190 in. dia.—just a tad larger than the $\frac{3}{16}$ -in.-dia. rod magnet. Set the depth stop to make sure you don't drill through the top side of the panel.

Add the optional inlay. This decorative pattern, made with ebony stringing and ebony dots, is designed so that one of the dots marks exactly where to place the magnetic pull in order to unlock the drawer. Inlay the stringing before the dots.



Glue up the case and fit the drawer. Be as accurate as possible when gluing up the case, and then make a drawer to fit it.



TWO HANDY VARIATIONS

The magnetic locking pin can be used for drawers in a variety of pockets (and in doors as well).



DRAWER BOX WITH SEPARATE TOP

If there is a separate top above the drawer pocket, use a longer magnet for the locking pin.



LOWER DRAWERS

To lock a lower drawer, put the pin in the panel or web frame just above it. In this case, you'll need to remove the upper drawer to access the pin and unlock the lower one.

I created an inlay pattern with lines and dots on top, with one of the dots indicating where to place the magnetic drawer pull to unlock the drawer. The dots are made with a plug cutter, and the simple lines (stringing) can either be made or purchased.

Once you are done drilling the top of the case—and adding the optional inlay—you can glue up the case.

Drill the drawer and test the lock— Assemble and fit the drawer so that it moves smoothly in its pocket. Then lay out the hole in the drawer side so that it will line up with the one under the case top when the drawer is closed. Drill the same 0.190-in.-dia. hole in the drawer side, but this time make the hole just $\frac{3}{16}$ in. deep, centered on the top edge.

Trick #2

How to do it continued



Drill the drawer. Measure carefully to make sure this hole will align with the one under the case top when the drawer is closed, and drill it with the same centering bit and #11 drill bit.



Test the system. Invert the case and drop the magnetic rod into place in the top. Then insert the drawer, flip the case right side up, and make sure the mechanism works. The rod should drop into the drawer when it is closed, and a magnet should unlock it.

Insert magnets in the drawer front and drawer pull. One of the pulls gets a 1/4-in.-dia. by 1/4-in.-thick magnet epoxied into its back face. A corresponding magnet goes in the drawer front. A 1/4-in.-dia. hole works for both.



Veneer the drawer front. A layer of maple veneer covers the inset magnet. Use the same clamping setup as before, and trim the veneer the same way also.



Chamfer the hole lightly to help the magnet drop in.

Flip your case upside down and insert the rod magnet in its hole. Now slide the drawer in, flip the case right side up, and see if the drawer locks in place. If it does, place a loose magnet in the right spot on the case top and see if the drawer can be pulled out. If the drawer won't lock or release, one of the holes might be misaligned. If the two holes are only slightly off, try enlarging the hole in the drawer side. Increase the drill size in small increments to avoid making the fit too loose.

Make the magnetic drawer pull—When you are sure the mechanism works correctly, you are ready to add the magnetic pull to the front of the drawer. You'll make it the same way you made the pull for trick #1, but this time the magnet is on the back side of the pull, not the front, so it doesn't need a wood plug to cover it.

Another magnet is recessed into the drawer front—and hidden behind a layer of veneer—the same way the magnets in the rear drawer were hidden in Trick #1.

When inserting the magnets in the pull and drawer front, make sure the polarities are opposite (attracting) where the two magnets meet. The second pull is attached to the drawer front with a screw.



Attach the fixed pull. The detachable pull clicks into place with magnetic force, but the opposite one is fixed in place with a screw. Be sure to drill a pilot hole in the pull so the screw doesn't split it.

Trick #3

One drawer unlocks another



The right-hand drawer has a magnet embedded in its side. Pulling out this drawer just the right amount causes its magnet to retract a magnetic pin in the drawer divider, unlocking the adjacent drawer.

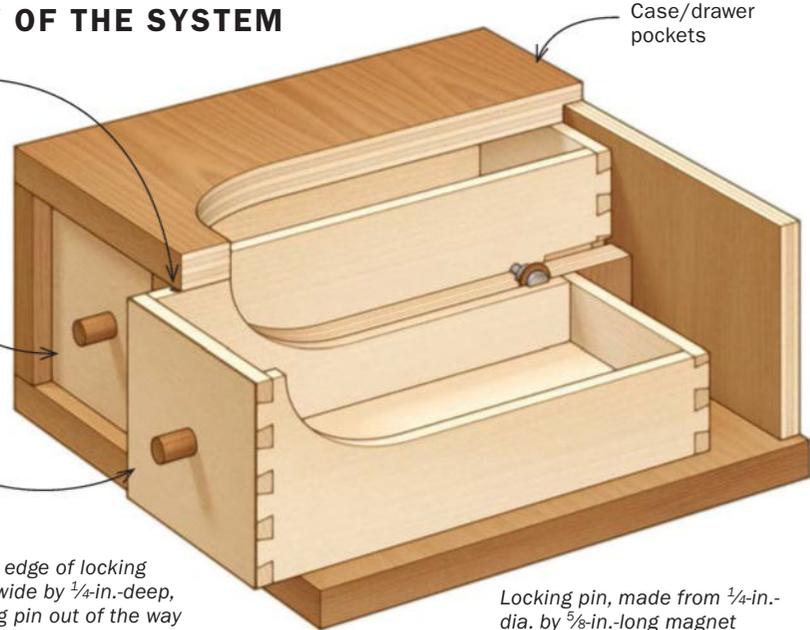
ANATOMY OF THE SYSTEM



Optional inlay dot marks how far to pull out this drawer in order to unlock its neighbor.

Locking drawer

Nonlocking drawer



Ramp at back edge of locking drawer, $\frac{3}{8}$ -in.-wide by $\frac{1}{4}$ -in.-deep, pushes locking pin out of the way when the drawer is pushed shut.

