

Popular Woodworking

FEBRUARY 2025 | #282

Norwegian Linen Chest

Craftsman Fern Stand

Prepare for the
Spring with this
Elegant Plant Stand

Bent Lamination Headphone Stand

This Bent Lamination Project Is a Great Gift

Linseed Oil Paints

An Old World Paint is Making
a Resurgence in Today's shop



EVERYTHING

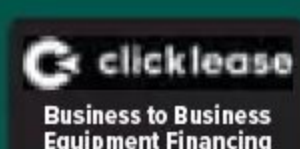
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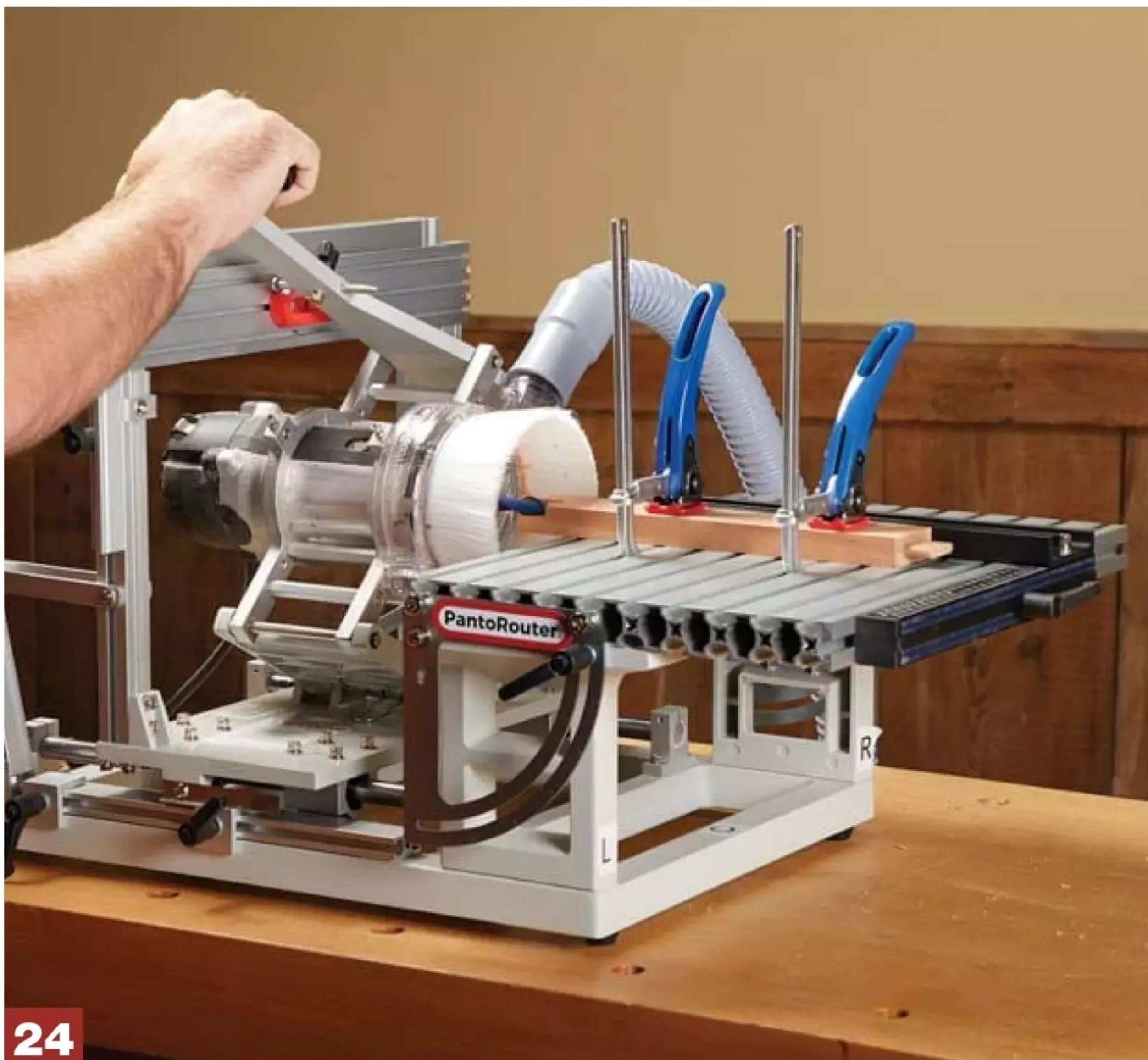
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FROM THE EDITOR

Appalachian Roadtrip

By Logan Wittmer

As subscribers to our magazine, you see a part of what we do every day—you're holding it in your hands. What you don't see is all of the behind-the-scenes stuff. We operate in two month cycles; we send an issue to the printer (and you) every two months. Between being in the shop, sitting at my computer writing articles, or being in front of a camera for video work, I'm generally on the road with our contributing writers, shooting photos of projects. My goal is to keep this magazine filled with woodworkers from all over the US (and world).

Earlier this month, the three full-time Popular Woodworking staff (Collin, Danielle, and myself) met up in central Ohio for Danielle's wedding. It was one of the most beautiful weddings I've been to, and I wish that we could have stayed longer. Alas, Collin and I had to jump on the road and make a seven hour drive to central Virginia for a three-day photo shoot. There, we met up at the Alexander Brothers shop (and lumberyard) to shoot several projects with Shea Alexander and Albert Kline. Shea makes his living running a lumber yard with his brothers and building custom furniture. Albert lives in DC and works as an economist by day, marquetry savant by night.

Over the three days, Collin, Shea, Albert, and myself shot a total of six magazine features, ranging from carving to marquetry, stools, and boxes. The amount of talent that I was surrounded by in those three days was humbling to say the least. Generally, I can handle a photoshoot by myself. But, having Collin on hand allowed us to pack that much more into those three days, as well as the opportunity to shoot a bit of video while we were there. Keep an eye out for that—we'll align the projects in the magazine with the release of the videos on the website.



Speaking of other duties, earlier this month we concluded our first (relaunch) of Woodworking In America. I think it exceeded all of our expectations, and we've already started planning for our fall 2025 Woodworking in America. I met many of you there, and to those that were able to make it, I thank you. To those that couldn't—I hope you can next year. I'll do my best to keep the magazine audience privy of our plans, but also keep an eye on our website (and emails) for info on that when it comes out. Another great way to keep in touch with what's going on is our podcast. News flash—myself and the team at Woodsmith do a weekly podcast, and have for several years now. It's basically a bunch of us wood-working nerds talking about things related to what we're working on, with a healthy serving of dry, eye-rolling humor. It's terrible. You should listen. Cheers!

ABOUT THE AUTHORS



COLLIN KNOFF:

Headphone Stand—pg. 36

Collin has been fascinated with building things as long as he can remember—from LEGO sets to taking apart things around the house just so he could see how they went back together (sorry Mom!). It wasn't until he took wood shop in high school, however, that he found the best way to channel that

energy, and has been a maker ever since. Collin joined the Popular Woodworking team as the Digital Editor in 2019, and is excited to be part of the bright future ahead for the next 40 years.



WILLIE SANDRY:

Fern Stand—pg. 52

Living in the Pacific Northwest, Willie Sandry is a longtime fan of Arts & Crafts furniture. He enjoys taking inspiration for his projects from antique furniture exhibitions as well as "old barn finds." Never one to do a job partway, Willie has developed a vast skill set to elevate his projects. From sawing

lumber and kiln drying it to finishing a chair with top-notch upholstery, Willie sees a project through from the start until the finish. YouTube: *The Thoughtful Woodworker*.

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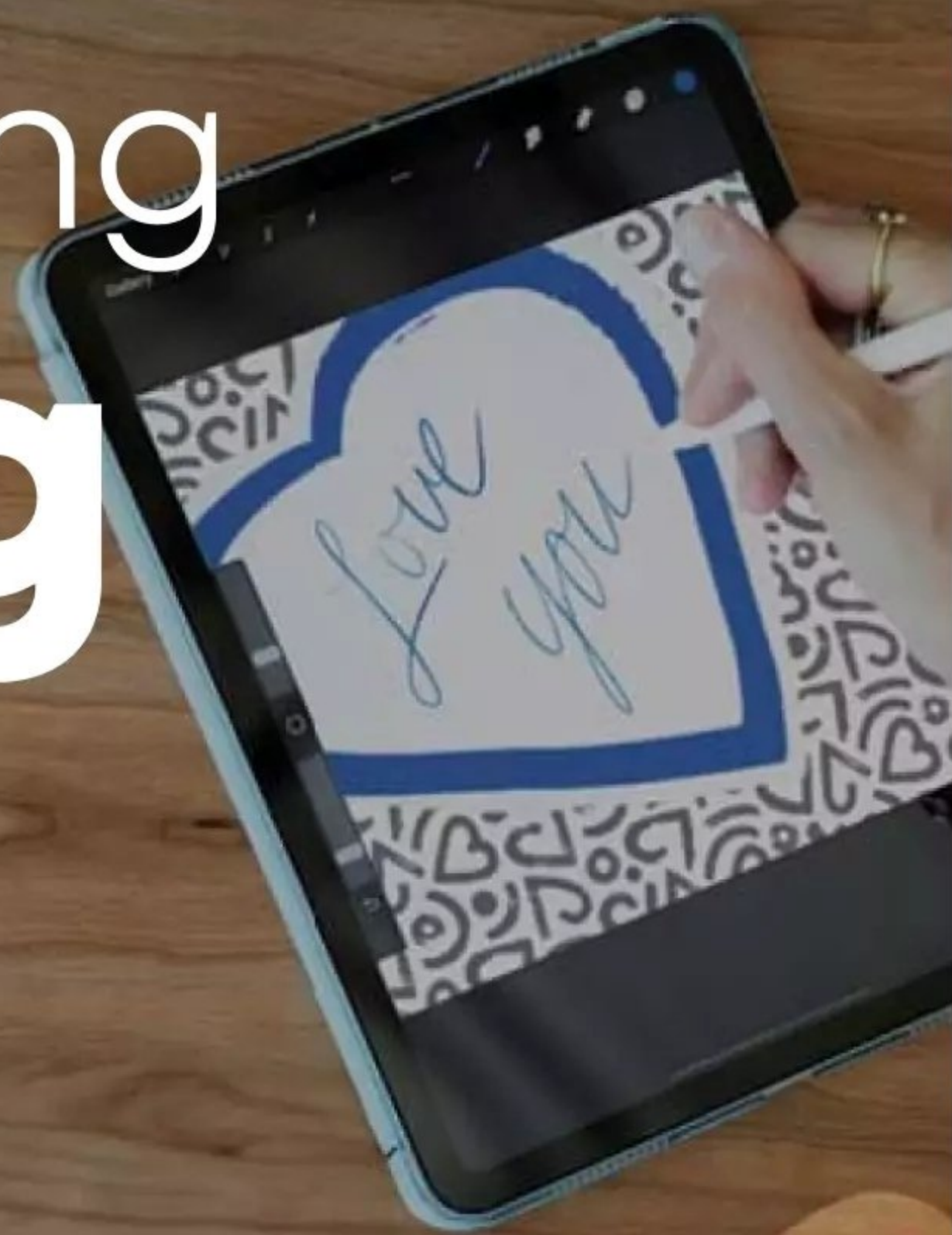
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WORKSHOP TIPS



Plane Blade Chisel

When I needed a very wide chisel for accurately paring some dovetails, I just removed the blade from a plane and added a handle to it. This massive chisel proved to be so easy to control that I use it for many other jobs, too.

Make the handle from 1/2" thick stock. Round the sides and top edge and chamfer the bottom edge of each piece. Fasten the two halves with 1" long 1/4"-20 machine screws and square nuts. Chop square recesses for the nuts so they sit flush with the surface. – *Tom Caspar*



CAUTION:
Unplug your
drill press.

No Mortising Attachment, No Problem

Here's a cheap, time-honored way to clear the waste out of mortises after drilling. Buy a plastic handled chisel and twist off the handle with a pipe wrench, exposing the chisel's tang.

Unplug your drill press and tighten the chisel's tang into your drill press' chuck. Line up your part and start paring the mortise. Don't try to take all the waste at one time. This design is similar to very old mortising machines, before they used hollow chisels with a bit inside. – *Jack McGary*

Staple Set

Pneumatic staplers don't always set 1/4" crown staples flush. Driving them the rest of the way with a hammer causes the staples to kink, so I designed this easy-to-make tool, which I call a "staple set."

To make this set, cut a 5" section of a dowel at least 1" in diameter and drill a 1/4" hole down the center. You'll have to drill the dowel from both ends to reach all the way through. Insert a 6 1/2" length of 1/4" steel rod into the hole. Place the staple set over the staple and tap the steel rod. This sets the staple without bending it. – *Bob Enderle*



PHOTOS PROVIDED BY THE AUTHOR

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WORKSHOP TIPS

Cheap, Easy Storage

I found a quick, cheap, and easy way to store lots of little stuff like biscuits, screws, wood plugs and the like. Drill a hole in the cap of a plastic soda bottle and insert an eyebolt. Secure the eyebolt with two nuts, one above and one inside the caps. Finally, cut a round hole in the shoulder of the bottle.

One cool thing about this storage system is if I knock one of these bottles off my workbench, all the stuff inside doesn't spill out. It gets trapped in the neck of the bottle rather than spilling out the opening. – *Jeff Briere*



PHOTO PROVIDED BY THE AUTHOR

Stuffing Glue in Cracks

On several occasions, I have come across delaminated plywood or fractured lumber that I need to glue closed. Getting glue into these tight cracks can be difficult, but I discovered that using an old scroll saw blade works well. I hold the crack open with a screwdriver, and work the blade back and forth. The dulled teeth carry glue into the crack and the blade is flexible enough to bend through the cut.

– *Cliff Sommers (Jackson, Mississippi)*



PHOTO PROVIDED BY BILL ZUEHLE

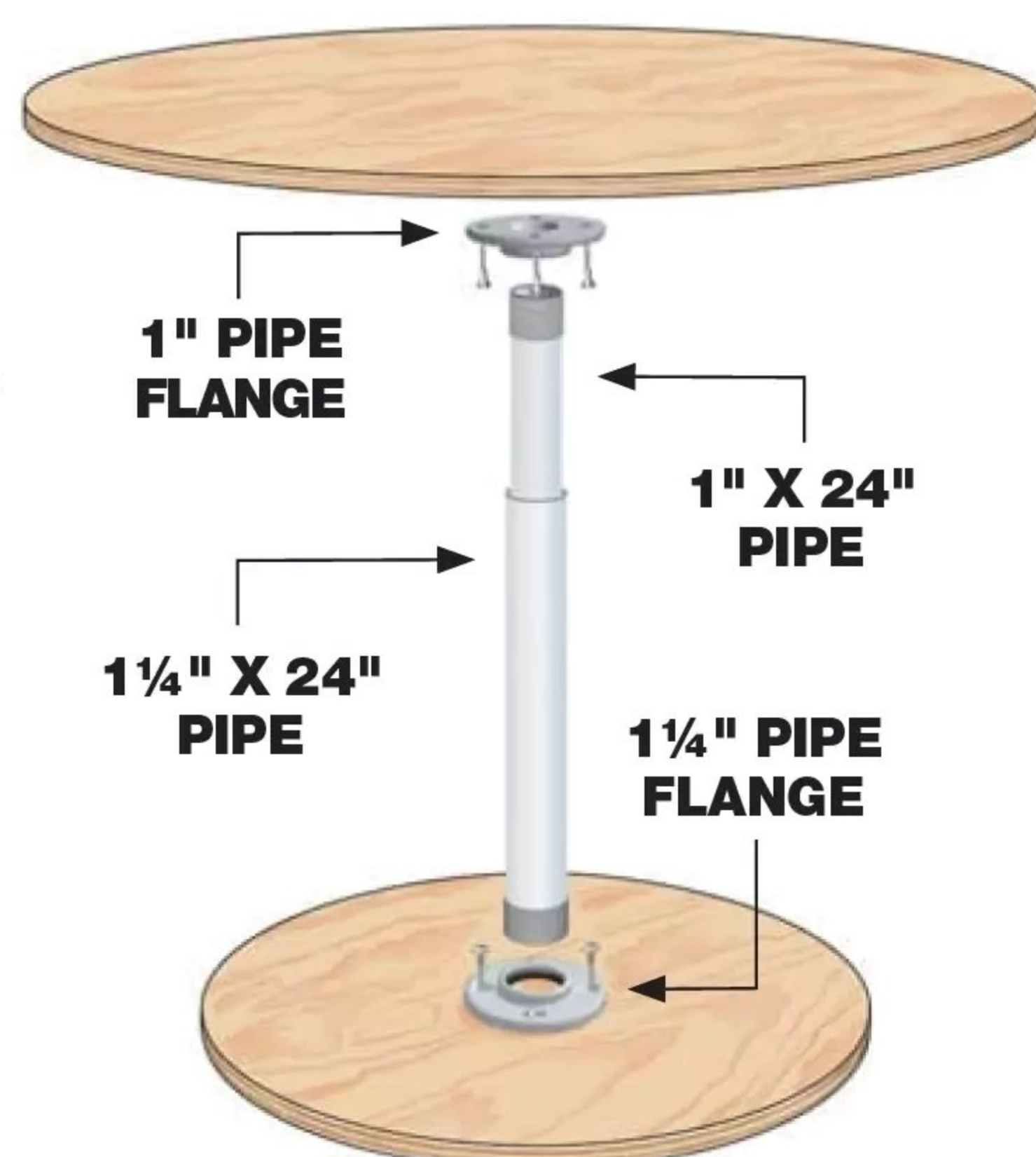
Storable, Portable Turntable

If you do a lot of spray painting and finishing, but don't have room for a permanent finishing bench, give this turntable a spin. It's surprisingly sturdy and because it rotates, you can get to all sides of your project while standing in one spot. It's lightweight, so it can easily be taken outside. When you're done, just unscrew the pipes from the flanges and store all the parts out of the way in the corner of your shop.

The pipe parts are available at most home centers, hardware stores, and plumbing shops. Don't try to use pipes with diameter of less than 1" and 1 1/4". These are the only pipe diameters that telescope together well. Other pipe diameters either won't fit together at all or will be too loose.

The plywood top is 36" in diameter and the base is 24" in diameter.

– *Michael Dresdner*



WORKSHOP TIPS

Simple Storage for Layout Tools

I used to keep my layout tools in a toolbox, but they always banged around against each other. I needed a better way to store them, so I came up with this simple rack. All it took was a chunk of 2x6 and some angle cuts spaced about 1 1/2" apart. Now my layout tools are protected from damage and readily available. Plus, it turned out to be a good way to store my scrapers too. – Leon Long (San Jose, CA)



PHOTO BY RAMEN MORENO & BILL ZUEHKLE

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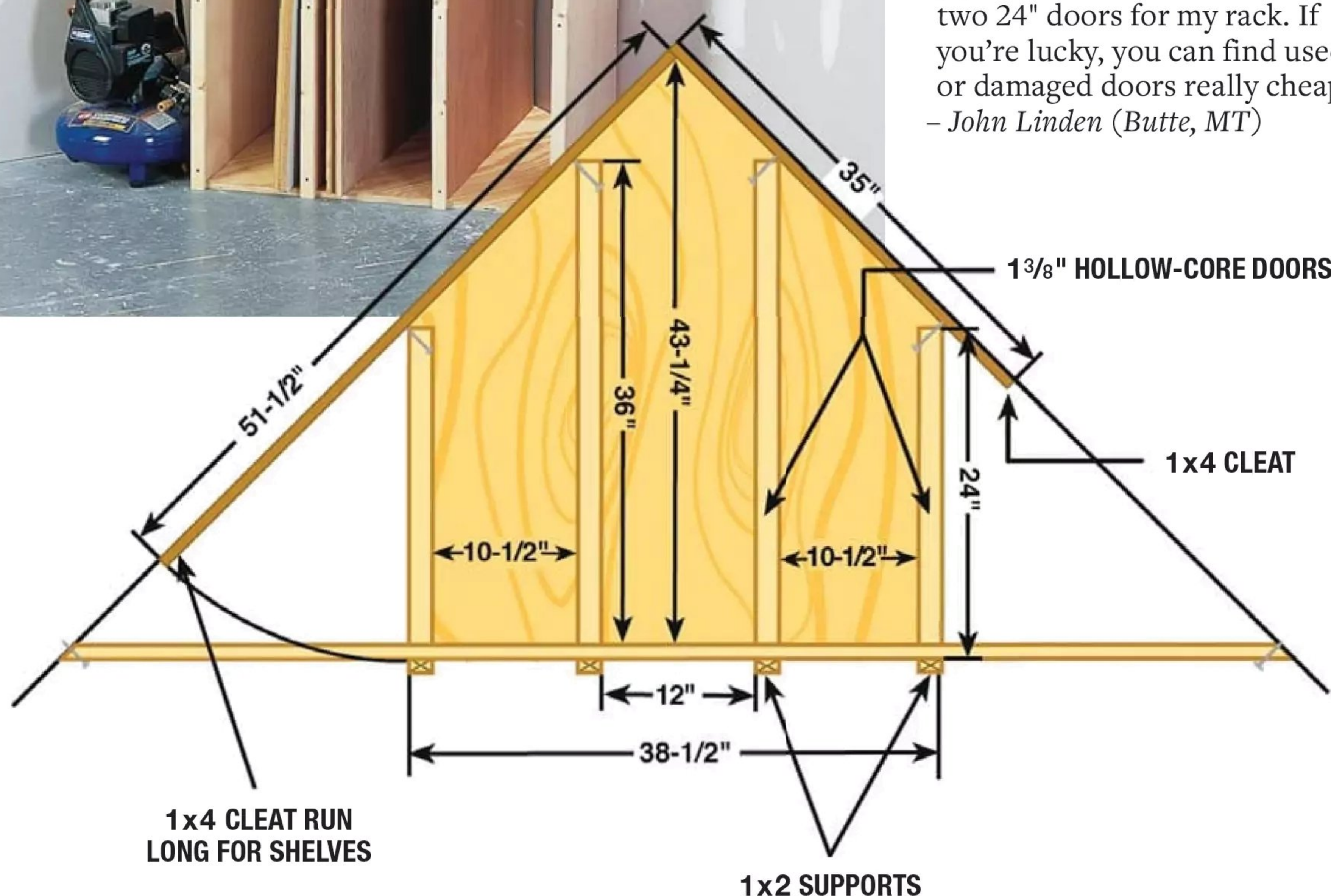
WORKSHOP TIPS



Utilize Your Corner Space

If you use a lot of sheet stock like I do, you know what a problem storage can be. A growing colony of sheet goods, offcuts, and scrap forced me to get organized and build this lumber rack. The rack makes perfect use of wasted corner space without taking up a lot of floor and wall space. The center slot can handle full sheets of plywood and the two outside slots work for partial sheets and scrap. I added shelves in one corner for general storage and left the other open for stacking lumber vertically.

Hollow-core doors make perfect dividers because they're flat, smooth, and cheaper than plywood. I used two 36" and two 24" doors for my rack. If you're lucky, you can find used or damaged doors really cheap.
— John Linden (Butte, MT)





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★★★★★ Gary R.

NEW TOOLS

Skunk Tool Works No. 444 am

As a rule of thumb, if something doesn't have multiple uses in my shop, I don't generally keep it around. That even goes for hand tools. The new No. 444 dovetail marker from Skunk Tool Works is an adjustable dovetail marker that covers the gamut of commonly used dovetail angles and eliminates having and storing several different dovetail markers.

The No. 444 is adjusted via a knurled knob on the front of the marker. When you loosen the knob, you can slide it up or down to adjust the angle. There are two stainless steel blades that move along the outside edge of the marker (you can see them poking out on the right hand side of the dovetail marker). The thin blades allow you to easily get a marking knife in there to make an accurate mark.

