POPULAR
Woodworking
MAGAZINE
APRIL 2026 | #288

FLOATING TOP ENTRY TABLE
A Mid-Century Design and a Floating Top Define This Table

CORDLESS TOOL CADDY
A Little Bit of Plywood And An Afternoon In The Shop Yield a Wall-Mounted Tool Caddy

SHOP LASERS
A.J. Hamler Offers An Introduction To Laser Types And Their Uses In Your Shop

BRIAN DEJONG

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G0403

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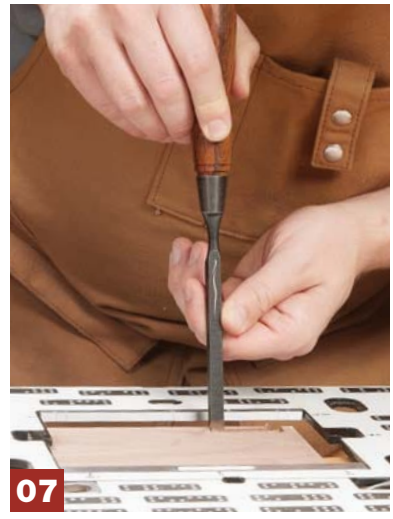

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FROM THE EDITOR

Holy Swedish Burls Batman

By Logan Wittmer

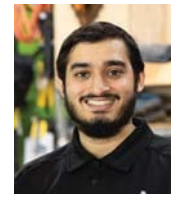
As we wrap up this issue of the magazine, the calendar has quietly turned the page to a new year. As holiday seasons tend to be, it's been busy around here—made even more so by the fact that we always have an issue coming due right after New Year's. With that in mind, I'm not entirely sure why my wife and I thought it was the perfect moment to take a vacation to Europe. But we did. We boarded a plane and spent time wandering Sweden and Italy—and I have to say, it was a fantastic trip.

While walking through one city, I stumbled upon a park filled with trees—many of them covered in burls. The photo above shows one of the largest examples I've ever seen. I can't say for certain what species it was, but based on experience, I suspect a Norway maple. Absolutely unbelievable. My wife made it abundantly clear that I was not allowed (legally) to bring home any clippings, leaves, or "souvenirs" from said tree. A boy can dream.

If there was one big takeaway from the trip, it was a renewed excitement for the European Woodworking Tours we're putting together for the fall of 2026. In September, Phil Huber of *Woodsmith Magazine* and I will be leading a group for a week in Denmark and Sweden. We'll even be visiting a museum in Gothenburg—just a few blocks from this very tree. If you're inclined to join us, I'd love to have you along. We can take a group photo next to it—and if you happen to notice me packing "prohibited botanical samples," feel free to look the other way.

All joking aside, I'm genuinely looking forward to 2026. Trips, classes, woodworking events, and a whole lot of projects are already filling the calendar. Now that my shop feels like it's finally settled into its final form, I'm ready to make real progress on projects that have been sitting on my bucket list for years. Some of those I'll bring you along for. Others I'll tackle quietly, behind closed doors—no camera in sight. Either way, my outlook for the year is bright. Cheers!

ABOUT THE AUTHORS



ABDUL HASEEB AHMED:

Floating Top Entry Table*– *pg. 50

Haseeb is a software engineer for Microsoft, and is located in the greater Atlanta Metro. In his free time, he spends it in his shop building projects for friends and family. Haseeb was the winner of the 2025 Grizzly's Maker Challenge, and his project can be found on page 50. Haseeb's work can be found on his Instagram, @AhaMakes.

BRAIN DEJONG:

Harlem Spice Chest*– *pg. 38

Based in Harlem, Georgia, Brian DeJong has spent a lifetime shaping ideas into form through wood. His passion began in early childhood while growing up in Kenya, Africa, and has since evolved into a full-fledged custom furniture business (DeJong Wood Creations). When he's not in the workshop, Brian shares his craft by demonstrating 18th-century woodworking techniques at a historic village near his hometown.

A.J. HAMLER:

Lasers In the Shop*– *pg. 22

Originally a broadcast professional, A.J. Hamler is the former editor of *Woodshop News* and *Woodcraft* magazines, but over the last four decades he's written hundreds of woodworking articles appearing in most of the publications in the field. A.J. has also authored a dozen books (including five titles for *Popular Woodworking Books*), and edited several more. When not in his workshop, A.J. enjoys gourmet cooking, science-fiction, Civil War re-enacting, and taking part in charity events with the 501st Legion.

CHAD MCCLUNG:

Tool Caddy*– *pg. 32

Over the better part of two decades, Chad McClung has been in the woodworking space, teaching his craft to readers across the US. Chad is the former editor-in-chief of *Woodcraft* Magazine and an experienced how-to content creator in the woodworking, home improvement, and luthiery spaces. When he's not in the shop, he's busy justifying an ever-growing Blu-ray collection.

JAMES WRIGHT:

The Spill Plane*– *pg. 18

James has been working with wood since he could stumble into the shop with his dad. Later, when he moved into a house with no space for a full workshop, he decided to take up all hand tool woodworking. This decision sparked a whole new passion for wood. Now, he feels like he is learning the art all over again. His joy and desire are to share this passion for hand-tool woodworking with everyone he can. So, he invites others to come along for the fun of learning the ancient and new art of hand-tool woodworking. You can follow James on his YouTube channel, Wood By Wright.

PHOTOS PROVIDED BY THE AUTHORS

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WORKSHOP TIPS

PHOTO PROVIDED BY THE AUTHOR

Sawdust Catcher

After years of sweeping under my contractor's saw, I finally devised a way to directly collect most of my sawdust in a large plastic trash bag. I made a frame of 1/2" MDF to hold the bag. I drilled holes for machine bolts in the frame and corresponding holes in my saw's base. I epoxied the bolts in the bases' holes. The bag wraps around the frame, which is attached to the base with wing nuts. *—Stephen Drummer*

Super Sandpaper

Whenever I was sanding by hand, the sandpaper would roll or slide in my hands, eventually tearing and turning into small, useless scraps. I tried folding it every which way until I finally solved the problem with a little spray adhesive. Now I cut a sheet of sandpaper in half and spray on a light coat of adhesive. Then, I fold the sandpaper to a quarter-sheet size, which is just right for hand-sanding. The glued paper doesn't roll or slide and its double thickness makes it stronger. *—Brian Roesch*

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WORKSHOP TIPS

Slick Drawer Runners

One day, I really fed up with the drawers in my desk at home. They're the old-fashioned kind, which ride on their wooden sides. The sides had become so worn that the drawers were always a pain to open and close. This day, they were particularly bad. I considered installing the side-mount ball bearing slides I had always dreamed about, but the cabinet's opening wasn't big enough to allow for them. I'd have to make new drawers, and I really wasn't up to it.

Feeling frustrated, I went to the kitchen to make a sandwich. I noticed that our cutting board was made from UHMW (Ultra High Molecular Weight) plastic, which is very slick and durable. I quickly decided that this cutting board was worn out, and told my wife we should get a new one. Old cutting board in hand, I headed for my shop. First I cut down the drawer's height by 1/2" and then repositioned the front. Then, I countersunk and screwed on my new UHMW 1/2" x 1/2" runners. Now my only problem is that instead of working in my office, I just sit there sliding the drawers in and out. — *Lou Bush*

Sanding Guard for Inside Corners

Sanding inside corners used to leave nasty buzz marks from my sander banging into the adjacent face. I still haven't tamed my sander, but now I get buzz-free results by protecting the adjacent face with a painter's edging guide. It doesn't cost much and is so thin that I can sand virtually all the way into the corner. Now sander-base-whacking won't leave marks. — *Madeline St. Amant*

PHOTO BY VERN JOHNSON

Cool Tip

Changing the sanding sleeves on a spindle sander can be as tough as removing an old rusty bolt. Next time, try this trick: Put the drum in your freezer for 15 minutes. The cold will shrink the rubber drum and the sanding sleeve will almost fall off. — *Alex K. Madler*

PHOTOS PROVIDED BY THE AUTHOR

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NEW TOOLS

Y-2 Bench Chisels from *Zen-Wu Toolworks*

Y-2 CHISELS
Zen-Wu
ZenWuToolworks.com
Price: $69.99+

If there's one hand-tool company that's finally getting the recognition it deserves, it's *Zen-Wu Toolworks*. Founded by Luke Lyu, *Zen-Wu* specializes in traditional Chinese tools made to an exceptionally high standard, and the Y-2 bench chisels are a perfect example of that commitment to quality.

At first glance, these chisels follow a familiar Western bench-chisel pattern. According to the Zen-Wu website, they're made from a "white-paper carbon steel" designated as ZW-C2. While the exact metallurgy may be a bit opaque to me, the performance is not: these chisels take an edge quickly, hold it for an impressively long time, and arrive from the factory sharper than almost anything I've handled.

Priced at $69.99 per chisel, these aren't big-box tools — and they're not trying to be. At the same time, they don't venture into ultra-premium pricing either. What they offer is something far more compelling: outstanding edge retention, a great feel, and a price point that makes them one of the best values on the market today. When all of that is taken into account, the Zen-Wu Y-2 bench chisels may very well be the best bang-for-your-buck chisels available. — *Collin Knoff*

Woodpecker's Joinery Sled

JOINERY SLED
Woodpeckers
Woodpeck.com
Price: $339.99

Most people think of a table saw primarily as a tool for cutting parts to length or ripping them to width. Add a dedicated joinery jig, however, and it becomes a far more versatile machine—capable of precise, repeatable joinery that would otherwise require specialized setups or additional tools.

The new joinery sled from *Woodpeckers* is one of those accessories that truly expands the capabilities of a table saw or router table. The sled rides on a sliding base that accommodates a wide range of machine setups, while its tilting table adjusts from 91° down to 44°, allowing for everything from square joints to compound angles. A vertical fence with a replaceable sacrificial face supports clean cuts, and the fence itself can be angled to securely hold mitered workpieces.

What really sets this sled apart is its ability to be fine-tuned. A threaded adjustment knob at the rear of the jig allows for extremely precise micro-adjustments to the vertical table, making it easy to dial in exact fits. For woodworkers who would rather spend their time building projects than shop jigs, the *Woodpeckers* Joinery Sled is a well-engineered solution. — *Greg Kopp*

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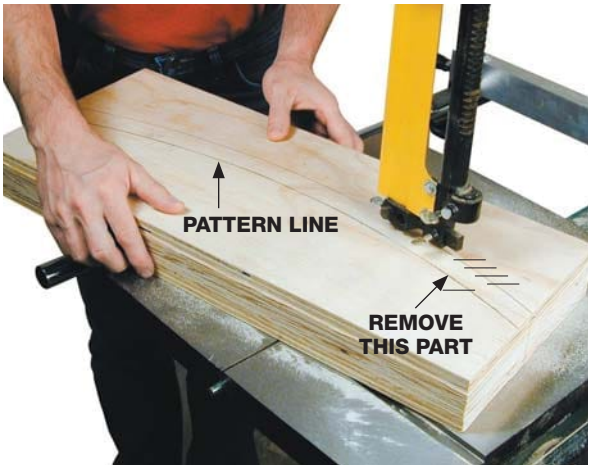
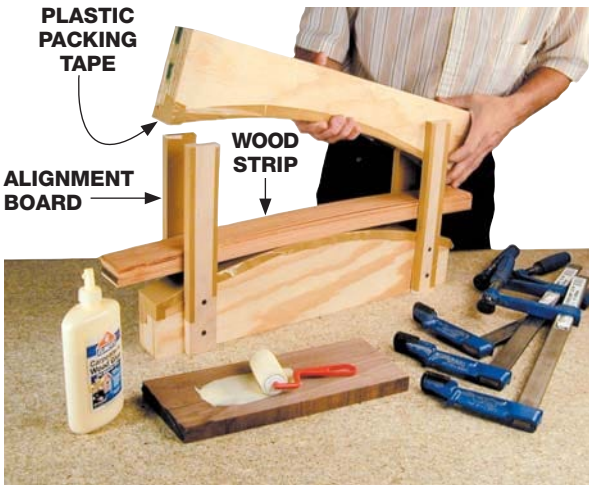
WORKSHOP TIPS

A Press to Laminate Curved Parts

Curved, laminated parts are stronger than parts sawn from solid wood. This press makes laminating easy. The press is made of layers of plywood or particleboard that are glued together. This sandwich is cut into two parts on the bandsaw. The alignment boards (which keep the press and the wood strips lined up) are screwed onto one half. During clamping, some glue squeeze out will occur, so apply plastic packing tape to the clamping press and alignment boards to keep them from sticking to each other and your workpiece.

The strips of wood should be milled to between 1/16" and 1/8" thick. (Sawing them to thickness on a tablesaw works, but planing them to thickness will produces a better glue joint.) Apply glue evenly to the strips. A small paint roller works great for this. Then place your parts in the press and clamp. Leave the clamps on for at least eight hours. Now you've got a board that's both curved and strong.





Trouble-Free Dovetail Clamp

Dovetails are popular because they're strong and self-locking from one side. But you need to clamp the other side with the pressure directly over the joint, if possible. And when the dovetails protrude a bit, that's tough. This unique clamping block solves the problem.

You can make one of these blocks with your bandsaw or a dado blade on your tablesaw. You want the feet of the clamping block to be spaced and sized so they fit between the pins of the joint. For assembly, tap the box together and position the clamping blocks. A little masking tape works wonders to hold them in place while the clamps are added. Check your box for squareness and let it dry.

Clamps by the Roll

Tape works wonders when it comes to clamping together small projects like jewelry boxes. Regular clamps can be cumbersome and simply too big and heavy. By contrast, masking tape, is easy to use. When you stretch the tape a little it exerts sufficient pressure for small projects. As always, make sure your project is square before setting it aside to dry.

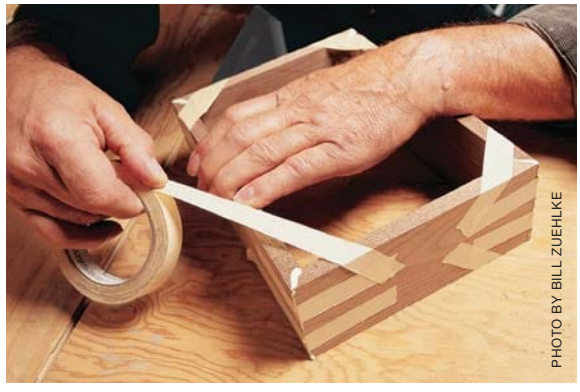


PHOTO BY BILL ZUEHLKE

Paper Towel Pads Keep Corner Joints Clean

Here's a trick for managing glue squeeze-out when you clamp dovetails or box joints: Face your clamp pads with paper towels. They absorb glue so it doesn't soak deeply into the wood. After the glue has dried, the blocks knock off easily because of the paper. Dampen any paper that remains on the joint. After about a minute it'll scrub right off.
—*Tim Johnson*

Wide Cauls Require Fewer Clamps

Cauls distribute clamp pressure, which radiates from the jaws up to 45° from center. When you locate the clamps, simply make sure the adjacent pressure lines overlap at the outside joints. The wider cauls, the fewer the clamps you'll need. Cauls are especially useful when you glue numerous thin boards—butcher-block tops, for example. —*Tim Johnson*

PHOTO BY MIKE HABERMANN

Create Clamping Shoulders for Curved Shapes

Make custom clamping blocks by tracing and cutting curved profiles. Then mark and cut clamping shoulders parallel to the joints. By proactive: Self-hanging clamping blocks free both hands for clamping.

PHOTOS BY THE AITHOT UNLESS OTHER STATED

NEW TOOLS

JET JDP-20S Smart Drill Press

At first glance, a drill press seems like one of the simplest tools in the shop: a motor turns a spindle, the spindle turns a bit, and a hole appears. In practice, though, drilling clean, accurate holes across different materials and bit types is far more nuanced. Feed rate, spindle speed, depth control, and material choice all play a role in getting clean, accurate holes.

Jet Tools recently introduced a drill press designed to take some of that guesswork out of the process. The JDP-20S, which *Jet* calls their Smart Drill Press, adds a suite of user-focused features that elevate what's traditionally been a very analog machine. After spending some time with it, the name makes a lot of sense.

The most obvious difference is the touchscreen mounted on the front of the head. This interface is where you control the machine's smart functionality. You simply select your material, bit style, and bit diameter, and the JDP-20S automatically calculates and displays the recommended spindle speed.

Once you're ready to work, the main screen provides real-time feedback including current bit depth, target depth, spindle RPM, and motor load, along with controls for the laser guide and work light. One standout feature is auto-start: begin feeding the quill and the motor turns on automatically; retract it, and the motor shuts off. Pair that with the digital depth stop—which halts spindle rotation at a preset depth—and repetitive drilling operations become faster, safer, and far less tedious.