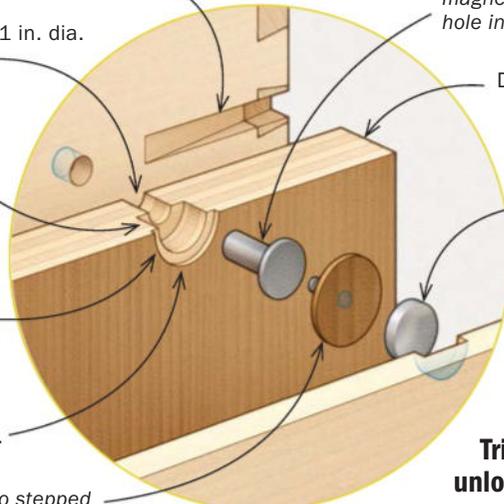
Locking pin, made from $\frac{1}{4}$ -in.-dia. by $\frac{5}{8}$ -in.-long magnet and $\frac{1}{2}$ -in.-dia. by $\frac{1}{16}$ -in.-thick magnet, is housed in stepped hole in drawer divider.

Through-hole, 0.261 in. dia. (letter G drill bit)

Middle step, $\frac{9}{16}$ in. dia. by $\frac{5}{16}$ in. deep, receives head of locking pin.

Top step, $\frac{3}{4}$ in. dia. by $\frac{1}{16}$ in. deep, for thin wood plug

Stopped hole in divider is located 2 in. from back of drawer box, centered top to bottom.



Drawer divider

A $\frac{1}{2}$ -in.-dia. by $\frac{1}{8}$ -in.-thick magnet is glued into side of nonlocking drawer. Magnet is strong enough to pull entire locking-pin assembly out of adjacent drawer.

Trick #3: One drawer unlocks another

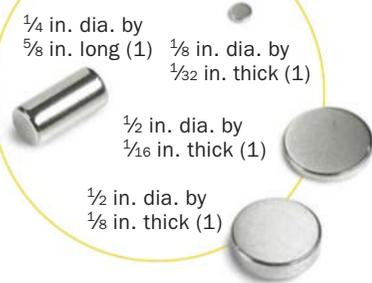
This secret latch is a bit more complicated than the others. A two-part magnetic locking pin is installed in the divider between two drawers. And there are two other magnets involved as well. As with Trick #2, the process starts before you've glued up the case parts, so you have full access to the drawer divider. By the way, this lock is easiest to execute in a divider that is $\frac{3}{4}$ in. thick.

The locking pin in the center divider is made with two different magnets, which will click together, center themselves, and stay that way. This two-part pin is housed in a stepped



Wood plug, glued into stepped hole, contains tiny $\frac{1}{8}$ -in.-dia. by $\frac{1}{32}$ -in.-thick magnet that presses pin into opposite drawer, locking it.

MAGNETS NEEDED



Trick #3

How to do it

As with Trick #2, this case begins with its joinery cut and parts dry-fit—but not glued together yet.



Drill the drawer divider. Drill the stepped hole in the case's central drawer divider. Start with two Forstner bits, $\frac{3}{4}$ in. and then $\frac{9}{16}$ in., following the dimensions in the drawings.



Make a drilling guide as you drill the last hole. Use a letter G twist-drill bit to bore through the rest of the way. But first place a piece of $\frac{1}{4}$ -in. MDF under the workpiece—cut to the same width and aligned along its top, bottom, and front edges—and drill through that too. This template will be used to mark corresponding holes in the drawers.



Magnetize the plug. A $\frac{3}{4}$ -in.-dia. plug cutter (left) cuts the plug. Make it a hair thicker than its $\frac{1}{16}$ -in.-deep hole so it can be sanded flush later. Drill the small shallow hole (center) for the tiny magnet it will hold, and glue in the magnet with epoxy (right).



Assemble the locking mechanism. Click together the magnets that form the locking pin (orient them so they repel the tiny magnet attached to the wood plug), and drop them into the hole (left). Then glue in the plug (above). After the glue dries, plane and/or sand the plug flush.

hole, drilled with three bits at the drill press. All three bits use the same center point. Start with the largest bit, then the middle-sized one. Before using the smallest bit, which cuts a through-hole, get some $\frac{1}{4}$ -in. material to make yourself a drilling template for the drawers.

The locking pin needs to line up with holes in the drawers drilled after gluing up the case. You could reach through the divider to mark those locations on the drawer sides, but that would be very tricky to do once the case is glued up, which you have to do in order to make and fit the drawers.

So pause here to rip a piece of thin MDF or plywood to the same width and height as the center divider. Then place it under the divider, clamped in alignment with it, and drill the template at the same time you are drilling the through-hole in the divider.

Make a $\frac{3}{32}$ -in.-thick by $\frac{3}{4}$ -in.-dia. wood plug to trap the locking pin in the divider. Before installing the plug, inset a very small magnet into its inner face. This magnet will push the locking-magnet assembly into its hole in the drawer. But when the adjacent drawer is pulled out to the right position, its larger magnet is strong enough to withdraw the entire locking pin. Check the photos for the other steps.

There are many ways to use these secret locks and compartments in your work, and lots of fun ways to leave behind clues for unlocking them. □

Craig Thibodeau makes world-class puzzle furniture and boxes in rural Virginia.



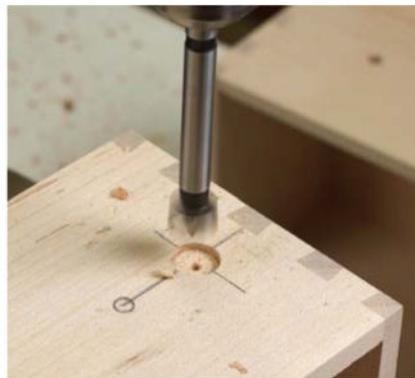
Glue up the case and fit the drawers. Assemble the case as accurately as you can, and then make and fit the drawers.



Drill the locking drawer. The drilling guide will be longer than the drawer itself, so align its back and lower edges to be sure this hole will line up with the one in the drawer divider.