The marker has common angles and dovetail ratios laser-etched on the front for quick and easy referencing. The ability to adjust the angles also allows you



ADJUSTABLE DOVETAIL MARKER

Skunk Tool Works
SkunkToolWorks.com
Price: \$129.00

to identify and remark previously cut dovetail angles. Picking up the marker, you can tell it's well-made. There is a heft of quality about it. The No. 444 dovetail marker is one of several that Skunk Tool Works produces (the others are fixed angle) and can be found on their website, SkunkToolWorks.com—Logan Wittmer

Grex 105° Angle Sander

Woodworkers all know the importance of sanding, and how tedious it can be. As a woodturner, we are all too familiar with that struggle as well. The tools we use for sanding are slightly different than for flat work however. Most of the time, when I turn a bowl or a vessel, the sanding of the outside and inside are done with a drill and a sanding pad. This form of power sanding works pretty well, but being a pure orbital motion can leave a scratched surface. I recently came across a product from Grex that has helped alleviate some of my power sanding struggles.

Grex, known for their pinners, staplers, and nailers, produces a large line of professional airbrushes and accessories. Part of this line is a set of pneumatic sanders. Their 105° angle sander has been bundled into a kit geared towards the turning market. The random orbit pneumatic sander comes in a kit with 1, 2 and 3" pads as well as some hook and loop paper from *Klingspor*. In addition to the sander, pads, and paper, there are a few different extension shafts to further your reach inside of deep bowls or hollow forms.

The Grex sander is angled at 105° (as the name implies) and this leads to a more ergonomic grip as you're sanding. The random orbit action makes sand-



105° SANDER

Grex
GrexUSA.com
Price: \$198.00

ing much quicker and more efficient, but you can't press as hard or you'll stall out the action.

One thing to keep in mind as you're using a pneumatic sander is that they require more air than a standard small "pancake" compressor can supply, so you may need to upgrade your compressor to run something like this Grex sander. But, I believe that is a small trade off in the much better, and quicker, sanding experience.—Greg Kopp

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(Outdoor Applications)

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NEW TOOLS

Harvey ALPHA HW615 Nickel-Plated Band Saw

A band saw is an invaluable tool in the shop. In fact, I know several extraordinary woodworkers that don't even own a table saw, favoring a band saw instead. After seeing a few of the *Harvey* band saws in person at the IWF show in Atlanta, I knew that I would want to add one to my shop in the near future.

For several years, the *Harvey* band saws (both the ALPHA and the smaller AMBASSADOR) have received rave reviews from users in the woodworking community. At IWF, *Harvey* released an update to these beloved saws in the form of a nickel plated table. They've dubbed this nickel plating their "Stain-less" coating, and it's now available on almost all of their large tools. Having put this coating through the paces for the last several months, I have to say that I'm a believer. The coating, being nickel, is not only resistant to rust and stains (as a turner and butcher of green wood, that's huge), but it's also harder than the cast iron and can take a higher polish. This leads to a lot less friction than a cast iron surface as well as additional wear resistance.

Coating aside, let's talk about the saw. Were all of the positive reviews I had read hype? Nope. It's as simple as that. The ALPHA is a fantastic saw. For being a 15", 3HP saw, it has a fairly small frame, which is a benefit in a lot of shops. There's plenty of power for heavy resawing duties, and with 14" of capacity, you can pack a lot of wood under the guides.

Speaking of the guides, they might be my favorite feature of this saw. Most of the time, when people have an issue with a band saw, you can narrow it down to improper setup of the blade guides. A lot of guides can be tedious to set up, and when you tighten them, they shift. The tool-less adjustment of the guides on the *Harvey* saws are easy to set up and stay where you set them (photos on the next page).

The adjustments on the saw are well-made. The table tilt and upper blade guide are geared for easy adjustments. The table tilt adjustment has a pneumatic shock to help with tilting. The fence is well-made, though after using the *Harvey* Big-Eye fence for over a year now, it doesn't surprise me. *Harvey* seems to know how to make a fence.

The fit and finish of the ALPHA band saw are top-notch, as has every piece of *Harvey* equipment that I've used. Having hosted several classes in the shop in the last several weeks, I've had a lot of students using



■ ALPHA HW615
HARVEY
HarveyWoodworking.com
Price: \$3,399

the ALPHA. Almost all of them have mentioned how nice the saw is to use, and as beginning woodworkers, they all were completely comfortable on it. The retail price of the saw is listed at \$3,399, but it's often found on sale for as low as \$2,599, which in my mind is a steal.—Logan Wittmer

Details of the Harvey ALPHA HW615 Nickel-Plated Band saw

BELOW True tool-less guide adjustments is one of the home-runs that Harvey has hit with their saws.

RIGHT The new nickel plating on the saw is bright, low-friction, and stain/rust resistant.



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NEW TOOLS

FORTIS CLAMP Fortistrut-Q Clamp

For years, the woodworking industry has relied on pipe clamps for large format glue ups. The idea behind this clamp is that you purchase the clamp ends, and supply whatever length of pipe you need. A new company, *Fortis Clamp*, has taken this same idea and applied it to strut channel. Strut channel (sometimes generically called *Unistrut*, which is actually the name of a manufacturer of strut channel) is often used in the HVAC and electrical industry to suspend and support ducting and conduit. What makes it work so well for clamping is that it is rigid.

Fortis Clamp is currently manufacturing several different heads for use in strut channel, as well as aluminum T-track. In its simplest form, one of the heads (such as the Fortistrut-Q shown here) can be used as bar clamps—strut channel is available in 10' lengths at most hardware stores. What really makes the offering from *Fortis Clamp* interesting is that there are hundreds of brackets and attachments available



FORTISTRUT-Q
FORTIS CLAMP
FortisClamp.com
Price: \$64.95

for strut channel. Everything from tees to angle brackets. These, combined with the offerings from *Fortis Clamp* open up a world of possibilities to build entire clamping centers. The Fortistrut-Q, shown here, features a quick release button, and a lead screw with a hex head and hole for a screw driver. —*Collin Knoff*

Milwaukee 18ga Nailer

I've been a slow converter to cordless power tools. However, with today's advancement in batteries, you can do a heck of a lot with a fairly small battery. And, there's something to be said for not having to lug around a power cord, extension cord, or air hose. When Milwaukee released their new 12V 18ga nailer, it seemed like a great way to cut a cord in my shop.

The 18ga nailer shoots 18ga brad nails in sizes from 5/8 to 1 1/2" lengths. This flexibility means that you can just as easily use this nailer in the shop as you can putting up trim in your house. The nailer has the capacity of firing over 700 nails on one battery, which is more than plenty when it comes to shop uses. You'll see in the later part of this issue that I am using this Milwaukee nailer on the Norwegian linen chest build. The precision tip on the nailer makes it easy to position and aim the nails accurately, even in thin stock like I used in that project. Zero nails poking out the side of the case. Of course, you can also dial in just how far you want the head sinking into your work.

Now, I don't think that I've ever reviewed or used a Milwaukee tool that doesn't feel like it has the professional in mind. This nailer is no different. A selectable mode allows you to switch between single-fire mode



18GA NAILER
Milwaukee
MilwaukeeTool.com
Price: \$249.00+

(which I think is what most of us will use in the shop) and a "contact actuating mode" that will fire a nail any time the head is pressed down. This means that production type nailing tasks can quickly be done by holding the trigger and bumping the head along where you want to shoot nails. As with most Milwaukee tools, you can purchase the 18 gauge nailer as either part of the kit, or tool only. —*Logan Wittmer*



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Linseed Paints

Linseed paint will change the way you approach painting a project, but this wonderful finish takes a different approach than modern paints.

By Logan Wittmer



The world of finishes is a complex one. When I find a finish I like, I tend to stick with it. For the last several years, I've relied pretty heavily on both acrylic enamel and General Finishes milk paint when a project needs a bit of color. Over the last several years however, a very old type of paint has made a resurgence—linseed oil paint. About a year ago, I ordered several flavors of *Allback* linseed oil paint from SageRestoration.com. This paint has very quickly become my favorite colored finish, but it requires a different approach than water-based paint.

Now let's pump the brakes before I start talking up linseed paint, and get a little background info on the painting landscape. Prior to the 1920's or so, linseed oil paint was just about the only oil-based paint you'd find. After

the first world war, the industry needed to produce mass volumes of paint, and the landscape shifted to petroleum-based products. Today, the most common types of paint are alkyd (artificial oil) and acrylic (latex). This is mostly due to the cost of manufacturing, as well as the ability to produce these artificial paints at a high volume.

Benefits of Linseed

The biggest difference between linseed oil paints and other types is that linseed oil paint penetrates into the wood. Because linseed oil paint is simply cold-pressed linseed oil combined with a finely ground pigment, it penetrates deep into the surface and protects from within. Alkyd and latex paint tend to create a film of color on top of the surface. This layer will look great

for a while, but at a point, it will fail and start to flake and chip. Linseed oil paint, however, allows the moisture to leave the wood fibers and it will not chip or crack. The protection that linseed oil paint offers is unmatched.

Another benefit of linseed oil paint is that it will stick to nearly any surface without primer. I don't like painting with a brush, so knowing that I have to less coats to get the coverage that I want is a win in my book.

Now, I'll admit, everything has a drawback. Linseed paints are a bit more expensive than other types of paint. However, they go nearly twice as far (it's really amazing how far you can stretch a little bit of linseed paint). I've found that the *Allback* paint is a super high quality paint, and does not need to be thinned at all. The



1

1 Linseed paint separates rapidly. You'll want to stir it with a stout stirring stick, breaking up the sludge at the bottom.

2 The linseed paint goes on smoothly, and is thinner than most paints.

Allbäck paint is made in Sweden, where they've been using linseed paint for centuries—look at any town in Sweden, and you'll be greeted with bright colored buildings and doors.

Application

First things first when it comes to any form of painting project—linseed oil paint is no different. The surface needs to be sanded and prepped accordingly. Check out the box on page 22 for some tips on how I prep for paint.

Linseed paint will separate pretty quickly. I've found if you don't use a paint for a while, a thick layer of sludge will form at the bottom. A few minutes of scraping and stirring will smooth stuff out. This paint does take quite a while to dry—two days to a week isn't uncommon in my experience. With that in mind, small projects (like this Norwegian linen box) can be painted on a piece of cardboard where it can be stored away from little kitty paws.

Painting starts at the bottom of the project. Once I've added a layer of paint, I'll set it on painter's points so that I don't have to touch it. Linseed paint has a tendency to get all over everything. The less I

can handle it, the better.

Now, I know that there are many people that have favorite brushes for Linseed oil paint. And, I'm sure they're great and paint well. However, I have had great luck with cheap chip brushes that I buy in bulk—just watch hairs falling out of them into your wet paint. Maybe down the road I'll invest in a nice linseed brush, but I don't see the need to make that purchase at this point.

Linseed oil paint applies very smoothly. Compared to other types of paint, it's much thinner. As you can see in the photo below, I apply it to bare wood without priming. *Allbäck* claims that their linseed paint can be applied over a bare surface, or over a surface that's been primed with linseed oil before hand. Allegedly, the oil paint will apply easier and more smoothly over linseed oil. To be honest, I don't see how it would go on any smoother than it does already, but take it for what it's worth.



2



3

3 I may have PTSD from wet linseed paint, but I am diligent about my painting order. I do hard-to-reach areas first, to avoid dragging my arm (or clothes) across wet paint.

4 After the initial coat, I get low and view the surface with a raking light. This highlights any thin spots, or areas where there's a drip.

5 Like milk paint, linseed paint can be top-coated with several different finishes. Here, you can see how the Allbäck linseed wax makes the color a bit darker and more rich.



4

As I'm painting my project, I like to get the hard-to-reach places first, such as the inside. Then, it's a simple matter of brushing on the paint, following the grain. I haven't noticed runs or drips being nearly as much of an issue as it is with other types of paint. However, as I get towards the end of the piece, I get low and try to view every edge from a raking angle. Any drips or dry spots can be touched up. As you're working, you'll notice the paint absorbing into the surface. Don't be fooled—it's not dry. The best bet now is to let it sit for several days.

Maintenance & Top Coats

After several days, take a look at the paint. Any thin or splotchy areas can be touched up, or you can add a second coat. I like one coat usually—it allows the wood grain to show through and is a matte look. If you want a little more sheen, you have several options. First, you can add another layer of paint. *Allbäck* sells a linseed oil that you can add into the paint to add more sheen.

Another option is to add a layer of linseed oil over the top of the paint. Do yourself a favor and buy a good quality linseed oil. Finally, you can add a bit of wax over top. Be aware that any top coat you add will change the color slightly. You can see color shift below when I add a bit of the *Allbäck* linseed wax over top of this brick red paint.

As far as maintenance goes, linseed paint is easily cleaned with linseed soap (which is also the "solvent" used to clean up brushes). As I mentioned before, linseed paint is durable and pretty much trouble-free. Apply as many coats as you see fit, and then let the paint do the heavy lifting over the next several decades or so.

PW—Logan Wittmer



5



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No matter what type of paint you're using, having a good foundation is key. The ability of paint to hide imperfections or flaws (such as knots or nail holes) is predicated on having a smooth surface. For little blemishes like these, I like to use a good water-soluble filler. For years, *Durham's* has been a go-to for filling, and I like the fact that it's simple to use. The powder is simply mixed with water—there's no formula here. Just add water until it's the consistency you want. I aim for peanut butter. With *Durham's*, it actually swells a little bit, so I will smear it flat into the holes. As it cures, the filler will change colors. *Durham's* is hard, so I use a flat sanding block to keep surfaces flat (and avoid sanding a divot around the filler).

The other blemishes that often happen are small dents on the surface of parts. To deal with these, I'll usually drop a bit of water into the dent and let the wood absorb it. Then, using a hot iron and damp cloth over the dent will force steam down into the fibers. The steam will often pop the dent back up. Just make sure to let the wood fully dry before sanding the raised grain.

A-B *Durham's* Rock Hard Water Putty is my filler of choice if the project is getting painted. The putty won't accept stain, but you can paint over it easily. Start with a bit of small powder, and mix in water. Only mix up small amounts at a time, as it will cure fairly quickly. I add enough water to get to a peanut butter consistency.

C I use a small off cut to mash the putty into the nail holes.

D The water putty is very hard, so I use a firm sanding block to smooth out the cured filler.



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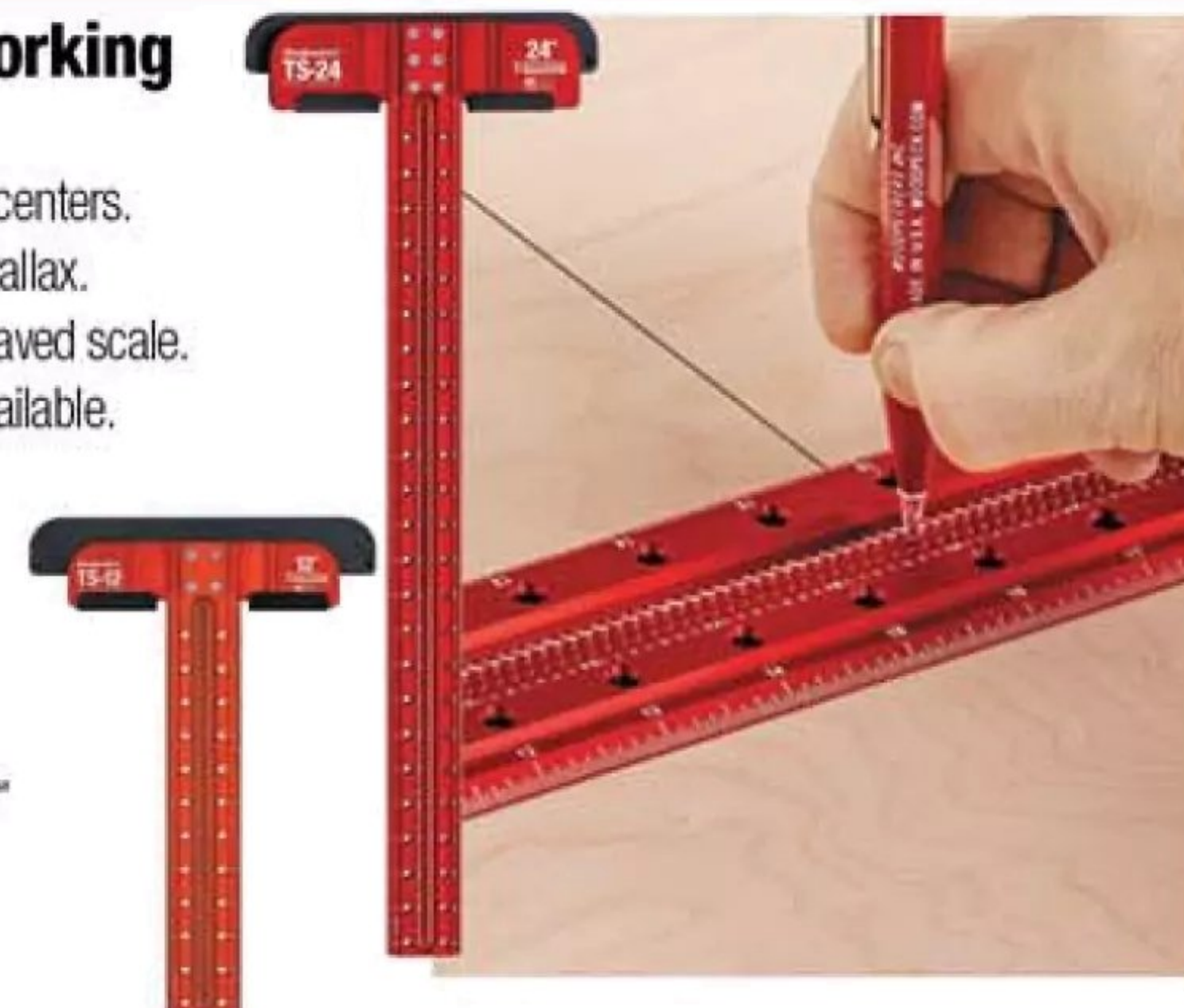
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■ In the Shop

Joinery Machines

Joinery machines are much more than one-trick ponies. Here's an intro, and why you should consider adding one in your shop.

By Logan Wittmer

There are several machines that come up as “shop necessities”. Table saws, jointers, planers, and band saws are the most common ones. In my opinion, there's a new class of machine that needs to be talked about more than it is, and that is joinery machines. These are machines that are designed to help you cut joinery in your shop, generally powered by a router.

In this article, I'm going to focus on two different machines—the PantoRouter (*PantoRouter*) and the Multi-Router (*Woodpeckers*). One could argue that the Shaper Origin is a similar tool, and I wouldn't dis-

agree. However, I believe that's in a separate class, and am not going to look at that here. I also want to point out that I'm not directly comparing pros and cons of each of these machines. Instead, I want to give you the broad-strokes of what they can do, and where each one excels. It's worth keeping in mind that they both are within the same price range.

Why Have a Joinery Machine?

The idea behind a dedicated joinery machine is that they are a machine that you can rely on

to produce repeatable joinery cuts day-in and day-out. Sure, you can do similar tasks on other machines, but the idea is that this machine is set up just to do joinery. Let's take your table saw for example. Instead of switching your blade out for a dado stack, you can leave it set up for accurate cuts. Likewise with your router table—it's great for cutting profiles and routing grooves. However, tearing that down to set up box joints is probably not the best use of time.

Ultimately, it comes down to being able to get super precise results with the least amount of time. Now, on that note, I want to point out something. Many people look at a PantoRouter or a Multi-Router and say “great, it makes awesome mortise and tenons... so what?” Yes, it does. However, joinery machines do so much more than that. Both of these machines can do dovetails, box joints, dowel joints, slot mortises, and more. I think one of the worst things that a woodworker can do is buy a



- 1 Joinery machines look like a slot-mortiser on steroids. They make mortises of nearly any size very quickly, and more accurately than other methods.
- 2 Once you start to understand the versatility of a joinery machine, only then will you realize how valuable one of these machines is.

joinery machine and just think of it as a mortise and tenon tool. It's so much more.

Multi-Router

Believe it or not, the first time I saw a Multi-Router and thought that I wanted one, I was probably about 14 years old, watching David J. Mark's TV show, *Woodworks*. David had one of the original Multi-Routers, made by JDS. Fast forward a couple of decades, and Woodpeckers has purchased the rights to once again produce and sell the Multi-Router.

The Multi-Router works by combining three levers — one for each axis. The Z-axis moves the router up and down. The X and Y axis handles move the workpiece and table separate of the Z-axis (router). Having three levers

sounds counter-intuitive (after all, I only have 2 hands, I don't know about you), but it's honestly not that big of a deal. The Multi-Router movements are all on linear bearings, and are super smooth. The entire machine has a stand available, and is made out of cast aluminum and is hefty. As with all Woodpeckers products, it's made in the USA.

PantoRouter

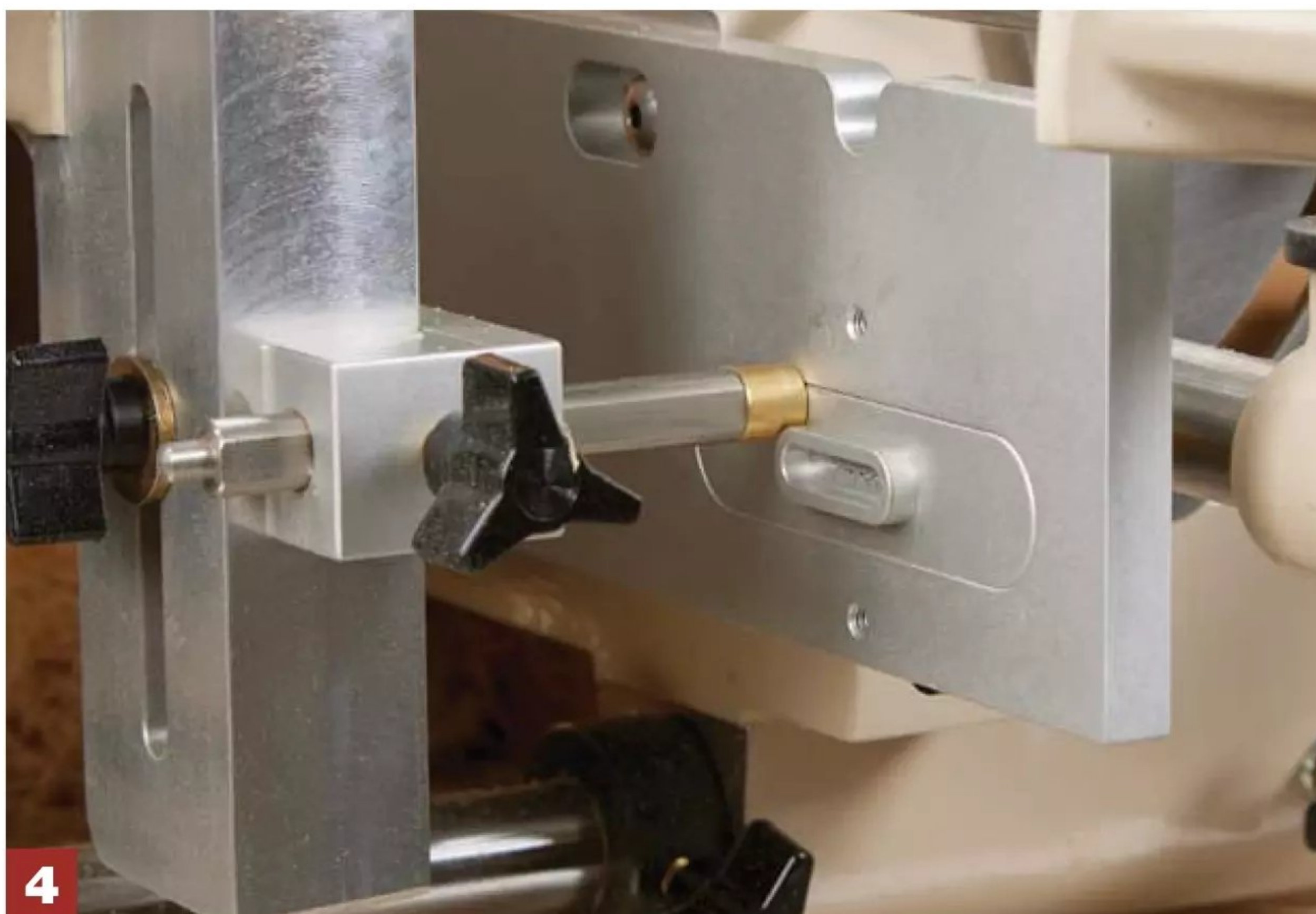
I first introduced the PantoRouter a few years back in an "Editor's Choice Tools" article. It was one of those tools that I wanted to hate, but I couldn't help myself but to be enchanted by it. The PantoRouter was first designed by YouTuber Matthias Wandel and made out of wood. Matthias passed the design onto a company in the Pacific Northwest that produces them out of cast and machined aluminum.