JDP-20S
Jet Tools
JetTools.com
Price: $2399.00

While the smart features are impressive, they wouldn't matter much if the machine itself felt flimsy. Fortunately, that's not the case. The JDP-20S is a solid, stoutly built drill press that feels every bit as capable as it is intelligent. Smart tools are clearly the direction the industry is heading, and if the JDP-20S is any indication, the future shop is going to be filled with some genuinely exciting machines.— *Logan Wittmer*

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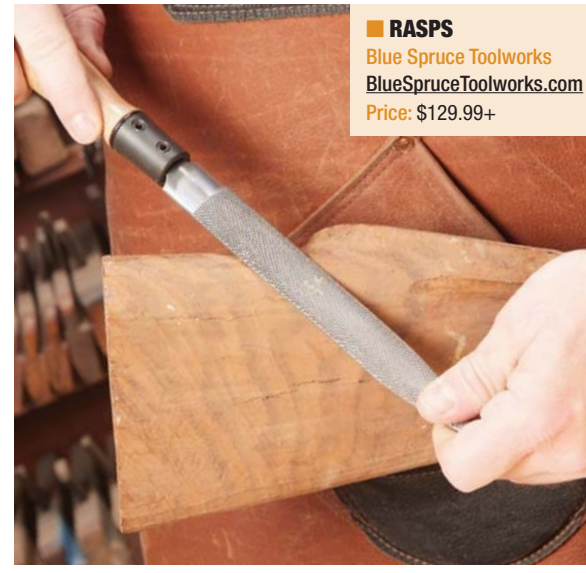
NEW TOOLS

Blue Spruce Toolworks Hand Stitched Rasps



RASPS
Blue Spruce Toolworks
BlueSpruceToolworks.com
Price: $129.99+

A rasp is one of the most valuable shaping tools you can have in the shop. If you don't already own one, I'd strongly recommend adding one to your kit. Once you do, you'll be surprised by how often it becomes your go-to tool for quick, controlled material removal.

The new rasps from *Blue Spruce Toolworks* are, quite simply, the best I've used. *Blue Spruce* has partnered with *B&B Argentina* in Italy to produce these hand-stitched rasps, and the results are exceptional. The unique tooth geometry cuts aggressively while leaving a smoother surface than most traditional hand-stitched rasps—a combination that's hard to come by.

As a longtime fan of the *Blue Spruce Toolworks* lineup, I was especially pleased to see these rasps fitted with true *Blue Spruce* handles. Secured with set screws, the handles are available in stabilized maple or Bolivian rosewood. Their added weight provides excellent balance, making the rasps easy to control and comfortable to use over extended shaping sessions.

The lineup includes several styles and profiles; for most woodworkers, an 8" 5T and an 8" 6F make an ideal starting point. After using a couple, though, don't be surprised if you find yourself wanting the full set. These rasps have been extremely popular since their release and often carry a several-week lead time—but they're well worth the wait.— *Logan Wittmer*

HD1900
Ridgid
HomeDepot.com
Price: $199.00

Ridgid HD1900 NXT Vac

Heavy-duty shop cleanup is where a shop vacuum really earns its keep. For me, a good vac needs three things: a powerful motor, a drum large enough that I'm not emptying it constantly, and a design that rolls easily around the shop. *Ridgid's* HD1900 NXT checks all three boxes.

The HD1900 NXT is powered by a stout 7-HP motor that's more than capable of handling demanding cleanup tasks. Its 16-gallon drum provides plenty of capacity for extended use, and it comes with a selection of attachments—though, admittedly, I still find myself reaching for an older brush-style attachment for most day-to-day work in my shop. Performance-wise, the vacuum feels strong and consistent, with no shortage of suction for general shop use.

Where this vacuum really stands out is its mobility. The four-wheel cart rolls smoothly over cords, debris, and uneven shop floors, and the included bent handle makes steering and repositioning the unit straightforward. The HD1900 is available through HomeDepot.com. — *Collin Knoff*

Connect

NEW TOOLS

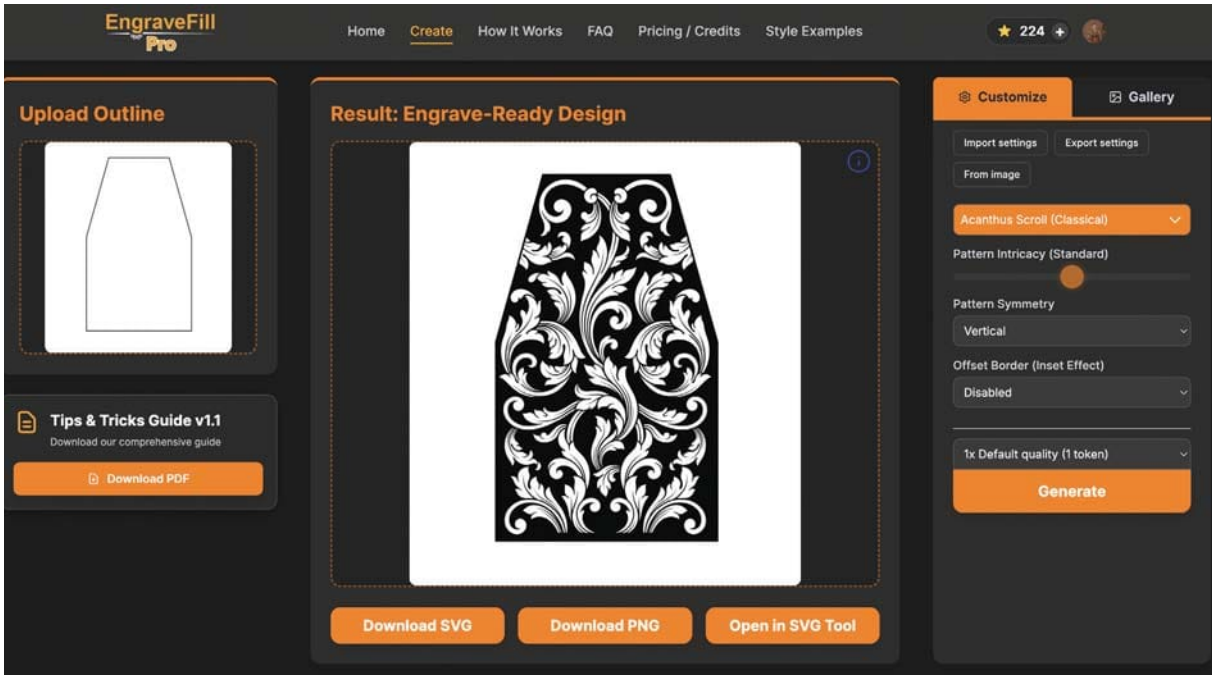
Engrave Fill PRO AI Pattern Generation

AI PATTERN
Engrave FillPRO
Engravefill.app
Price: €0.07/image+

It's not often that we feature software in our New Tools section—and even less often that a piece of software excites me. A few months ago, though, I came across a social media post asking whether anyone would be interested in an AI-powered tool that could generate decorative patterns and fills for laser engraving. That idea caught my attention, and I followed along as the project evolved into what is now *Engrave Fill Pro*.

Engrave Fill Pro is a web-based application that allows users to upload an outline and fill it with AI-generated decorative patterns. Once your outline is loaded, you can choose from dozens of pattern styles, including classic scrollwork (acanthus, Victorian, hunting scenes, and more), multiple leatherworking-inspired scroll patterns, and thematic options such as Norse, Viking, skulls, and other ornamental designs. After selecting a style, the software generates a complete fill pattern that you can download and use however you like. I've recently been experimenting with fiber lasers and used *Engrave Fill Pro* to generate an image that I engraved on the blade and chip breaker of my No. 3 hand plane with Norse scrollwork featuring a pair of ravens—the results were both detailed and visually striking.

Access to Engrave Fill Pro is based on a credit system: €20 purchases 250 credits, with each pattern generation costing one credit. Pricing is listed in euros, as the software was developed in the Netherlands. Overall, this is a tool I'm genuinely excited about—not just for what it does now, but for where it appears to be headed. New features have been added at a steady pace, and it wouldn't be surprising to see expanded export options or additional capabilities in the future, such as pattern generation specifically tailored for CNC workflows. — *Logan Wittmer*



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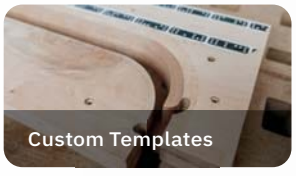

SHAPER

PRECISION CUTTING SIMPLIFIED

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NEW TOOLS

Custom Cutterheads from *WGM Toolworks*

If you've watched any of our videos, or listened to our podcast, you'll know that I'm a vintage tool fanatic. Tools of yesteryears are, in my opinion, superior to a lot of tools today (obviously, exceptions). But one way that modern tools are better than vintage are the innovation in cutter heads. When I recently rebuilt a 1950's era Moak jointer, I ordered a new cutterhead from *WGM Toolworks* to replace the original straight head. And I have to tell you that this thing is amazing.

You may recognize the name *WGM Toolworks* — I've showed their heads in the past (most recently in a DJ-20 jointer). When searching for a new head, I discovered that *WGM Toolworks* offers custom machined heads for a variety of machines. After reaching out to *WGM*, I quickly received a drawing of a 16" cutterhead for a Moak jointer to verify that it matched my head. *WGM* knows their stuff; Moak changed heads over the years and wanted to verify my machine style. They went out of their way to make sure I was getting a matching head.

CUTTER HEAD
WGM Toolworks
WGM-Toolworks.com
Price: Varies by Machine

The head is everything I expected. The machining was flawless on it — not one blemish. The cutters are sharp, and this head cuts phenomenally. If you're looking for a new head for your machines, I suggest taking a look at the *WGM* offering. I have a full video on our YouTube channel about installing this head, and the first cuts on it.— *Logan Wittmer*

UltraShear Alternating-Shear Pattern Flush Trim Bits

Pattern or template routing is something I use on almost every project in my shop. Whether I'm making corbels or simply rounding corners, there's no better way to ensure perfectly identical parts every time. A new style of router bit from *Woodpeckers* makes these tasks easier — and better — than ever.

These new flush trim bits are called the *UltraShear* Alternating-Shear Pattern Flush Trim Bits. It's a mouthful, sure — but once you use them, you won't care what they're called. What you'll notice is how smooth they cut, without grabbing you often get with other bits, especially on end grain.

The secret lies in the four cutting edges, which alternate between forward-leaning and backward-leaning shear angles. One flute cuts from the top toward the center, while the opposing flute cuts from the bottom toward the center. The result is exceptional control when entering a cut and a surface that's dang-near finish-ready right off the router. — *Greg Kopp*

ALTERNATING-SHEAR BITS
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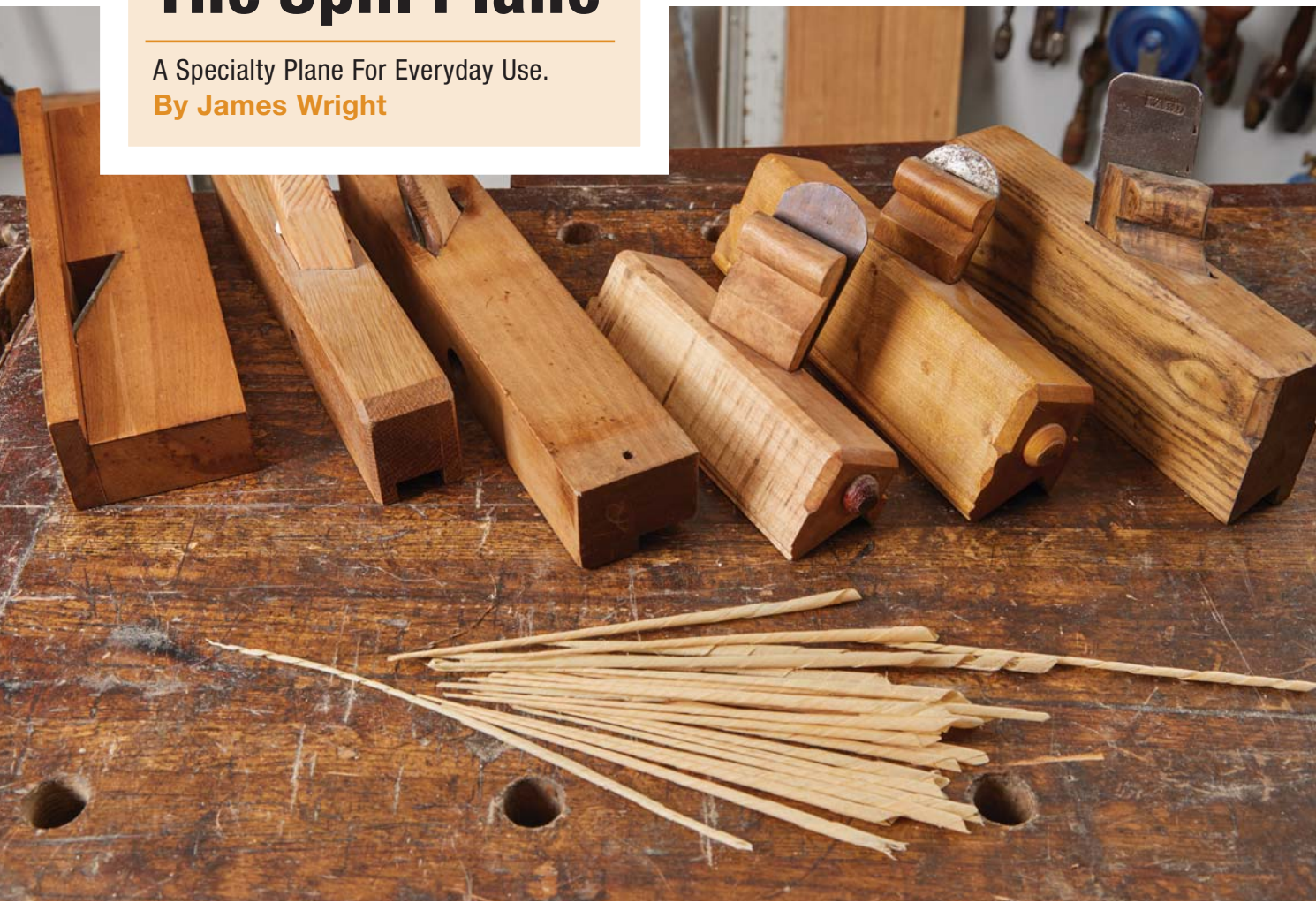
Joiner's Bench

The Spill Plane

A Specialty Plane For Everyday Use.

By James Wright



A tool that whispers of simpler times, of hearth fires and candlelit evenings. It's not just a tool; it's a piece of history that you can hold in your hand, a connection to the woodworkers who have come before us. It is a powerful tool that can produce a finished project in a single pass of the plane. And it is one of the few times where the byproduct is the actual product.

What is a Spill Plane?

In essence, it's a small, specialized plane designed to create thin, narrow shavings, or "spills", that were used to light fires and candles before the advent of matches. You needed a way to transfer a flame from the fireplace to a candle or start a new fire, and that is where the spill plane came in.

The design is straightforward: a small body, a sharp blade set at a shallow angle, and often a fence to guide the plane along the board. But the angle and geometry were mind-boggling. They were often made from scrap and iron that were past their life in other planes. Because of this, they came in many shapes and sizes. Some would mount in a bench vise and have the board pulled over them, and others would have the board stationary with the plane moved over the board.

There's something deeply satisfying about running a well-tuned spill plane across a piece of wood and watching that thin ribbon of shaving emerge and grow out of the side of the plane. It's almost meditative. The wood curls come off in long, delicate straws; each one requires a mastery of the plane's geometry and the skill needed to set up the plane.

The spill plane was often a great way to earn extra money from the scraps left over after the project was completed. The apprentice could use the spill plane and learn how to set up a wooden plane with a plane-setting mallet. And in doing so, have a product that could be sold. It is a powerful tool that can produce a finished project in a single pass of the plane.

PHOTOS BY LOGAN WITTMER

What's the Process Like?

The process itself is a joy. You need to hold the plane at just the right angle, apply steady pressure, and let the blade do the work. There's a rhythm to it, a back-and-forth motion that becomes almost hypnotic. And when that perfect curl comes off, long and unbroken, it's a small victory. Using the plane is not about the end project; it is about the process, the connection to the material, and the feeling of working with a hand tool. It's about the history you're touching, the tradition you're continuing.

In today's world of instant gratification, there's something special about slowing down and taking the time to create something by hand. There is satisfaction in knowing that you're not just consuming but creating. With a spill plane, you're creating something beautiful and useful, and something that connects you to the past.

So, if you ever have the chance to get your hands on a spill plane, take it. Spend some time with it. Sharpen the blade, wrap your mind around the geometry, find a good piece of wood, and start making curls. You might find yourself transported back in time to a simpler, slower pace of life. And you might just discover the pure, simple joy of watching those delicate wood shavings emerge, one after another. It's a small pleasure, but it's one that's deeply satisfying. And in a world that often feels too fast and too complicated, sometimes the small pleasures are the ones that matter the most.