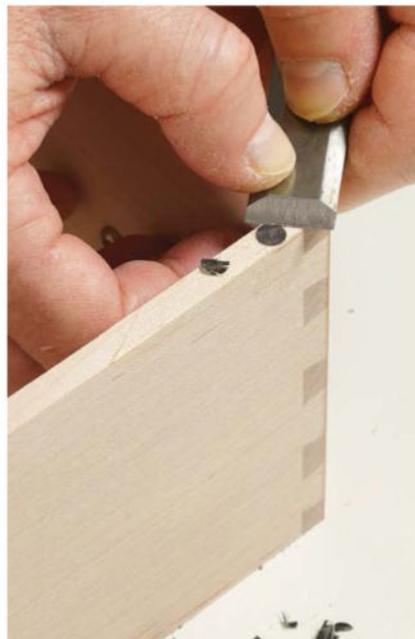
Mark and drill the adjacent drawer. Reach through the drilling guide to mark the elevation of the hole (left), but then move the hole layout so it's 1 in. away from the back of the drawer. Bore a $\frac{1}{2}$ -in.-dia. hole a hair deeper than the magnet it will contain (right).



Glue in the magnet. Place epoxy above and below the magnet. After the epoxy cures, sand it flush with the drawer side.



Cut a ramp in the locking drawer. This $\frac{1}{4}$ -in.-deep by $\frac{3}{8}$ -in.-wide ramp is aligned with the lock hole. Saw its sides first and then chisel out the middle.



Add an optional inlay dot. An ebony dot inlaid into the nonlocking drawer indicates how far to pull it out in order to unlock the adjacent one. Drill for the dot, glue it in, and chisel it flush.



Build all three into one piece?

Stacking the drawer boxes made for this article shows one way the three different magnetic systems could be incorporated into a single project.

Shaker Round Table



A dynamic piece in a small package

BY JEFF MILLER

I've never seen the original of this Shaker table in person, but when I saw it in a photograph I knew at once I wanted to reproduce it. I found it strikingly elegant—from its round top thinned at the edge with an underbevel, to the dynamic splay of its legs and the single, subtle bead down the legs' outer corner. Made in the Harvard Shaker Village outside Boston, it is now at the Sabbathday Lake Shaker Village in New Gloucester, Maine.

Working from the photo, I made a drawing of the table using three-point perspective, determining the dimensions, angles, and details of the piece as best I could. Once it was built, I saw slight variations from the original, but after making some revisions I was pleased with the likeness.

I used hand tools to cut the mortise-and-tenon joinery, and then both hand tools and machines to do the rest. It's a good piece on which to use—or sharpen—your hand skills, but machines would make the table just as handsome.

Profile the perimeter

Lay out the underbevel.

A wide bevel underneath gives the table top a thin, light appearance. After bandsawing and fairing the blank to a circle, score a line around the edge $\frac{3}{8}$ in. from the top face.



Pencil the bevel underneath. Miller uses a shopmade marking gauge on the underside of the top to define the width of the bevel.

Start on top

After gluing up a blank for the top of the table, plane it level and do a preliminary smoothing. Then cut it to shape on the bandsaw. I made a quick circle jig—a piece of plywood with a runner underneath and a pin at the center that fit into a hole on the underside of the table top. I took the blank for a spin and then faired and smoothed the sawn perimeter at the workbench with a block plane and a card scraper. Be aware that you'll have to work the edge in quadrants to avoid planing against the grain.

To lay out the underbevel, run a marking gauge set to $\frac{3}{8}$ in. around the edge of the top. Then with the top upside down, draw a line inset $1\frac{1}{2}$ in. from the edge. I do this with a shopmade marking gauge.

Begin the bevel by working your way around the table with a jack plane—preferably set up with a cambered plane iron—to remove the bulk of the wood. Then for the final smoothing, switch to a block plane for ease of control.



Cut a circular bevel. After removing most of the waste between his layout lines with a jack plane, Miller smooths and fairs the bevel with a block plane.

Mortise by hand



The standard mortise. Miller cuts the table's mortise-and-tenon joints by hand. To see more of the steps he used to cut the mortises, go to FineWoodworking.com/322.

Bead work

The beads begin.
To speed up the bead cutting, plane a chamfer along the leg's outside arris.

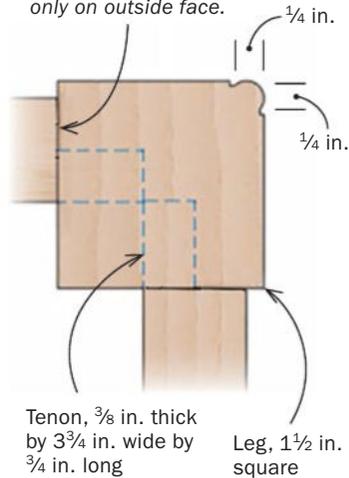


A better beader.
Miller greatly improved the performance of his Hock scratch stock by attaching it to a long fence. Here he tightens the set screw on the cutter.



CORNER BEAD

Tenon is shouldered only on outside face.



Legs get mortises, tapers, and beads

Mill the stock for the legs to size, but leave the blanks a few inches long for now. You'll want some extra material on both the top and bottom; this will be helpful while you're chopping the mortises and when you're cutting the bead on the outside edge of the leg.

Lay out the mortises with a marking gauge (for the sides) and a marking knife (for the ends). I chopped these mortises by hand, but use whatever method you find most comfortable.

If you are working by hand, prior to chopping the mortises pare away the top layer of wood inside your scribed lines. Getting rid of this layer of wood will make it much easier

to place your mortise chisel properly between your lines. There are plenty of strategies for hand-chopping mortises. I like to start in the middle and work my way out, with each subsequent cut pushing the waste into the opening in the middle. This tends to leave a hump in the middle, but it's easy enough to chop and lever that away. Follow up the chopping by paring the mortise side walls. Using a paring guide block will greatly increase your accuracy and the overall smoothness of the sides.

Bead scratching.
Using light pressure and a number of passes, work along one face of the leg until the blade stops cutting. Then flip and turn the leg to work the corner from the adjacent outer face and fully form the bead.



Leg trimming

The first slice. After the bead is cut, saw the inside faces of the leg to a taper. The taper is stopped, leaving the top 5½ in. of the leg square where the aprons will meet it.



