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Vol. 44 / No. 260

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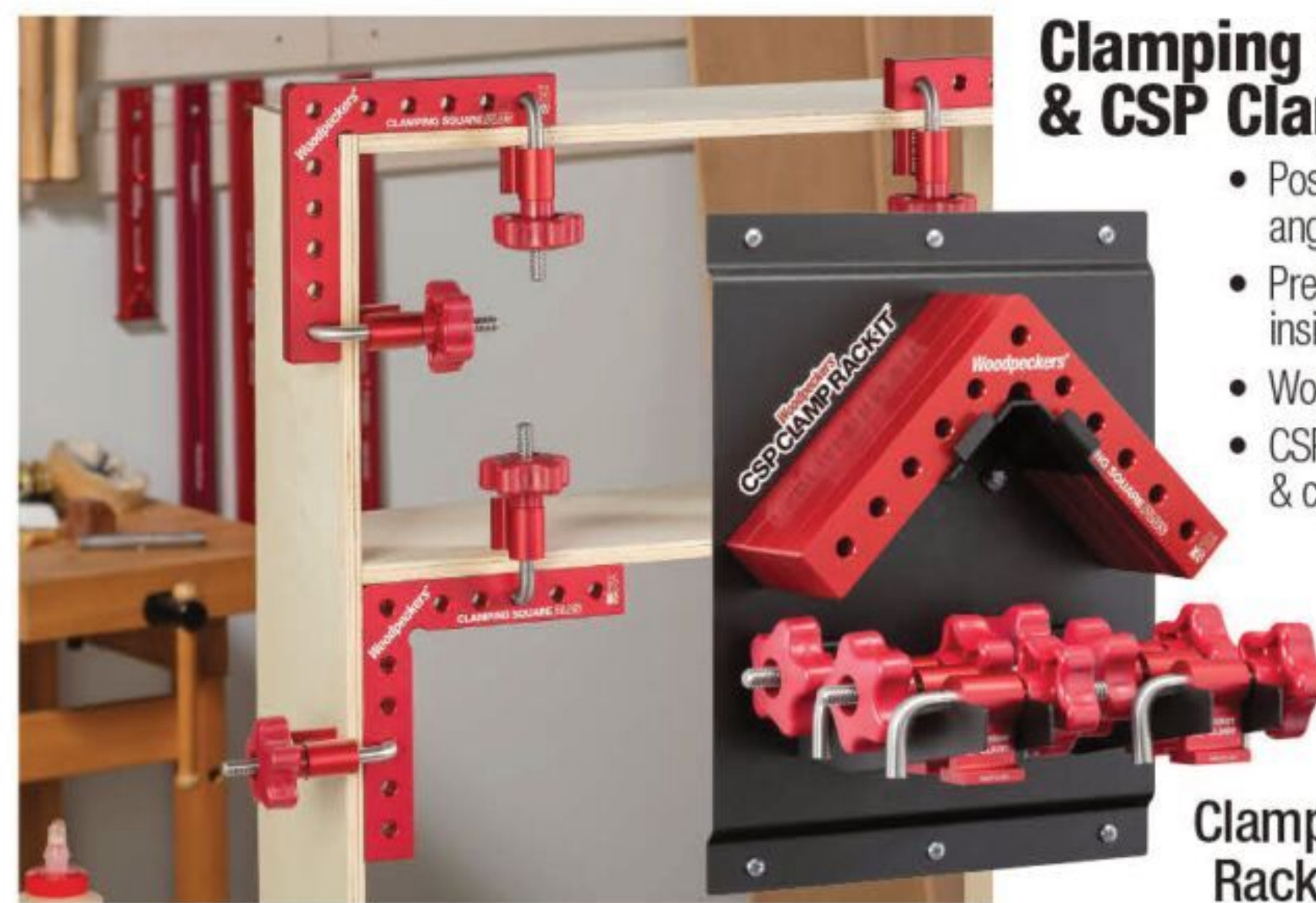
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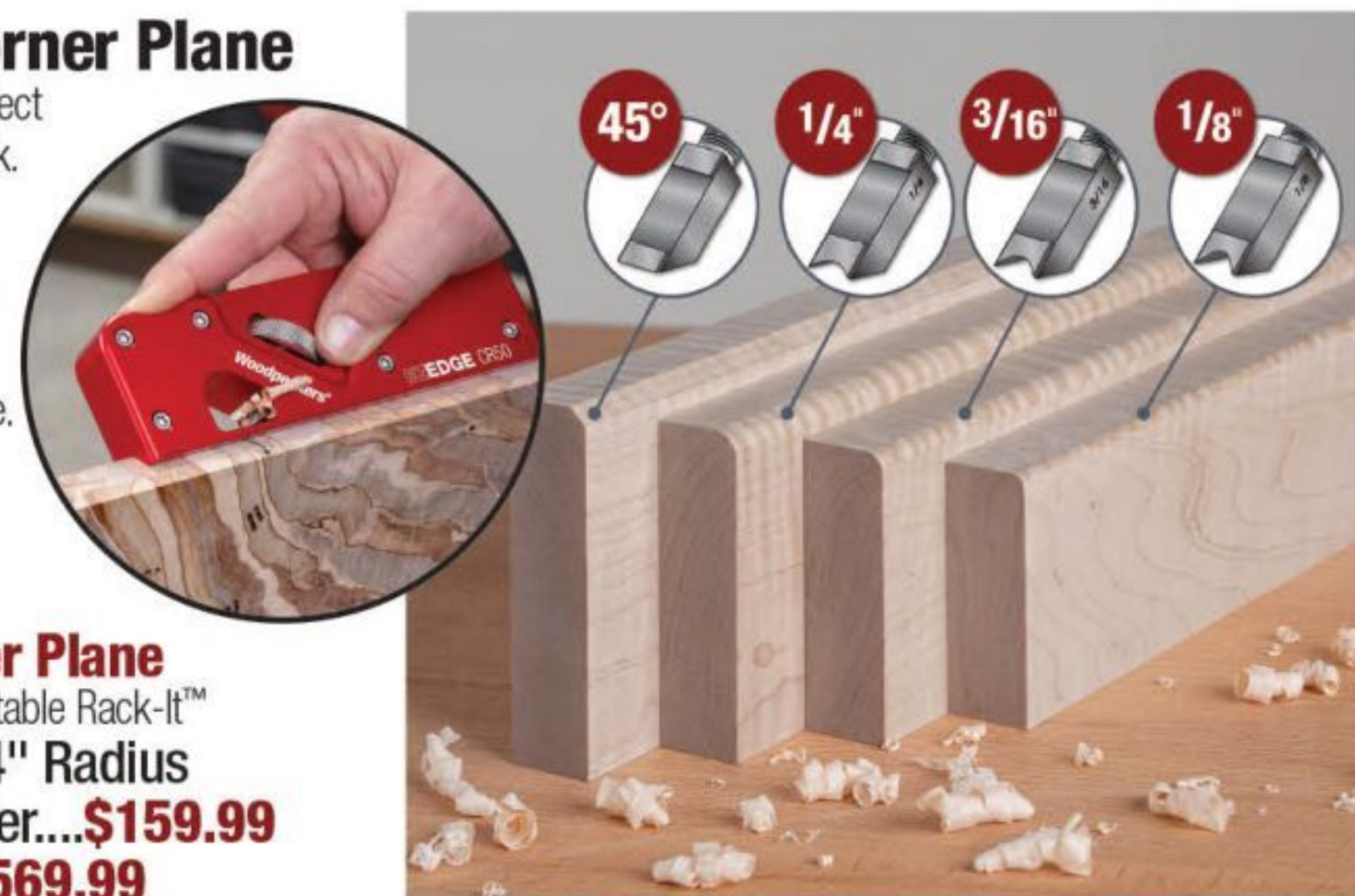
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from the editor Sawdust