PW - *James Wright*

1 This style of spill plane is mounted to the bench and the stock ran across it.

2-3 Traditional style spill planes can be either pushed (2) or pulled (3) to create a curly shaving, or spill.

4-5 Modern-day spill planes are a thing of beauty, often featuring figured wood and a skewed blade.

6-7 Sharpening a skewed blade can be done with a wide guide (6) or free-hand.

Spill Blade Sharpening

Sharpening a spill plane blade requires more care and planning than sharpening a standard blade. As shown in Photos 6 and 7, spill plane blades are ground at a skewed angle, which means they must be sharpened differently from straight blades.

There are several effective approaches to sharpening a skewed blade. If you choose to use a honing guide, it must clamp the blade from the top rather than from the sides. As shown in Photo 6, the *Veritas* guide is wide enough to accommodate the blade's angle while holding it securely. When setting the blade in the guide, align the cutting edge so it is parallel to the roller at the bottom of the jig. Adjust the blade's protrusion so the entire bevel rests flat on the sharpening stone.

Alternatively, you can sharpen a skewed blade freehand. I do this by placing my thumbs along the back edge of the blade and using my index fingers to keep the bevel flat against the stone as I make my sharpening strokes.

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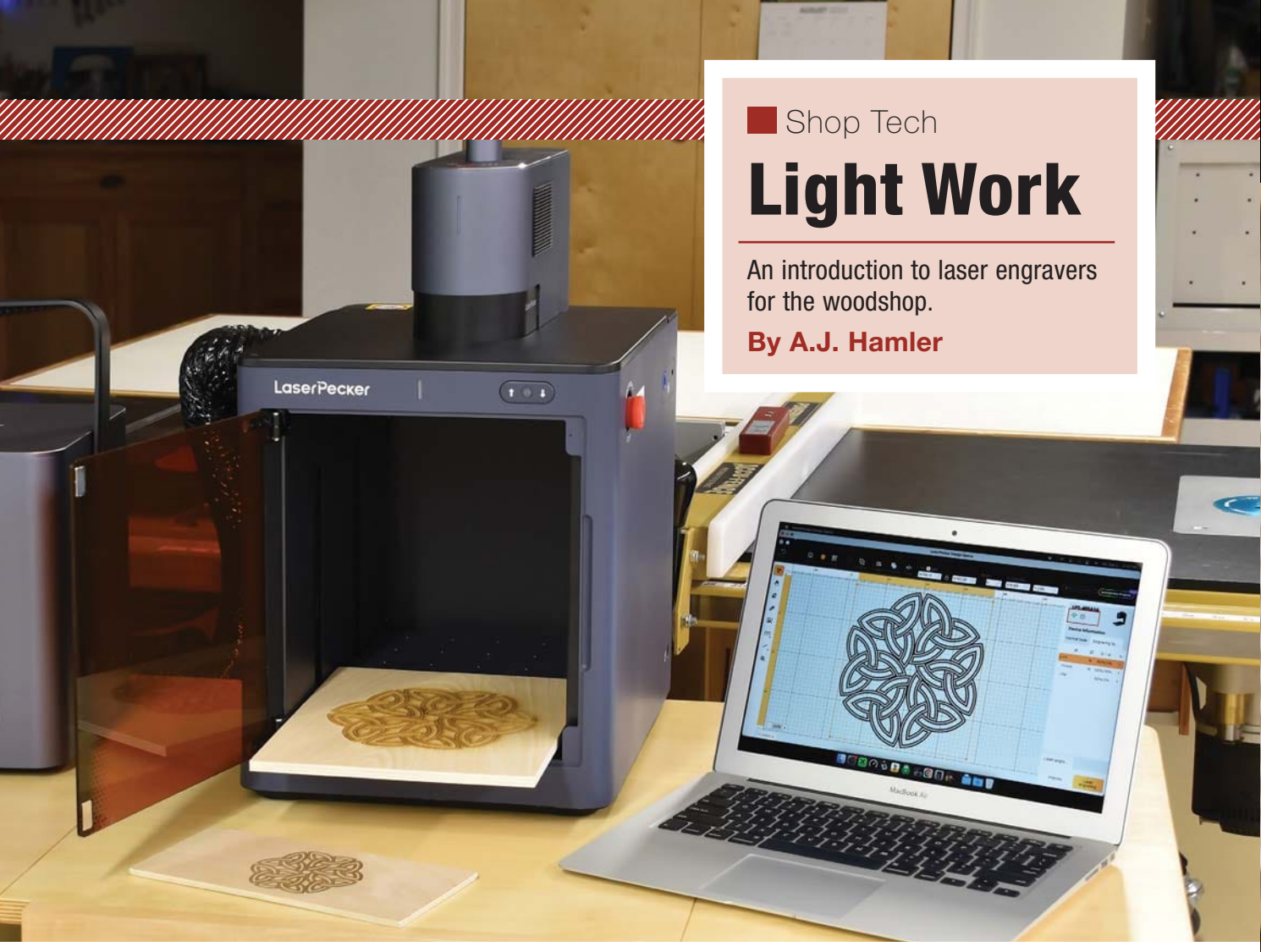

Shop Tech

Light Work

An introduction to laser engravers for the woodshop.

By A.J. Hamler

Engraving, scoring, and cutting wood with a beam of light may sound like science fiction, but it's becoming an increasingly common reality in woodshops.

Laser technology produces repeatable results, converting digital images and text into wood engravings, lettering, decorative panels, and complex inlays. If you have any familiarity with CNC machines, you'll find lasers quite similar. But is one right for you? Let's find out.

Different laser types have unique capabilities based on the wavelength of light they produce. Materials respond differently (or not at all) to different wavelengths, determining if the laser can engrave, cut, etch, mark, score, or emboss a specific material.

The process starts with an image or text file created with graphic-design software like Photoshop or CorelDRAW, then "translated" to a format the laser understands with a laser-specific design tool such as LightBurn or LaserGRBL.

Types of Laser Engravers/Cutters

There are three main types of laser engravers showing up in woodshops, each with a distinct set of strengths and weaknesses.

Diode Lasers

Diode lasers work by directing semiconductor diode light beams to engrave and cut organic materials, including wood, plywood, MDF, and bamboo, as well as leather, paper, cardboard, and cork. They can also mark slate and opaque acrylic, plus metal, glass, and clear acrylics with an opaque coating.

Using a gantry system to guide the laser module through x/y coordinates, diode engravers can add logos and decorative elements to furniture and craft projects, and cut softwood up to about 1/4" in a single pass. Among the more affordable engravers ($150-$800), diodes provide good value and quiet operation. Typical wattage for most consumer diode lasers ranges from 5W-40W, with a wavelength of 445-455 nm, but some diodes approach near-infrared with higher wavelengths.

CO_2 Lasers

Taking a step up, CO_2 lasers are also gantry machines, using electrified carbon-dioxide gas in a sealed glass tube to create an

PHOTOS BY A.J. HAMLER

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infrared beam capable of cutting, engraving, carving, and inlay. The laser itself is stationary and directs a beam through mirrors to the moving laser head.

As with diodes, CO_2 lasers work well on wood, plus organic materials like leather, rubber, paper, and cork. Unlike diodes, however, CO_2 lasers easily cut or engrave all acrylics, including clear, and can etch glass. They can also engrave slate and stone.

CO_2 lasers cost more, typically $1,000 - $5,000, but their higher power allows deeper one-pass cuts — about 1/3" in hardwood up to 3/4" in softwood. Note that these are not small machines; mine weighs over 100 lbs. Wattage for consumer CO_2 lasers usually ranges from 40 - 150W, with a wavelength of 10,600 nm.

Fiber Lasers

Fiber lasers, also infrared, use a combination of rare-earth elements and optical fiber for a high-intensity beam. Instead of a gantry, most use a galvo system to direct the beam through gimbaling mirrors.

Fiber lasers aren't suited for wood or acrylic, which barely react to the wavelength, but they excel at marking and engraving metal for adding logos, lettering, and decorative details. They're also adept at deep engraving and embossing — it's possible to create custom hardware, coins, and thin metal inlays. That versatility comes with a steeper price, generally $3,000 - $15,000. Typical wattage runs from 20W - 100W with a wavelength of 1,064 nm.

UV Lasers

There's a fourth type — UV lasers — that produces high-finish engraving results on wood, plastics, glass, leather, metal, and ceramics. However, they're fairly new for the consumer market and very expensive, with a small work area of only a few inches square. They're not ready for serious woodworking yet, so we won't cover them here. But keep an eye on them — they may turn out to be true do-it-all machines.

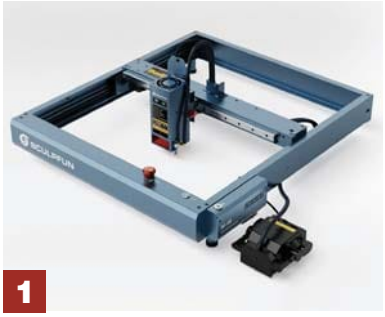
Most CO_2, fiber, and enclosed diode lasers arrive assembled and ready to rock-and-roll; but not open-frame diodes. Assembly isn't difficult, plus setup videos are available online.

Safety Considerations

Lasers, like other woodshop tools, can be dangerous. But the threat posed by traditional tools generally involves direct contact with blades, bits or flying debris — lasers can hurt you without touching you.

Create a dedicated laser work area that no one, especially kids, will wander into. Everyone in your home should understand what you're doing, and when. Curious pets (I'm looking at you, cats) should be kept away.

Never leave an operating laser unattended, even briefly. You can still get other work done while a laser is running, but always keep the machine in sight. Most lasers have a "pause" function. Use it if you leave the work area, then pick up right where it left off afterward.



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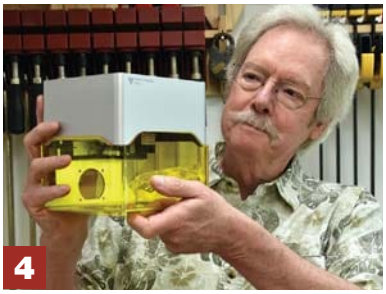
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1 Most basic diode laser engravers use an open-frame design and gantry. For these open machines, eye protection and a means of exhaust are a priority.

2 Enclosed systems like this large *OneLaser* CO_2 machine, provide eye-protecting tinted windows to monitor engraving. Because they're completely enclosed, exhaust is easier to accomplish.

3 This 20W fiber laser from *OMTech* is typical of their smaller, open design. Unlike diode and CO_2 engravers, fiber lasers use internal mirrors to direct the beam instead of a gantry.

4 Laser engravers run the gamut in sizes, from stationary floor machines to this 1.6W diode from *TwoTrees* measuring only 6" x 6 1/2" and weighs just over two pounds.

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Fire safety

Lasers work wood by ablation—literally vaporizing it—and the created heat can flare up. A tiny spurt of flame at the laser contact point is common, but typically harmless and gone in a split second. But in the unlikely event that the laser module jams or overheats, it could get out of control. If it happens you need to be there.

You have smoke detectors in your home, but how about your shop? Likewise, keep a fire extinguisher just for the laser area within easy reach. An ABC-type extinguisher is good, but a CO_2 extinguisher is cleaner and less damaging to electronics. Some laser manufacturers offer internal CO_2 fire-suppression kits that detect and extinguish flames instantly—worth considering.

Ventilation

As with traditional woodworking equipment, lasers require some means of removing harmful by-products. Lasers don't create wood dust, but they do create smoke; metal and stone produce fine dust; acrylics release smelly, sometimes toxic, fumes. You can't "collect" that—so vent it.

Enclosed lasers usually have an internal fan and port for a flexible hose. At a minimum, a hose out a window may be sufficient. A better way is a simple plywood spacer with a dust port, sized to an open window or door. Put the plywood in the opening, then close it to hold the spacer in place.

Open-frame machines may have a tiny fan on the module, but that just blows smoke into the shop. For these, make an enclosure—a simple box with an exhaust port, hinged access, and laser-blocking window. Attach an inline fan and hose to vent smoke outside. Some manufacturers offer fabric enclosures with a zip-open tinted plastic cover and small exhaust fan.

Lacking a convenient window, or if you want mobility—to take the laser to a craft show, say—the solution is an air purifier, which many manufacturers offer as an option. It pulls fumes and fine particles from the laser and through multiple internal filters.

The best solution is a dedicated exhaust/duct system similar to a dust-collection setup, except the fumes are vented outdoors using the largest practical ducting for efficient airflow. Exhaust ports on most lasers are about 3", so use an adapter to size up to larger hoses or ductwork.

My setup hides ducting inside two cabinets and a desktop, to an exterior wall vent.

A 4" hose goes from the exhaust port adapter of my CO_2 laser, to a blast gate on the first cabinet. That

5

5 The easiest means of exhausting smoke is to simple run the laser's exhaust hose out a door or window. Here, an exhaust port mounted on a narrow piece of 1/4" plywood is held in place by the sliding door.

6 Open-frame machines are difficult to exhaust unless enclosed. This cover uses a small fan to pull exhaust away from the laser and out through a hose. With the cover over the laser, access is gained through a zip-open flat. Note the tinted clear-plastic window to protect the user's eyes from reflections.

7 An air purifier, like this one attached to an enclosed *LaserPecker LP5* engraver, can remove smoke, fumes, and fine particles when a means of exhausting to the outside isn't available.

6

7

A.J.'s Hidden Exhaust System

LEFT A 4" hose leads from the Large CO_2 engraver to the blast gate on a base cabinet in the work center.

CENTER It joins a 3" hose from the desktop laser on the countertop above it.

RIGHT Once the exhausts are joined, the ductwork expands to 6" and exhaust is pulled out of the workshop by this powerful 6" inline fan.

connects via PVC to a fiber laser above, then jumps up to a 6" duct running through the other cabinet and out the wall. Inside that cabinet is a 6" inline fan. It's enclosed, so fan noise is minimal.

Keep whatever exhaust system you use clean and free of debris buildup, which is a potential fire hazard. Replace or clean purifier filters as needed.

Some materials should never be used with a laser because they can release toxic fumes. Avoid PVC and artificial leather (chlorine gas), ABS (hydrogen cyanide), polycarbonate, polypropylene, polyethylene, fiberglass, and epoxy resin castings.

Vision safety

In the woodshop, eye danger usually comes from flying debris. With lasers, the danger is the beam itself.

Laser engravers fall into safety classes based on type and power. Fiber and CO_2 lasers are usually Class 4, the most powerful. Even momentary exposure can cause permanent eye damage. Most diode lasers have lower class levels, but can still be dangerous.

Fortunately, enclosed lasers incorporate tinted plastic windows that block beams, and lock-out covers to prevent opening during use. If your cover can be opened during operation — say for oversized workpieces — always wear certified safety glasses.

Open-frame lasers usually have tinted shields around the module but remain open below, where beams can reflect upward. Never operate an open-frame laser without certified glasses.

You can't use just any glasses;

they must match your laser's wavelength (in nm) and optical density (OD). The rating for both should appear right on the glasses. Don't buy them if they don't.

The wavelength for diode lasers is typically 450–455 nm, for fiber around 1,064 nm, and for CO_2 10,600 nm. Choose accordingly. Your eyes are irreplaceable—proper eye protection is never optional.

Applications: Wood

The most common woodshop use for laser engravers engraving patterns, text, and even photographs. Using lower power and higher speed, the engraved surface is shallow, marking the surface rather than cutting. Higher power and slower speed allow cutting through wood for components and fretwork.

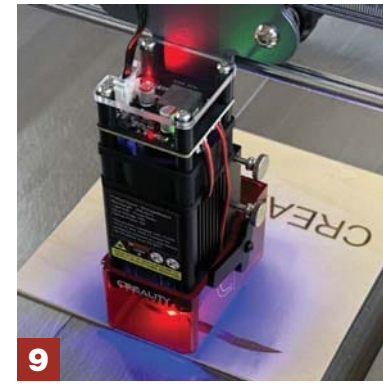
Depth depends mainly on power: higher power cuts deeper in one pass. A 20W–40W diode can cut up to 1/4", while a 60W CO_2 can cut more than 1/2". Softer woods cut more easily than hardwoods.

Lasers excel at inlays, where a single pattern cuts both the relief and inlay for a perfect fit. With a rotary attachment, cylindrical objects like turnings, vases, and pen barrels can be engraved around their circumference; rotaries also handle tumblers and wine glasses.

Engraved wood may show light scorching, and resinous woods can leave residue. Power and speed are the factors: Higher power or slower speed causes more. Both can be minimized with an "air assist," a small nozzle that blows smoke and gases away from the beam. It also prevents flare-ups. Most higher-end lasers include air assist, but third-party versions are available. Even so, some scorching or residue may remain, but is removable with rubbing alcohol or light sanding.