In contrast to the Multi-Router, the pair (two) PantoRouter handles move the router only — the workpiece and table are fixed. This free-form movement feels a



3-4 The Multi-Router uses aluminum templates—one for each size of tenon. Fine-tuning is done with different sized bushings that are installed on the end of the stylus.

5 In contrast, the PantoRouter uses tapered injection-molded templates. Fine-tuning of the joint is done by sliding the bearing forward or backward on the tapered surface, changing the size of the router movement.



bit “looser” than the Multi-Router with its linear bearings, but once you realize how everything works, it’s very fast and accurate.

The Templates are Key

The secret to both of these machines’ repeatability and precision comes down to their templates. You can see these in the photos on this page. The Multi-Router utilizes machined aluminum templates that are held in an aluminum holder. A stylus attached to the router head follows the template, allowing you to create the shape of the template. Any fine-tuning of the joint is done by changing out the bushing on the end of the stylus. Each bushing adjusts the fit ever-so-slightly, so you can dial it into what you’d like.

Flipping to PantoRouter world, the templates here are held on a template holder (located with a locating pin), and many of the templates are designed with a taper to them (photo 5). A bearing attached to the router arm follows the template, and you can adjust the fit of your part by pushing or pulling the bearing further up or down the taper. It’s a clever little system.

Both of the template systems work well. The templates for the PantoRouter are cheaper, but they’re also plastic, so one could argue they’ll wear with enough use. In contrast, the aluminum

6 PantoRouter has, for several years, introduced new accessories to help users with work holding and positioning.

7 The Multi-Router design has been around for decades and is tried and true.

templates for the Multi-Router are well-made, but adjusting the fit is slightly more inconvenient than moving the bearing location. Both machines have templates available for dovetails, mortise and tenon, box (finger) joints, as well as round tenons.

Work Holding & Locating

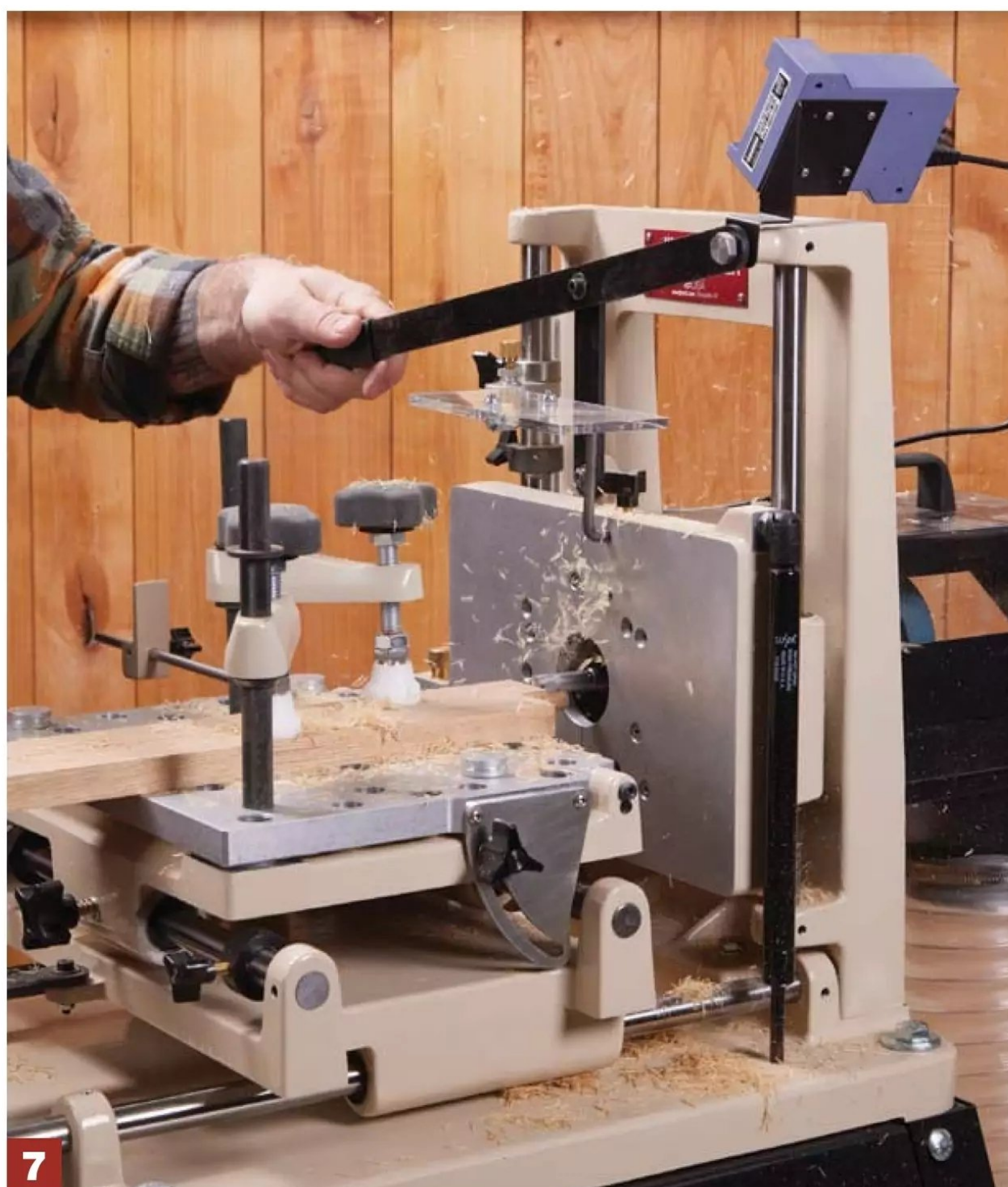
Both of these machines are great at repeatable joints, as long as you get your work in the same location. The PantoRouter has a sliding fence that you can adjust the position, based on your workpiece size. An optional swing stop allows you to set the workpieces in exactly the same spot each time.

The Multi-Router uses a machined table and dog system, similar to what you'd see in a *Festool* MFT table. The dogs have set spacing, and you may need to use spacers to position parts correctly, but it's not a big deal. Both machines have standard hold downs, or have the ability to add pneumatic clamps for high-production environments.

Going Forward

Joinery machines don't seem to be as common as I think they should be. The ability of one of these to replace several machines, especially in a small shop, is a huge benefit, not to mention the time savings they offer. Going forward, I'm going to make a concise effort to really show how I use these machines in my shop and where they shine. The biggest thing to remember is that a joinery machine is only limited by your creativity.

PW - Logan Wittmer



All About PPE

Safety is #1 in the workshop.

By Collin Knoff



Before you're ready to lift a single hammer or cut a single board, you're going to want to understand the impact of safety in the shop. Accidents can happen to anyone, even the most careful of us out there, so taking the appropriate precautions can mean the difference between losing a fingertip and a whole hand. Not to mention the long-term health complications that can arise from poor use of protective equipment. While this guide on PPE is far from comprehensive, it's a good start to a long, healthy life of woodworking.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is the first line of defense in the shop. You should always be protecting your eyes, ears, and lungs while woodworking. You may

not see it all the time in photos in the magazine, but believe us that we always have our PPE on behind the scenes.

For Eyes...

Safety glasses are my number one safety device in the shop. I treasure the use of my eyes far too

much to risk anything happening to them. While I'm almost always wearing my personal glasses that are impact-resistant, I still take the precaution of throwing on real safety glasses whenever the need arises. You literally cannot have too many pairs of these, and you can buy ANSI-certified glasses at



the home center for less than \$5. Whenever I lose track of the pair I was most recently wearing (which is often) I go grab a fresh set off the pegboard on the wall.

...and Ears

This is another one I always have on. I've noticed that lack of hearing protection causes the most immediate discomfort. Just running a few boards through the table saw without protection will cause short-term ringing, not to mention long-term hearing loss. I also enjoy listening to music while I woodwork, but I make sure to keep the volume low enough that I can still hear what my tools are doing. Often the blade, bit, or motor will tell you audibly when it's

struggling before it suffers a more serious failure.

Don't Forget the Lungs

When considering long-term risks, you can't forget to take care of your lungs. You don't need fancy dust extractors for this, even a basic N95 or KN95 will go a long way toward protecting your lungs. Even better yet is an upgrade to a high-quality respirator, especially during finishing work. That being said, I do think finding a way to collect dust at the source is a very worthwhile investment though, and will help keep it out of the living areas of your home. You can visit PopularWoodworking.com to check out a rundown of dust extractors at different price points.

Protect Your Body Too

A sometimes-overlooked aspect of PPE is the clothing for the rest of your body. Composite-toe boots are especially important if you're working with large pieces of lumber or saw-milling. And don't forget industrial-quality pants and shirts to protect

- 1 Safety glasses come in all shapes and sizes.
- 2 I prefer in-the-ear hearing protection, but earmuffs work great too.
- 3 Fit your mask to your task; the finer or more dangerous the particle, the better the mask should be.
- 4 Gloves in the shop are a no-go for most tasks.



2



4



3

yourself from scratches and sharp edges. That being said, I don't encourage gloves in the shop. While there are certain scenarios where they can be beneficial, they are a catch risk when working with high-speed blades.

WHAT THE HECK ARE ALL THESE ACRONYMS?

You might have noticed that many types of safety devices are labeled with ANSI or NIOSH certification numbers. But what do they mean, and does it matter?

ANSI stands for the American National Standards Institute, a nonprofit organization which was founded in 1918 to lay out operation standards for equipment.

NIOSH is the National Institute for Occupational Safety and Health, a United States federal agency mostly dealing with work-

place safety from the standpoint of exposure to harmful substances.

There are a few additional agencies certifying other industry-specific workwear that we won't cover, but the premise works the same for all of them. Basically, any PPE item that has been certified meets or exceeds certain standards laid out to protect the user.

Equipment that is certified isn't guaranteed to be better at protecting you than a product that lacks certification, but it does mean that the product has undergone testing to meet a minimum level of protection. Likewise, a non-certified piece of safety equipment doesn't mean you're in additional danger, just that you don't have a set level to compare it to.

Let's use a non-NIOSH-certified dust mask for example. The filtration itself might be of equal or

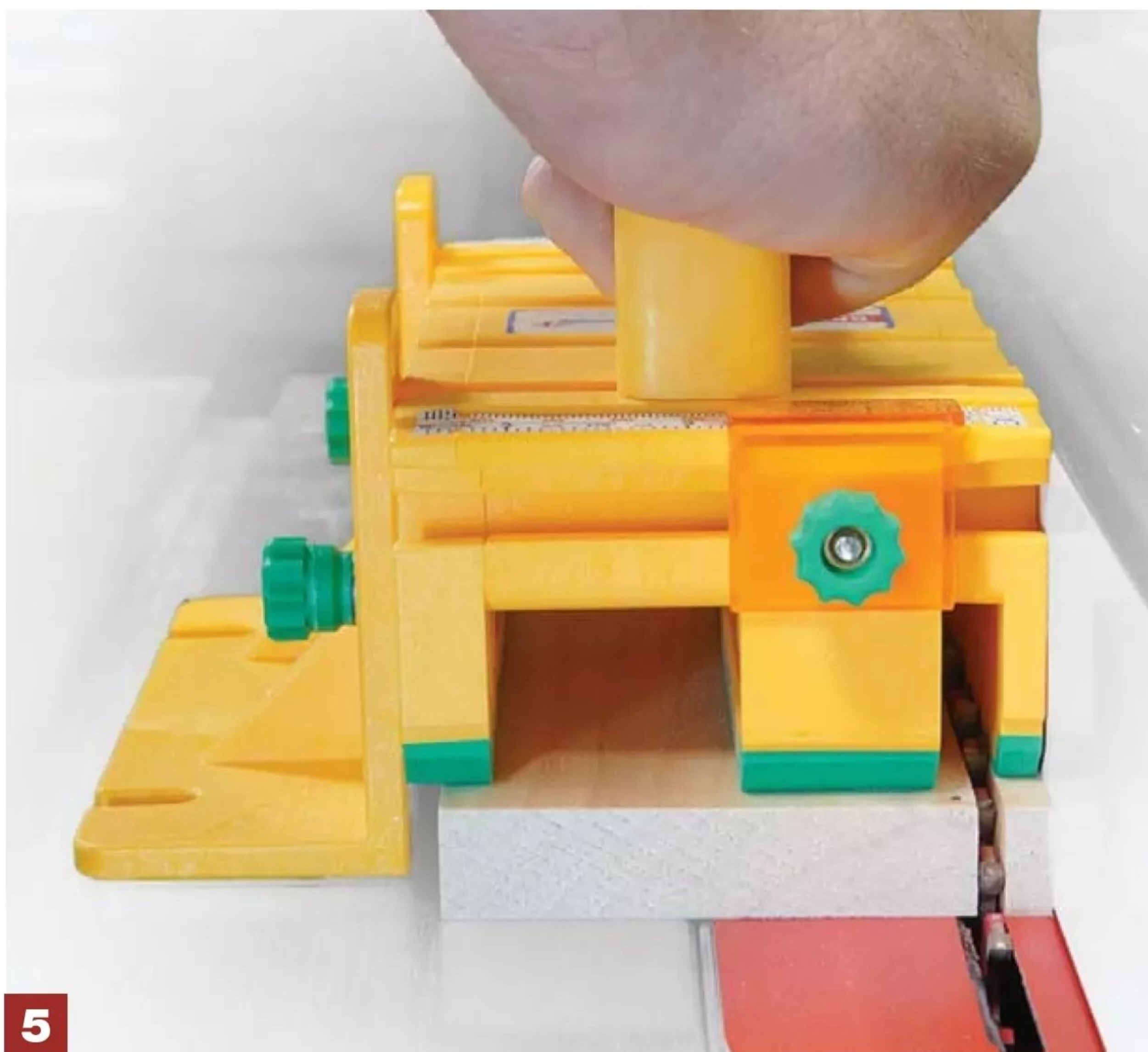
better quality than the standard, but if it doesn't reach the minimum requirements for a tight fit on the face, it won't pass. Certifications can help give peace of mind that you're getting the full protection package.

As a general guideline, you should shop for PPE that is safety certified. I will say that I make occasional exceptions. I might have normal earbuds in while running a more quiet machine. Or when I'm sweeping the shop I'll throw on a more comfortable mask. Ultimately, even lower standard safety gear is better than none at all.

BONUS PPE Push Blocks

I'm going to add something to the usual realm of PPE in the shop: push blocks. While most safety features of the tools in your shop are integrated to the tool itself, push devices are standalone items that become an extension of your person. After all, the real endgame of woodworking is to finish your project with the same number of digits as you started. The easiest way to achieve that goal is to keep said digits as far away from sharp moving blades as possible.

Previously you could categorize push devices into two separate fields — sticks and blocks. Push sticks help you maneuver wood in tighter spaces, like between a blade and a fence. Push blocks (or push pads) work great for holding down stock while jointing or at the router table. There are some new options out there from companies like *Microjig* and *Milescraft* that allow a bit of a hybrid approach. Strategically-placed channels allow you to hold the entire workpiece steady even with a blade running through. Personally, I think you should find whatever sort of device you're comfortable using and to always keep it nearby when making cuts.



5 The *Microjig* -ripper provides a high level of control of the workpiece, while also keeping your hand well out of harm's way.

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NON-PPE

Safety in the shop doesn't stop with your personal equipment. Modern tools have numerous built-in safeguards that will help protect you—if you use them. You'll notice this section is heavily-weighted towards table saw safety. It is, without a doubt, the most likely tool to harm you in your shop. One study that 42% of reported woodworking injuries were caused by table saws and that they were the cause of the highest proportion of amputations at 39%. Another study found that table saws were responsible for 20% of non-occupational amputations, more than any other single consumer product.

Riving Knives & Splitters

While your brain is the biggest safety feature in the shop the biggest safety feature on your saw is the much more humble riving knife. As many as 90% of table saw accidents happen around kickback, which is where the board becomes bound on the blade (or between the blade and another stationary object) and is thrown back towards the operator. Kickback happens lightning fast and entirely unpredictably. Sometimes the action of the



6 A riving knife is the single biggest safety feature built into your table saw.

7 This mechanism includes a riving knife with an optional blade guard and pawls. I used as many of them as possible when making cuts.

board jerking will pull hands and fingers into the saw; other times it will launch the board at 100mph backwards towards anyone standing in the way.

The best way to prevent this from happening is also devilishly easy—a piece of metal that helps prevent the board from becoming

bound. All modern table saws include a riving knife, and it should always be used, unless you have a dado stack installed.

Guards and Pawls

Also important, but far more cumbersome, are blade guards and pawls. The guards, which are





8

8 This blade guard floats above the table and sucks dust away. It also means I can use accessories like a miter gauge with the guard in place.

9 Using a featherboard ensures a tight fit to the fence and leaves both hand free for feeding the board and a push pad.

often clear plastic, work great for preventing accidental contact with the blade. Pawls are the spiky things you see on the right side of the photo on the opposite page. They are intended to catch the board during a kickback event to prevent it from being flung.

There are some drawbacks to these safeguards though. The guard can make it difficult to see your cut, and they often get in the way of push blocks. They also can't be used in narrow cuts as there is limited room between the blade and fence. I try and keep my blade guard in place as much as possible, but if I'm forced to choose between using the guard and using the push block, the push block takes priority for me.

Featherboards

Ever wish you had an extra hand in the shop? Maybe you just need to try using a featherboard.

A featherboard is a clever device that both applies pressure to

the board, like that extra hand, but is also designed to help prevent or reduce kickback by not allowing the workpiece to move in a backwards direction. While not quite as effective as a riving knife from a safety standpoint, featherboards are easy to make, inexpensive to buy, and very handy.

Soft Start

One of the newest safety features on power tools is soft start motors. Like the term implies, the tool's motor will take a second or two to spool up before reaching maximum power. This both prevents the tool from bucking or kicking, as well as giving you one last second to make sure everything else is set up in a safe manner.

LASTLY, THINK FIRST

Probably the best way to keep yourself safe while woodworking is mindfulness. It's very easy to slip into a routine task without much thought. Taking a split second to run a checklist through your mind is the antidote to this problem. Are you wearing your PPE? Are the blade guards in place? Is your push stick within easy reach? What about your hands — are they placed in such a way to be clear of any spinning blades or slipping chisels? Is your body positioned to the side of the blade if there's kickback? If you feel rushed or uncertain, take an extra moment to cool your head before proceeding. Your woodworking project taking more time won't hurt anyone, but if you make a mistake there's a real chance you'll hurt yourself.

PW—Collin Knoff



9

PROJECT #2501

Skill Level:

Intermediate

Time: 2 Days

Cost: \$35

Practice some mass-assembly techniques to create this elegant stand.

By Collin Knoff

Bent Lamination Headphone Stand

You know how it goes, you spot a need that you can fill with a woodworking project. In this case, I needed a place to put my headphones, as well as a tray for my drawing pens that are supposed to be stored horizontally. Should be easy enough to build, right? Then again, if I'm taking the time, I could build more than one. Something like this would make a great gift after all. If I'm building more than one, I should probably make some jigs, make things easier on myself...

And without warning you've seemingly gone full *If You Give a Mouse a Cookie* on what was once a rather simple project. But with a project like this one, the effort to make one headphone stand or 30 is nearly the same.

Modern-Day Templates

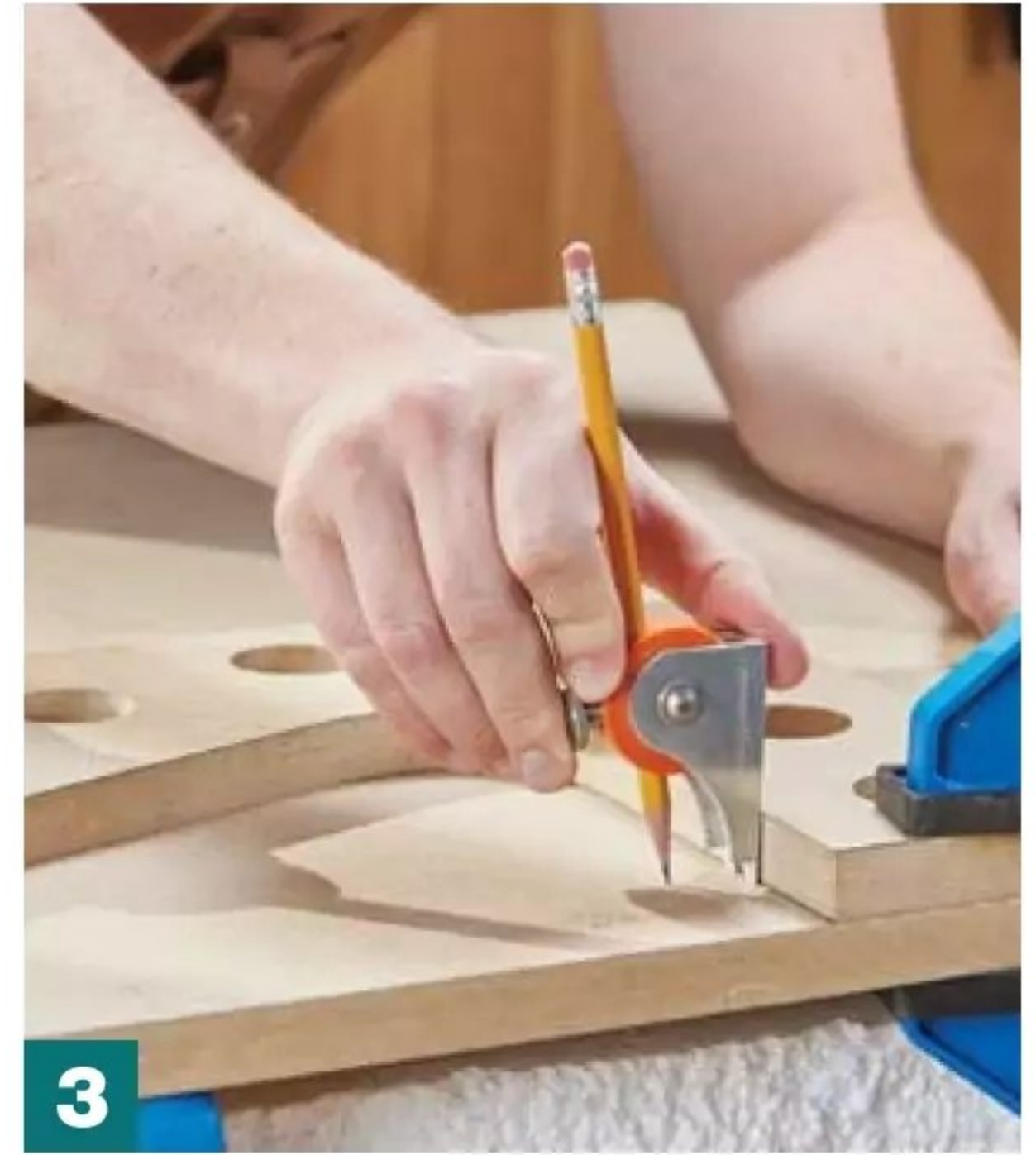
Woodworkers have been making templates throughout all of history, but modern technology has made it easier than ever. The huge strides CNC woodworking have made in the past decade means that more people than ever have access to these useful machines. For this project, I took a spin with the *Shaper Origin*, which uses some novel tech to recreate the CNC experience with a much higher level of portability and flexibility.