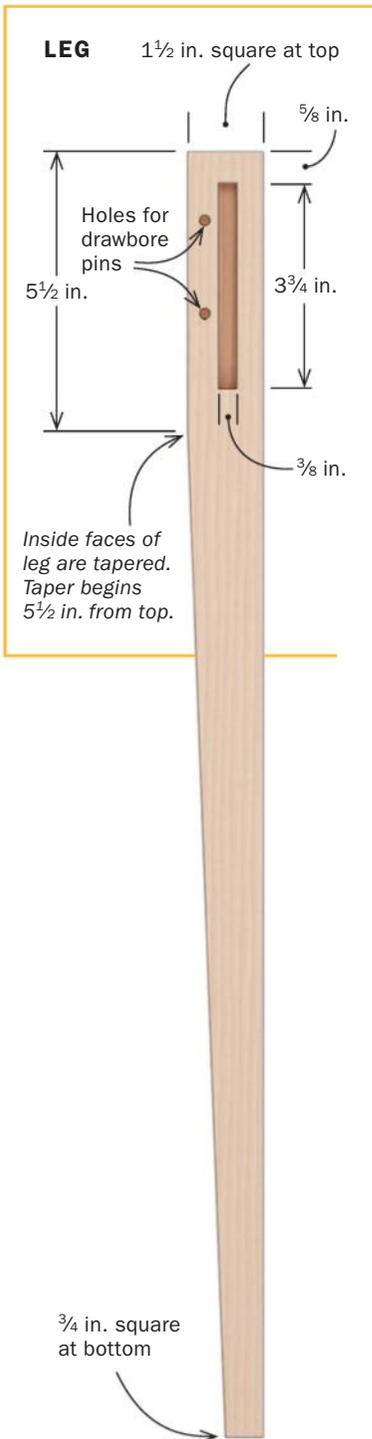
The second slice. After making one taper cut, turn the leg and taper the second inside face.



Remove some of the extra up top. Having left the legs well over length top and bottom to make the mortising safer and the beading easier, cut off much of the excess up top now. But to protect the short grain above the mortise, leave some to trim after assembly.



Finished cut below. Now that the beading is complete, all the excess length at the bottom of the leg can be cut off.



Next comes the bead. A scratch stock does a great job cutting the bead on the outside corner of each leg, although it does take a little time. Set up the scratch stock's fence and cutter so the bead will be tangent to the two outside faces of the leg. Start scraping very gently about an inch from one end of the leg, and slowly work your way toward the other end. It's important to have a sharp cutter, to use a light touch, and to keep the fence firmly against the leg.

Once you've done the corner from one side, turn the leg around so you can cut the rest of the bead on the adjacent side. Having the leg extralong top and bottom will make it easier to cut the bead, because it's hard to start the scratch stock right at the end of a board. Clean up the beads as needed with a card scraper and/or sandpaper.

Now cut tapers on the two inside faces of the leg. Start the tapers 5½ in. below the top of the leg—and don't forget to take into account whatever extra wood you've left at the top of the leg. I did the tapering on the table saw with a quick shopmade taper jig.

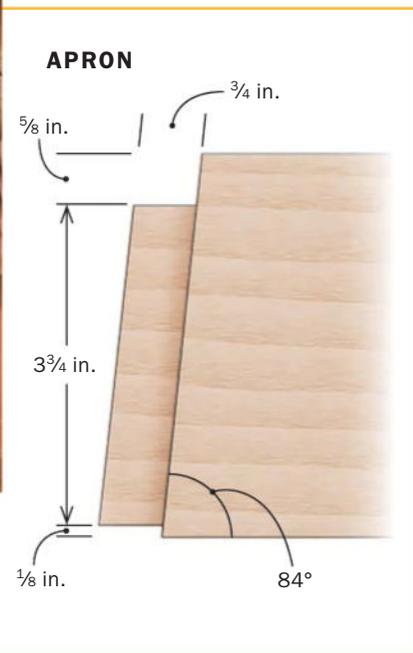
On to the aprons



Angle the ends. A 6° wedge against the miter gauge sets the angle for the ends of the aprons.



Scribe for the shoulders. Use a cutting gauge set to 3/4 in. to lay out the shoulder lines for the apron tenons.



A path to guide the saw. With paring cuts toward the scribed shoulder line, remove a series of shallow chips to create a starting trough for the backsaw.



Saw the shoulder down to the cheek. Having marked a line for the cheeks, saw down to that depth (above). Miller uses a tenon saw, with its teeth set for ripping, to cut the tenon cheek (right).



On to the aprons

The ends of the aprons, as well as the shoulders of the apron tenons, are angled to create the splay of the legs. I made a 6° wedge to help me cut and shoot the proper angle on the ends of the aprons. If you're planning to cut the tenons by machine, the wedge can help both with cutting the aprons to length and cutting the tenon shoulders.

Once the aprons are cut to length at the proper angle, scribe the outside faces for the shoulders of the single-faced tenons. Then lay out the tenon cheeks. Pare away a chip of wood on the outside of your scribed shoulder lines as a guide for your saw. Then saw down to the layout line for the cheek. Finally, saw the cheeks down to the shoulders. Pare away any remaining wood

so your shoulders are precisely on the scribe lines.

Because you'll be using drawbore pins on these joints, fitting the tenons to the mortises is more forgiving than usual; the joints can be a little looser. I opt for a router plane for fitting the cheeks. A cutoff from one of the rails can be used as a support to prevent the router plane from tipping and overcutting the tenon.

Drilling for drawbore pins

For each mortise, drill a pair of drawbore holes into the leg. Fit a scrap into the mortise while you drill to prevent blowout inside the mortise. And be sure to offset the two pairs of holes in each leg so that they don't intersect.