When making multiples, internal cameras help align engravings

8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8 Safety glasses of the proper rating absolutely *must* be worn when using any open-frame laser. Good glasses should have wavelength rating printed right on them.

9 The diode laser module on this open-frame engraver has a tinted shield around the business end to block harmful exposure. However, a laser beam can still reflect up into the user's eyes. Wear safety glasses!


10


11


12

10 Photos, once digitized and prepared using laser design software, can be engraved on slate, tile, leather, metal, or the plywood shown here.

11 Laser engravers can do intricate fretwork in a fraction of the time it would take with a scrollsaw. This "Tree of Life" design was created on the author's *55W CO_2* laser.

12 Creating inlays is a simple two-step process. First, engrave the relief for the inlay to the proper depth. Use the same design to cut out the inlay itself.

13 A rotary attachment allows you to engrave cylindrical objects, such as baseball bats, tumblers, glasses, or the lamp base shown here.

14 Most lasers can be set to produce multiples of a pattern using a sliding table as shown here, or a conveyor system.

15 Makers of many higher-end machines offer a feed system with the ability to engrave extremely long workpieces. The function is similar to using a planer.

16 Open frame machines can also handle longer workpieces with after-market accessories. This conveyor feeder from *AtomStack* is compatible with almost any frame-style laser and offers a capacity of 15¾" x 31½".

17 Lasers aren't necessarily limited by size. This 8½' high and 19' long wall produced by Kat se Blade Laser Studio consists of 36 individual 17" x 36" MDF panels (22 of them engraved).

and detect workpieces. Batch jobs can also use a sliding table or conveyor, letting the laser engrave multiple items as they pass under the beam. With lasers that detect objects and adjust pattern placement, you can keep tossing additional workpieces onto a moving conveyor.

A conveyor or sliding table handles long workpieces, too, pulling them continuously under the module, like using a thickness planer. Many laser makers offer these accessories, like the *xTool* CO_2 laser shown in photo 15.

Open-frame lasers can also use compatible third-party conveyors. The sliding table shown in photo 16, made by *AtomStack*, can be used with lasers from several companies.

Large projects can be done as separate components and then assembled. The 8 1/2' × 19' wall behind the reception desk shown photo 17 is composed of 36 individual 17" x 36" MDF panels. On the small end, a laser's fine beam can handle jewelry, pencils and pens, or even toothpicks.

18 Got a tiny task you need to do? No problem. The author engraved each of these toothpicks in about five seconds.

Applications: Metal

Though most useful for wood, some lasers can engrave metal for custom hardware and fittings.

Fiber lasers are best, and can mark, engrave, and emboss without coating. Diode and CO_2 lasers can't directly engrave metal (or glass), but can mark surfaces if coated first with black tempera, chalkboard paint, or a laser-specific spray. Anodized or powder-coated items also work. The coating absorbs laser energy at a high temperature, marking the surface underneath.

For true metal engraving, a fiber laser's wavelength vaporizes layers of metal. One or two passes create surface marks; more passes engrave deeper. The black pulls in photo 19 are marked by removing powder coating only, while the silver and brass pieces are deeply embossed. After engraving, metal can be darkened for contrast.

The award shown in photo 21 combines three engraving techniques in one project: deep embossing in brass with a fiber laser, text on the burl with CO_2, and anodized aluminum name plate with a diode.

Finally, fiber lasers can also give old, rusty tools a makeover. See sidebar "Bye-bye Rust" on page 31.

19

19 Fiber lasers are king when it comes to engraving metal. Here, a 20W fiber machine embosses a Lion's Club logo into a metal knob.

20 Depending on the settings, fiber lasers can deep engrave on metal, as in the brass and alloy pulls, or the simple surface marking on the black pulls.

20

21 The author used three different lasers to make this custom award: a fiber laser for the embossed brass coin, a CO_2 to engrave the burl, and a diode for the small anodized aluminum name plate.

22 For engraving or etching clear materials, like the acrylic (left) and glass (right) examples here, a CO_2 laser is a must. The shorter wavelength of a diode or fiber passes through clear material like it's not even there.

21

Applications: Glass & Acrylic

Most lasers can mark clear materials if they're coated first, but that only produces surface marking, no depth or cutting. CO_2 lasers, however, can etch glass and cut acrylic. Glass can't be cut (it would likely break from the heat), but engraving works with adjusted power and speed.

Acrylic cuts easily and cleanly with CO_2, ideal for cabinet windows, clocks, decorative accents, and more. It's especially useful for making accessory pieces and jigs, as well as templates and patterns.

In photo 23, I'm making a

22

Bye-Bye Rust

Got some old, rusted tools? You're in luck: Fiber lasers can clean them up in minutes by vaporizing the rust.

Unless the tool fits entirely inside the machine, you'll need to open the cover for its length. Do NOT do this without eye protection, and keep others away.

Photograph the tool, then use photo-editing software to silhouette the metal — in this case, a hammerhead — into a flat, high-contrast image. Place the tool in the laser base. In the design software, resize the silhouette to cover only the metal. The wood handle won't be affected, but engraving outside the silhouette wastes time and marks the base.

With the silhouette aligned, set power and speed for your machine and start. The beam passes over the surface, vaporizing rust, and revealing clean metal. Run additional passes if needed.

23 A CO_2 laser slices easily through this clear acrylic with edges requiring no further finishing. A CO_2 laser was used to create a clear router sub-base. Note that the laser cut approximately sized mounting holes at the same time.

24 The finished sub-base has a smooth surface that glides over the workpiece and gives a clear view of what's happening underneath.

24 Laser-cut acrylic routing templates hold up longer than MDF and retain a smooth edge even under repeated use.

custom router sub-base with an extended handle, something not easy to find commercially for all routers. To do this, I first drew the shape, then traced the router's openings and screw holes.

I then scanned the drawing, finalized it in Photoshop, then saved it as a line drawing in a format the laser can use. That's usually a vector file for cutting, such as SVG, DXF, AI (Adobe Illustrator), or PDF. Raster files like BMP, TIFF, or JPG are for engraving only. The laser software converts the file and sends it to the laser. When cutting acrylic, leave the protective covering on to prevent scratches. The finished workpiece lifts right out of the surrounding acrylic, and has a glass-smooth edge.

Acrylic templates and patterns for routing, made the same way, last longer than plywood or MDF, with less wear and tear on the edges.

There are countless other uses, but we can't cover them all here. Besides, you'll want to have the fun of discovering for yourself as you become more familiar with this new woodworking tool. **PW** - ***A.J. Hamler***

PHOTOS BY THE AUTHOR

Drill Station

This simple storage solution stashes your drills and drivers, charges their batteries, and organizes your drill accessories.

By Chad McClung

When I first set up my shop, I built a few plywood cubbies to corral my cordless tools and accessories. They worked well enough at first, but over time, my drills and drivers turned into a tangled mess of bits, batteries, and other tools. I'd have to shuffle things around just to find the right bit or a charged pack. It wasn't efficient, and it drove me nuts.

The more time I spent in the shop, the clearer it became that the issue wasn't the tools themselves—it was the lack of a system designed around how I actually work. Cordless drills and drivers get used constantly, and any friction in accessing them adds up fast. I wanted a setup that kept everything visible, prevented tools from piling on top of each other, and made it just as easy to put things away as it was to grab them.

So I built a dedicated drill station. Each tool now hangs in its own compartment, ready to grab and go without fuss. The top shelf holds chargers, with a clean cord-management hole and a lower shelf keeps bits and accessories close at hand. Everthing's organized, visible, and within reach.

Since this is a high-use shop shelf, I used leftover plywood I had around the shop. Its notched sides lighten the design, while the simple dado and rabbet joinery keep the structure solid without relying on hardware. It hangs on a French cleat, making it easy to take down or move as your shop evolves.

Designing Your Drill Station

Use the cut list to build this station as shown or tweak it to fit your tools. Check your drill lengths and handle widths before cutting and adjust the compartments as needed. Make it wider, stack two rows, or add shelves for more accessories—whatever suits your shop. Designing is half the fun.

Rabbets, Dadoes, & Notches

Break down your sheet goods to rough size, referring to the cut list. Take the parts to the table saw to rip and crosscut them to the final dimensions. At the workbench, lay out the notches for the back's two top corners on its rear face, one side's two front corners, and one corner on one support.

At the table saw, set your miter gauge to 45°. Rest the back edge of the marked support against the fence. Align the layout line with the table saw blade, ensuring the teeth are on the waste side of the line. Clamp a stop block to the fence and against the support's rear end to lock in the setup. Make the cut and then flip the piece edge for edge to notch the opposite corner. Saw the notches in the remaining supports using the same setup and procedure. Make a slightly wider support to rip in

1 Mark the back. Use a rule and pencil on the back's rear face to connect the end of one 3/8" long line from the edge, 1" down, to a mark 2 3/8" in from the edge.

2 Notch the supports. After locking in the setup with your miter gauge and a stop, cut the corners of each support.

3 Rip the side supports. Saw the wider support in half to make the side supports that are glued into the bottom dadoes in the sides.

4 Saw stopped rabbets. Strike a line on your sacrificial fence at the infeed side of the blade. Transfer the dado location to the board's outer face. Turn on the saw and feed the piece into the blade until the two lines intersect.

5 Drill the charger hole. With the bit installed and backerboard under the workpiece, drill the hole in the side.

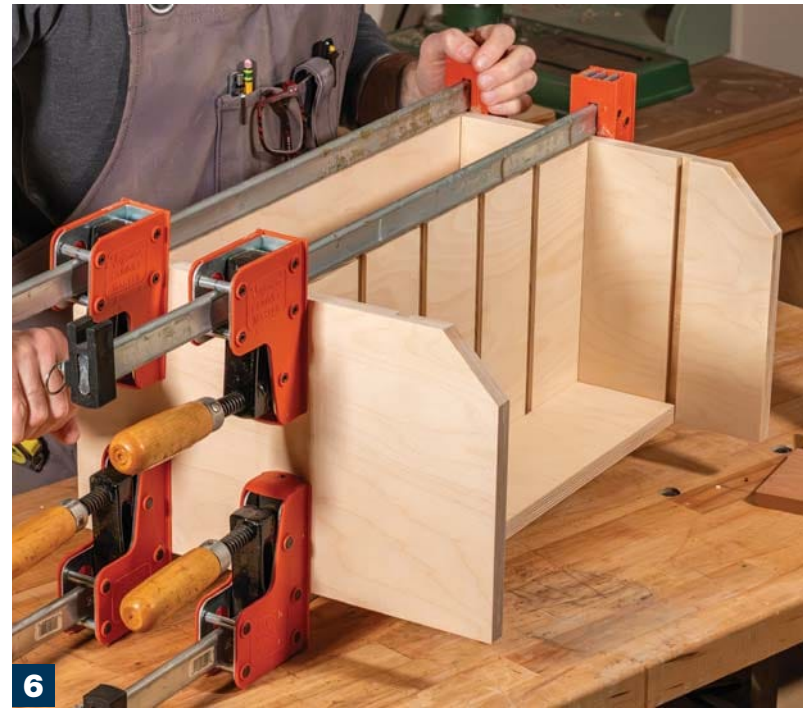
6 Assemble the case. Rest the back on a pair of clamps and drop in the sides. Slide in the shelves before adding another pair of clamps on top of the assembly.

half for the side supports, adjusting your miter gauge as needed to saw the notches.

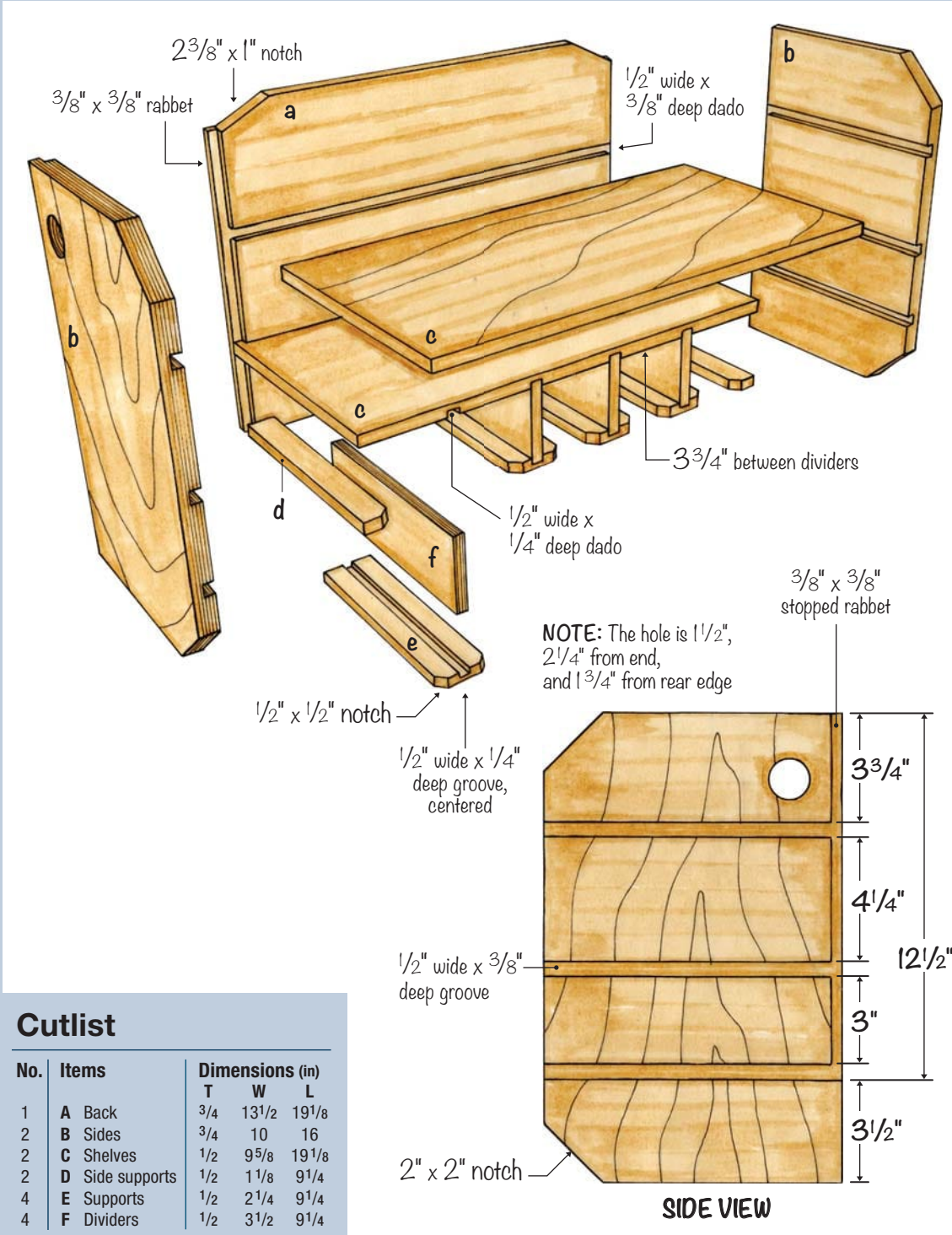
Install a dado stack in your table saw, setting the width to the exact thickness of your nominal 1/2" plywood. Outfit your rip fence with a sacrificial fence and bury the blade so that the 3/8" is exposed and the height is 3/8". Make test cuts for a tight fit. Saw the through rabbets in the back and then the stopped rabbet in the sides. For the other side, adjust the fence to saw the stopped rabbet in the opposite edge.

Next, remove the sacrificial rip fence and saw the dadoes in the back and sides. Your bottom dado will intersect with the stopped rabbet. Clean up as needed. Set the dado height to 1/4" to saw the dadoes in the lower shelf and the grooves in the supports.

Bandsaw the back's notches as shown in the drawing. Double-stick tape the two inside faces of the sides together, before bandsawing



Drill Station



Cutlist

No.		Items	Dimensions (in) T	W	L
1	A	Back	3/4	13 1/2	19 1/8
2	B	Sides	3/4	10	16
2	C	Shelves	1/2	9 5/8	19 1/8
2	D	Side supports	1/2	1 1/8	9 1/4
4	E	Supports	1/2	2 1/4	9 1/4
4	F	Dividers	1/2	3 1/2	9 1/4

the corners. Mineral spirits will help release the adhesive when done making the cuts.

Assembly & Final Touches

On the side piece that will be closest to an outlet, measure and mark the 1 1/2"-diameter hole for your battery charger's cords. The hole's center is 2 1/4" from the top end and 1 3/4" from the rear edge. Use an awl to mark the point. Chuck a 1 1/2" Forstner bit in your drill press and set up a backer board to prevent tearout. Sand the parts and clean up any rough edges.

Glue the sides to the back. To help seat the back into the stopped rabbets in the sides, glue the shelves in place. Use two clamps for each shelf. Glue each divider in its dado in the lower shelf and each support to its divider. Drive a few pins into the bottom face of the supports to clamp these pieces. Glue and clamp the side supports in their dadoes.