An issue of Woodsmith comes together over two months. Well, project development takes longer. But in those two months, themes sometimes emerge. You'll find two such themes in this issue. The first is router techniques. The dresser, air cleaner, the chest, and the watering vessel all rely on extensive router techniques or jigs for key elements. The router in my shop is my favorite portable power tool. There are just so many things you can do with it. So I think it's fun that these projects show off those capabilities.

A second commonality is red oak. I'll admit to holding a bias against red oak due to the careless use of flatsawn oak in so many projects over the years. Too much wild grain patterns. But the chest and bench in this issue show off some of the strengths for this common and inexpensive material. Logan Wittmer has even decided that 2022 is the year he rescues red oak. We'll see how it goes.

Let me know about any material you avoid — and favorite tools. Happy woodworking!



BECKY KRALICEK, SENIOR GRAPHIC DESIGNER

◀ Becky is a product of *Woodsmith*. "I have known the business all my life. My dad, Ted Kralicek, was the former Creative Director. Which means I grew up in a house full of saw dust, scrap wood, and prototype furniture." Since artistic abilities run deep in her roots, she studied graphic design at Grand View University. Working alongside her pops was great, but since his retirement, she's found her place in all *Woodsmith* media: TV and video, online seminars, books, photography, and of course illustrations. You'd be hard pressed to find something at *Woodsmith* that doesn't have Kralicek fingerprints.

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Made from all solid wood, you'll hone your joinery skills as well as learn some carving techniques.