With those holes drilled, insert the apron tenon and clamp it tightly in place. Then mark the location of the holes on the tenon. Use a transfer punch (or a brad-point bit) that is $\frac{1}{16}$ in. smaller than the hole; this will give you an offset of $\frac{1}{32}$ in., which is perfect for this joint. As you're marking, hold the punch against the side of the hole closest to the tenon shoulder. Then take the apron to the drill press and drill through the tenon using a brad-point bit centered carefully on your marks.

The drawbore pins do some serious work and should be made from a hard, straight-grained wood like white oak or ash. You can split rough pins out of scrap stock, shave them down to octagons, then pound them through a dowel plate (or skip the dowel plate and just shave them further until they are roughly round). Cut the finished pins to $1\frac{3}{4}$ in. long. Then chamfer the leading end a little so the pin will enter the offset hole easily. I use a wee pencil sharpener to do the chamfering.

Apron details

Since the aprons will be angled, you'll need to bevel their top edge so it mates with the table top. Mark out the bevel on both ends of each apron, then plane until you reach the layout lines. You could do this on the table saw, but be sure you sneak up on the lines in case there's any discrepancy from one side to the other. If there is, you're back to hand planing.

The batten that helps hold the table top flat passes through notches in the tops of the aprons. You can cut both notches at the same time with the aprons clamped together to ensure they come out exactly the same width.

Mill the batten a hair wide for the notches, then plane to fit. Drill holes through the batten for screws into the aprons and into the top. Because the batten is oriented across the grain of the top, the holes for attaching the top need to be slotted to allow for some expansion and contraction.

In the two unnotched aprons, drill pocket holes for attaching the top. Center these holes on the inside face of the aprons.



A smooth cheek. A router plane makes quick work of smoothing the sawn tenon cheeks. These tenons are shouldered only on one face.



Top shoulder. After sawing the small shoulder and cheek at the top of the tenon, clean up both faces with a chisel.



Make way for the batten. A long batten running across the grain will be screwed to the top from below to keep it flat. Two aprons get notched at the top to let the batten pass through. Miller notches both at once.



Apron has a pocket. With the apron clamped to an angled support block, drill a centered pocket hole for a screw up into the top.

Pin the tenons



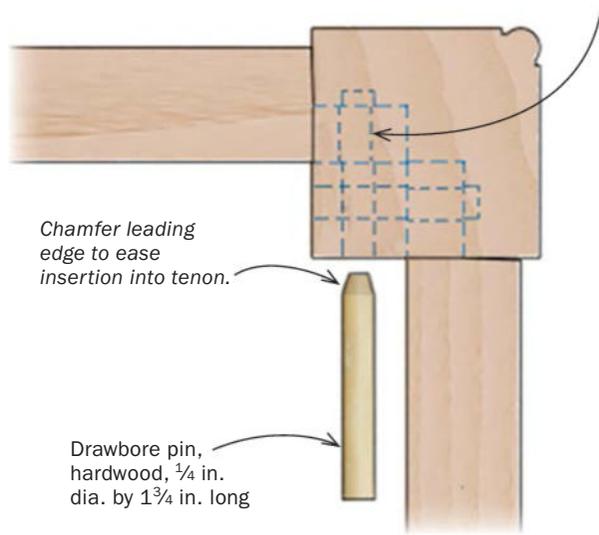
Drawbore drilling. Like the original Shaker table, this one has its tenons cinched with drawbore pins. Offset the two sets of drawbore holes in each leg so they don't intersect, and use a scrap in the mortise for clean exit holes.

Off-center marking. With the tenon inserted in its mortise, take a transfer punch (or a brad-point drill bit) that is $\frac{1}{16}$ in. smaller than the hole, and hold it against the side of the hole closer to the shoulder as you make your mark.



DRAWBORE PINS

Hole in tenon is offset $\frac{1}{32}$ in. toward shoulder so pin draws joint tight.



Chamfer leading edge to ease insertion into tenon.

Drawbore pin, hardwood, $\frac{1}{4}$ in. dia. by $1\frac{3}{4}$ in. long



On the spot. Using a brad-point bit, and with a scrap beneath the tenon to back up the cut, find your mark precisely and drill for the drawbore pins.

More than one way to skin a pin. You can make drawbore pins with a dowel plate, but Miller's favorite method is faster and much more fun.

 **Online Extra**

To see Miller's dowel maker in action, go to FineWoodworking.com/322.



Assembly



Start with a side. With drawbore pins, you can skip clamps when assembling this table. Start by gluing one apron to two legs, then glue the other two legs to the opposite apron.

Assembly

The drawbored mortise-and-tenon joint turns what might be a tricky angled assembly into an easy one—no clamps and slipping angled cauls to worry about. The drawboring will pull the tenon shoulders tight to the legs.

Glue-up starts with one apron and its pair of legs. Spread glue in the two appropriate mortises, and very lightly on the tenons. Put the legs on the apron, then hammer the drawbore pins into place. Glue the opposite apron to its legs, then complete the base by adding the last two aprons.

Once the glue has cured, trim the tops of the legs flush to the aprons. You can do this with a flush-trim saw, but to avoid the possible wandering of the saw, I rout them flush with a simple jig: a piece of plywood with a 2½-in.-dia. hole through it. Set the bit depth to just barely touch the aprons, then start with a climb cut around the leg before wasting away the rest of the material.

Now use a router plane to bevel the bottoms of the notches for the batten. Check the depth with the batten slipped into place. Then glue and screw the batten to the aprons.

Finishing

I finished the table with a blend of high-quality varnish and some pure tung oil, thinned out with mineral spirits. The ratio I've settled on is four parts varnish, four to six parts thinner, and one part tung oil. Apply the first coat to thoroughly wet the wood, then reapply after five minutes. Wipe everything dry after another few minutes with a clean rag.

Let the table dry overnight, then apply a second coat, wet-sanding it in with 320-grit wet-or-dry sandpaper (sanding gently and always with the grain). Wipe everything dry, and let things dry overnight again. The following day, repeat with 400-grit wet-or-dry. You could stop there, but you'll have a more durable finish if you continue with another coat or two, sanding in with 600-grit. Finally, apply some paste wax with 0000 steel wool, and buff out with a clean rag. □

Jeff Miller builds furniture and teaches woodworking in Chicago.