I created the shape I wanted on my computer, uploaded it to the Shaper, then cut it out. In order to achieve the thickness I would need for shaping the form, I had to laminate three pieces of MDF. With one perfect shape cut already, I quickly roughed out the other two on the band saw and used a pattern bit to cut everything to size.

For the inner template shape I used a scribe set to the target thickness of my lamination (plus the cork padding) to trace the shape of the inside curve. Then I cut out one perfect copy on the

band saw, cleaned it up on the spindle sander, and repeated the earlier steps to create my laminated form. As an FYI, it might

seem counterintuitive, but the inner template will not nest exactly inside the outer form. This is normal.



1-2 This was my first time really working the Shaper Origin into my project workflow. It's an impressive and intuitive machine, especially for precision template work.

3 Transfer the shape of the curve with a scribe. Make sure to get it nice and tight in the corner.

4 Glue the rough cut forms to the perfect template form.

5 Use a pattern router bit to trim to size.



6



7

6 Steam your wood strips until they have regained flexibility.

7 Install the cork with contact cement.

8 Cork protects the bending form and allows compression.

9 The packing tape prevents epoxy from sticking to the form.

10 Clamp the steamed strips to the template to pre-shape them.



8



9

Create the Strips

One of the fun parts of producing a magazine is that you (quite often actually) make mistakes. We shot 128 photos during this project and didn't manage to capture a single one of making the strips for the lamination. Thankfully it's a pretty straightforward process.

Start with the usual steps of squaring up your lumber and cutting it to rough width. Then you're going to head to the band saw to do some resawing. We have a few articles on PopularWoodworking.com that go into great detail, but there are three main things you need. Your band saw needs to be powerful enough, you need a fence that is tall enough and accurate enough, and you need a good blade. If you have a really nice blade you can probably cut strip after strip, but most likely you'll want to step over joiner between each cut so you have a nice clean edge to hold



10

against the fence. I cut the strips down to about $\frac{1}{8}$ " on the band saw, then ran them through the drum sander until they were down to $\frac{1}{16}$ ".

Get Steamy

Even at that thickness, the strips of walnut will not bend without breaking. Enter the steam bend-

ing chamber. Effectively a steam machine hooked up to a box, the goal is to re-infuse the dried wood with moisture so it regains flexibility. I threw my wood strips in there for about an hour, making sure to shuffle them around a few times, and went to work on getting the bending form ready to go.



11

Final Form Furnishing

The bending form needed a few small things to ensure the best result and extend its longevity. One was a layer of cork on both shaping surfaces. The cork keeps the wood and MDF from marring each other during bending, and also allows for a small amount of give during the clamping process. I also added a layer of packing tape over the cork to prevent any glue squeeze out from permanently adhering the form to the lamination.

Bend it Once

With the lamination strips adequately steamed, it was time to bend them to shape. This bending is meant to create a new “memory” shape to the wood, not be a final form, so I only used the outside half of the template. The steamed strips get clamped into place and are allowed to set for at least 12 hours.

Bend it Twice

As you can see in photo 11, the lamination strips are close to the final shape, but it takes a bit more to make it permanent.

I used epoxy for the lamination for several reasons. Epoxy has a



12

11 With the strips pre-bent to the right shape, it's time to epoxy them together.

12 Epoxy has a long open time, so you make sure everything is lined up just so.

13 Take turns tightening clamps — you want to shift everything into place without any gaps or bends.

long open time, it doesn't require air to cure, and it is inflexible once it's set. You can use whatever type of epoxy you prefer, though it should be thin enough to brush.

Apply your mixed epoxy to one side of each lamination strip and stack them into the form. If your strips have specific grain pattern, make sure to keep them in the correct order — I didn't and you can see it on the front view.

Clamping everything up isn't difficult, it just takes quite a few clamps and a little patience. If you've ever learned how to change a tire, you've heard that you shouldn't tighten one lug nut all the way down before the others — it can shift everything out of position. Tighten in a star



13

pattern to properly set the wheel. The same principle applies here. If you clamp down one area tight first, you'll prevent the form from shifting together as needed. All of that is to say: install all of the clamps to medium tightness and take turns incrementally tightening until everything is fully in place.



14



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14 Cutting a template helps you make quick work of the base with a router.

15 Really take your time here, and make sure to keep your hands on your push block.

16 It might take a few passes to hit your target depth when cutting out the tray.

17 The finished base and template. As you can see, the template mirrors the base, and leaves room for router bearings to ride.

Build the Base

The laminated neck mounts to a base that is heavy enough to prevent tipping and provides a nice tray for my aforementioned drawing pens. I used the Shaper Origin again to create the template for the base. I'd be remiss if I didn't mention that you can actually cut the entire base using Origin, but since not everyone has access to one, I'll walk you through the steps to make one without a CNC.

Once you've created your base template, trace the shape onto your stock and rough cut it on the band saw. With a healthy amount of double-sided tape, mount the template to the piece and clean up the edges with a pattern bit on the router table. Use a push pad and be careful; even a high-quality, sharp bit will want to grab on the end grain. I was taught once to let the router take as much material it wants, and take multiple passes. That advice served me well here.

I decided to cut the mortise slot before hogging out the tray. That allowed me to use the template offcut to help support the router. I used a plunge router with a guide bushing to follow the slot in the template. Some grippy non-slip mat helps keep the part in place. Because the base is small, it would be hard to clamp. However, you could use double-sided tape to stick it down to your bench if you'd like.

For the recess I went back to the router table with a bowl and tray bit with a bearing. I cut the perimeter of the tray first, working in a clockwise direction. Then I made careful passes back and forth to hog out the remaining material. I had a bit of burning on the cross grain cuts, but it worked quite well.

Squaring the Lamination

I gave my lamination a full 24 hours to fully cure before I removed it from the form. If you can

still dig your fingernail into the squeeze out, it needs more time.

Freed from its template, it's time to clean up the edges and cut it to size. If you're daring, you could flatten an edge on the joiner, rotating the workpiece to follow

the grain. Alternately you can use the belt sander or a block plane to flatten it instead. Once you have one good surface, you can rip the form to width on the band saw with the fence.

If your shaping form is nice and

square like mine, you can use it to cut the bottom of your neck. I simply clamped mine to the miter gauge and ran it through the band saw. I then ditched the template and just used the gauge to cut the top of the neck square.

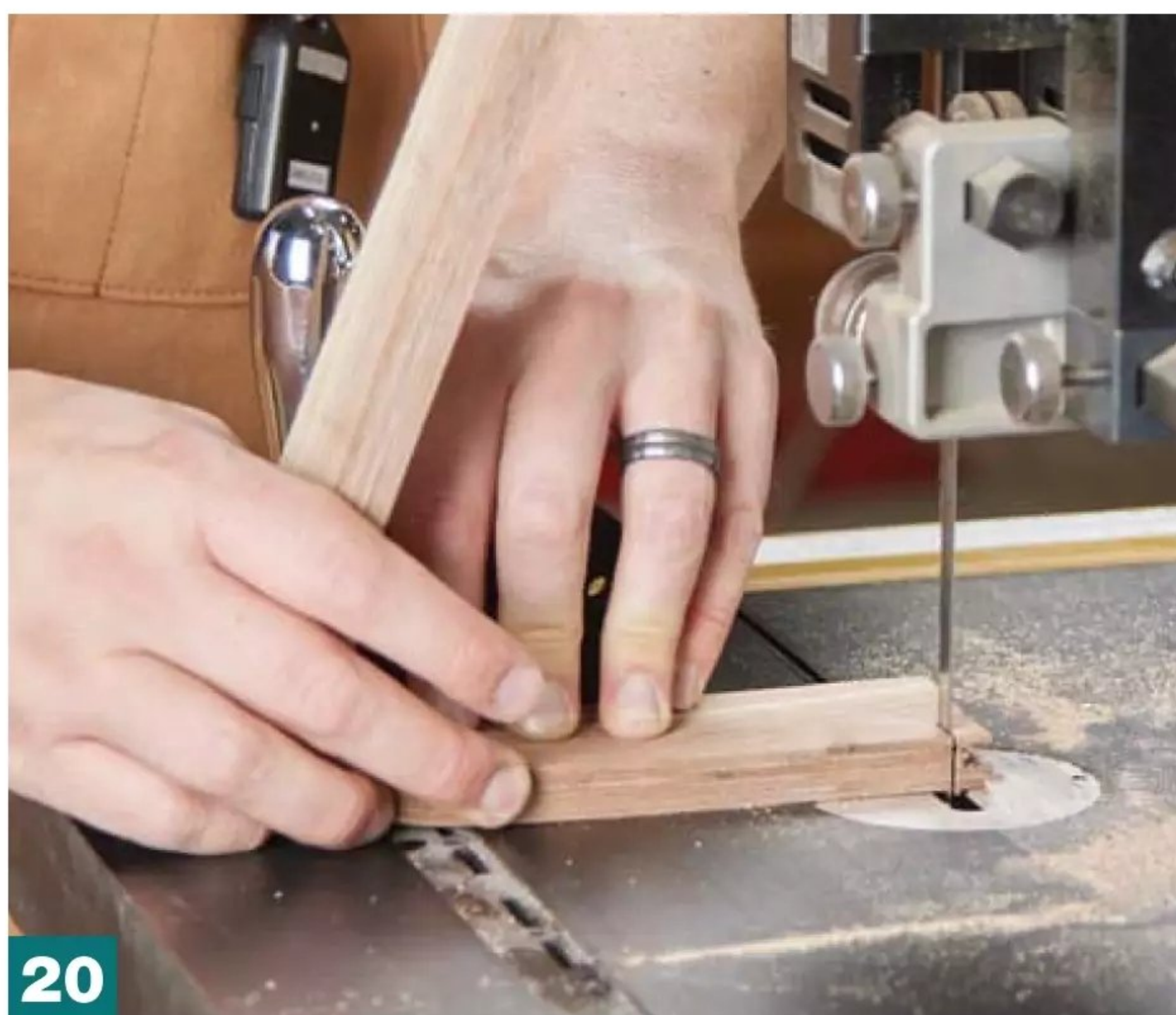
18 With one edge of the neck square, you can rip it to width on the band saw.

19 The bending form came in handy squaring up the base. Make sure to leave room for the tenon.

20 I squared up the top at the band saw too.

21 This table saw jig worked great for roughing the tenon.

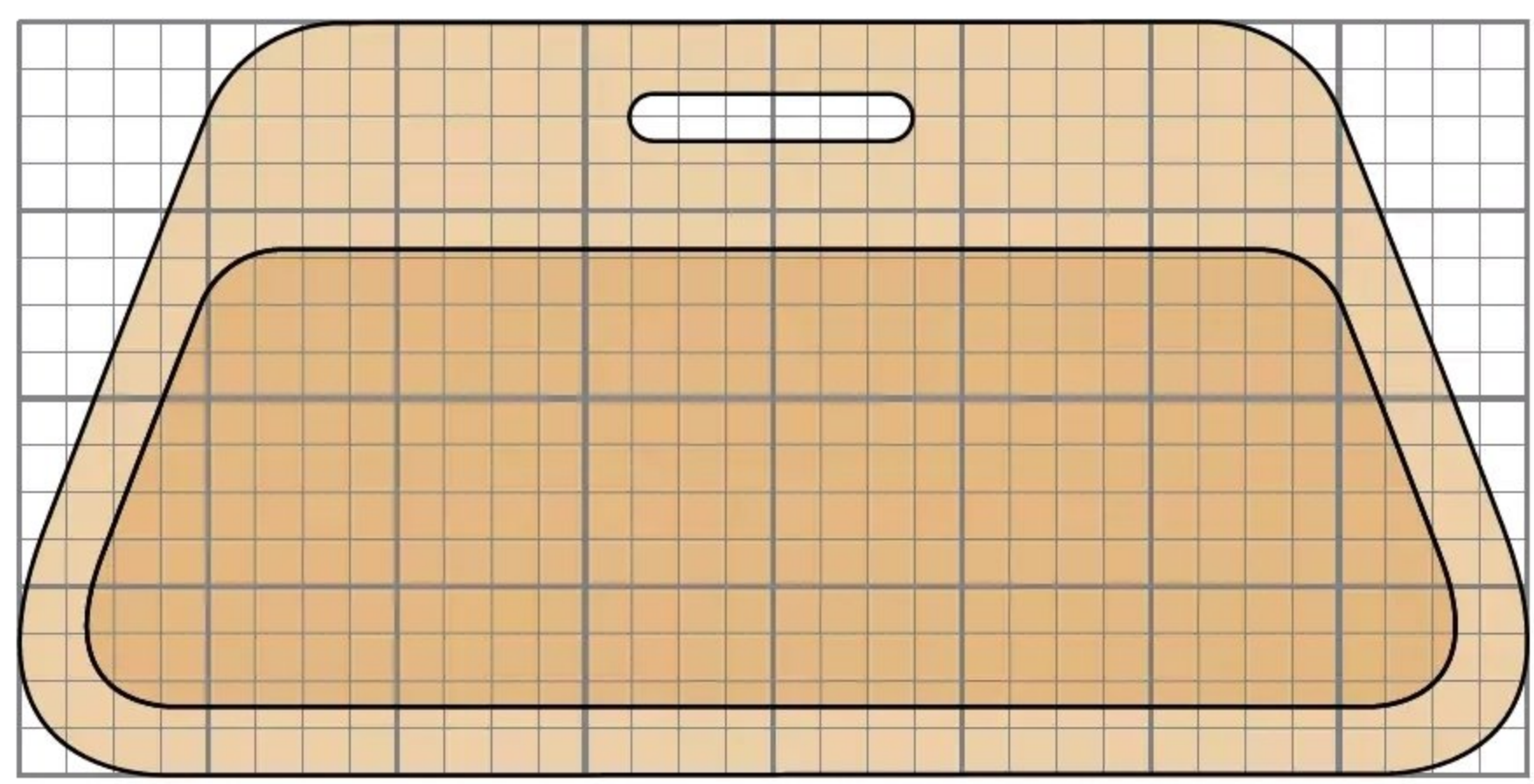
22 Hand tools delivered the quick and accurate results I needed to finish the tenon.



Angled Tenon

You might have noticed earlier that I cut a straight mortise in the base. That's because it's much easier to cut a tenon at an odd angle than a mortise. It's even easier to do when you're using a handy table saw jig, like the one from *Infinity* you see in photo 21. It took just a bit of time to dial it in exactly, but then

Bent Lamination Headphone Stand



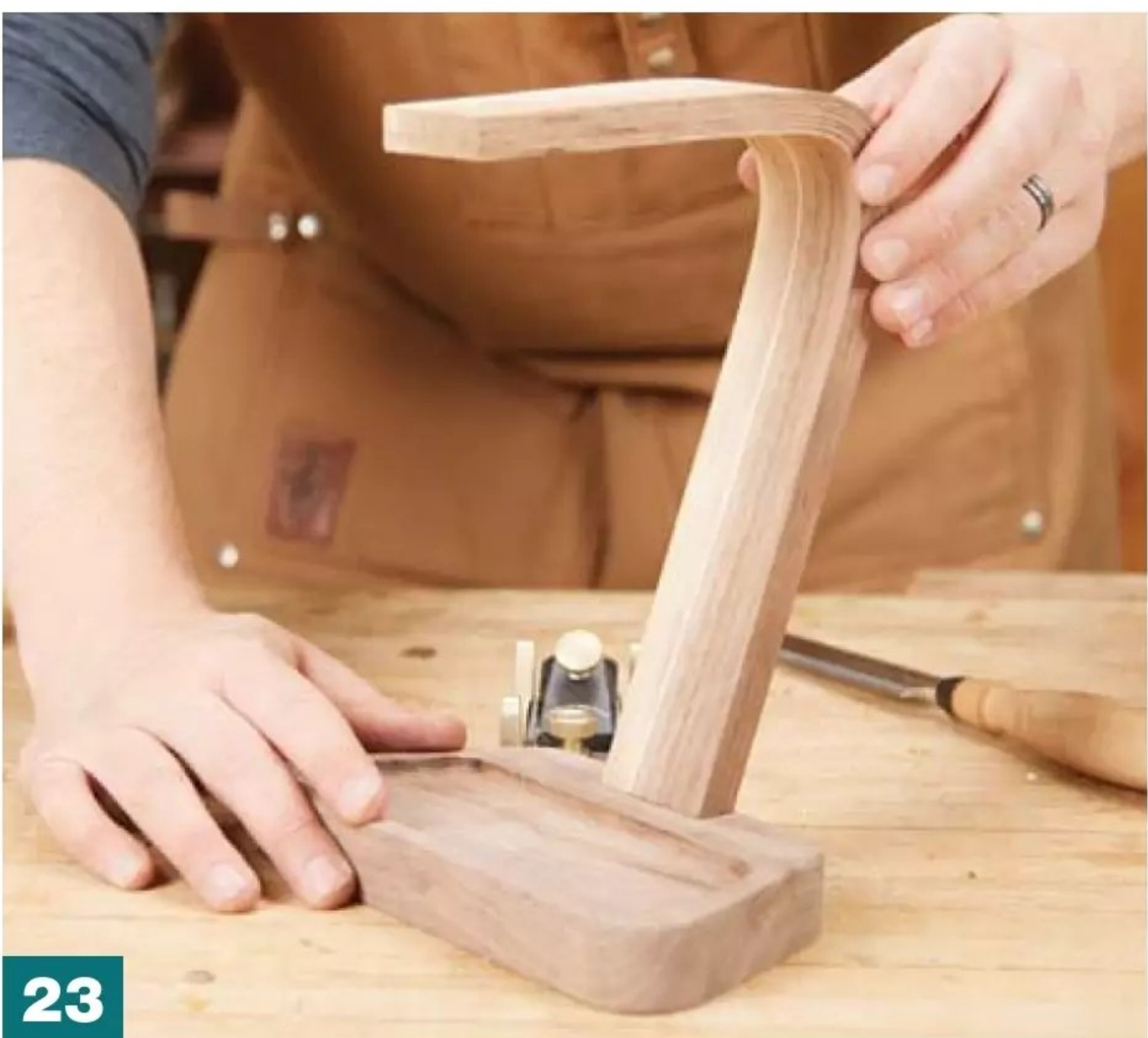
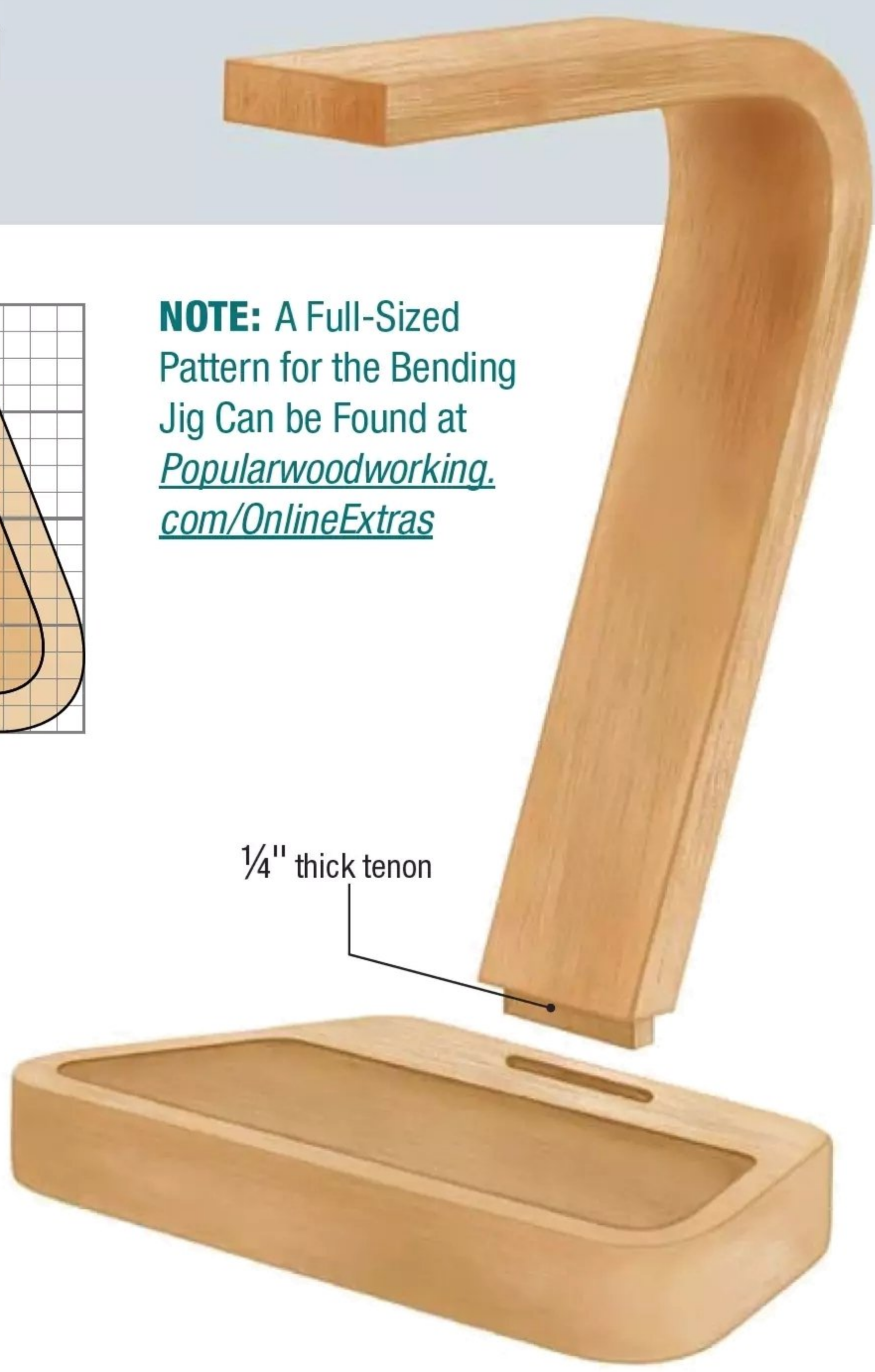
NOTE: 1 square = 1/4"

Cutlist

No.	Items	Dimensions (in.)		
		T	W	L
7	A Bending strips*	1/16	3	17
1	B Base	1	8	4
1	C Base template	1/4	8	4
2	D Cord pieces	1/8	3	17
1	E Jig	2 1/4	13	13

*Cut oversized and trimmed down after glue-up

NOTE: A Full-Sized Pattern for the Bending Jig Can be Found at Popularwoodworking.com/OnlineExtras



23 The tenon fit was perfect — no glue needed!

cutting the tenon was an absolute breeze. I used a handsaw and some chisels to finishing cutting and cleaning up the outside shoulders, and a shoulder plane to finesse everything flush to base.

Assemble & Finish

Normally right about now I would have just glued everything together, but the tenon was such a perfect fit I decided to just friction fit it and leave it as is. If it gets loose this winter I can just glue it then, but in the meantime it's a nice testament to patience and a job well done.

For a finish I used wiping poly, lightly sanding with 220 between each coat and finally buffing up with a soft cloth. If you're running larger production runs, spray lacquer would also be a good choice.

Speak of production, all of my templates and forms held up great. Whenever I need to make another one (or ten) the process will be a snap. I've even considered hitting the craft fair circuit next summer and selling them. **PW**—*Collin Knoff*

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Norwegian Linen Chest

This small linen chest can be made in batches, and the lid presents some fun challenges during the process.