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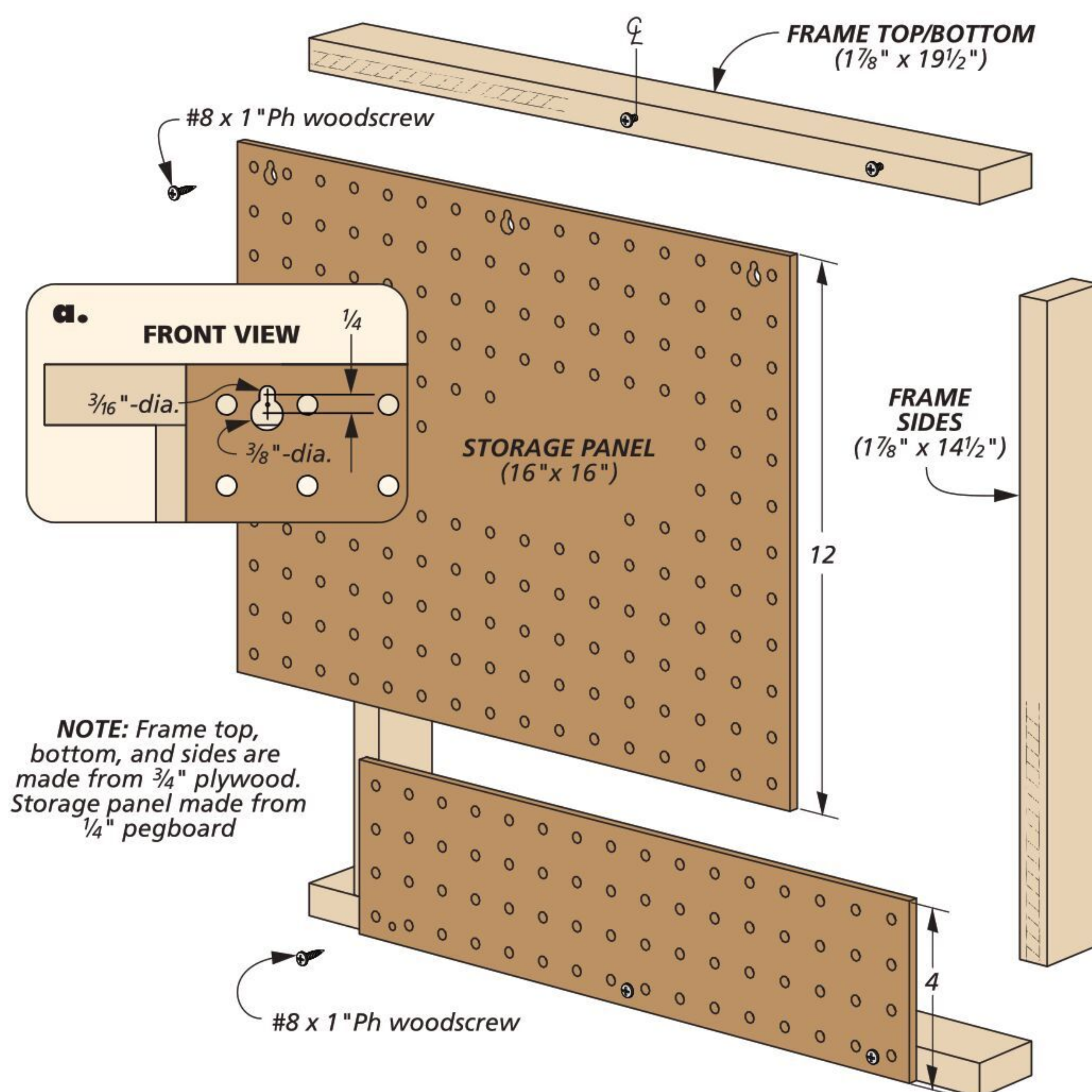




Router Table Storage

I was looking for some extra storage in the shop when I came up with this use for the open space between the legs of my router table. After making a frame to span the gap, I screwed a piece of pegboard across the bottom, keeping items securely inside. The “door” on this little cabinet is a key-holed panel of pegboard. The key holes allow the panel to easily slide on and off when I need something from inside, and the pegboard itself allows me some vertical storage too. You can see the dimensions I used to the left, but to make your own just match it to the dimensions of your router table.