Before moving on to final sanding, take a moment to check the assembly for square and make any small adjustments while the glue is still workable. Confirm that the shelves and dividers are fully seated in their dadoes and that the supports are flush and aligned. This is also a good time to scrape away any excess glue squeeze-out, especially in corners and along joints where it will be difficult to remove once cured. Taking care of these details now will make the final cleanup faster and improve the overall fit and appearance of the unit.

Once the glue is dry, complete any final sanding and cleanup, then ease the sharp corners using a sanding block. Apply edge banding if you like, but I choose to leave the plys exposed.

I drove a couple of sets of screws to hold the chargers in place on the upper shelf. This allows me to grab a battery with one hand. Alternatively, drive screws into the sides of the assembly to hold chargers or hangers for accessories.

Install a french cleat on the back to hang the unit. Include a strip along the bottom of the back so it hangs flush on the wall.

There is no need to apply a finish, but for a little extra protection, I applied a few coats of poly before mounting the unit to the wall. When hung, slide your drills in place and organize your bits and chargers for easy access. **PW** – *Chad McClung*

7 Pin the dividers. While the case is assembled, install the dividers and supports. Pin the supports in lieu of clamping.

8 Clamp the side supports. After applying glue to their dadoes, insert the side supports and clamp them in place.

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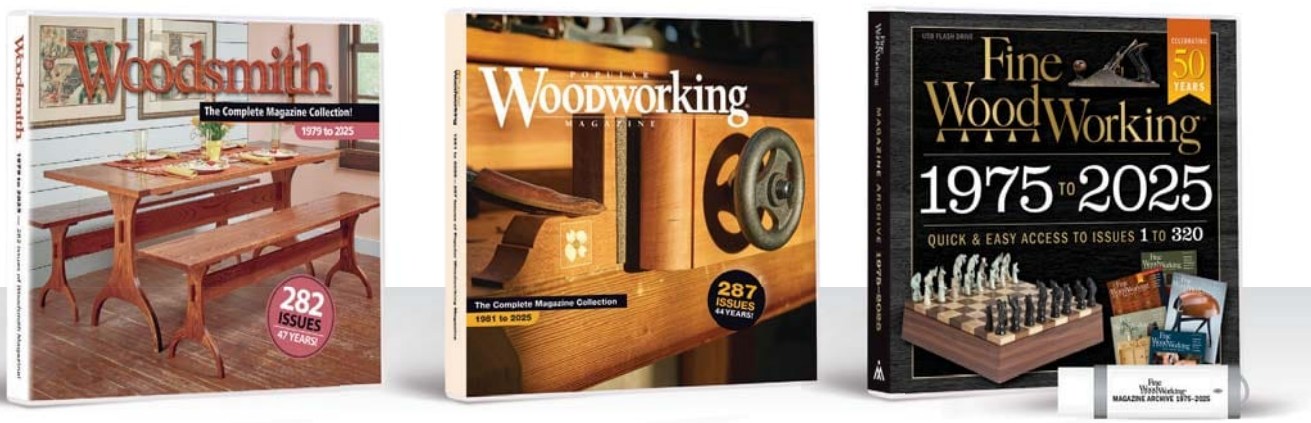

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PHOTOS BY LOGAN WITTMER

Harlem Spice Chest

Part I: Crafting the Case & Dividers

This piece is inspired by period spice chests and offers a great way to practice traditional hand tool techniques. **By Brian DeJong**

The spice chest is a fun, small project with lots of details. Historically, there are a lot of examples of spice chests that were built in the past. These would have been used to house spices (obviously) as well as other expensive commodities.

A chest such as this is a great project to use hand tools on and practice your skills. This example here has a lot of hand-cut dovetails, so you'll become well acquainted with your dovetail saw. Additionally, you'll be making moldings with hollows and rounds, and cleaning them up with scratch stock. As if that wasn't enough, you'll also get a bit of practice in carving and turning. Throughout this article, I'll be using a few power tools for some particular tasks, but I will concentrate on the hand tool aspects of this project. On that note, this project is small in scale, but big on technique. We'll break out this project over the next two issues, with this first issue covering the main case construction and the lower molding.

Start with the Case

The heart of the spice chest is the case. The main box has two sides, a bottom, and a curved top. The wood for the spice chest is entirely up to you. I like the hardwoods, especially walnut, cherry, and mahogany. Any of these will lend to the period feel of this piece, so dealer's choice here. Whichever wood you want, start by squaring up your stock.

As you can see in the main photo, the top of the spice chest is curved. The top is connected to the sides via dovetails. I start here with a thick blank and use the bandsaw to cut a large rabbet along each end (see Photo 1). This removes a lot of the waste that is unnecessary before dovetailing. Now, the top is treated like a normal (non-curved) top. I strike a line on the top that is equal to the thickness of my side panels (Photo 2). You can lay out the dovetails however you'd like. My preference is always to create tails with very tight gaps—it shows future inspectors of this chest that these were cut by hand. (Plus, I think they look great).

The dovetails are cut using a back saw. I saw down to the mark I scored, then removed the waste with a fret saw. The remaining material can be chopped away with a chisel. Make sure to work back to the scored line, so that


1


2

1 Cut a wide rabbet in the end of the top blank. The bandsaw can take care of this cut easily.

2 Scribe a line for your dovetails. This line is set up to be the same thickness as the stock you're using for the sides.

3-4 Start to cut the dovetails. The tails are cut first using a back saw. The waste is then removed with a fret saw. The remaining waste next to the base line can be chopped away with a chisel.


3


4

the chisel doesn't push past the line if you make too heavy a cut.

With the tails cut, you can transfer the layout to the sides. The pins are cut the same way — use a back saw to cut down to the line, and cut away the waste. I like to do a little bit of a test fit, and if any pins need adjusting, I pare down the face of the pin with a chisel.

With the dovetails cut, it's time to shape the top. As mentioned, this is a curved top. A flat area on the left and right leads into a smooth curve that maintains the thickness of the ends across it. I use a pattern to lay out the profile of the curve (Photo 5). The same pattern is available on page 47. After transferring the shape, make several relief cuts with the bandsaw and start to remove the waste. Stay outside the lines — the final shaping will come later. Here, you're looking to cut away as much of the material as you can. With the rough shaping done, a groove needs to be cut for the back panel to slide into. I use a plow plane for the straight sections. Then, I use my router plane as a marking gauge to transfer the groove inside the curve (Photo 9). The remainder of the groove is chopped away with a chisel.

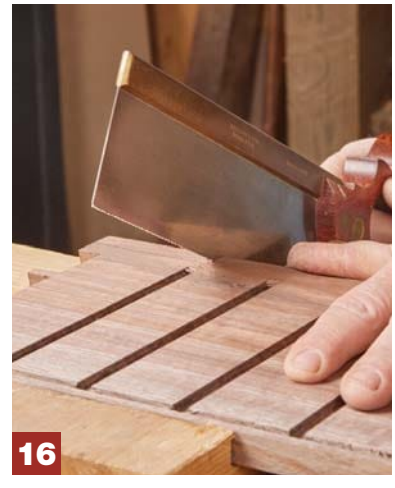
5 A template of the top profile is made, then is transfered to the edge of the top blank.

6 Make a series of relief cuts on the concave side of the top.

7-8 Start to nibble away the waste from both sides of the top. Curve the inside utilizing the relief cuts, and curve the outside starting from the middle.

9 Transfer the groove position using a router plane.

10 Chop away the groove on the inside curved section of the lid.



11 A plow plane quickly cuts a groove for the back panel.

12 Transfer the divider location and thickness to the sides.

13 Chop away the stopped dado using a chisel.

14 The notch on the side panel us cut with a saw then cleaned up with a chisel.

15-16 Both the left and right hand panels get a stopped miter cut on the top edge.

Case Sides

The sides of the chest need a bit of work in addition to the pins you've already cut. The first order of business is to cut dadoes for the dividers. To cut these, I first plane my divider stock to the final thickness and mark the location of the dividers with a knife. (The divider stock can be set aside for a bit once you've marked the locations.) Then, I used a chisel and router plane to chop out the waste and make it a flat-bottom dado. While you're at it, go ahead and use the plow plane to create a groove for the back.

Now, there's a bit of an odd cut on both sides of the chest case. The left side has a large notch cut in it to make room for the door to be inset. Cut this with a saw, and plane it flush with a chisel (Photo 14). The remaining "ear" on the top side of the left panel is mitered at 45° to mate with the curved face frame that you'll make in a bit. Make this cut with a back saw. This same cut is mirrored on the right-hand side. (Photo 34 shows this joint pretty well, as does the drawing on pages 46-47). Clean up the miter with a chisel if necessary.

17

18

19

17 Transfer the dovetail key to the bottom panel of the case.

18-19 Cut the edges of the slot and chop away the waste with a chisel. You're looking for a snug, sliding fit that will keep the back panel in place, but not be too sloppy.

20-21 Shape the dividers by cutting out the profile using a turning or bow saw. You can clean up the shape with a rasp and sandpaper.

20

21

A Secret Toggle

The back panel slides into place into the grooves you've already made in the sides and the top. However, I thought it would be interesting to make the back removable to access a few hidden compartments. To accomplish this, a dovetailed toggle is recessed into the bottom. Create a dovetailed piece by planing a small piece of stock to shape. Then, transfer the profile to the bottom panel. Chop out the waste with a chisel. A dovetail chisel comes in handy here to clean out the corners. Test fit the toggle, and chop a thumb hole in it with a shallow sweep carving gouge.

Dividers & Back Panel

The dividers for the case have a gentle curve to the middle section. This provides relief when handles are added to the drawers. Find the divider stock you used when you laid out the dadoes and cut the profile onto each divider. A bow saw (or a turning saw) roughs this out very well. Then, a fine-cut rasp helps smooth out the curves and bring the lines into shape. Looking at the main photo and the illustrations on page 46, you'll notice that a few of the dividers have additional dadoes in them. These are for vertical dividers to break up the top cubbies into additional sections. Lay these out and chop them the same way you did the case side dadoes.

Now comes tackling the back panel. This panel is made up of one piece of thin stock. Creating the shape of a panel is pretty straightforward. Scribe the top profile onto the panel, and offset the line by the same depth as your groove (mine are 1/4" deep). Then, use a bow or turning saw to rough out the curve. See Photo 22. Once the rough cutting has been done, refine the curve with a spokeshave. You're just looking for a curve that's pretty close here. It's not

22 Shape the back with a bow saw.

23 A spokeshave cleans up the curved profile.

24 Profiling the back starts with a rabbet plane around the edge.

25 Switch over to a molding plane to make a decorative profile.

26 The curved top is profiled with a carving gouge.

critical if the profile fits the top groove exactly (remember, the back panel is removable and not glued in place).

Once the shaping is done, profile the edges. I created a bit of a decorative edge on mine. I started with a rabbet plane to create a rabbet along the two sides (Photo 24). A molding plane (in this case, a small round) creates a bit of a cove along the corner of the rabbet. This offers up a nice-looking edge that slips into the groove you created in the case. Bringing that decorative profile around the curved top of the back is a bit more work. Start with a rabbet still, but here, you'll need to chop it out with a chisel. If you have one, a wide-sweep carving chisel helps define the edge of the rabbet by following the curve of the top.

Once the rabbet has been chopped out, dig through your chisels to find a sweep that closely matches the plane you used for the side profile. Carve the profile around the top—remember, this is the back panel. Try to get it as clean as possible, but you can always clean it up with a bit of sanding or a card scraper.

Assembly & Face Frame

At this point, you can assemble the case. Spread a little bit of glue between the pins and the tails. I find a small palette knife works well for this. Then, drive the dovetails together. Even though dovetails are pretty self-squaring, I do like to double-check them. If any adjustments are needed, now's the time to do them. (Adjustments can be made by stringing a clamp from corner to corner and pulling the case as necessary.) A couple of clamps will hold the case together while the glue dries.

With the case drying, it's time to knock out the mitered face frame piece. This is mitered on the ends (to match the mitered corners on the side panels). In addition, the miter also has a small step in it. This step allows it to seat fully on the case.

27-28 Apply glue to the inside of the tails of the case. Use a mallet to drive the parts home.

29-30 Start the face frame with a shallow rabbet on the ends. This is done by sawing a shoulder and chopping away the waste.

31 After cutting the miter, you'll want to clean up the surface with a chisel.

32 The curved profile of the face frame is laid out using a compass and a piece of scrap.

33 The curved cut is cleaned up with a spoke shave. Work from the outside down towards the middle.

Creating the step is straightforward. Saw a shoulder line with a back saw. Then, chip out the waste to create a small rabbet. The miter can be cut by hand or at the table saw, and any excess fluff on the face of the miter can be cleaned up with a chisel.

The curved section of the face frame needs to be laid out before it can be cut on the bandsaw. Using a compass and a scrap of wood, strike the arc. After cutting away the waste, use a spoke shave to clean up the inside of the curve. Make sure to spokeshave with the grain for the cleanest cut — on this curve, it's from the outside

34 Glue and clamp the face frame in place on the miters.

35 Pre-assemble the inside, upper dividers. Once dry, this can be installed into the case.

36 The top shape can be refined using a handplane and sandpaper.

towards the center. Once it's clean as you can get it, go ahead and glue it in place on the case.

Case Details & Feet

At this point, the case is almost complete. The next thing to do is to get the dividers in place and clean up the top. The large dividers can be stuck into the dadoes and simply glued in place. The upper dividers need a bit of pre-assembly before stuffing them in the case. A handful of clamps can be used to lightly hold all of these dividers together as the glue dries. Once they're ready, stick them inside the case with glue.

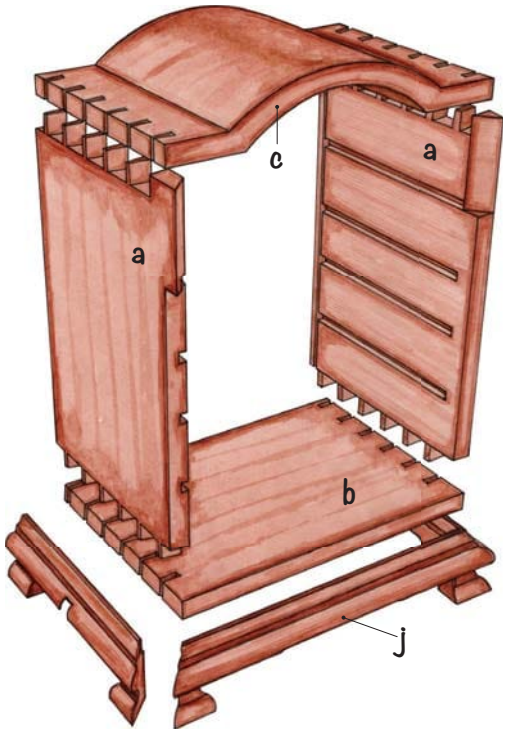
The top of the case is still probably pretty rough (at least, mine was). So now, with the case all glued up and rigid, it can be cleaned up. The best thing I've found is to use a combination of tools. You want to keep a crisp line where the curve meets the flat plane of the top. To do this, I like to use a rabbeting plane. This allows me to plane right up to that corner and keep the light crisp. Because you're planing cross-grain here, keep the blade set very light, and clean it up with a cabinet scraper or sandpaper when you're done.

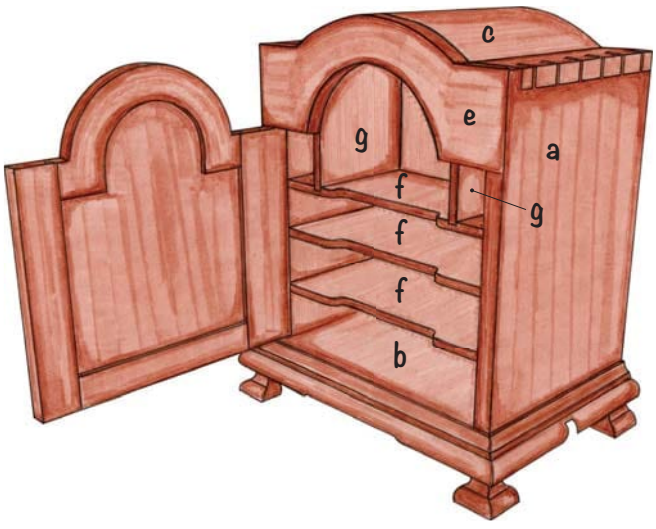
The curve can be cleaned up with a standard handplane, cutting across the grain. Keep rolling the plane around the curve as you go. What you're doing is creating dozens of tiny facets. The more facets you make, the easier it is to get that curve nice and smooth. A rasp also works well to blend this profile.