By Logan Wittmer



PROJECT #2502

Skill Level:

Intermediate

Time: 2 Days

Cost: \$20

Inspiration for a project can come from anywhere. Take this linen chest for example. I was recently visiting a friend of mine at his home a few hours away. Norman, who you may recall me talking about in an editor letter a few issues back, was showing me a few of the projects that he had built over the years. A small dome-topped box caught my eye. As it turns out, Norman's great grandmother had brought the original trunk with her from Norway. As the story goes, this trunk was called a "kerchief" box, or a box for handkerchiefs.

Norman had a feeling that his grandmother's chest would be passed down to one of the ladies in the family, so he did what any self-respecting patternmaker would do—he built his own based on the original. Over his working career, Norman built dozens of these chests to either sell at craft fairs, or to give away as gifts. When I mentioned that I thought it would make a great little magazine project, Norman graciously loaded me up with all of the patterns and jigs that he had accumulated over the years associated with this project.

A Domed Top

Looking at this little trunk project, it looks deceptively simple. The main trunk is simply butt joints and brad nails. The bottom is nailed in place, and has an elegant little profile on it. The complexity of this project is wrapped up in the top. As a woodworker, as I'm looking at any domed-top of a trunk or chest, I'm immediately thinking about a coopered glue up. And, I'm sure you could do that. But, Norman came up with a different way to produce this top using two pieces of $\frac{3}{4}$ " stock. I'll get to that in a minute. First I want to point out that several of the jigs that I'm using in this article are from Norman. I'd also like to point out

that I'm doing a few things slightly differently than Norman did, just because I have different tools available to me. In short, there's no right or wrong way to do any of this. There's only different paths on the same journey.

Accurate Glue-Up

The top is glued up from two $\frac{3}{4}$ " boards, with a bevel ripped along the glued edge. The bevel is cut at

17°. I use an angle gauge to tilt my table saw blade to an accurate angle. Also, because this will be the glue surface, I make sure to have a clean ripping blade installed.

After ripping the blanks for the top to width, they can be glued up. A simple gluing fixture eases this glue-up—the boards slip into place and are held by cleats. A few V-blocks on top with weight clamp the parts as the glue dries.



1

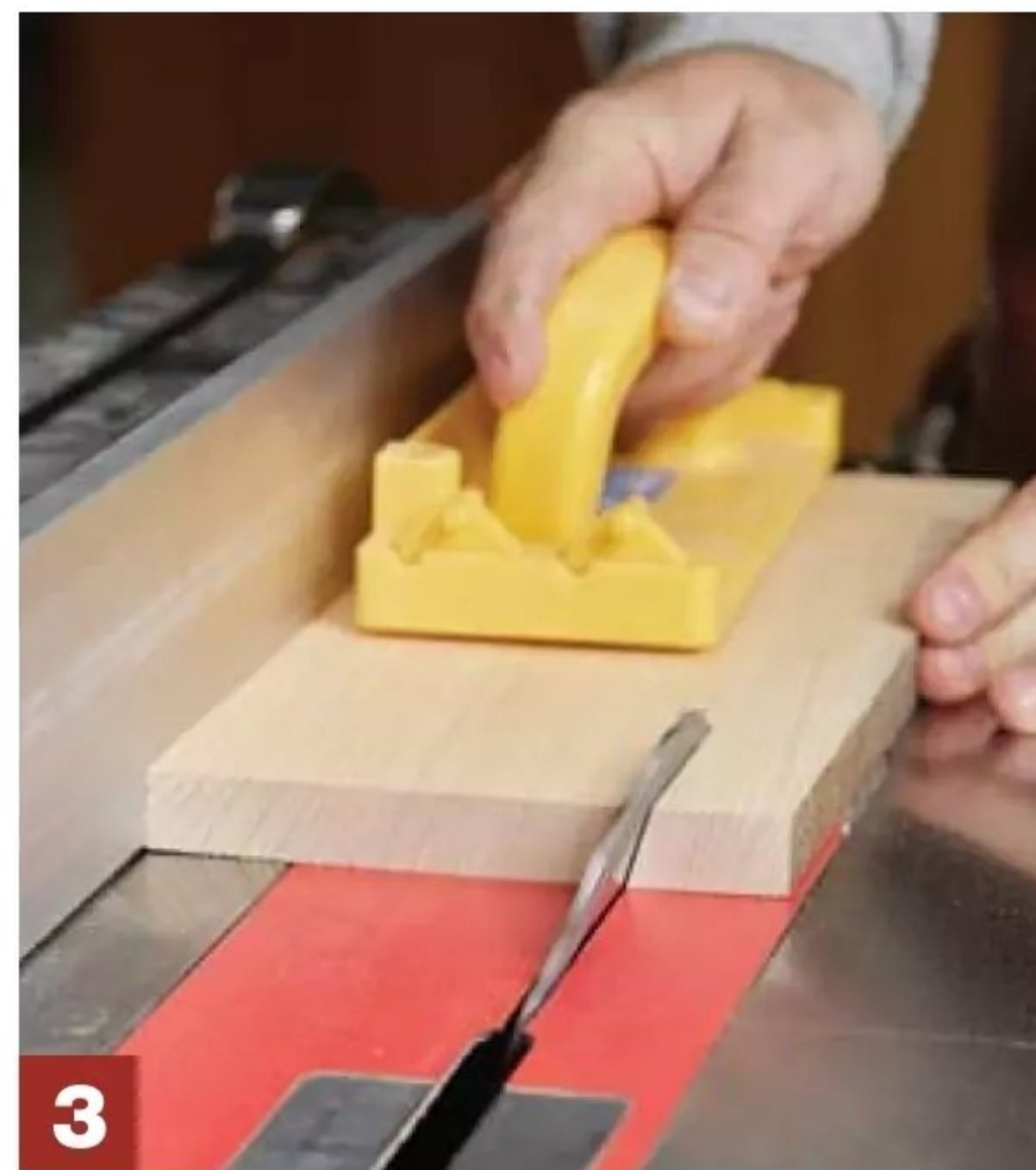
1 A pattern block gives all the info needed to make the top at a later date. Length, bevel angle, and width are all shown.



2

2-3 An angle gauge accurately sets the blade angle.

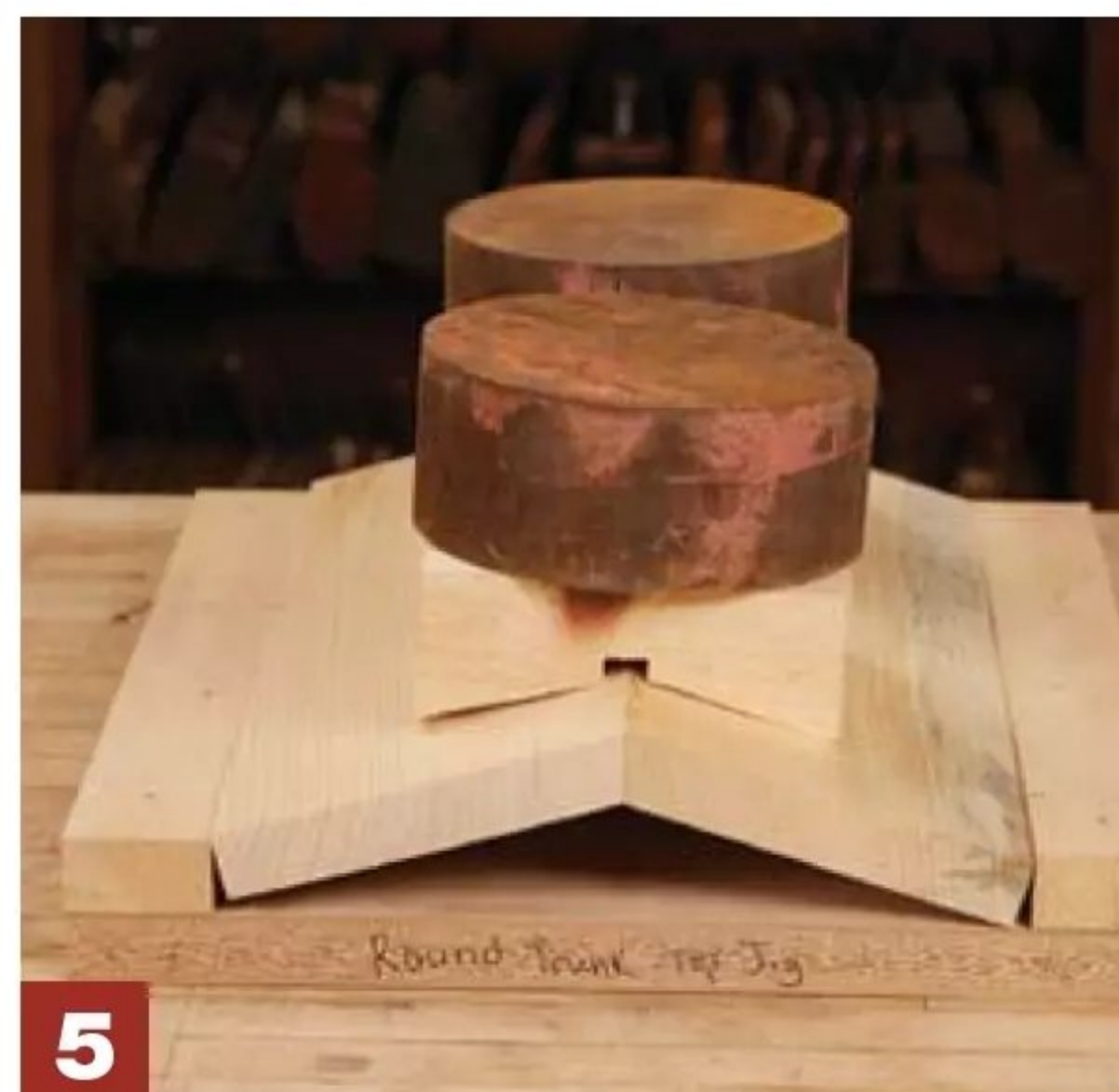
4-5 The top can be glued along the beveled edge. A pair of cauls on top with some weight hold the pieces in place as the glue cures. The gluing sled with cleats keep the parts from sliding apart.



3



4



5



6

After leaving the lid over night, it's time to transfer a pattern to the end of the blank. One cut out of thicker chip board works well, if you plan on reusing it over time. I lay out the pattern on both ends of the lid. Now, here's where I start to deviate from Norman's process a bit. First, I knock off the peak of the lid (photos 7 and 8). Norm used a profile cutter in the table saw (a beading cutter, to be exact). I don't own one of those, so instead I used my *Veritas* box maker's plane with a beading blade to form the bead. This bead is at a slight angle from the face, which makes it a little tricky to cut with a router table, but you could probably do that. This quarter-sawn pine planed beautifully, so I see no reason for me to approach it any differently in the future.

Now, as you can see in Photos 9 and 10, there's a bit of material to remove around the edges of the bead. A dado blade in the table saw can eat this away. Or, a rabbet plane will work as well. I used a combination of two different rabbet planes — one with a bit longer fence to get on the inside of the



7



8

6 Transfer the lid profile onto both ends of the lid blank.

7-8 Knocking off the apex of the joint leaves a flat spot.

9-10 Use a beading blade in a plow plane to form the bead. Pay attention to the angle of the bead and adjust the plane accordingly.



9

10



11-13 With the bead complete, you need to lower the material around the bead, leaving it proud. To do this, I used a pair of rabbet planes. The first is set up for the outside edge. The second has much longer fence arms, allowing me to get the rabbet plane inside of the bead. You could easily set up a straightedge to guide the plane as well.

bead. Here, you're looking to bring the surface of the lid down, leaving the bead proud of the surface. Most of the curving will be done later, I just took care of this heavy material removal while there was mass on the underside of the lid.

Now comes the fun part. The bottom of the lid needs to be hollowed out, turning the intersecting flat planes into a smooth curve. A majority of this work is done at the table saw, as you see in the photos below.

Cutting coves at the table saw

isn't as crazy as it sounds. By setting up a pair of fences running at an angle to the blade and using a wide push block, you can make several shallow cuts to remove most of the waste. I'll list out the rough dimensions of this jig (and others in this article) so that you can have something to base yours off of. You'll find those at www.popularwoodworking.com/onlineextras.

The coving process works like this. With the fences clamped in place, raise the blade so that you're removing no more than

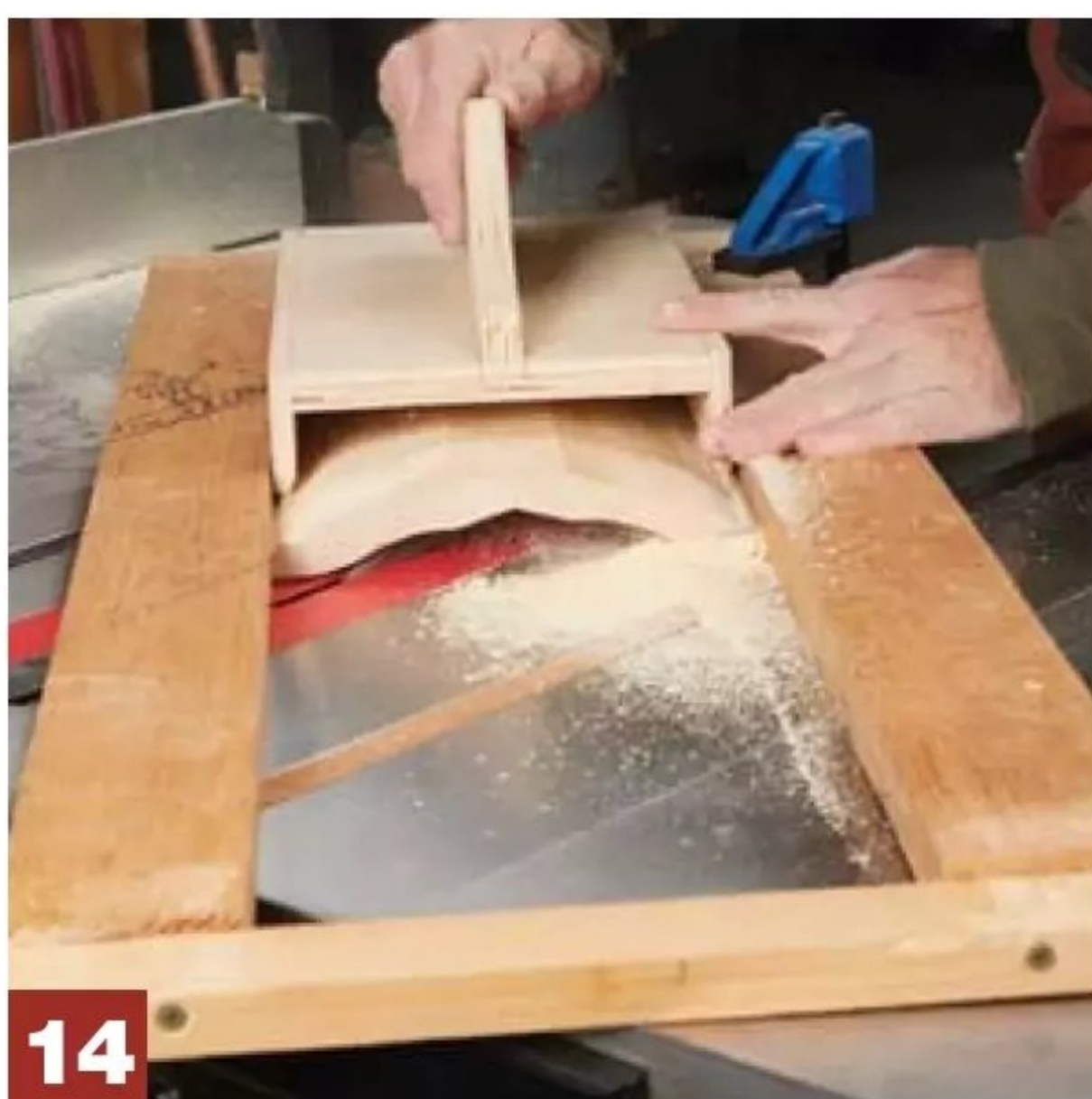
1/8" of material at a time. Turn the saw on and push the lid across the blade (using a push block). Raise the blade up on the next pass, sneaking up to the template lines.

To create the entire cove, you may need to move the fence several times (I did three different fence setups). This left a "clover leaf" type look on the bottom of the lid (see photos 15 and 16). Even more material could be removed with an additional setup or two.

14 The cove starts with cutting the outside edges of the arc.

15 Transition to the center to sneak up to the line.

16 The finished cove has a few ridges that will be planed out.





17



18

Here comes a bit of fun with a handplane and quartersawn pine. Norman gifted me, along with his jigs and patterns, a Stanley transitional plane that he had machined the sole to match the curvature of this lid. (That's a true pattern maker for you—making the right tool for this one specific task). A few swipes with this plane really started to blend the curve. However, I started to think about how I would tackle this if I didn't have this plane. A wide round molding plane would be the best bet—I seem to have a few that are close to this radius. However, I also discovered that my travisher was almost the perfect radius, and it left a silky smooth finish. You can see this in Photo 18. Of course, a curved sanding block is fine as well.

Now, the top of the lid is a little more straightforward. As long as you were able to get a rabbet plane down alongside the bead, you shouldn't have any problem getting the curve of the top using a standard smoothing plane. Start by identifying the arris (ridge) formed by the flat planes. You want to remove this, creating a new facet and two new arris (left and right). Now, pick one of those arris and repeat the process. As you continue to tackle them, you'll gradually work the top into a smooth curve that can be sanded smooth.



19



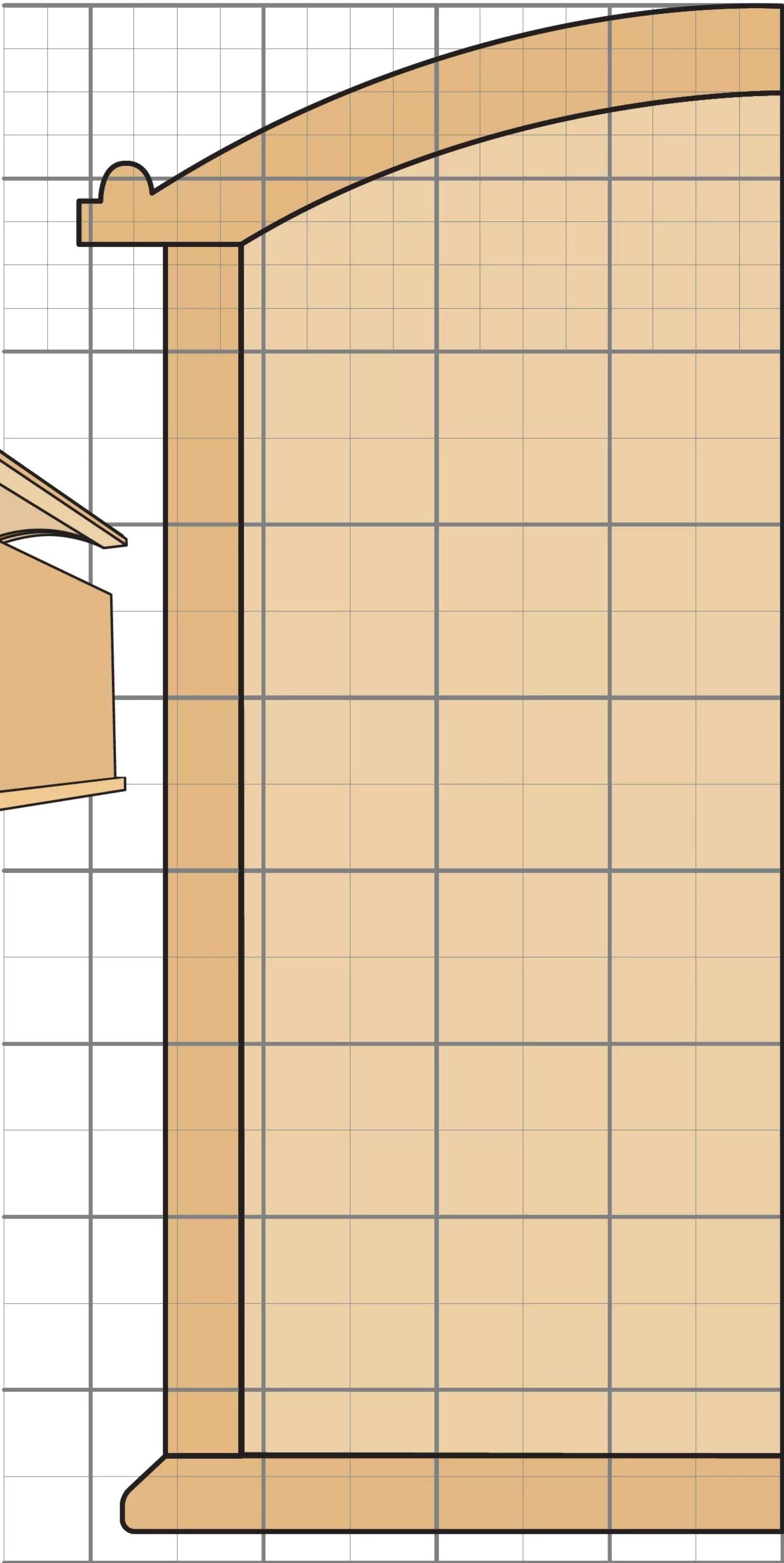
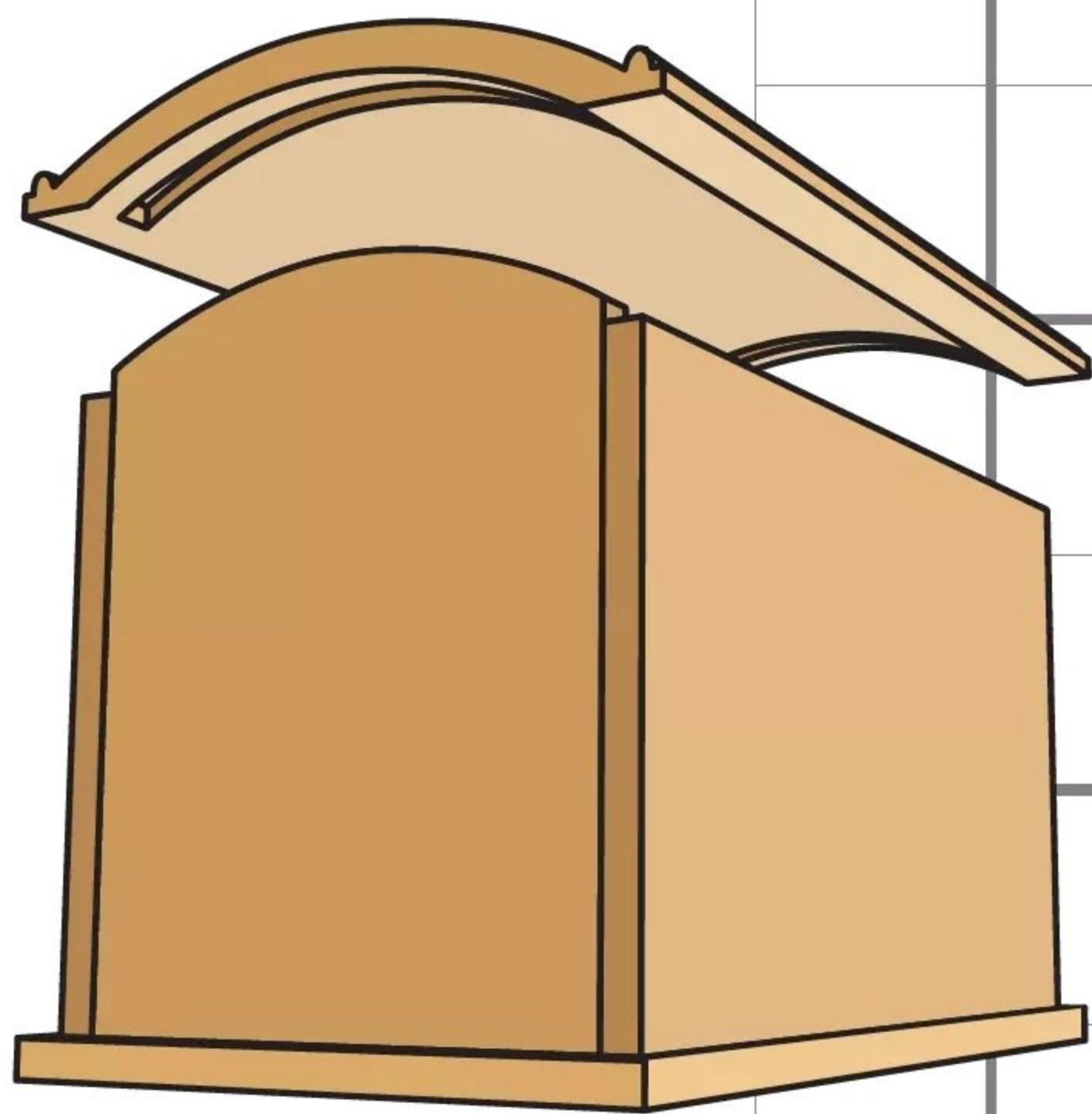
20

17 A specially ground plane is the ideal tool for forming the inside curve.

18 Short of defacing a plane, you can also use a travisher to help smooth out the curve.

19-20 Start planing the top. Keep an eye on the pattern lines on both ends of the top, working down to the lines. Get it close with the plane and then smooth it out with a soft sanding block.