Larry Anderson
Brookfield, Missouri



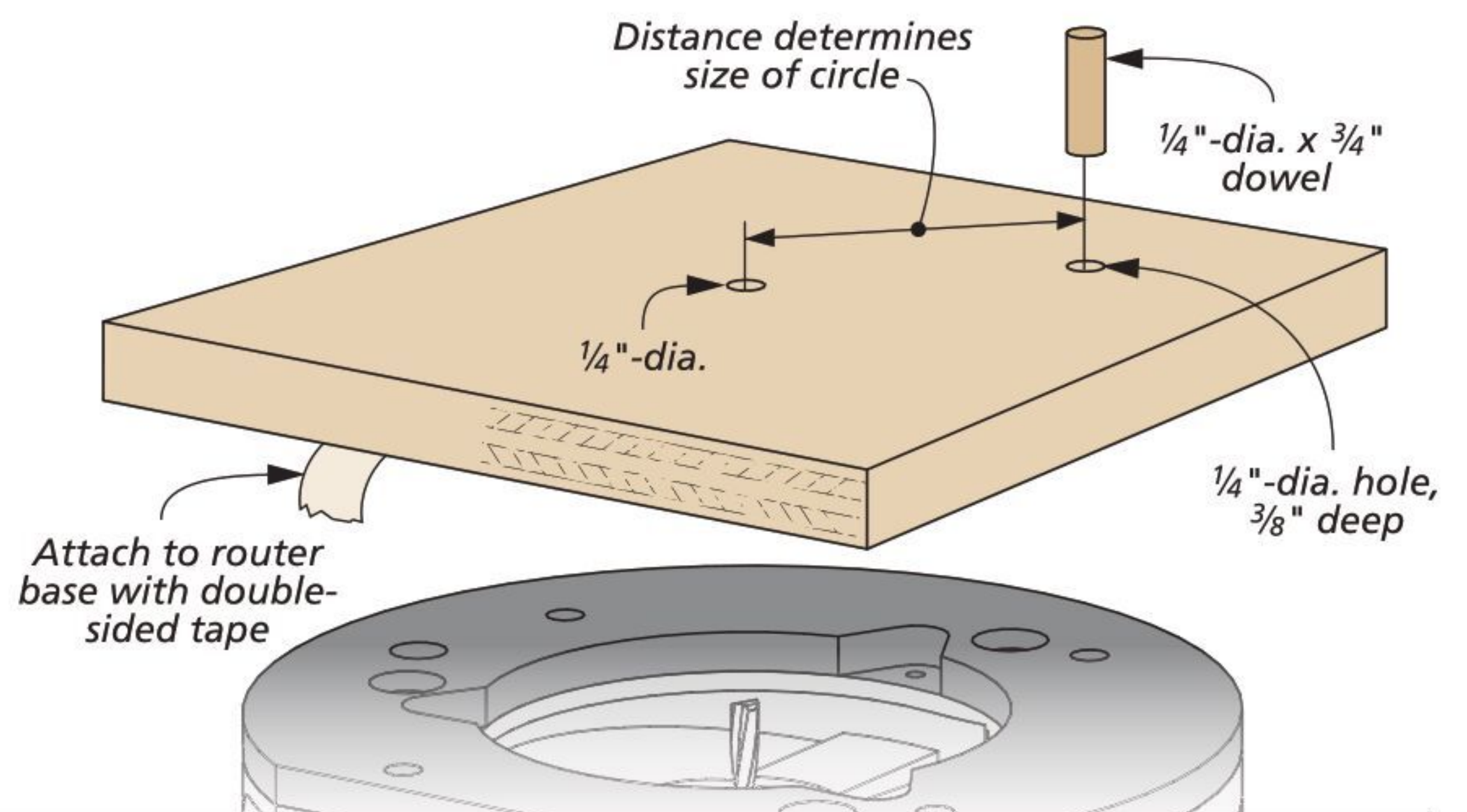
▲ Using L-hooks with the pegboard panel allows plenty of hanging storage for items like wrenches and router table inserts.



Mini Router Circle Jig

When it comes to making circles, I prefer a simple jig like this one when I can use it. The jig works as a trammel to guide your plunge router as you cut. Drill out two holes in a piece of plywood, one for the bit and one for a dowel. Glue the dowel into the jig. Drill a hole (or holes) in the piece you'll be cutting as well. Once dry, attach the jig to your router (I use double-sided tape) and fit the dowel into your piece, then let the jig guide your routing.