Linking side assemblies. With both sides pinned, complete the assembly with the last two aprons. A rubber mallet gets the joints home, then the pins draw them tight.



Skim the leg tops. To trim the tops of the legs, Miller clamps a scrap of plywood to the aprons, sets the router bit to just brush the apron tops, and routs away the excess.



Fix the batten. The batten gets screwed to the apron and the top. The holes through the batten for screws up into the top should be elongated to accommodate seasonal movement of the top.



Keeping the top tight. Attach the base to the top with screws through the pocket holes and screws through the batten.

gallery

Inspiration for our readers, from our readers

MIKE WEBER

Pickerington, Ohio

This piece incorporates dovetails, through-tenons, and drawers. Weber also opted for something akin to Gothic architecture with a tracery-inspired pierced carving on the door and curved rails that together form the look of a continuous arch.

WHITE OAK, AFRICAN WALNUT, AND PINE, 6D X 18W X 25H



TIM HEIL

St. Paul, Minn.

A lifelong woodworker and turner, Tim made this countertop mirror for his wife to celebrate their 48th wedding anniversary. It has three lathe-turned sections. The frame pivots so the user can toggle between a magnifying mirror and a regular reflection.

MAPLE AND BALTIC BIRCH
7 IN. DIA. X 15H



ADAM GODET

Washington, D.C.

Adam's client for this desk, an artist, wanted small boxes for storage up top, drawers for supplies, and a live edge on the front of the top. Together they decided he would shape the drawer fronts to match the live edge. The blanks for the fronts started at 8/4 and were clamped in place under the top. Then Adam traced the live edge and resawed the fronts along that line.

WHITE OAK AND WALNUT
24D X 62W X 34H



ASHLEY PIEPER

Thomasville, Pa.

This cabinet was inspired by the motion of a ballerina dancing. Ashley is drawn to asymmetry, and through the wood choice and shapes she wanted to convey the dichotomies between darkness and light, and grace and power.

SPALTED MAPLE AND CHERRY
8 1/4 D X 19 W X 54 1/2 H

DICK EVANS

Chatham, Mass.

Dick made this bachelor's chest using wood with different colors and grain patterns to set off its otherwise conventional structure. He played different types of cherry (cat's paw and mottled) and maple (plain, curly, and birdseye) against each other to create contrasts of color and texture.

CHERRY, MAPLE, HOLLY, AND PEAR, 16 D X 30 W X 30 H



STEPHEN PORTER

Baltimore, Md.

After taking a workshop with Garrett Hack at the Center for Furniture Craftsmanship, Stephen was confident he had the skills to build his first chair. This was also his first attempt at using Shaker tape.

WHITE OAK, 27 D X 23 W X 34 H



**BRAM KYER AND
LAUREN BRIGGS**

York, Pa.

A husband-and-wife team, Bram and Lauren design and build furniture together as Briggs and Kyer. Drawing inspiration from staked chairs, they built this coffee table—which features turned legs and shaved stretchers—for Bram's sister. Lauren, who is the couple's designated upholsterer, wove the shelf.

ASH, 21D X 60W X 19H



FROST WHITE

Craryville, N.Y.

Frost enjoys making copies of early Chinese pieces and reproducing their complex joinery. This is a copy of a Chinese slope-sided cabinet from Dr. S.Y. Yip's Ming and early Qing dynasty furniture collection. A combination of 70% handwork and 30% machine work, it includes Frost's first attempt at metallurgy.

WALNUT, 16¼D X 32½W X 57H



RON GURITZKY

Wellington, Fla.

This chair was inspired by an Amana church bench Ron made in a class with Jameel Abraham, a split-seat stool he saw online, and traditional Japanese torii gates. With the exception of a bandsaw to rough-cut the lumber to approximate size, all the construction was done with hand tools.

SOUTHERN YELLOW PINE AND
MAPLE, 18D X 19W X 31½H



Show your best work

For submission instructions and an entry form, go to FineWoodworking.com/rg.

MARC SPRINGER

Woodland Hills, Calif.

A hand-tool woodworker, Marc has always liked casework, despite the challenges of doing it with only hand tools. He used a chisel and rasp to pillow the drawers and doors to create a softer look to this case. The idea of building something that people can use to store “personal treasures, collections, or just mismatched socks” appeals to him.

WESTERN RED CEDAR, 20D X 66W X 30H



LEON GIBBLE

York, Pa.

Leon began building this clock, a copy of one attributed to the 1770's Philadelphia clockmaker Edward Duffield, using online photos from the Metropolitan Museum of Art for the designs and proportions. He also relied heavily on an article by Tony Kubalak in the 2020 issue of *American Period Furniture* that has excellent structural drawings and descriptions.

WALNUT, 9⁵/₈D X 20W X 104H

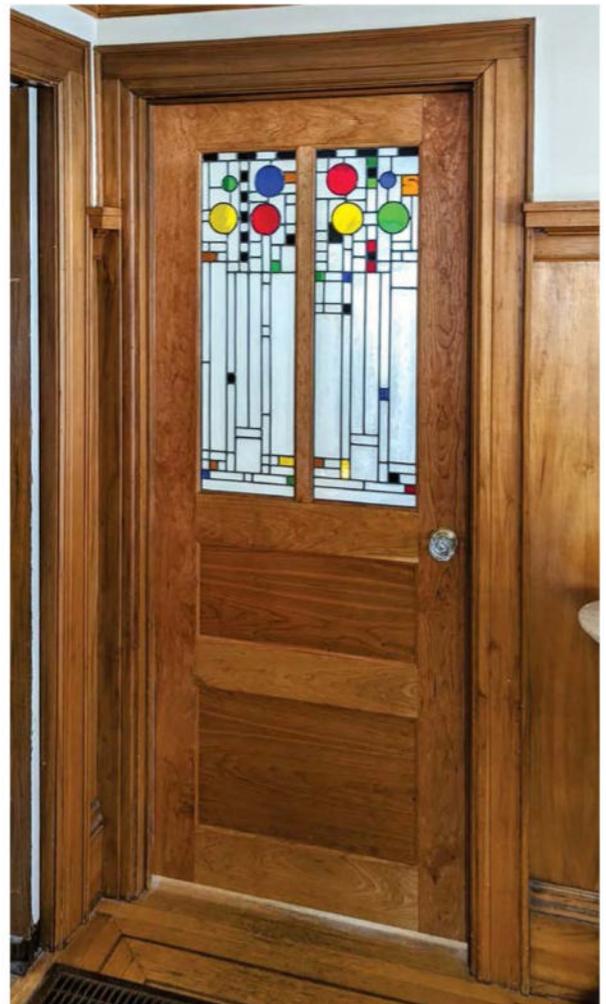


SPENCER RAFF

San Francisco, Calif.