Norwegian Linen Chest



Cutlist

No.	Items	Dimensions (in.)		
		T	W	L
2	A Top	3/4	4 3/8	13 1/2
2	B Sides	7/16	11 3/4	7
2	C Ends	7/16	6 1/4	8 1/8
1	D Bottom	7/16	7 5/8	12 1/2



21

21 Rough out the ends at the band saw, leaving a bit of room all the way around.

22-23 Use double-sided tape to stick the master template onto the blanks. Then, use a good quality flush trim bit to trim the ends to shape.



22



23

Build the Box

Set the top aside for a bit, and let's make a box. This Norwegian box is pretty simple—curved ends with nailed on sides and a bottom. Keeping the sides uniform is really the biggest trick. As you can see in photo 21, I roughed out the ends at the band saw. Using a template to trim the sides up guarantees that they're uniform. I had a template from Norman, but you can easily make a master template that can be saved and reused. Stick the template onto the sides with double-sided tape. Routing endgrain requires a sharp, clean bit. I found that the carbide compression bits from *Woodpeckers* are great for this task. I rout all the way around the template to make sure the ends are exactly the same size.

Now for the bottom. It's a piece of pine that's glued up,



24

24 The bottom has a combination profile, consisting of a roundover and a bevel. The tiniest of flats remain between the bevel and roundover.

with a simple profile on it. A small roundover is routed on the bottom side, then the edges are beveled slightly at the table saw. It's a simple, elegant look that I will probably pull forward into future designs.

Assembling the box is as simple

as nailing the sides to the ends, then nailing the bottom in place. I had a jig from Norman to help with positioning. The jig, shown in photos 25 and 26, holds the ends in place and positions the bottom. Nails can be driven before nailing on the sides.



25-27 Position the bottom on the ends and nail it in place. The sides can then be added and attached.

28-29 A curved straightedge guides the router (with an attached curved baseplate). This set up produces an accurate, no-fuss dado in the curved surface of the top. Make sure to mark the dado location, including stop and start points.

Dadoes

The final thing to do is to cut some dadoes for the top to register on the end panels. The lid simply sits in place over the ends (which are slightly proud). Position the box on the lid and mark the end panel locations. This is where the dadoes

need to be routed to locate the lid.

The dadoes are cut using a router with a straight bit that is just slightly wider than the thickness of the ends. A 1/2" straight bit gives just enough breathing room for the 7/16" thick sides. An auxiliary base is added to the bottom of the router that matches the curve of the top. The edge of the auxiliary base rides against a (curved) straightedge clamped to the top. You can see this in photos 28 and 29.

The key here is to keep the edge of the router base against the straightedge, and plunge the bit into the top. Then, slowly rout the dado. The curved base plate gives you good contact inside of the lid, and the straight edge gives you a reference point. You can square up the ends of the

dado with a chisel if you want, or leave them round.

What Finish?

Norman had completed several of these trunks and had them painted in a traditional Norwegian style called *rosemaling*. This style of painting is done with oil paint and has a flowing style, usually depicting flora. It was seen as a great way to kill the long, dark hours of a Norwegian winter. The chest here is painted with linseed paint (check out the article on page 18). To be honest, I did try to find an artist to paint this chest with *rosemaling* but had no success on this short of notice. Oh well, there's always the next one (seeing how I now have all the jigs, there will be plenty of next ones).

PW—Logan Wittmer

Fern Stand

This Charles Limbert table was sold as a fern stand, but it's a great addition to any home.

By Willie Sandry

PROJECT #2503

Skill Level:

Intermediate

Time: 3 Days

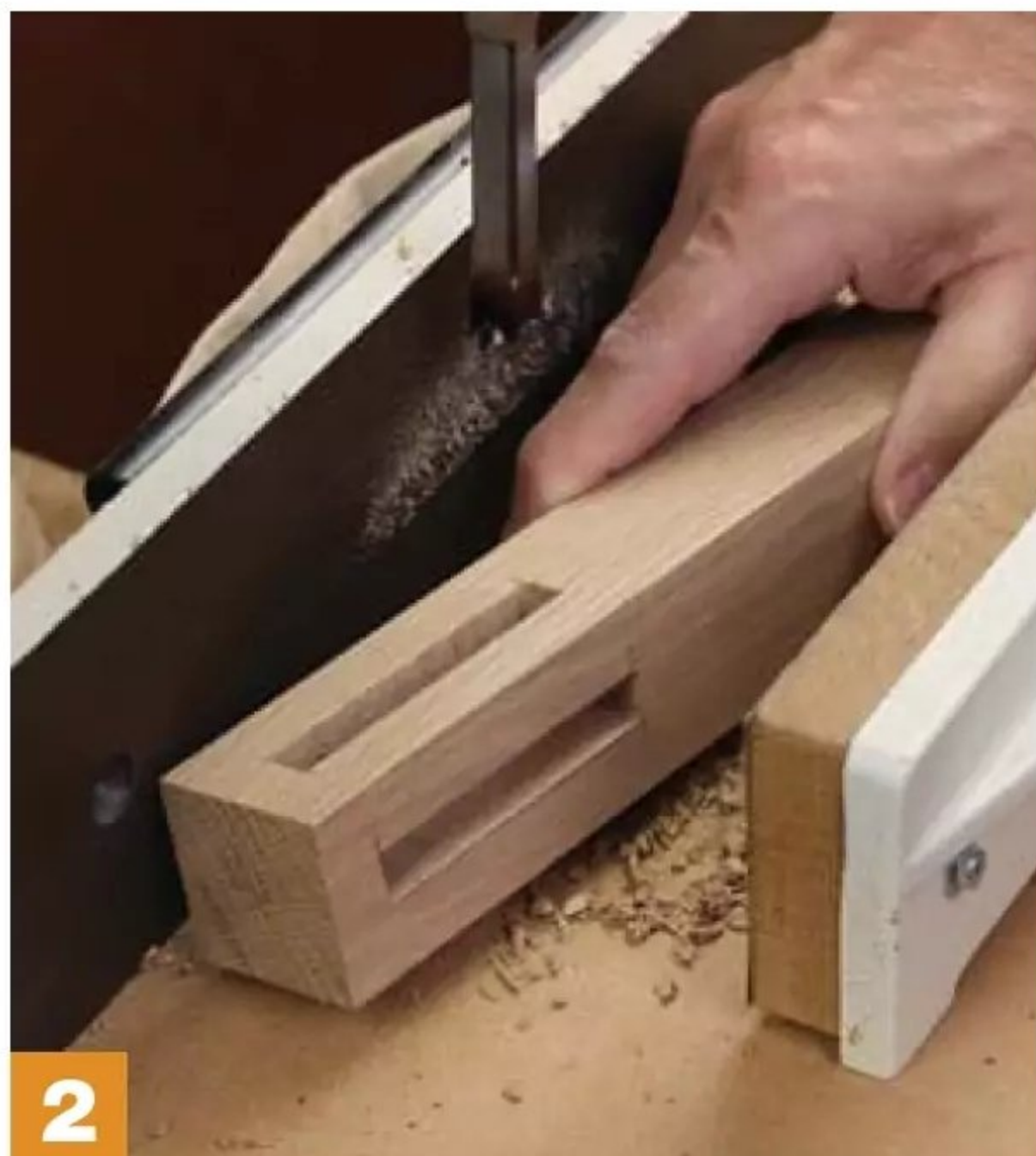
Cost: \$250



At first glance, Arts & Crafts style furniture often looks simple to build. After all, there are no turned legs or intricate moldings to contend with. But most notable antique pieces from this era have a deceiving level of complexity. This Limbert style #802 Fern Stand has several features that you notice on closer inspection. A series of “Eb-on-Oak” inlays adorn this compact plant stand and give the piece a unique aesthetic. In fact, there are 20 individual square inlays, some connected by thin strips of inlay. Then you may notice a subtle arch detail on the upper rails that echoes the curve on the lower rails. This detail seems to elicit a universal woodworker response; “How’d they do that?” And while there are certainly two or three ways to accomplish this detail, I’ll share a simple method that helps keep the parts centered on the legs, so the slats will fit as intended. Finally, there’s the inset top panel detail, a hallmark of later Charles Limbert desks and occasional tables. This exposes the top of the legs and a bit of the top rails, so make sure your joinery looks good before gluing this fern stand together!

Legs are Straightforward

As with most tables, we’ll start by milling the legs flat and square. Then plane the leg blanks to $1\frac{1}{2}$ " square and trim them to a final length of $29\frac{1}{2}$ ". The inset top panel will add another half inch of height, for a finished table that stands 30" tall. With projects featuring particularly thick legs, I’ll sometimes laminate them for quartersawn figure on all four sides. With the relatively slender legs in this project, it’s probably not worth the extra effort. Straight-grained riftsawn white oak will work just fine in this case. Next, break out your favorite mortising tools, whether that be a router or a dedicated mortiser. We don’t have any through mortises in this project,



1 Mill leg stock $1\frac{1}{2}$ " square and crosscut them to $29\frac{1}{2}$ " long. A single-runner sled works best because it allows a taller blade height than double-runner sleds.

2 Cut $\frac{3}{8}$ " wide mortises. If you use a hollow chisel mortiser, set depth of cut slightly less than $\frac{15}{16}$ ", to preserve the mortise walls where the 2 cuts intersect.

3 Use a chisel to remove excess wood from the inside corner.



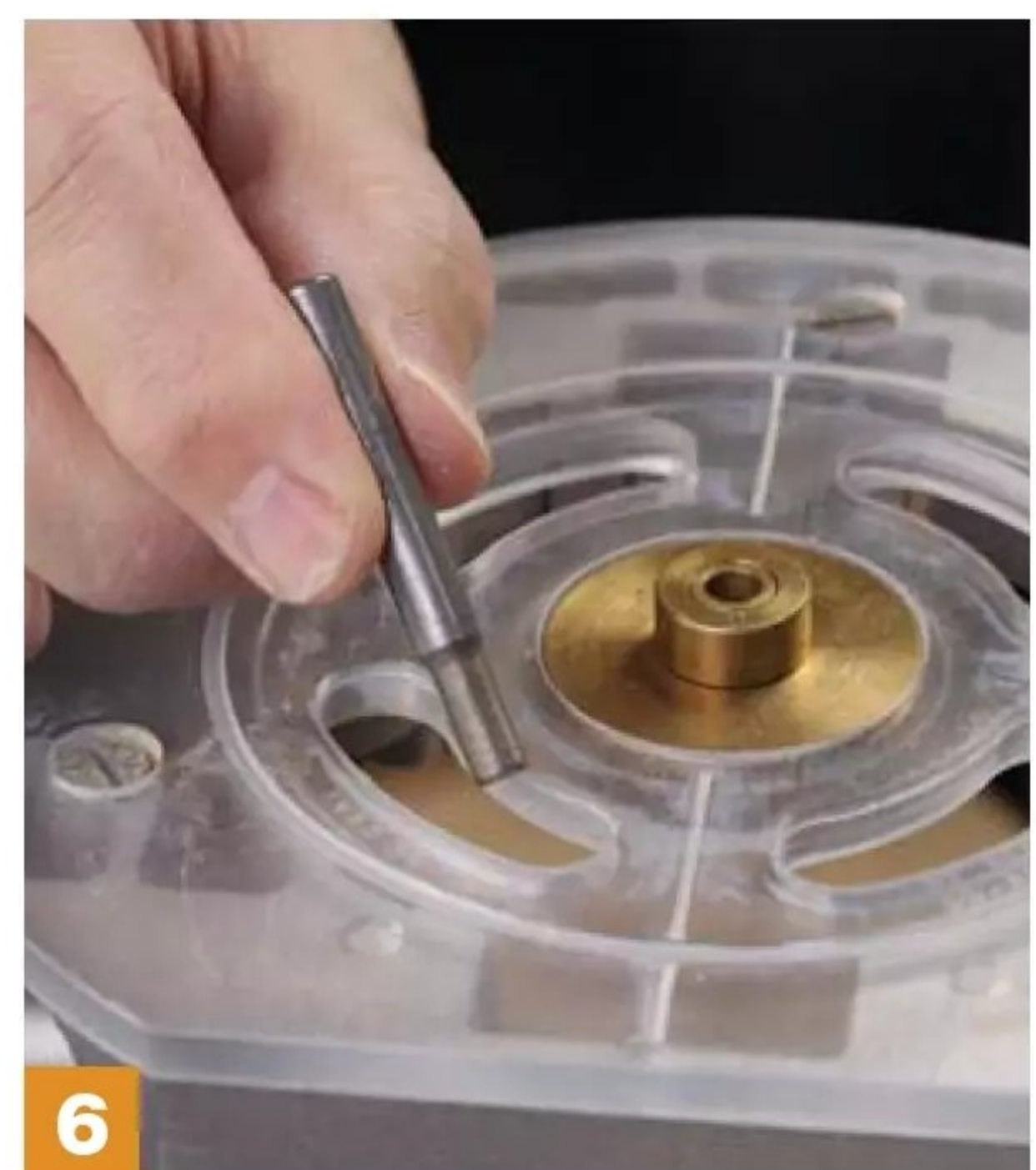
so there's no real advantage either way. Just use the method you're most comfortable with. Create four intersecting mortises in each leg, as shown in the detailed rendering on page 57. The mortises are all $\frac{3}{8}$ " wide and centered on the thickness of the legs.

Inlays Come Next

Cut the rails and slats to size and begin laying out the square inlay patterns on MDF template stock.

On several occasions, I've made similar square inlays with a hollow chisel, however this project calls for odd-sized inlays such as $\frac{5}{8}$ " and $\frac{7}{8}$ ". Plus, the thin slats would be very difficult to mortise with a hollow chisel bit. By the time the recess had adequate depth, the drill bit would be coming out the other side. So, I opted to use an inlay bushing kit and shop-made templates to rout the inlays. $\frac{1}{2}$ " thick MDF works well for the templates, and you'll need one piece for the rail inlay and one piece for the slat inlay. Layout the squares as shown in the template rendering and cut them out with your best method. I cut out the template openings with a hollow chisel mortiser, but a drill and jigsaw would work fine. Either way, you'll want to use a flat file to tune the square shapes right to your pencil line.

Once you're satisfied with the trio template, add 1" strips of MDF on either end. These will act as cleats and help register the workpiece to the template. For short workpieces such as these, I like to position the whole operation in a bench vise, set just proud of the workbench surface. That way, there's no clamps to interfere with the routing operation. A couple strips of double-sided woodworking tape help ensure the parts don't shift as you rout the recesses. Make sure your router sub-base is centered and install a template inlay kit such as Whiteside #9500. For the first step of routing the



4 Cut out the openings and use a file or sanding block to fine-tune the $\frac{1}{2}$ " MDF inlay templates.

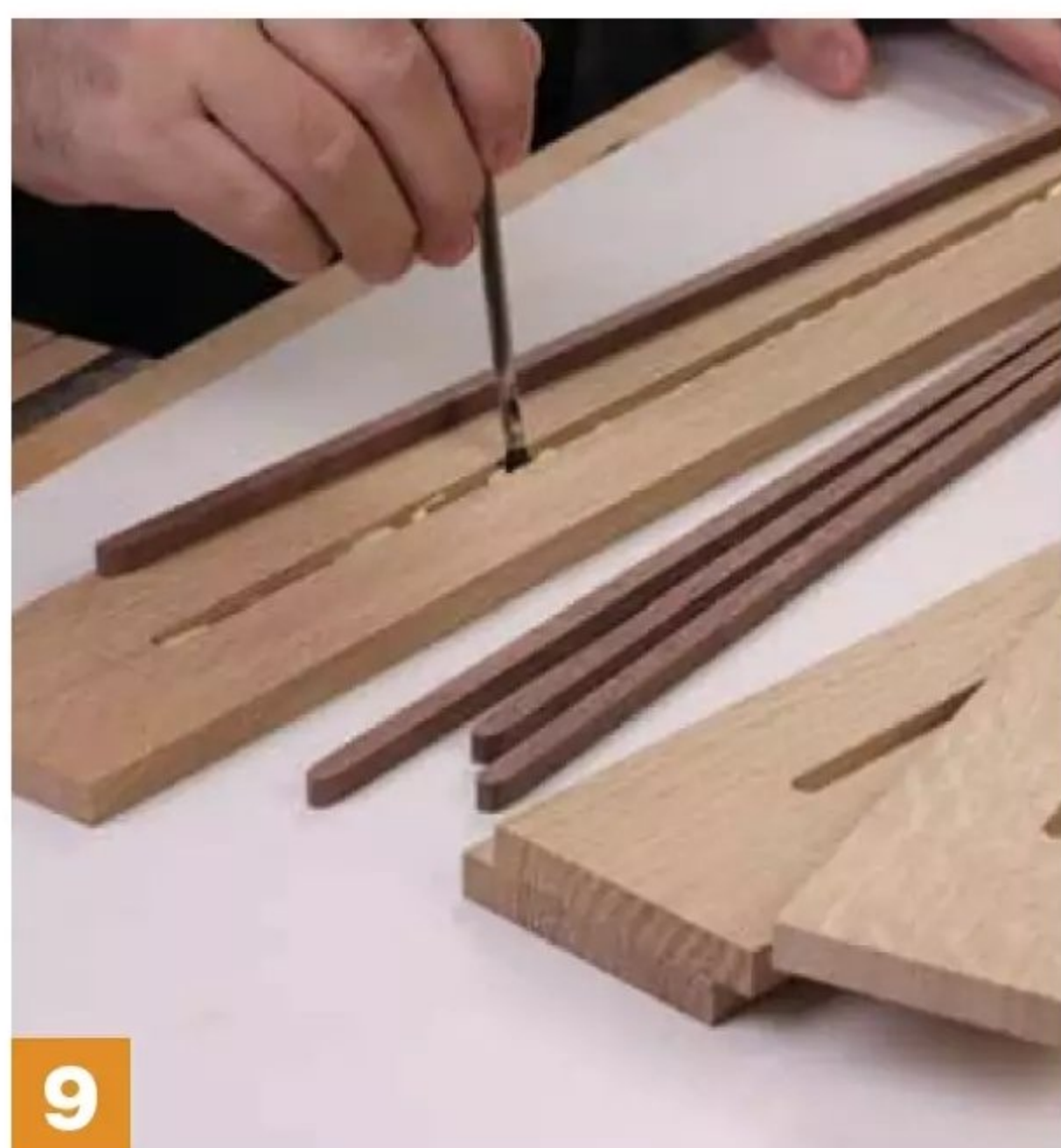
5 Attach 1" wide cleats to the back of the trio template with screws. Don't glue strips in place. They are removed later in the inlay process.

6 Prepare your plunge router by installing an inlay bushing kit. Some kits, such as Whiteside #9500, come with a special centering rod to center your router sub-base.

recess in the white oak rails, you'll need the brass spacer ring installed on the guide bushing. Set the $\frac{1}{8}$ " spiral router bit to a depth of $\frac{3}{16}$ " and rout each recess in a clockwise direction. Work around the perimeter of the square first, then remove the interior waste in a circular motion. Once all three recesses are formed, pop the template off and square the corners with a chisel. If you're accustomed to squaring inside corners formed by larger router bits, you'll be amazed

how quick and easy it is to square corners formed with this small bit.

Now prepare a piece of walnut for the inlay by planing it to roughly $\frac{3}{8}$ " thick. Remove the MDF cleats from the template as needed, and again use double-sided tape to attach the trio template to your thin walnut board. Increase router bit depth to about $\frac{1}{4}$ " and remove the brass spacer ring from the guide bushing. Wedge the router in one corner of a square as you plunge the bit to start the



7 Use double-sided tape to attach the trio template to an upper rail and clamp in a bench vise. With the brass spacer ring installed on the router, rout in a clockwise direction. Continue with circular passes until the waste is removed.

8 Remove the template and square the corners with a chisel.

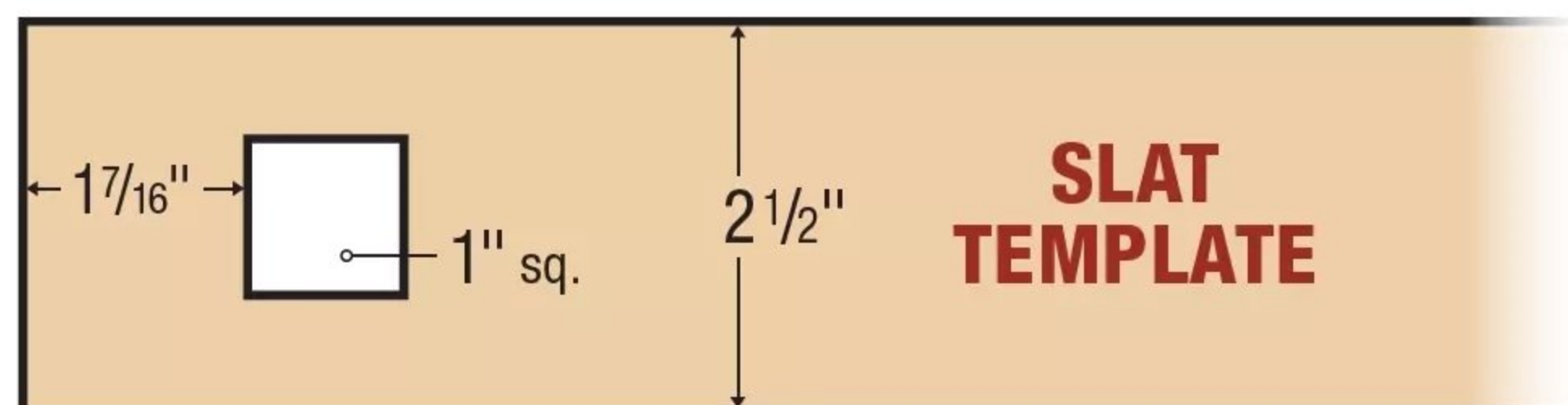
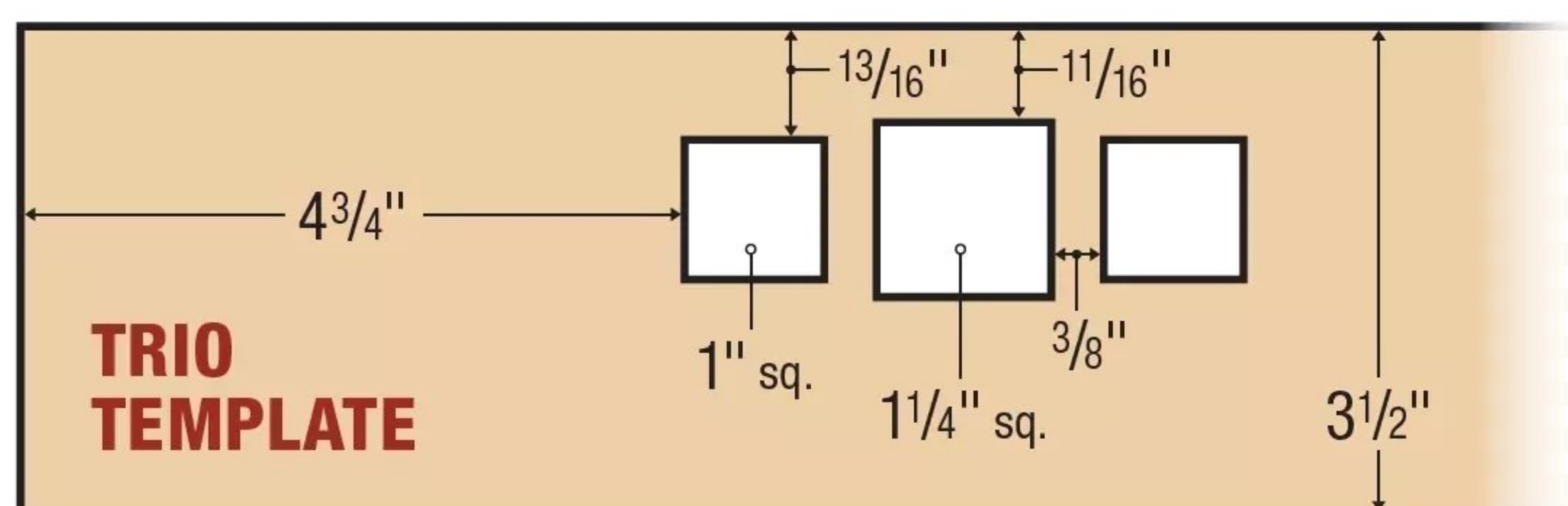
9 Rout a centered groove in the slats and glue in a 1/4" wide strip of walnut.