*Phil Huber
Urbandale, Iowa*



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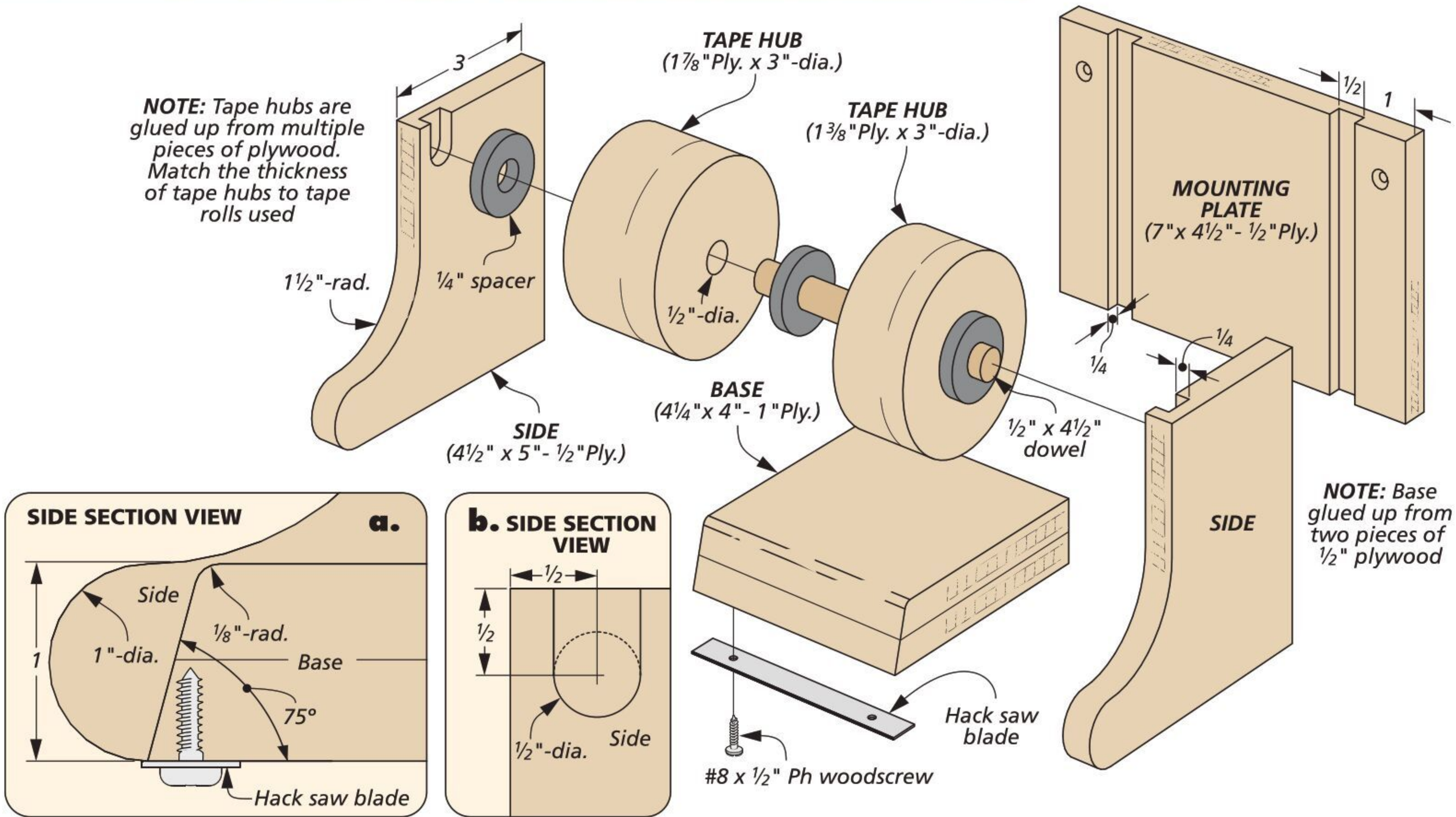


Tape Dispenser

If you use tape as much as I do, you'll appreciate this dispenser. Two sides fit in grooves cut into a mounting plate. A dowel spans the distance between the sides, holding the hubs which fit inside the rolls of tape. Each side has a notch in the top edge to support the dowel, which are left open at the top to make replacing a roll of tape easy. A cut-off hack saw blade is screwed to the base and used as a cutter.

After assembly, add the hubs that fit inside the rolls of tape. Each hub is sized to match the tape roll you'll be using, with a centered hole so you can slip it onto the dowel. Adding some store-bought washers between the sides and hubs allows the rolls to spin independently of each other. To mount the dispenser, the mounting plate can be screwed into a wall or a peg-board panel.