Spencer's house was built in 1923 in the Arts and Crafts style, as are all the other houses in the Westwood Park section of San Francisco. In keeping with the style of the house, he built this interior door. The stained glass is a modification of the first and third panels of Frank Lloyd Wright's triptych on display at the Metropolitan Museum of Art.

CHERRY, 1³/₄D X 32W X 80H



Classic rolling pin

MAKE A GIFT FOR THE COOK, AND LOCK
IN THE ESSENTIALS OF LATHEWORK

BY MATT MONACO

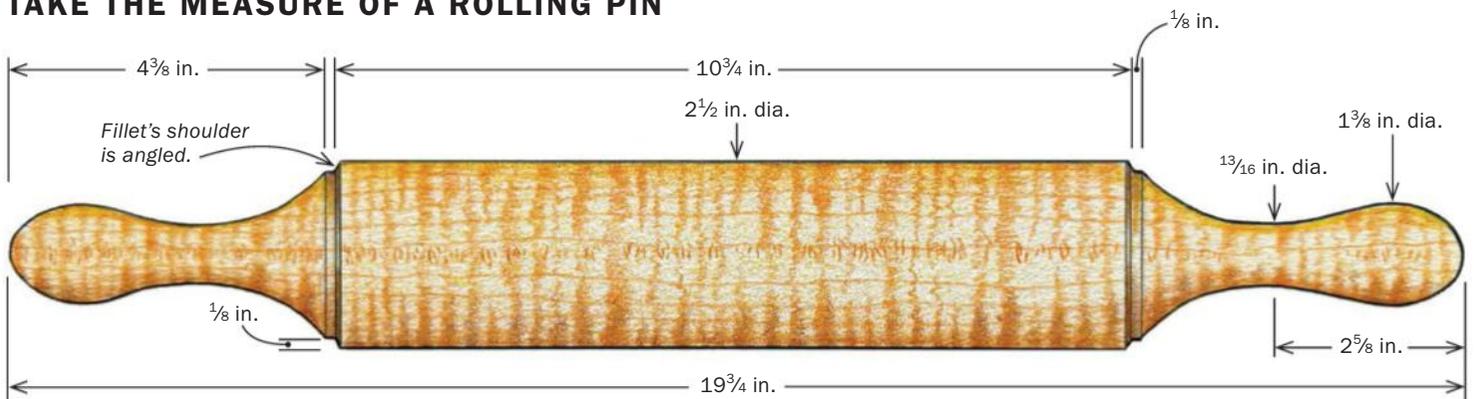


Early in my career, when I was working as a production turner at the furniture workshop of Charles Shackleton in Bridgewater, Vt., I would gather cherry, maple, and walnut offcuts from the furniture shop and then turn rolling pins by the score. That experience locked in the foundational turning skills for me, and I continue to find pleasure today in turning this straightforward, beautifully utilitarian form.

For the pin shown here, I chose figured maple stock, 3 in. square and 21 in. long. I love a wonderfully figured piece of wood, but I keep in mind—especially when making items that will see regular handling—that pleasing proportions and well-placed details will in time greatly outweigh even spectacular figure and color, which inevitably wear and fade.

Matt Monaco lives in Kansas City, Mo., and teaches turning across the country.

TAKE THE MEASURE OF A ROLLING PIN



A CYLINDER BETWEEN CENTERS



Roughing the blank. With the lathe spinning at 1,800 to 2,000 rpm, use a $\frac{3}{4}$ -in. bowl gouge to knock the corners off the blank and turn a rough cylinder.



Progress check. Press the back of the gouge on the spinning blank to gauge your progress toward a cylinder. Any remaining flat spots will be felt in the hand and will be audible as ticking.



Establish the pin's diameter. With calipers and a parting tool, make a series of relief cuts to the full diameter of the pin.



Measuring by hand. After marking $\frac{1}{2}$ in. of waste at each end of the cylinder, use your hand to find a comfortable size for the handle. Then add about $\frac{1}{2}$ in. of extra width.



Handle transfer. Use dividers to transfer the width you've established for the handle from the pin's tailstock end to its headstock end.



Find the handle's neck. Using a parting tool, make one cut at the end of the pin and another at the narrowest point of the handle.

TURN THE HANDLES



Gouge sets the terrain. After widening the parting tool's relief cut with a skew chisel, make sweeping cuts down toward the handle's neck with a $\frac{1}{2}$ -in. detail spindle gouge.



Roll the convex curve. Use the $\frac{1}{2}$ -in. detail gouge to begin creating the knob—the rounded end of the handle.



Smoothing with the skew. Carefully wielded, the $\frac{1}{2}$ -in. skew can smooth the concave sweep of the handle.



Finesse the curves. The skew returns to finish up the convex curves at the end of the knob.



Stepped and sloped. A fillet at each end defines the business section of the rolling pin. A $\frac{1}{2}$ -in. skew chisel defines the detail. Cut a $\frac{1}{8}$ -in. by $\frac{1}{8}$ -in. step, and give it a sloped shoulder.



Duplication. Use calipers and a parting tool to transfer the handle's various transition points to the other end of the pin. Then repeat the shaping steps.