10 Trim the strip flush with a low-angle block plane.

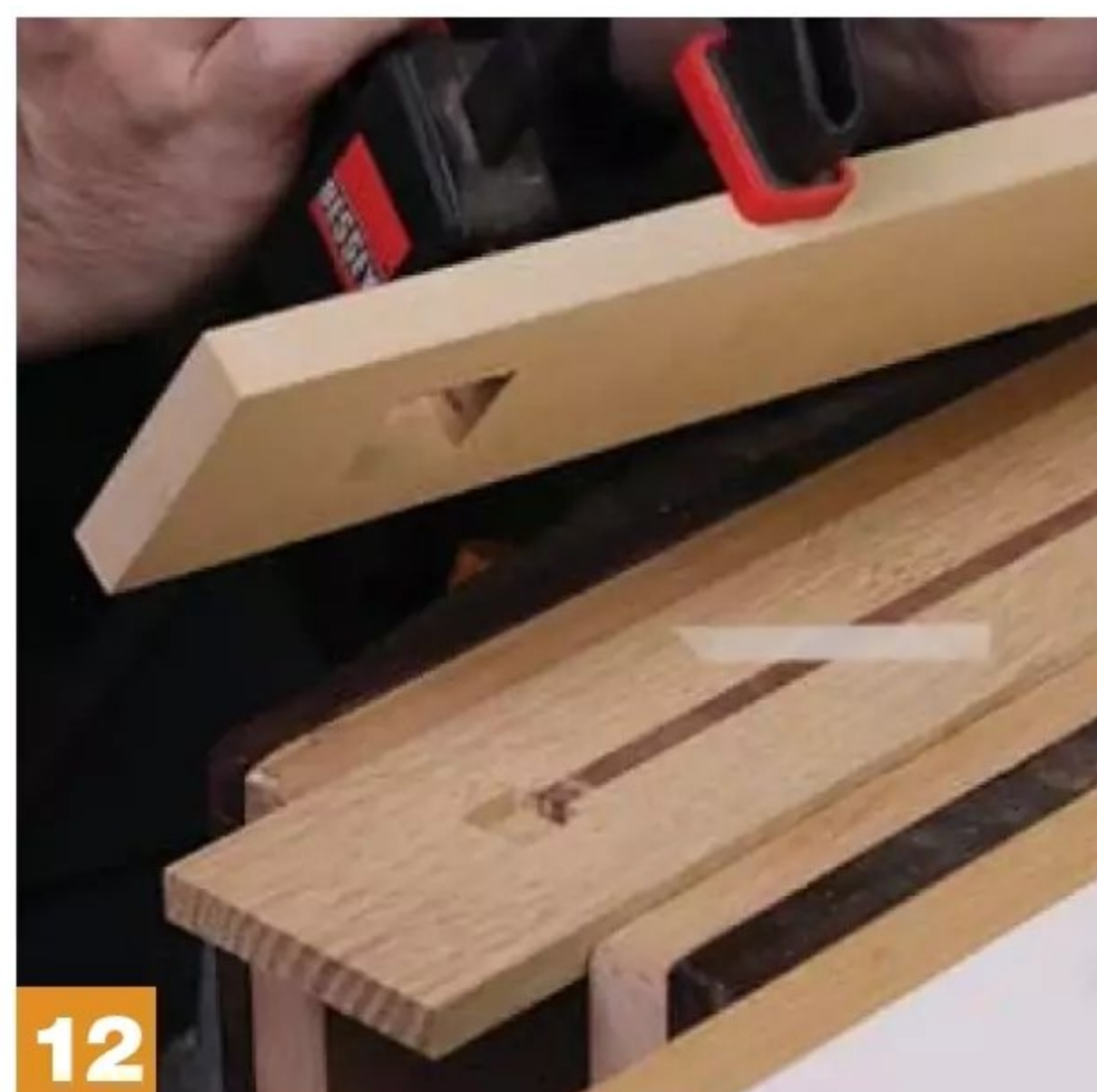
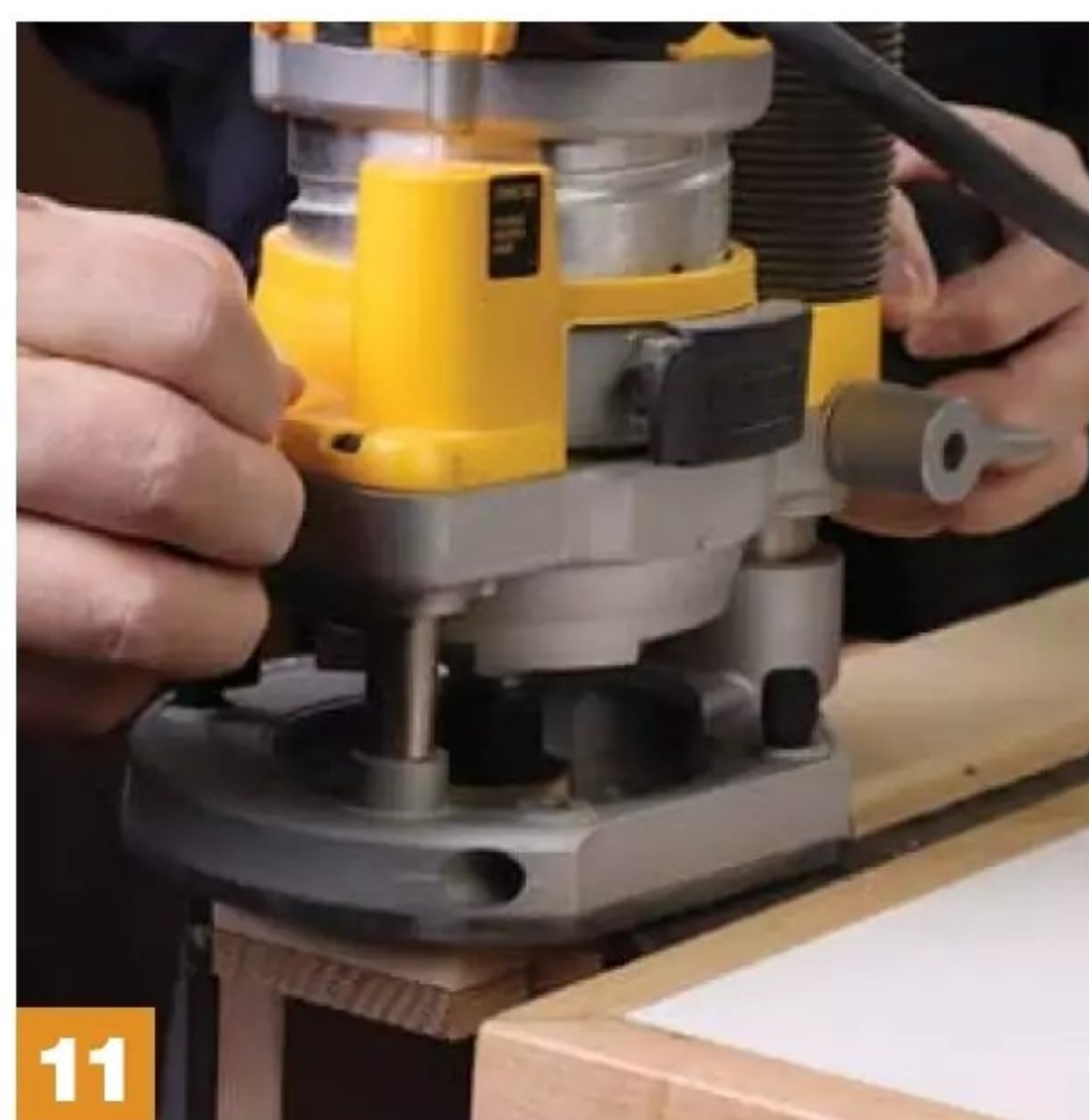
11 Attach the single template to a slat and rout the square recess as before.

12 A pair of clamps help break the template free. Note how the router has now defined the length of the walnut strip automatically.

INLAY TEMPLATES

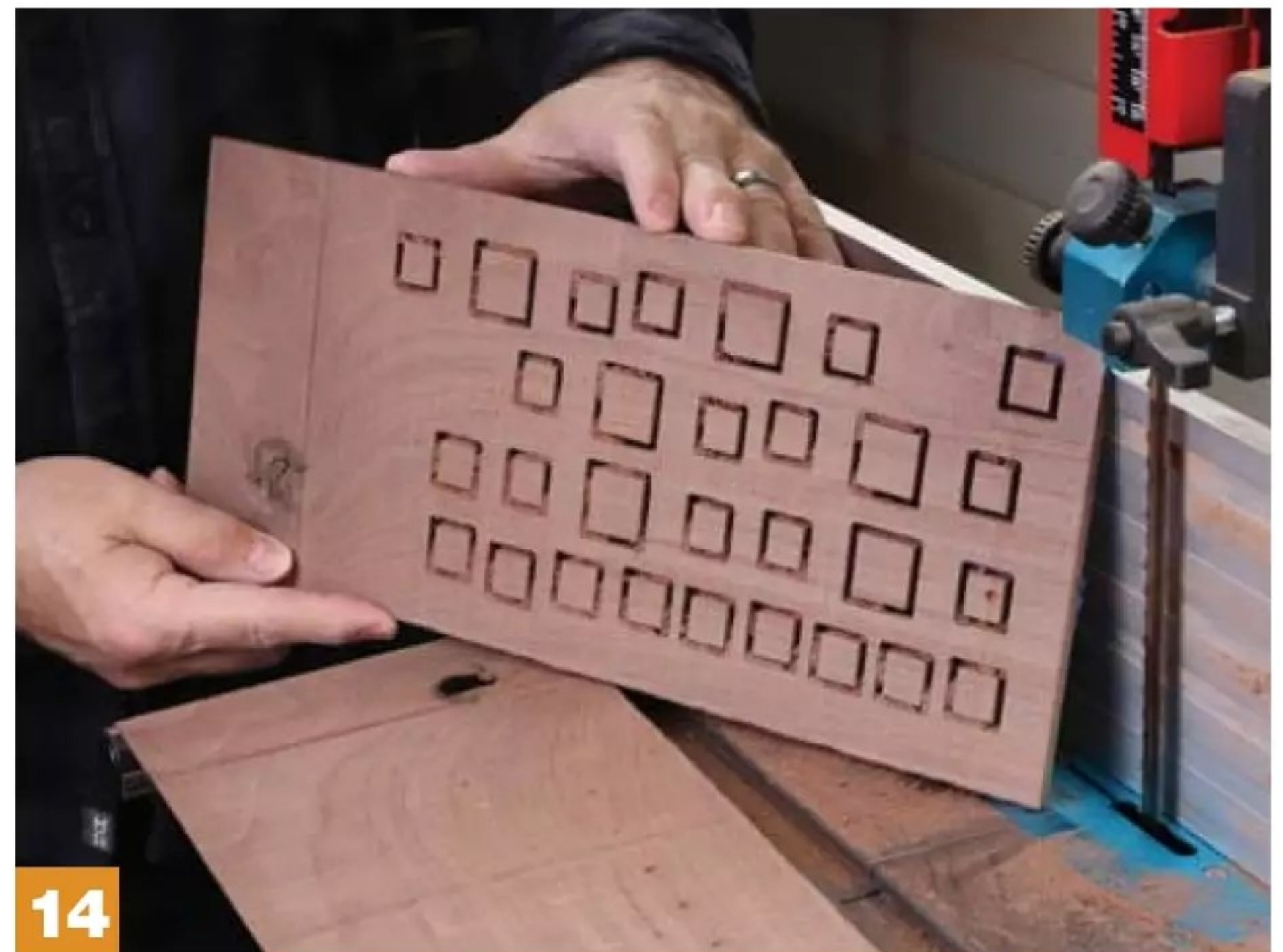


The trio template is sized 2" longer than the upper rails, to allow room for cleats. The cleats help register the template over your workpiece, as they're positioned in a bench vise for routing. The square holes in the template need to be oversized about 3/16" in each direction, to account for the inlay bushing. The template as shown makes a finished inlay a little less than 7/8" square for the large size and a little less than 5/8" square for the small size.



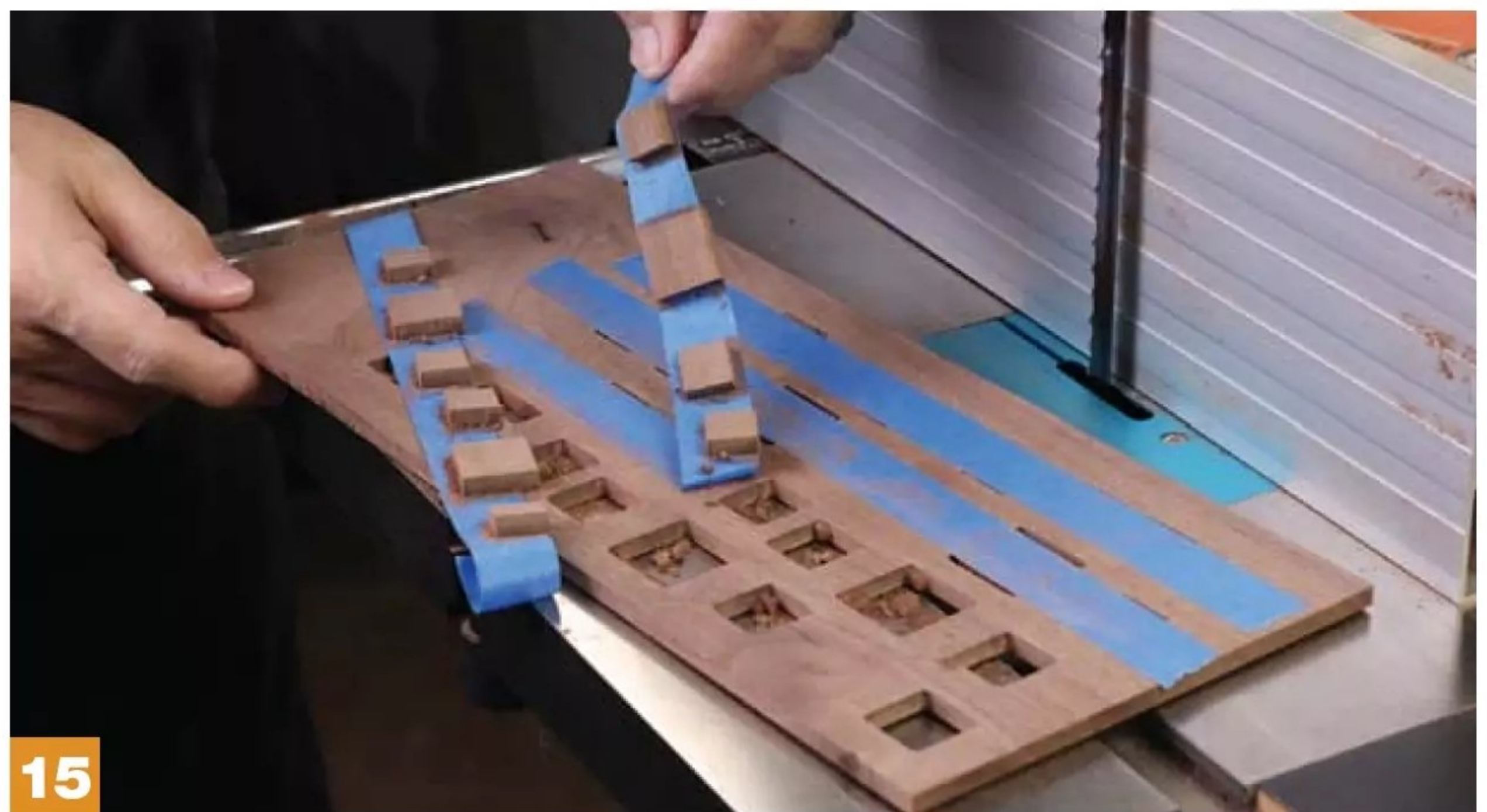


13



14

cut. Carefully trace the perimeter of each square in a clockwise direction, maintaining contact with the template. Before moving the template, take a moment to label the squares “1, 2, 3.” Remember, the template was cut by hand, so the left and right squares may have subtle variances. Also pay attention to grain direction as you mount the template to the walnut board. I generally make the inlay with the grain running the same direction as the workpiece, but that’s up to the builder, I guess. Finally, head to the band saw to release the walnut pieces. Set up the band saw to resaw and position a tall fence 1/4" from the blade. Place a strip of painter’s tape over each series of squares to hold them in place as you resaw the walnut board. Once you complete the cut, simply peel back the tape to retrieve the squares. Ease the back edges of the walnut squares with a sanding block and glue them in place. A gentle tap with a hammer or mallet should easily seat the inlays—but remember—they stand proud by design. Just sand them flush to complete the inlay pattern. It’s a detail that gives this little fern stand its signature look. The inlays for the slats proceed just the same way, although I like to add the inlay strip before routing the squares. Label the slat template and slat inlays “4” for clarity.



15



16



17

13 Remove the brass spacer ring from the inlay bushing. Attach the trio template to a walnut board and carefully rout out the squares. Make one clockwise pass, maintaining contact with the template as you work.

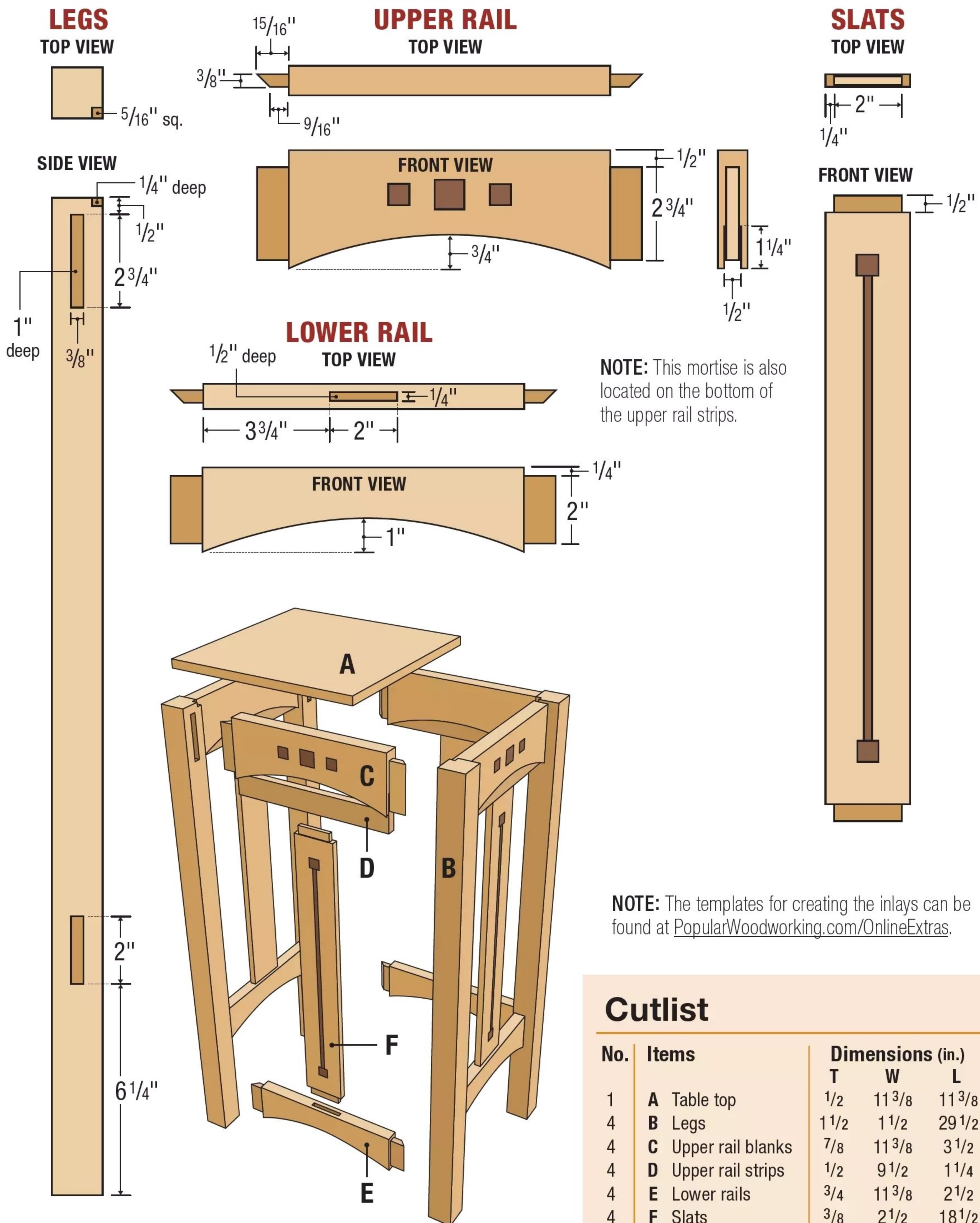
14 Using a tall resaw fence at the band saw, release the squares from the board.

15 Painter’s tape holds the squares in place and prevents damage as you make the cut.

16 Lightly sand the back corners of the inlay to help ease the fit.

17 Number the inlays to keep track of where they go and glue them in place.

Fern Stand



Cutlist

No.	Items	Dimensions (in.)		
		T	W	L
1	A Table top	1/2	11 3/8	11 3/8
4	B Legs	1 1/2	1 1/2	29 1/2
4	C Upper rail blanks	7/8	11 3/8	3 1/2
4	D Upper rail strips	1/2	9 1/2	1 1/4
4	E Lower rails	3/4	11 3/8	2 1/2
4	F Slats	3/8	2 1/2	18 1/2
-	G Walnut inlay	3/8	-	-



Curved Rail Detail

Looking at the unique shape of the upper rails may conjure up images of a trommel attached to a router with a ridiculously long radius. Rest assured, we'll take the easy route on this project, and focus on simple techniques that are easy to execute. To accomplish the arched detail, we'll first plow a deep groove in the upper rail blanks. Using a $\frac{3}{8}$ " wide dado stack, make multiple passes for a centered groove that's $\frac{1}{2}$ " wide by $1\frac{1}{4}$ " deep. I like to establish the correct width first and make an initial pair of passes with the blade raised

halfway, then raise the blade and complete two more passes.