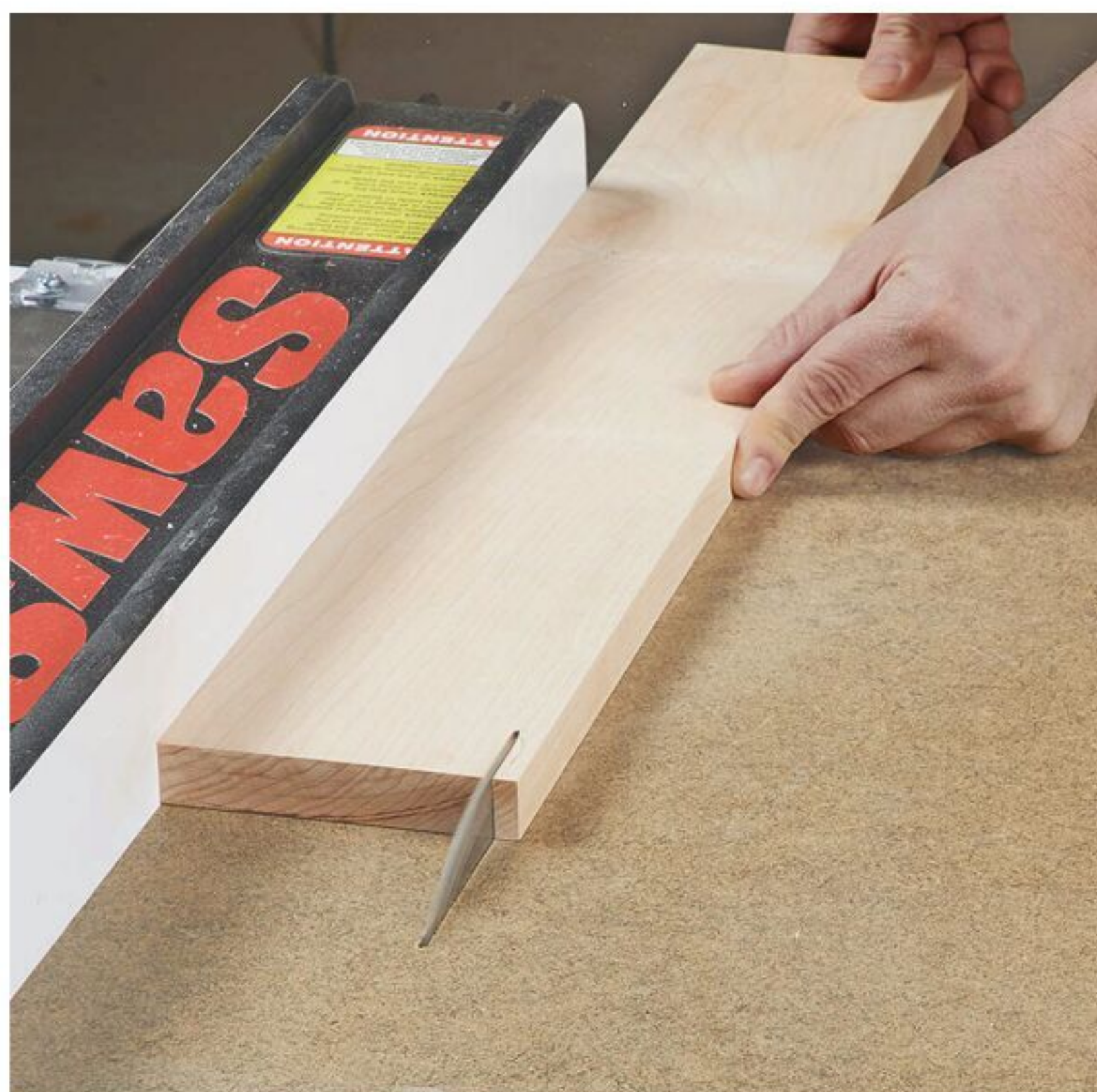
*Jake Pippin
Marshalltown, Iowa*



QUICK TIPS



Drill Guide. *Quinten Long of Des Moines, IA* came up with this way of drilling pin holes. By attaching a cleat to one side of a small piece of pegboard, he had an instant drilling guide. After drilling the first hole, he used a dowel as a spacer, then drilled the rest of the holes using the pegboard and dowel to guide him.