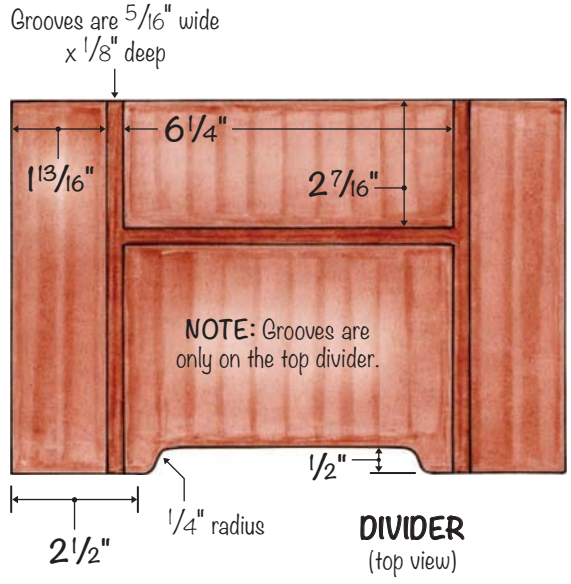
The feet of this spice chest are made in a traditional way — creating a long piece of molding, then shaping that into feet. It's a cool technique that yields great results. Start with a piece of the straightest-grain stock you can find. The molding is going to be made with a combination of plow planes, hollows, rounds, and fillister planes. The straighter the stock, the cleaner the cut you'll get.

The first task is to remove a bulk of the material with the easiest-to-sharpen planes — the plow and rabbet planes. The goal here is to create a series of grooves and rabbets that remove a large majority of the waste. Not only do these planes remove the waste, but they also

Harlem Spice Cabinet

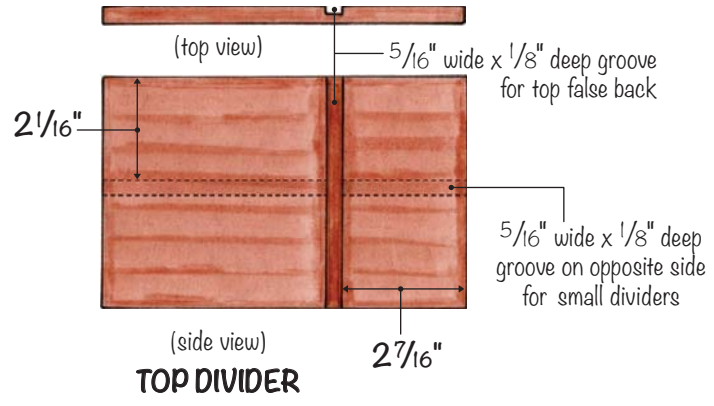




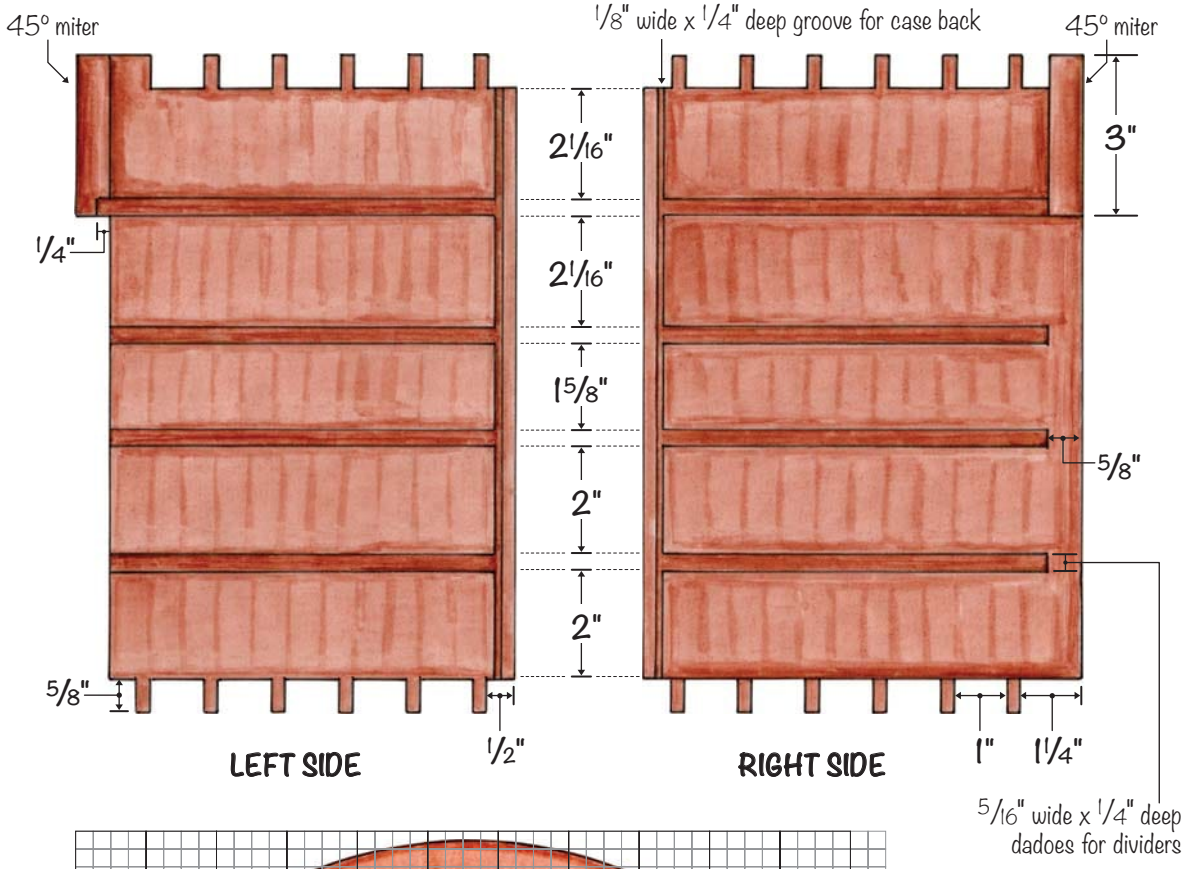


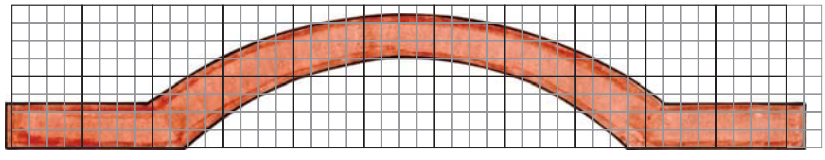
Cutlist

No.		Items	Dimensions (inches) T	W	L
2	A	Case sides	5/8	8 1/8	12 1/4
1	B	Case bottom	5/8	11 1/4	7 3/4
1	C	Case top	1 7/8	11 1/4	7 1/2
1	D	Case back	3/8	10 1/2	12 7/8
1	E	Case front	5/8	11 1/4	4 1/4
3	F	Dividers	5/16	10 1/2	7 1/8
2	G	Vertical dividers	5/16	7 1/8	4 9/16
2	H	Small dividers	5/16	7 1/8	1 15/16
1	I	Top false back	5/16	6 1/2	4 9/16
-	J	Case feet	1	2 3/8	32
1	K	Case back tab	1/2	1/4	7/8



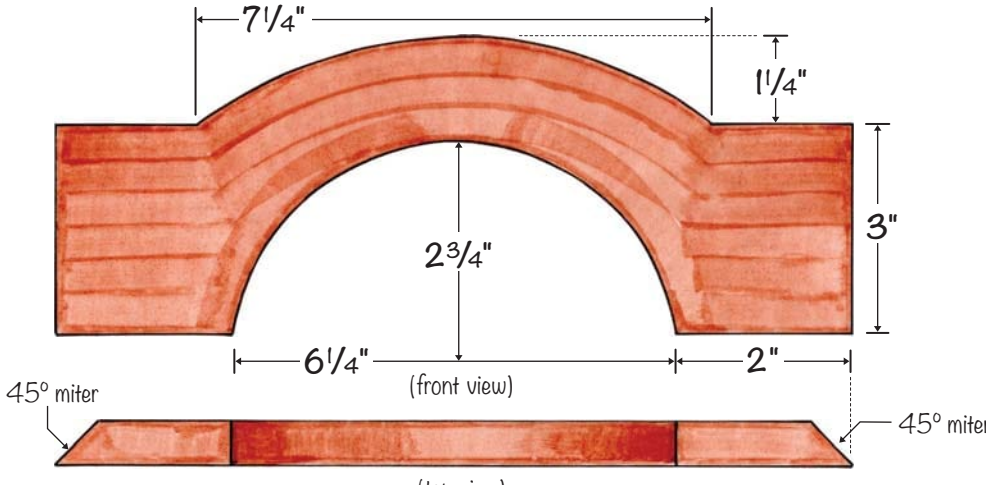
NOTE: Full-sized templates, additional dimensions, and SketchUp File are available at PopularWoodworking.com/OnlineExtras



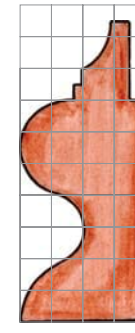


NOTE: Each square = 1/2"

CASE TOP
(front view)



CASE TOP



FOOT MOLDING
(side profile)

37 Start the molding with a plow plane to cut a series of grooves.

38 Chamfer the edges of the large rounded over areas.

39 Bring a round plane in to start to shape the coves.

40 Switch over to the hollow and start to round over the large round over areas. Rotate the plane a few degrees each pass.

41 Start to clean up the profile with a scraper shaped to match.

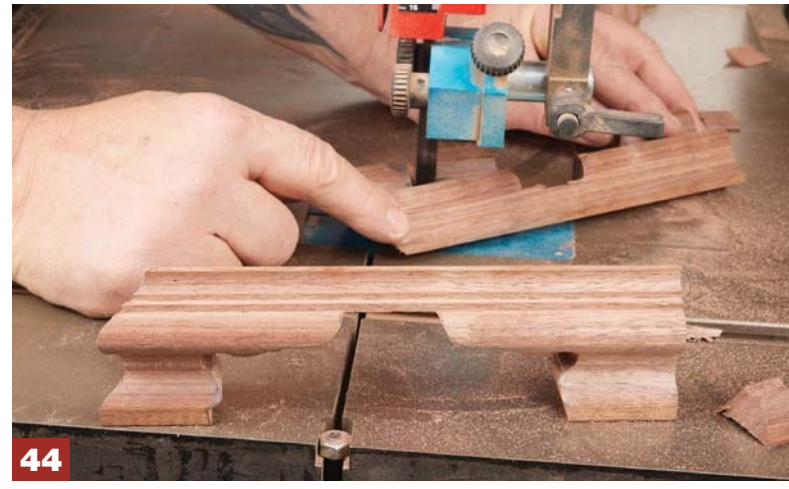
42 Cut a rabbet along the back, top edge. This will register with the bottom of the case when finished.

will help guide the hollows and rounds as you start to create the molded profile.

After plowing grooves and rabbets in your stock, switch over to a rabbet plane. Use the rabbet plane to start to nip off the corners of the "rounded" portions of the molding. See Photo 38. This will help guide the hollow plane in a little bit.

Using a small round plane, start to form the cove along the top edge of the molding (Photo 39). Pay attention to the shavings as they're coming out. The round plane is riding on two points of contact on the molding. Therefore, you should be getting two equally sized shavings coming out of the plane. If one is larger than the other, you're probably tilting the plane a little bit, and you need to adjust.

Once your cove is nice and clean, you can switch out for the hollow. The goal with the hollow is to remove the faceted tops you put on the molding previously. This is usually done in several passes, rolling the plane around the molding on each pass to create the rounded profile. (Remember, a hollow and a round are 60° sections of a circle, so to create a full half-round profile, you need to make at least 3 passes, side-by-side). Once you've shaped the molding the best you can, you can clean it up with a goose neck scraper and sandpaper. The final



43 Transfer the front-profile onto the molding, marking the rounded recesses with a Forstner bit.

44 Nibble away the waste at the band saw.

45-46 Use glue on the miters and apply the pinch clamps. Pin nails hold the molding in place as the glue dries.

task before mitering it is to cut a rabbet along the back side to mount over the corner of the case.

Take your stick of molding and miter the ends—you want a snug fit all the way around the base of the case (except the bottom). At this point, this just looks like molding. To form this into feet, we need to do a bit of surgery on the band saw. First, give yourself some guidelines. I use a hardboard template to trace my profile onto the face of the molding (it's a bit hard to trace due to the profile, but do your best with a sharp pencil). Note— in Photo 43, you'll notice I'm marking the tight radius with a Forstner bit. I'll drill this out before cutting for a clean radius.

Once the profiles are cut out, the feet can be installed. I use a bit of glue on each miter and use pinch clamps to hold them tight. The molding is clamped to the case and attached with a series of pin nails. These leave a small hole that doesn't even need to be filled.

With that, the case of this spice chest is wrapped up. This is a little case, but as you can see, it packs in a bunch of good woodworking — especially if you decide to tackle this with hand tools. In the next issue of *Popular Woodworking*, we'll talk about creating the remaining parts: the drawers, door, moldings and corbels. **PW** - *Brain DeJong*

Floating Top Entry Table

PHOTOS BY LOGAN WITTMER

1st

This mitered case and veneered top make this project an interesting challenge.

By Abdul Haseeb Ahmed

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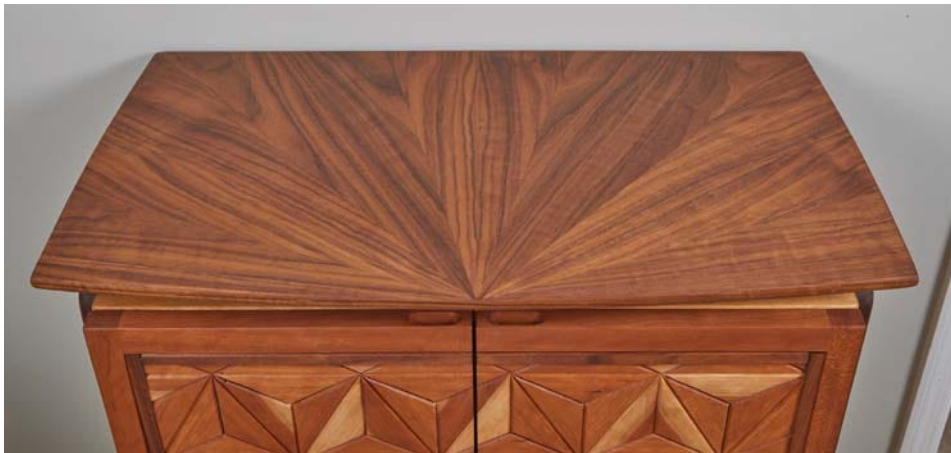

This floating top entry table was a project that I designed and built for the 2025 Grizzly Makers Challenge. As with most of my projects, I try to add in elements that challenge me and make me a better woodworker.

Some of the challenges on this table are apparent when you first look at it, while others are more subtle. The top features a sunburst style veneer, and getting the proper grain match and tight seams can be a bit of a trick. The front of the doors is covered in a variety of geometric shapes (triangles) that are actually thin veneers glued in place.

One of the subtle details that I believe helps complete the look of this table is the grain-matched miters of the case, as well as the bent lamination edging around the top.

Hardwood Case

Before diving into the construction of the case, there is a bit of prep work to do. The top of the table is veneered with that radial veneer. A balance veneer needs to be applied to the bottom of the top before we do anything else. This can be glued in place with PVA glue. If you don't have a vacuum bag, heavy weights (such as car batteries) work well to clamp this as it dries.

The case of this entry table is built out of white oak. I glued up three pieces of stock to get it to the final width. My material here is long enough to get all of the

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1 The top is made of a plywood core, covered on both faces with veneer. A veneer needs to be applied to the bottom so that the panel remains stable and flat.

2-3 Rough cut the material for the case to length using a track saw. I do this outside on a piece of foam, simply due to limited space in my shop. The ends of the panels are mitered at the table saw.

4-5 Rout a rabbet along the back edge of the case parts at the router table.


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5

parts out of, so I'll have a grain match on three of the corners.

I find it easiest to take the stock outside and break down the material with a track saw. Then, I use the table saw to cut the miter on each end of the case parts. Now, I'll admit that miters aren't the strongest joint around. And you could certainly reinforce these in various ways (splines, dominoes, dowels, etc). However, I decided to just glue the back into a rabbet. This plywood back adds a lot of strength to the case, and I've had good luck with this construction method. The rabbet for the back is cut at the router table. A rabbeting bit does the heavy lifting. Cutting this in a few passes minimizes chip-out and makes it an easy cut.

With the rabbets cut, the case is ready to be glued up. I use packing tape for a hinge, as you can see in Photo 6. I tape the inside of the joints with painters' tape to help capture any squeeze-out. The yellow PVA glue is applied liberally — the endgrain is going to wick in a bit of the glue, so make sure there's plenty there.