Next head to the band saw and cut the curved shape along the bottom of the upper rails. This step should make you do a double-take. Normally, you'd cut the tenons before you dare make any curved cuts, because a curve will remove one reference edge. This is a special circumstance, and we'll break the rule "joinery before curves" just this once. After the curve is cut and faired, ease the edges with sandpaper, and mill strips of wood to fit the groove. Glue the strips into the grooves

18 Cut a $\frac{1}{2}$ " wide groove in the upper rail, using a $\frac{3}{8}$ " dado stack. Make the centered groove in multiple passes for a finished depth of $1\frac{1}{4}$."

19 Band saw the curve just outside your layout line.

20 Action! You'll feel like a director as you install the strip into the groove to assemble the upper rail.

of all four upper rails and clamp them securely. I found it best to cut the strips exactly the same length as the rails but leave them slightly wider than $1\frac{1}{4}$ ". That way, the excess can be trimmed at the table saw after the glue dries. Now, we've essentially restored our reference edge, so the joinery can proceed as usual.

Mortises & Tenons

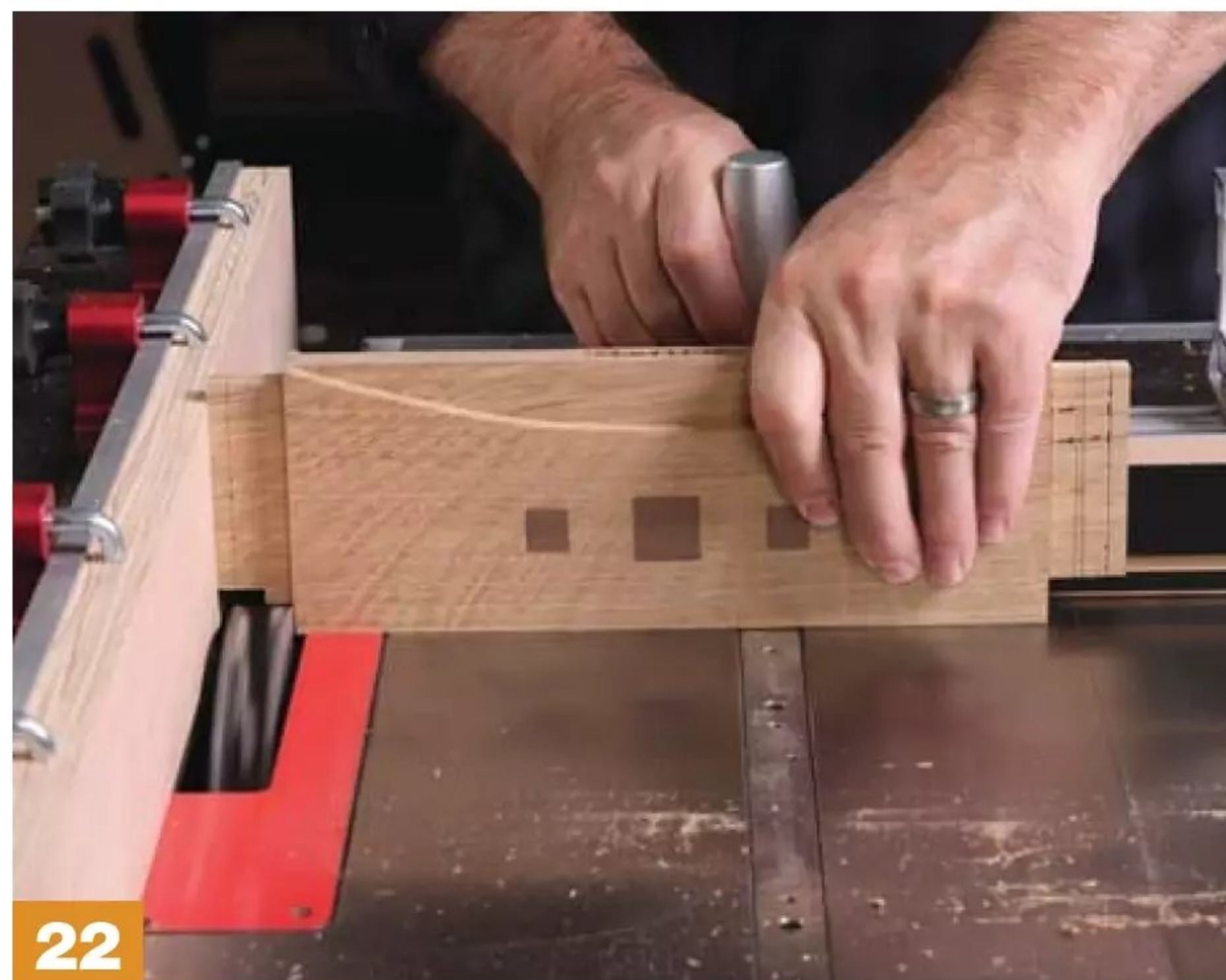
Then cut 2" long x $\frac{1}{4}$ " wide mortises for the slats. These mortises are just $\frac{1}{2}$ " deep and will be made in both the upper and lower rails. Note that the upper rails are $\frac{7}{8}$ " thick and the lower rails are just $\frac{3}{4}$ " thick, which will affect your joinery layout. However, as long as everything is centered, the slats will be positioned correctly. Continue work on the rails by cutting the 1" long x $\frac{3}{8}$ " thick tenons. Start with the lower rails, then raise the dado blade slightly to tenon the upper rails. Most of the shoulders are $\frac{1}{4}$ " wide and the only exception is the top shoulder of the upper rails, which is $\frac{1}{2}$ " wide. Finish work on the rails by band sawing the curved shape on the lower rails and sanding them smooth.

Dry Assembly

Miter the ends of each rail, so the intersecting tenons will come together inside the leg. In fact, you'll need to remove about $\frac{1}{16}$ " of tenon length as you do so.



21



22



23

Also, take a minute to notch the inside corner of the legs, so the rabbeted top panel will fit into the stand. The notch just needs to remove $\frac{5}{16}$ " square of material from the top of the legs and can easily be done with a chisel. Once the stand fits together as it should, take measurements for the slat length directly from the carcass. If it's $18\frac{1}{2}$ " overall and $17\frac{1}{2}$ " shoulder-to-shoulder, you're in good shape. Go ahead and cut the tenons on both ends of the slats, until they seat fully into their mortises. The cheek cut for the operation only requires a dado blade height of $\frac{1}{16}$ ", so carefully sneak up on the final tenon size.

Top it Off

The last part to build is the top panel. Glue a pair of boards together to net the $11\frac{3}{8}$ " square top panel. While the glue cures, sand all the parts you've made, and ease the edges as appropriate. Finally, trim the top to final size and rabbet the underside until it fits inside the frame. The rabbet should be $\frac{1}{4}$ " deep, to leave $\frac{1}{2}$ " standing proud of the upper rails. A $\frac{1}{8}$ " roundover along the exposed edge of the top panel matches the look of the original Limbert fern stand.

Finishing Details

Add the finish of your choice, which in this case was an oil-based stain and lacquer topcoat. Add the

21 Despite the interesting shape of the upper rail, joinery proceeds in the customary way. Chop 2" long x $\frac{1}{4}$ " wide mortises in the rails. Just remember the upper rails and lower rails are a different thickness, so your settings will change.

22 Raise 1" long tenons on the rails, until they fit into their respective mortises. The top shoulders of the upper rails are deeper than the others at $\frac{1}{2}$ ". This allows the rails to sit flush with the top of the legs.

23 Insert the slats into pairs of rails first, then add the legs to make two side assemblies, and sandwich the remaining parts between. Focus on setting the top rails flush with the legs for this step.

top panel after the finish is applied and secure it with wood buttons or tabletop fasteners. Because of the inset top, figure 8 fasteners won't work for this application.

PW – *Willie Sandry*

Check out a quick demonstration of the inlay process on Willie's YouTube channel The Thoughtful Woodworker. <https://www.youtube.com/c/TheThoughtfulWoodworker>

■ BESPOKE TOOLMAKER

Ironbark Toolworks

Devon Campbell is designing and building world-class tools from his shop in Queensland.

By Logan Wittmer



Sometimes, the universe has a way of connecting the dots, whether you're looking for it to or not. Back before the last Handworks Tool Show in the Amana Colonies, I was browsing some of the Facebook groups, seeing who was attending. Someone, and I apologize—I can't recall who, mentioned that there was a last minute addition to the show, a company called *Ironbark Toolworks*. I recall seeing it, but I didn't pay much attention, as there's a lot of small tool makers that pop up once or twice and disappear. Little did I know that I would cross paths with Devon Campbell from *Ironbark Toolworks*, and want to share his story.

Tools From Down Under
Devon Campbell, the founder and owner of *Ironbark Toolworks*, started manufacturing and

selling tools in 2020. Originally from Colorado, Devon moved to Australia to be with family, and has been exporting his tools from down under ever since.

Ironbark originally caught my eye at Handworks with their beautiful layout tools, unique spokeshaves, and edgy-looking block planes.

How did you come to decide to build tools, and why Australia?

I developed a love for music as a young kid and that evolved into a curiosity about how instruments are made. In middle school, I would spend breaks with a guitar builder in my home state of Colorado learning how to make musical instruments. After graduating college, I found myself living in Hawaii, working at a cabinet shop.

My alone time was spent in my home shop, away from the noise of production machinery. Since my interests frequently came back to musical instruments, I would frequently find myself making jigs and fixtures to hold and work the organic and unusual shapes prevalent on a guitar, as well as the tools to work on them. Slowly, I found my interests pivoting more and more towards the tools as I realized that there is a wonderful community of people who shared my excitement towards them. I would drool over images of planes from Konrad Sauer, Tony Rouleau, and Karl Holtey. I gave it a few tries with varying levels of success, but my priorities at the time were still split between school, an uncertainty of my professional future, and my woodworking hobby.

PHOTOS PROVIDED BY DEVON CAMPBELL & LOGAN WITTMER

A couple years later, I moved to Australia following my sister who had done her PhD there. I knew that I was interested in making tools and that there is a rich culture of tool makers in Melbourne. I was very fortunate to spend a bit of time with Chris Vesper and Peter McBride learning how to approach a tool as a piece of art and how to efficiently work form and function into a cohesive identity. During that time, I joined Carbatec, which is one of the largest woodworking tool and machinery retailers in Australia.

I am very grateful for the time I had at Carbatec since it reinvigorated my belief that I could have a future in tool making. It informed me about the gaps in the market, and my salary funded my workshop and accelerated me into being able to make things that I had previously thought to be prohibitively expensive or impossible. My tool making dreams

finally felt possible and I felt like I was up to the challenge, so I started *Ironbark Toolworks* and began marketing my own line of tools intended for woodworkers who appreciate how high quality and beautiful tools inspire high quality and beautiful work.

What made you want to build your own tools, and what do you see as a need in the community?

I wanted to make tools that are beautiful and collection-worthy while also being the practical, default 'go-to' tool for woodworkers of all experience levels. That's a big task, but I thought that it was doable through clever design and a good understanding of all the expectations around a tool. My tools are designed to be easily maintained and repaired to ease any concerns of woodworkers who think they are too beautiful to use. They are made from modern

materials to outlast and outperform their older counterparts, and they're engineered to be efficient at their intended purposes without being finicky to set up or use. They've also been made using continually improved processes to reduce cost and achieve a price point within reach of woodworkers who know that these tools will be of use to them. To my knowledge, this combination of principles isn't available elsewhere on the market, but they are the priorities that I look for in tools I buy and I believe those priorities are shared by my customers.

What would you guess the future holds for *Ironbark Toolworks*? New Products and expanding the line?

Ironbark Toolworks is still a small company, but it has been met with a lot of support and encouragement that I'm on the right track. Since I started *Ironbark Toolworks*, I



1



2

1-2 Devon Campbell spends his working hours hand making each and every tool that leaves the *Ironbark* shop. This includes the machining, sharpening, and testing of each tool.

3 Devon's block planes are edgy, yet somehow classic. They're designed for an ergonomic feel as you use them.



3

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White Oak (Quarter Sawn).....	4/4	8.95	\$180.00
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would regularly release new products and I expect that to continue. I have a plethora of tools in my mind that I feel I could make meaningful contributions to, so they will undoubtedly start trickling into my product offerings as I find the time to develop them and recognize their demand.

On the business side of things, I hope that I can grow the company and start hiring employees as sales

become more predictable and frequent. Right now I am committing most of my time to my current product offerings to stay on top of orders, but I would like to spend more time developing new products and I think training an employee could help with that workload. I also think there is space for *Ironbark* to embrace longer term projects like developing machines. Ultimately, there's no way to know

exactly what the future holds, but I will make sure that everything I sell is up to the standards consistent with the rest of *Ironbark's* offerings and that I respect the priorities of my customers.

Editor's Note:

Devon makes beautiful layout tools and hand planes. However, in my opinion, one of his nicest tools is his spokeshave. It's one that you need to really hold to understand how it's different. You can see it in the photo to the left and the exploded view below.

The *Ironbark* spokeshave differs from traditional shaves in a number of ways. In form, it more closely resembles the old "cigar spokeshaves". However, the blade mechanism is different. The brass knobs on the ends of the handle engage with pillar blocks embedded in the body. These dovetailed blocks lock on the edge of the blade to really lock it in place. The blade depth mechanism is simply two knurled thumb screws that rest on the back of the blade. As an owner of more spokeshaves than I would admit to, I believe it's probably my favorite.

Ironbark Toolworks are available both on the *Ironbark* website (IronbarkTools.com.au), as well as from Leslie at Heartwood Tools (HeartwoodTools.com).

PW — Logan Wittmer



ABOVE In use, the *Ironbark* spokeshave works similar to a cigar shave style spokeshave.

BELOW An exploded view of one of Devon's original spokeshaves shows the blade capture mechanism, as well as the immaculate machining.





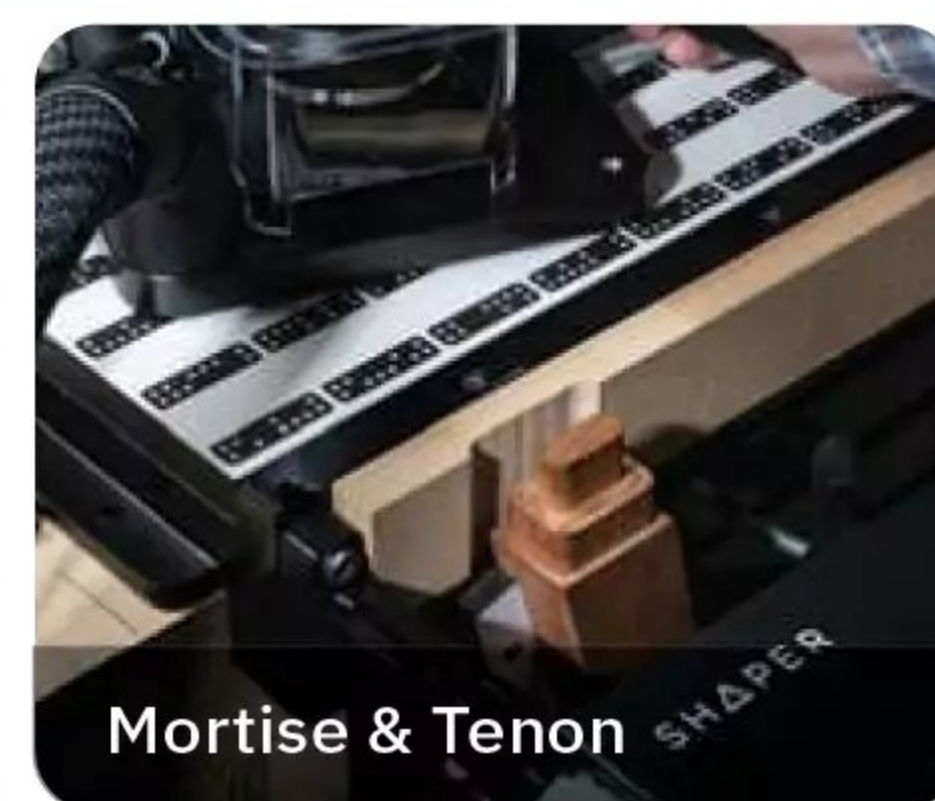
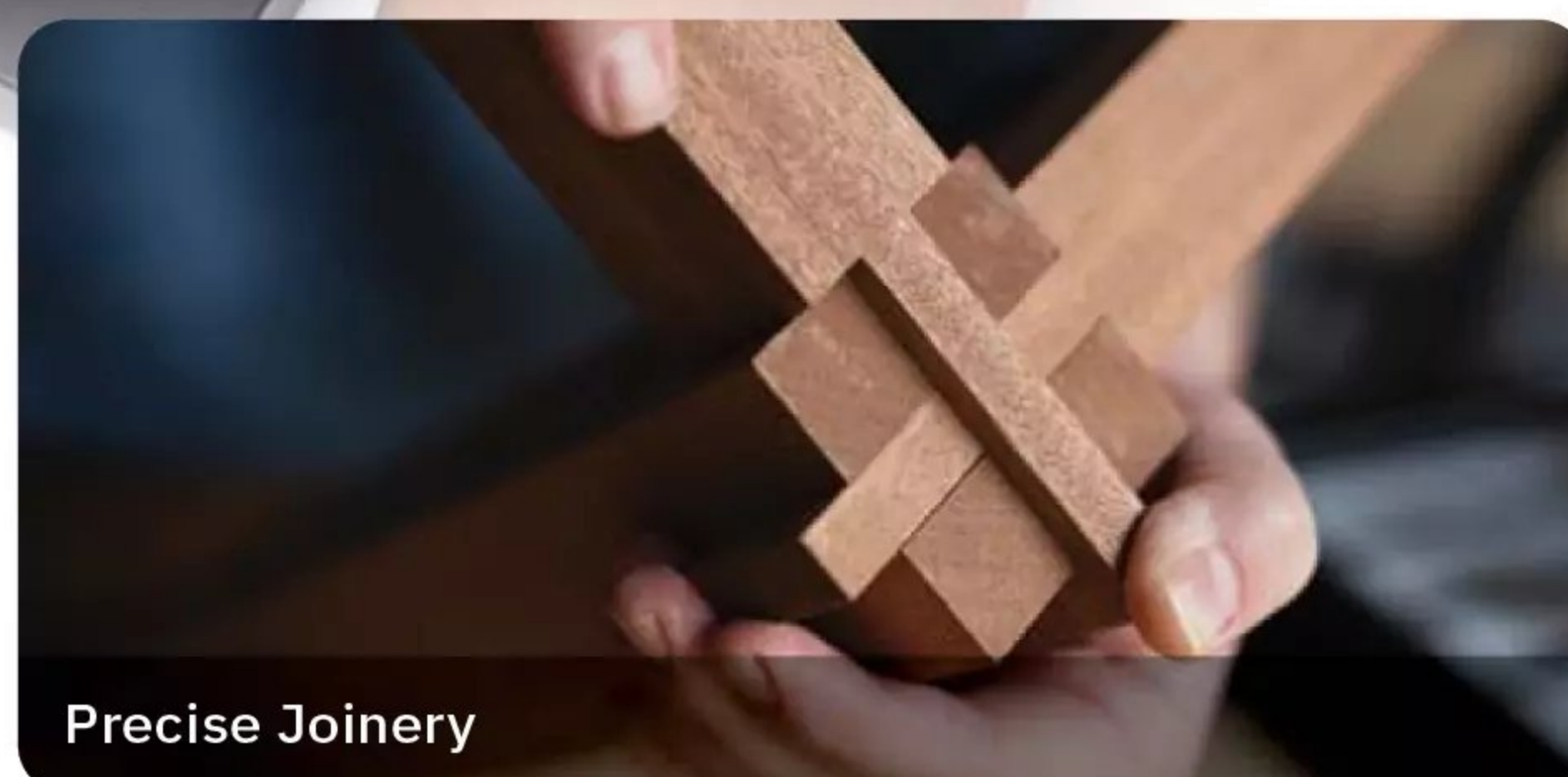
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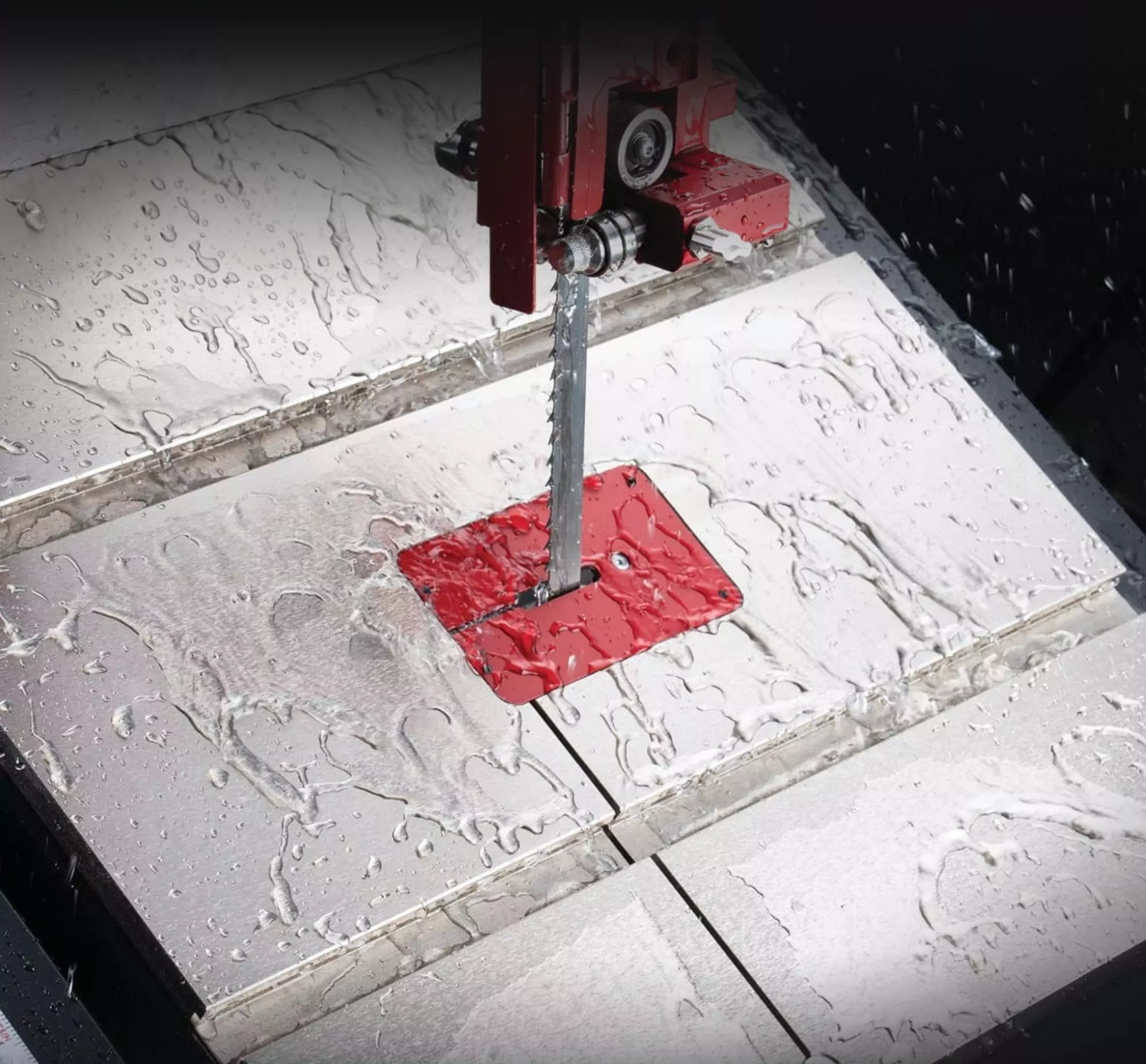


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* Waterproof refers to the nickel-plated table surface; the rest of the machine is not waterproof.