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FINISHING UP



Smooth and shine. With the pin spinning at 600 to 800 rpm, sand the final surface, going up through the grits from 220 to 320 and 400. Skip the fillet to keep that detail crisp. Then apply a coat of food-safe mineral oil with a lint-free rag.



Wax at last. With the lathe turning slowly, apply a coat of wax with a fine-grit abrasive pad. Then buff to a fine sheen with a lint-free rag.



Off with its end. With the lathe turned off, saw through the pin, leaving just a little waste on the end of the knob.



Nice ending. Mount a small hook-and-loop sanding disk holder in the four-jaw chuck, and round over the end of the knob with 220-grit paper. Follow that with 320- and 400-grit paper, then apply oil and wax to the sanded area.



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from the bench

For decades I had a desire to learn a craft so I could create something beautiful. I began by trying to envision the type of piece that would satisfy my creative urges were I able to produce it. But I had great difficulty imagining such an object. I looked at work by silversmiths, potters, photographers, woodworkers, and more. Some of the craftsmanship was exquisite, but none of the work seemed as if it could deliver the sublime experience I was in search of.

During my search I discovered there was a furniture maker in my town named John Reed Fox. I called him to ask about lessons, and he invited me to his studio to discuss my interest. He showed me around the studio and told me a bit about his work, including his use of Japanese hand tools. He handed me a plane shaving and enthusiastically said that it was only one-thousandth of an inch thick. I had no frame of reference for understanding the significance of this. Undiplomatically, I asked, “Do you think your clients appreciate that you work in such fine increments?” Without hesitation he said, “Maybe not, but I know what it means to shape a piece one shaving at a time.”

I decided not to pursue lessons with John. I wanted to learn a craft as efficiently as possible; spending time on Japanese hand tools seemed esoteric and tangential. I would come to see this as not one of my better decisions.

After more years of fruitless searching, it occurred to me that rather than judging a craft by the tangible items it produced, I should look at its creative process. I thought of John. Could his approach be what I was looking for? I contacted him and asked if he would take me on as a student. He suggested that we meet for a lesson on sharpening, after which I could decide whether or not to continue.

John explained how he uses a series of stones to sharpen a plane iron. He began his demonstration by flattening the first stone with a lapping plate. I sat and watched as he slid the plate back and forth across the stone until it was flat. He then started to work on the iron. He held it at an angle on the stone and slid it back and forth. I continued to sit and watch. He said very little as he worked, pausing periodically to inspect the iron or rinse the slurry from the stone, and then resuming the back-and-forth sharpening. I grew restless. When was he going to let me try? After quite a while, he set down the iron, looked at me, and asked, “What do you think?” He said this was the point at which most students decided to part ways. It was an educational first lesson. Clearly, studying John’s approach would require patience and perseverance. I told him that I would like to continue.

Subsequent lessons covered shop machinery, hand sawing, plane tuning, and chiseling. My first project was to make a marking gauge. It required chiseling a mortise within which the arm of the gauge would slide. After teaching me a variety of hand-cut joints, John suggested I make a jewelry box that he had designed, which required frame-and-panel construction, hinge setting, lid fitting, and finishing. When I was ready to attempt my own design, I decided to make a cherry nightstand.

John suggested I draw a sketch and bring it to him for discussion. He pointed out what worked and what was problematic, giving me enough information to understand problems but leaving room for me to come up with solutions. Many times I refined the drawing and returned with it for further review. When I had a sketch that seemed reasonable, John had me make a full-scale mock-up of the nightstand, and we went through the same critiquing process. To make the nightstand’s convex doors, I learned to cut veneers and make a bent lamination.

The most transformational lessons I received from John were not in technique, per se, but in the discussions we had regarding design, craft, and the roles of furniture and the craftsman. I wanted my pieces to be unique, beautiful, stunning. I struggled to come up with designs that would live up to such expectations. John told me that good furniture “can be simple but not plain,” and that “it knows what it is.” And he emphasized that “good craft has no ego.” He also suggested that I research the concept of shibusa.

Shibusa, I discovered, is a Japanese aesthetic that embodies simplicity of form and restrained elegance balanced by subtle complexity. It might be expressed in a detail not immediately evident but increasingly apparent over time. It values naturalness, tranquility, functionality, and the imperfection of everyday objects. I began to think of furniture as contributing to the emotional milieu of its setting. It can be elegant and modest and avoids distracting from the harmony of its surroundings (simple but not plain). It doesn’t overextend itself by trying to be more than it is (it knows what it is). It should not be exploited as a vehicle to brag about the maker’s technical skill (good craft has no ego).

Studying with John has been a gift. He has given me much more than a set of technical skills. He has enabled me to engage with my craft in a manner that is deeply satisfying and meaningful. I’m extremely fortunate to have met him.

Tad Baum works wood and pursues shibusa in Acton, Mass.

I discover shibusa

BY TAD BAUM



Online Extra

To see an audio slideshow on John Reed Fox, go to FineWoodworking.com/322.

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Tides and Timbers

Several times a year, Peter Pierobon and his wife go camping on the rugged west coast of Vancouver Island, a place he describes as “truly wild and absolutely stunning.” Surf-smoothed logs are strewn on the beaches, and when a storm comes through, he says, “it stacks them up—



you can have a pile of logs 20 ft. high, all interconnected and interlocked, waiting for the next storm to rearrange them.” The dramatic sight of those stacks found its way into his sketchbook and, along with other elements of coastal ecology, inspired his series of Tidal furniture.

Although he sometimes incorporates driftwood in his work (and concedes that he is “that guy you see pulling logs out of the surf”), these pieces are made from 12/4 lumber—mahogany or sapele for the natural-finished ones, and poplar for those that are ebonized. Composing with these elements, he explains, “is challenging because the contact points are very small; you need to pay attention to the structural integrity of the object.” A former student and then employee of Wendell Castle, and for many years afterward a teacher himself, Pierobon is well versed in traditional wood joinery, but he found that the logical connections for these pieces were bolts and threaded inserts secured with epoxy.

—Jonathan Binzen