After gluing the joints, you can start to fold up the case, using that packing tape as a hinge. Apply a few clamps, but not too tight yet. The back will have the added benefit of helping keep the case square during drying. Once the back panel is in the rabbet, clamp


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6 The outside of each joint is layered with packing tape.

7-8 Glue the miters and fold up the case. The painter's tape helps contain squeeze out.

9-10 The back is glued in place. The back helps hold the case square and adds rigidity to the mitered carcass.

11 Check the miters and adjust the clamps as necessary to close up any joints.


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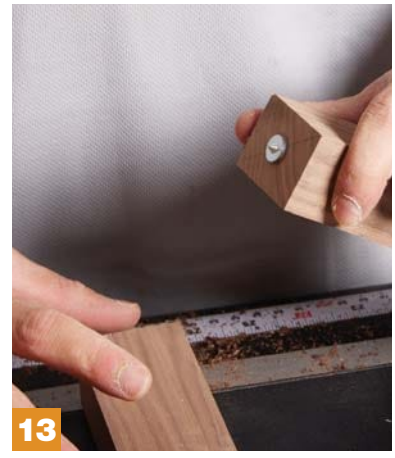

everything together nice and snug, paying attention to the miters. You might need to do a bit of a dance with the clamps to wiggle the miters together.

12 Drill the ends of the rails. A stop collar on the drill sets the depth so you don't drill deeper than your dowels are long.

13 Use dowel centers to transfer the dowel locations to the other parts.

14-15 Apply glue to the dowel and mating faces and assemble the joint. A clamp across the part holds it while the glue dries.

Walnut Legs

The legs for this table are based on the classic mid-century rectangular style. Each leg assembly has two rails and two stiles. The joinery here isn't fancy. As you can see in the photos on this page, dowels are the ticket here. I start by marking the center on the ends of the rails. Then, clamping it in a vise, I drill a hole in each end. To transfer the dowel location to the stiles, I use dowel centers. These are little metal plugs that fit snugly in the pre-drilled hole. A point on the outside marks your workpiece as you squeeze it together. It's a great way to get accurate dowel holes with minimal tools.

With both parts drilled, I applied glue to the dowel and tapped it in place. I also applied a good bit of glue to the mating parts. Even though one of the surfaces here is endgrain (the ends of the rails), I just want the glue to hold for a bit to keep the parts from twisting. Complete both of the legs like this — once they're in clamps, double check that the parts haven't twisted, and set them aside and start to think about the sunburst veneer on the top.

Shop-Sawn Veneer

When it comes to veneer, you have a ton of different options to choose from. You can buy presawn veneer from most woodworking retailers. You can get figured, fancy wood, or veneer that is dyed different colors. However, sawing your own veneer isn't complicated, and you can save quite a bit of money doing that. Plus, you can get some really interesting patterns if your beginning stock has some prominent grain. For the veneer on this table, I chose to use black walnut.

The trick with sawing veneers is to have a good blade on your saw, make sure that your fence is set parallel to the blade, and that your stock is jointed flat and square. Use a featherboard to keep the stock pressed up against the fence and slowly feed the stock through the blade. Keep the feed rate constant; any slight hesitation when feeding can cause the blade to drift slightly.

After sawing off one veneer, head to the jointer and re-joint the


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16 Veneer is sawn at the bandsaw using a featherboard.

17 Send the veneer through the drum sander to flatten out the back.

18 Cut the veneer into triangles.

19-20 Clean up the edges of the veneer at the jointer and start to lay out the pattern.


18


19

face that you just cut. You want one smooth and flat face against the fence at all times. Saw through the entire stock to produce the veneer. I ended up with nine sheets out of this 8/4 board. I ran all of these sheets through my drum sander to smooth out both sides and remove any of the bandsaw marks that may be left.

Because this is a sunburst (or radial) veneer, I want to cut these into triangles. The veneer gets reassembled back into the board form, making sure they're stacked up exactly as they came off the saw. Then, I wrap the bundle several times with painter's tape. The bundle gets ripped at the bandsaw into triangles, as you see in Photo 18. Cut as straight as possible, but if you wander a little bit, don't worry. The entire packet (now cut into triangles) can be run over the jointer. Add a few extra strips of tape before you joint the bundles to keep any slipping to a minimum. I ran both edges of both packets over the jointer so that I had straight, glue-ready edges.

Now it's time to figure out what pattern you want. You'll be doing yourself a favor if you label each veneer with a number, so that you'll always know how they came out of the bundle. Try different orientations, flipping, and rotating the veneers until you find a pattern that looks pleasing. Some of the things that I keep an eye on during this process is to not only watch the grain pattern as I'm arranging them, but I also watch the color. A simple shift in hue in each veneer can create a very interesting-looking fan pattern if laid out with intention.

Once you've decided on your pattern, it's once again time to start taping the veneers together.


20

Veneer tape is an actual material — it has a water-activated adhesive (like a stamp) on the back, and is perforated. I'm sure it works great. But I've found that blue painter's tape also works great for this. As I'm taping the veneer together, I am using several pieces along the seam, making sure that I'm stretching the tape a little bit to add tension to the

21-22 Start to tape the veneers together with painter's tape. After the entire fan is together, use a few long strips to add extra strength.

23-25 The joint of each veneer is glued together with CA glue. Press the glued joint down flat and spritz it with accelerator. Hold it for a few moments to let the glue cure.

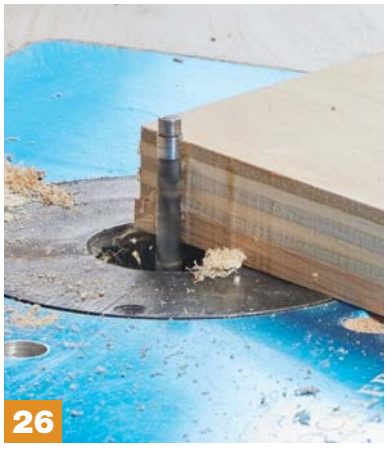
joint. Depending on the width (angle) of your veneers, this process can take some time. But, don't lose focus and concentrate on keeping each and every seam as tight as possible.

Once you've taped together enough veneer to create a "fan" that's at least 180°, it's time to add more tape. That's right—now you're going to go all the way across the veneer, adding long strips to help hold the entire unit together. Now, you may need a helping hand to flip the veneer over so that the untaped face is up. Use a shim (a dowel works great) to slip under the first joint. You'll see that it opens up like a book. The glue I prefer to use for the edges of the veneer is CA glue. A thick CA glue applies easily, and you can also speed up the curing with an accelerator. The process is as follows: Slip the dowel in place under the unglued joint. Apply a bead of CA along the entire edge. Remove the dowel and press the joint down flat. You'll notice you start to get a little squeeze out. Holding the joint down, spray a few dabs of accelerator along the joint. The fibers will wick it in and help cure the glue from the inside out. Keep your hands in place over the joint for a few moments, just to make sure that it holds. Then, it's rinse and repeat for the remaining joints.

Back To The Top

Once all of the veneer has been glued together, you'll want to let it set and cure for a bit. The accelerator offers a good initial grab, but let it rest to make sure it's fully cured. By this time, the glue used to attach the top core to the bottom veneer is cured. I use my bandsaw to trim the veneer down to be close to the same size as the plywood core. Then, with minimal waste remaining, I use a flush-trim bit in the router table to make sure the bottom veneer is exactly the same shape as the plywood core.

The bent lamination edges of the top are in place so that a large chamfer can be added to the top. The bent laminations are made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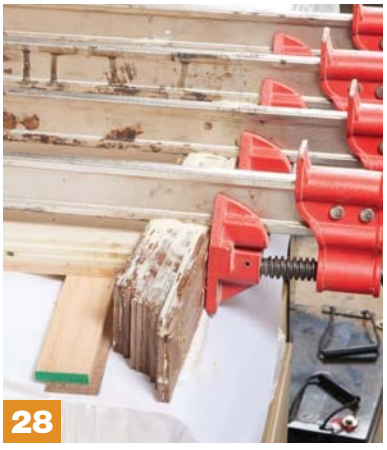
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26 Flush trim the backing veneer off of the top's core.

27-28 Glue up the bent lamination pieces that will become the edging. These are clamped in place, starting with the two end pieces.

29-30 After dry, trim the end laminations, and start working on the front and back. A bunch of clamps from front-to-back will help you get tight glue lines with no gaps.

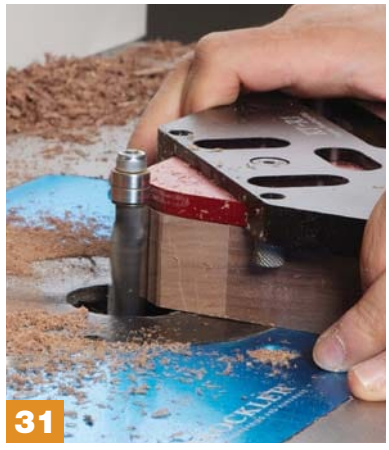

29


30

exactly the same way as the veneer was done before—joint, resaw, re-joint, and saw again. The bend in this top isn't super severe, so the laminations can be a little thicker. You'll be building up a pretty thick layer, though (it's a heavy chamfer that's added later), so I leaned toward the thinner side with these laminations.

The easiest way to glue all of these laminations together is to lay them out flat on a work surface. The biggest surface I have in my shop is my CNC, so I cover the CNC bed with plastic and do my large glue-ups there. With the laminations spread out, I use a roller to roll out a layer of glue on each. Then, the laminations can be added. I did the two ends first. These are shorter curves. Once these are dry, the ends can be trimmed and sanded flush, and the front laminations can be added.

You'll want to add several clamps along these curves—the more clamps, the better. One thing to keep in mind, however, is that the glue is adding a lot of water back into the stock. Because it's getting re-hydrated, it's easy to "squish" the laminations with your clamps (actually denting the material) and end up with a little bit of a wavy edge when you remove them in a bit. Squeeze the clamps just enough to get a good squeeze out.



Attach The Legs

As the laminations are drying, the legs can be finished up and attached to the case. First things first—the corners get routed with a radius so that there is no "point bit" on the legs. I use a simple aluminum template to create this. The template allows me to mark the corner and nip off the waste at the bandsaw. Then, the same template can be used with a flush trim bit to round over the corner. See Photo 31. The edges get a heavy roundover to soften the look. Now, the entire leg (inside and out) gets a heavy roundover. Depending on your material, you might get away with doing this in one pass, but it's a safer bet to rout this in a few passes—there's nothing worse than getting to this final step and getting a big piece of tearout.

Keeping in the theme of the leg construction, they are attached to the case with a series of dowels. As before, I drilled the dowel locations with a hand drill with a stop collar. Then, using a spacer under the case (Photo 35) I positioned the legs where I wanted them and used the dowel center to make a mark. The case gets matching holes for the dowels.

Take a few minutes and sand the case and legs now. Once everything's glued together, it's a bit harder to reach everything and sand efficiently. Apply glue to the dowels and drive them home. I also applied a thin bead of glue to the stiles—it's a long-grain surface, so it makes a good glue joint. Yes, I know that wood movement between the case and the legs could be an issue. However, the legs have plenty of flex in them, and I haven't had any problems with this style of leg and case connection. If you are worried about it, you could attach the legs to the case with screws from the inside (with oversized holes). However, I wanted to avoid hardware.

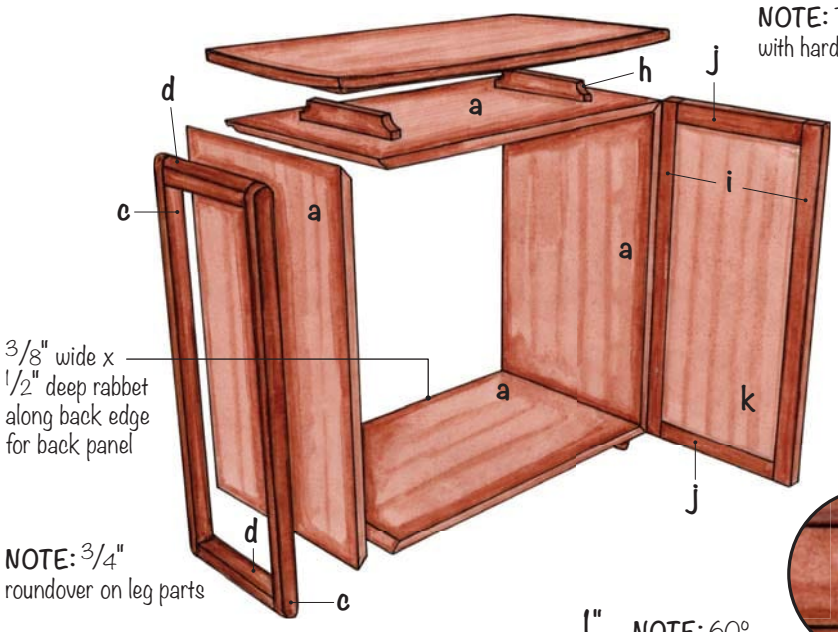
31 Use a roundover template to round the corners of the legs.

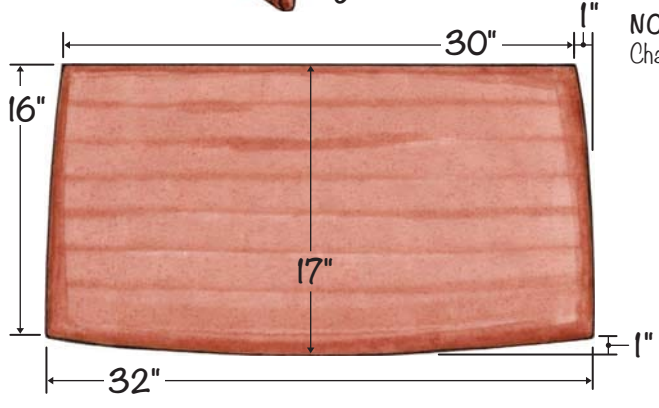
32 A large roundover bit softens the legs. Rout all of the edges of both the legs.

33-34 The legs are mounted with dowels. Drill the dowel locations and place dowel centers in the holes. Transfer the locations to the case and drill those next.

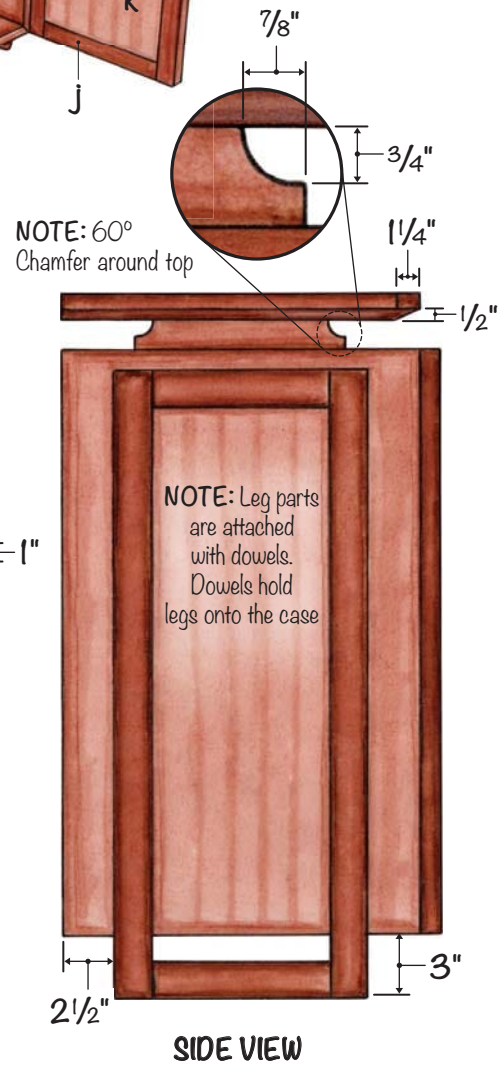
35 A bit of glue and clamps hold the legs onto the case.

Floating Top Entry Table





FLOATING TOP

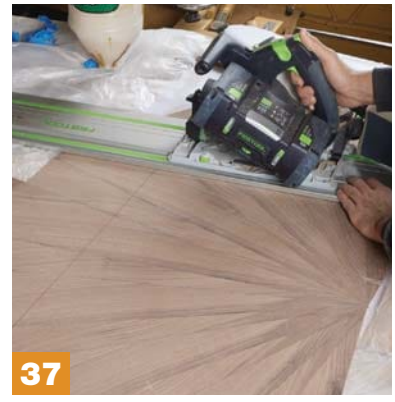


SIDE VIEW

Cutlist

No.		Items	Dimensions (in) T	W	L	Materials
4	A	Case sides/top/bottom	3/4	17	28	Oak
1	B	Case back	1/2	27 1/4	27 1/4	Plywood
4	C	Leg stiles	1 1/4	1 3/4	30	Walnut
4	D	Leg rails	1 1/4	1 3/4	8 1/2	Walnut
1	E	Top core	3/4	30	15	Plywood
2	F	Top edging (short)	1 1/4	1	15	Walnut
2	G	Top edging (long)	1 1/4	35	1	Walnut
2	H	Stand-offs	3/4	10	1 1/2	Walnut
4	I	Door stiles	1	1 1/2	28	Walnut
4	J	Door rails	1	11	1 1/2	Walnut
2	K	Door panels	3/4	11	25	Cherry

* 10 sq. ft. of walnut veneer for the top



36-37 Mark the size of the top on the veneer. Trim it down so there's not much over hang.