Easy Zero Clearance. *Mike Strickland of Hiram, GA* rarely uses his zero-clearance insert, so it was hidden away when he needed to use it. Instead of stopping to search, he simply used a scrap piece of hardboard. After clamping the panel down, he raised the blade to cut a kerf into the panel, then cut the piece he needed on top.

DREAM IT.

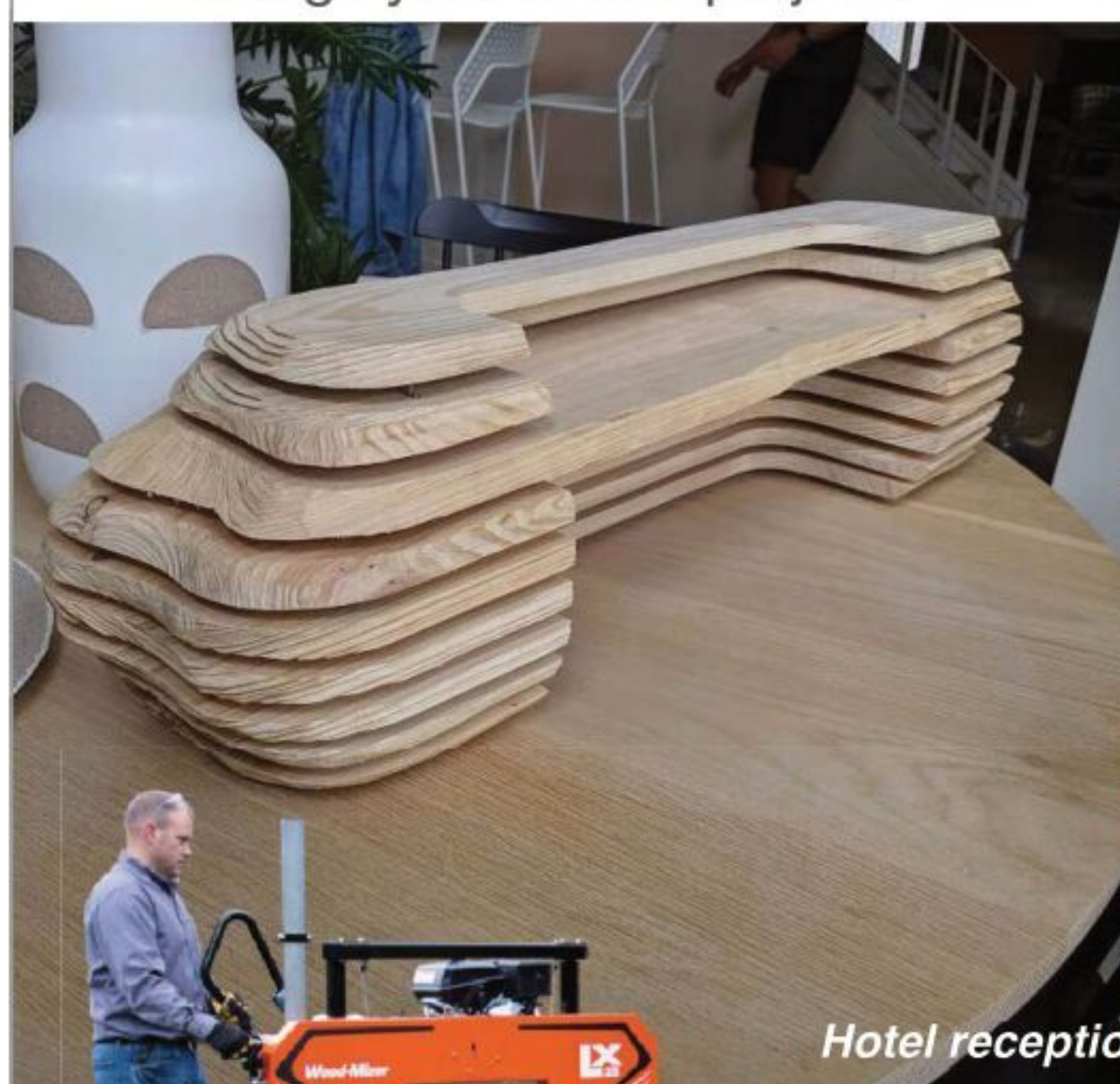
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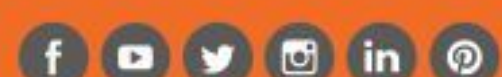