38-39 Spread glue on the surface of the top's core and position the veneer on it. Line up the points of the veneer with the center line.

40-41 Wrap parchment paper around the top before putting it into the vacuum bag. Apply vacuum to clamp the veneer to the core.

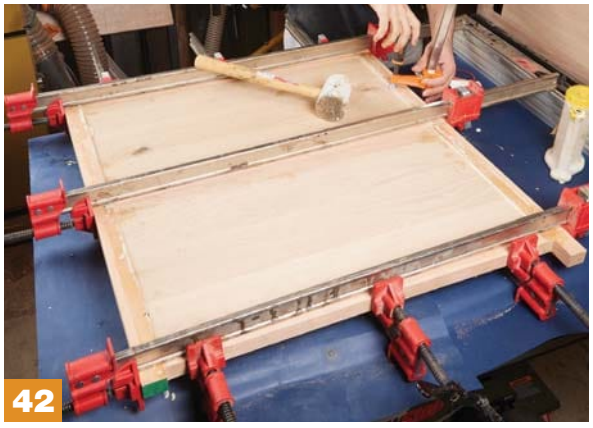
The Radial Veneer

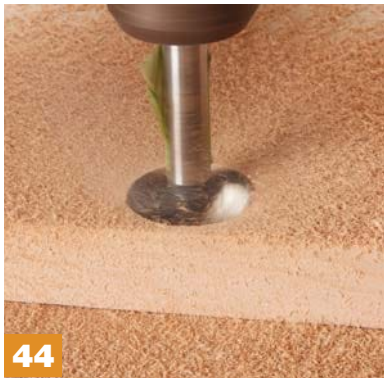
Applying the radial veneer to the top is old news at this point. My veneer, as you can see in Photo 36, was intentionally oversized. This makes handling and alignment much easier, but it does need to be trimmed down before glue-up. I used the track saw to cut it to a more manageable size, leaving enough extra material around the perimeter for final trimming. With that done, the veneer is ready to be glued in place.

A good, even layer of PVA glue is applied to the core using a roller. Take your time here — consistent coverage is important to avoid dry spots or bubbles later. The biggest thing to watch is alignment. When you apply the veneer, the points of the veneer (the focal point of the radial pattern) need to be dead-center on the top. If it's even a little off, it will be immediately noticeable and look goofy. Spend some time nudging it into position and checking it from multiple angles. Once you're satisfied, use painter's tape to lock it in place so nothing shifts during clamping.

Here's a great trick when working with a vacuum bag. Large sheets of waxed paper or parchment paper are readily available online or from restaurant supply stores. These are perfect for wrapping your veneered panel and preventing glue squeeze-out from sticking to the vacuum bag — or worse, getting into the vacuum pump. Wrap the entire top in the parchment paper and tape it into a tidy envelope. The wrapped top then goes into the vacuum bag. Pull vacuum to clamp the veneer, and if you're anything like me and have trust issues, feel free to stack some weight on it as extra insurance.

Once the glue has fully cured, flush-trim the top veneer to the core using the same process we used on the bottom veneer.





42 The door is glued up in one shot, with wide center edging.

43 The doors are cut apart and to size with the track saw.

44 Drill recesses for the Euro-style cup hinges.

The Doors

My construction method for these doors is a bit unconventional. That said, it's worked well for me, so this is the approach I'm sharing. Each door is made up of a panel with solid hardwood edging applied all the way around. On the original cabinet, the panels were covered in a geometric pattern. We've covered veneering techniques pretty thoroughly by now, so I'll leave the exact design choice up to you.

For the doors on the original cabinet, I cut all 150 pieces by hand. If that sounds a bit excessive to you, you have several options. A patterned veneer would work well, or you could echo the radial veneer from the top and use a mirrored layout on the doors. Either approach can look great—it really comes down to the look you're after. Of course, using a nice hardwood would look great, too.

The edging around the doors is thicker than the panel itself, creating a subtle recess that adds depth and shadow to the door face. The edging is glued all the way around the perimeter. The center edging is intentionally wider, allowing for a saw kerf to separate the doors after glue-up. This lets you glue both doors as a single assembly, ensuring perfect alignment. See Photo 42.

Once the glue is dry, I take a few careful measurements to confirm the exact location of the saw kerf. The cut is then made with the track saw, separating the doors cleanly and accurately.

The doors are mounted to the case using 35 mm full-overlay Euro hinges. These hinges require a precisely located 35 mm hole drilled into the inside face of each door. Careful layout here is important. After marking the locations, head to the drill press and drill the hinge cup holes as shown in Photo 44.

Finishing Touches

Now we're in the home stretch. There are just a handful of finishing steps left before the table is complete. The first task is cleaning up the veneered top. I flush-trimmed the veneer at the router table, just as we did with the lower veneer. Take extra care here, because you're routing across the grain of a thin veneer; chip-out can happen quickly. Light passes, and sharp bits are your best defense.

With the veneer trimmed, it's time to rout the large chamfer on the bottom edge of the top. This is done using a large 60° chamfer bit in the router table. Be sure to slow the router speed down—the large diameter of the bit requires a lower RPM for safe, clean cuts. Because this bit removes a lot of material, make the chamfer in multiple passes. About 1/4" per pass is a good rule of thumb until you reach full depth. The chamfer runs along the front and sides of the top, as well as the back.

At this point, the top itself is complete. The next step is attaching it to the case. I used shaped stand-offs mounted to the case interior. These are drilled on the drill press using a Forstner bit, and the curves are refined at the spindle sander or with a dowel wrapped in sandpaper.

To mount the top, drill holes through the stand-offs. Screws driven from inside the case,

through the stand-offs, and into the underside of the top secure everything in place. Two screws per stand-off are more than enough to hold the top firmly.

The doors are then mounted using the Euro hinges. The hinge cups are pressed into the holes drilled in the doors, and the mounting plates attach inside the case. These are 110° full-overlay hinges, so the doors swing wide and provide easy access to the interior.

Finally, consider the inside of the case. Depending on what you plan to store in this entry table, adding a shelf can make the space much more useful. I used a scrap of plywood with evenly spaced holes drilled into it as a drilling guide for the shelf pins. This makes it easy to ensure the pin holes line up perfectly on both sides of the case. The shelf itself is simple—a piece of plywood edged with hardwood to match the rest of the piece.

Now the cabinet is ready for whatever finish you choose. I prefer a warm, oil-based finish that enhances the character of the wood. When I designed this project, my goal was to incorporate and practice several new techniques, and it delivered on that front. My hope is that you'll try a few of these methods in your own shop and carry them forward into your next project. **PW** – *Haseeb Ahmed*

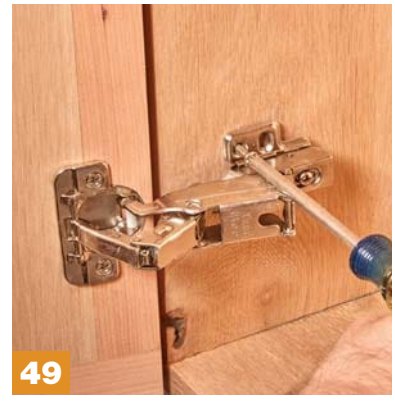
45 Trim the show-veneer to the top core using a flush trim bit.

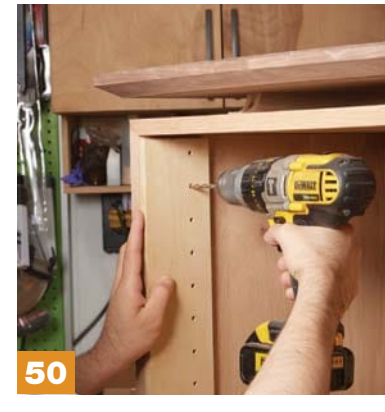
46-47 In several passes, rout a large chamfer on the bottom of the top. The chamfer wraps around the front onto the sides.

48 The top is mounted using a few standoffs. These are shaped with a swooped end, and raise the top off of the case.

49 The hinges are installed into the doors using euro-hinges. The hinges install with a pair of screws into the door and into the case.

50 The inside of the case is a great place for a shelf. A scrap of plywood with holes makes a great shelf-pin jig.





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End Grain

Woodshop BTUS

Nothing is more poetic and comforting than a roaring wood stove in the shop.

By Logan Wittmer

There are plenty of ways to heat a woodworking shop these days. Push a button, flip a switch, wait for the hum. They work fine. But for my money—and my heart—nothing belongs in a woodshop quite like a wood stove.

Wood heat just feels just as right in the shop as it does at deer camp, waiting to start our first drive of the morning. It's not nostalgia for nostalgia's sake; it's a natural extension of the craft. When the stove is ticking as it warms up and the shop slowly comes alive, it sets a pace that matches the work. No rush. No instant heat. Just steady warmth that builds, the same way a project does—one careful step at a time.

I've always loved cutting wood, long before it ever makes its way into the stove. There's a deep satisfaction in sawing logs fresh off the sawmill, knowing exactly where they came from and what they'll become. Some pieces turn into furniture or cabinets; others are destined for the firewood pile. Both matter. Both have value. Nothing feels wasted.

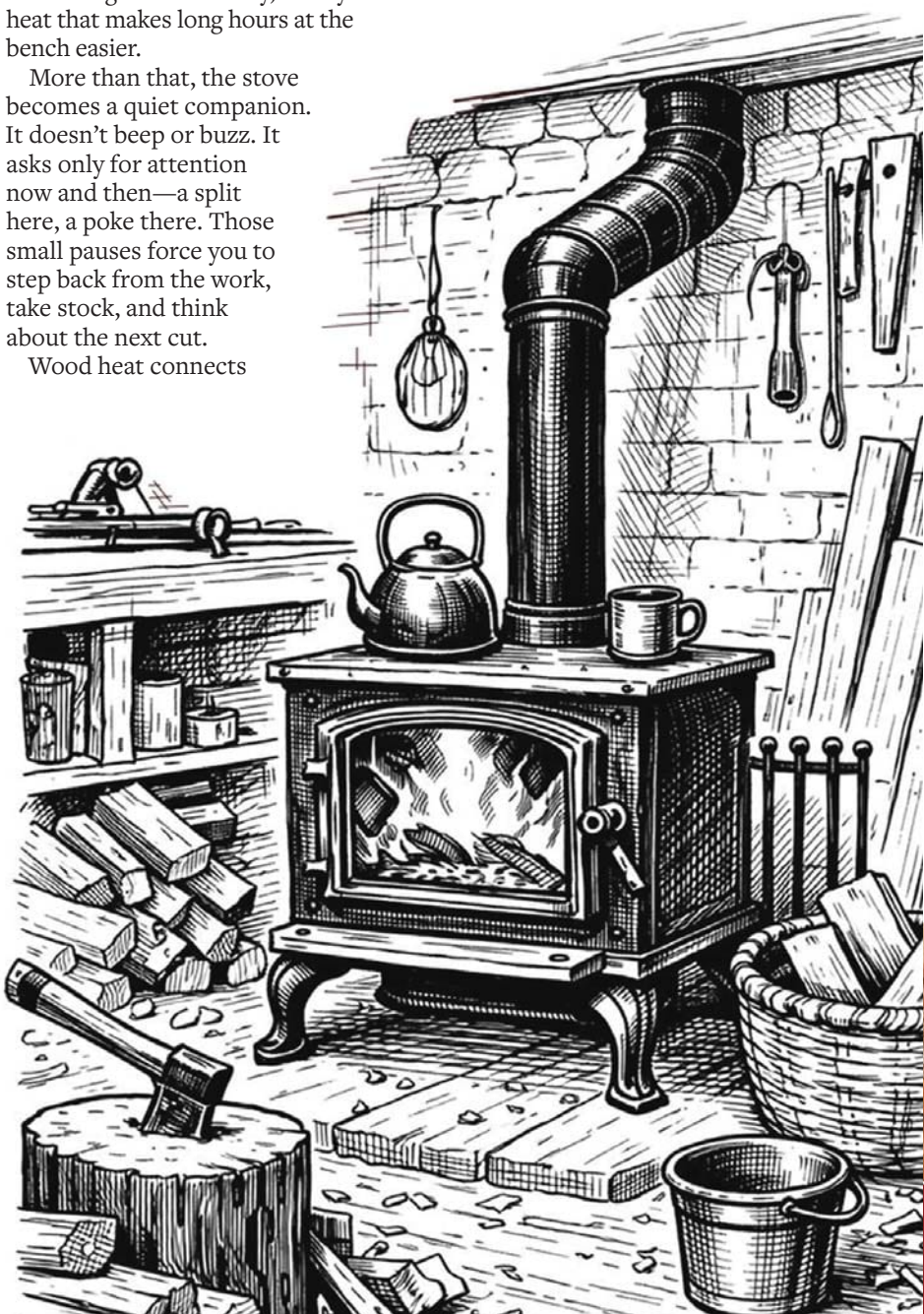
Splitting and stacking firewood is a job I look forward to every year. It's honest work. The rhythm of the maul, the sound of a log cracking open, the smell of fresh-cut wood—it all reminds you that heat doesn't come free. You earn it. By the time winter rolls around, those neatly stacked rows represent more than fuel. They're insurance, comfort, and a bit of pride all rolled into one.

In the shop, wood heat changes the atmosphere in a way no forced-air system ever could. The warmth radiates instead of blasting. You can stand near the stove to thaw out your hands, then step back to the bench where the temperature stays even and comfortable. Glue behaves better. Finishes flash off more predictably (though, obviously carefully). And there's something about that dry, steady heat that makes long hours at the bench easier.

More than that, the stove becomes a quiet companion. It doesn't beep or buzz. It asks only for attention now and then—a split here, a poke there. Those small pauses force you to step back from the work, take stock, and think about the next cut.

Wood heat connects everything I love about woodworking into one loop. I cut trees, mill lumber, build projects, and heat the very space where it all happens—using the same material. There's a satisfying completeness to that cycle. It reminds me of why I started working with wood in the first place.

In a world that's always pushing faster, tending the stove asks you to slow down. For a woodworker in a quiet shop on a cold winter morning, that's not a drawback. That's the whole point. **PW** – *Logan Wittmer*



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- One-piece central core.
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- Lip keeps the square flat on your work.
- Guaranteed perpendicular to ±.0085° for life.
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Precision Woodworking Square
Includes a wall-mountable Rack-It®
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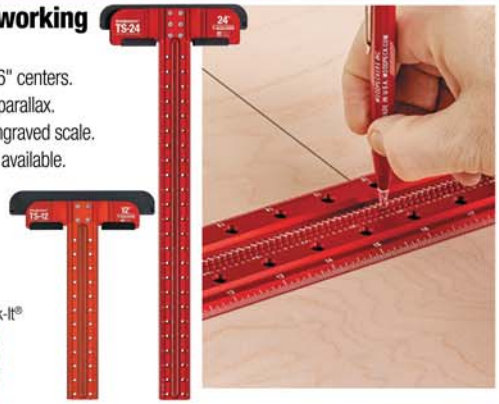

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in-DEXABLE® Combination & Double Squares

- Push-button index locks head at any full-inch.
- Laser-cut scribing guides for precision parallel lines.
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in-DEXABLE Squares
Includes a wall-mountable Rack-It®
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- Half-Laps, Bridle Joints, Sliding Dovetails, Tenons & More!
- Works with table saws & router tables.
- Patented leaf spring miter bar fits all 3/8" x 3/4" miter slots.
- Table adjusts from 44° to 91°.
- Micro-adjuster postitions vertical table precisely.

Joinery Sled....$339.99
Includes a wall-mountable Rack-It®

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- Perfect for end grain cutting boards.
- Adjusts to work with almost any size or style router.
- Two sizes: 15" and 24" wide. Both work from 3/4" to 3" thick.
- When it won't fit your planer, plane it with Rout-N-Plane!

Router not included.

Rout-N-Plane Benchtop Board Mill
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NEW TOOL

- Includes square & spearpoint blades.
- Blades lapped perfectly flat. Bevels ground and ready for final honing.
- 12 blade positions ensure maximum access & support.
- Fine-thread adjustment with no backlash.
- Ductile iron base with black-nitride treatment.
- Optional fence keeps plane parallel to an edge.

Router Plane....$279.99
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These bits create a subtle concave recess in the edge of your cutting and serving boards. Bearing controls depth of cut.

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