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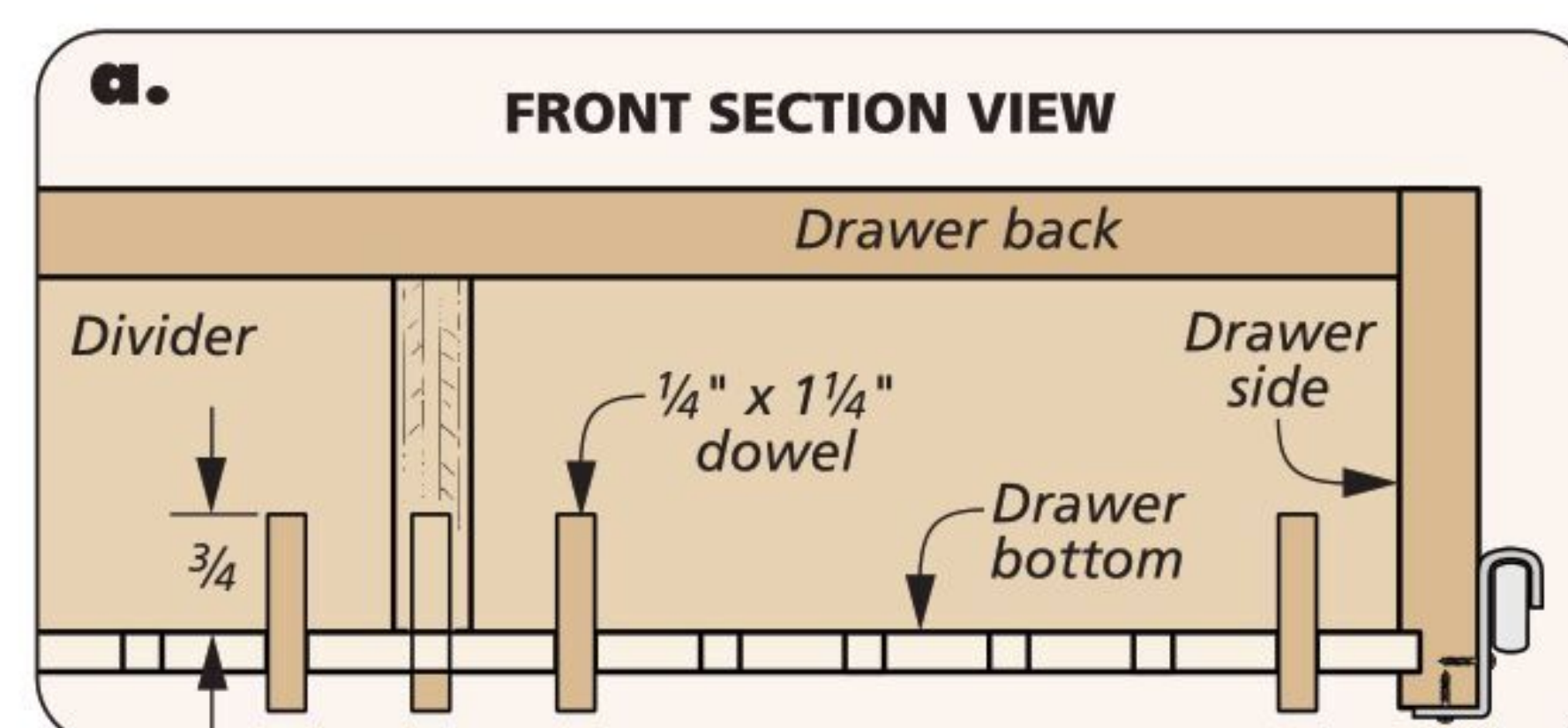
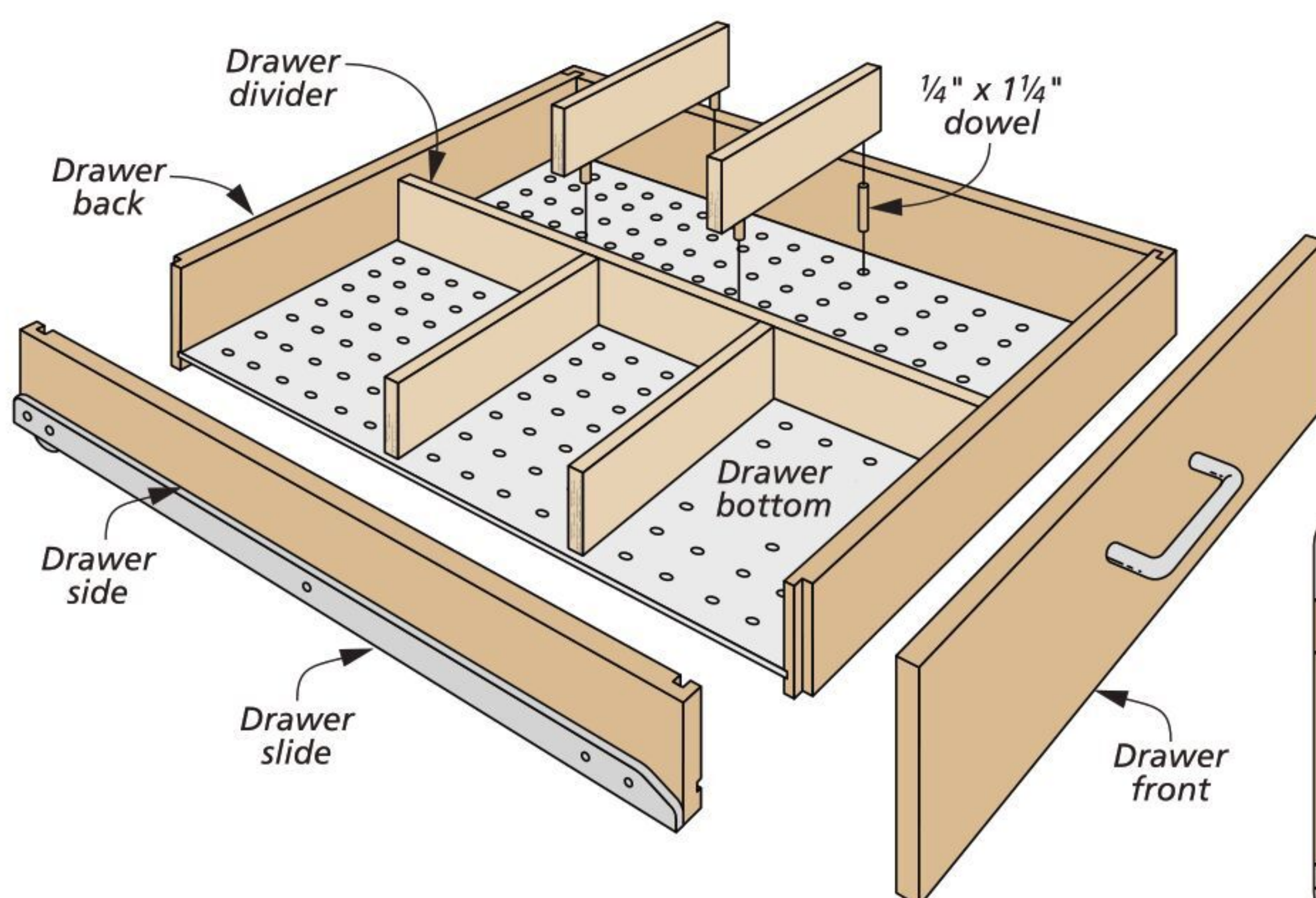
Dust-free Drawer Bottoms

While building some drawers for added storage under my workbench, I ran out of the $\frac{1}{4}$ " hardboard I normally use for the drawer bottoms. Looking around the shop for a suitable substitute, I found some $\frac{1}{4}$ " pegboard. It seemed sturdy enough for my purposes, so I gave it a shot.

The white melamine surface of the pegboard helps "lighten up" the inside of the drawers, plus it's easier to keep clean, but there's another big advantage to using pegboard. You can make use of the holes by adding dividers for the drawers. This helps keep things organized, as you can see in the photo at left.

On shallow drawers, you can use $\frac{1}{4}$ "-dia. dowels on the bottom of the partitions to locate them in the holes. On deeper drawers, I've found that #8 x $\frac{3}{4}$ " roundhead woodscrews with washers work to fasten them.

*Randy Maxey
Clearwater, Florida*



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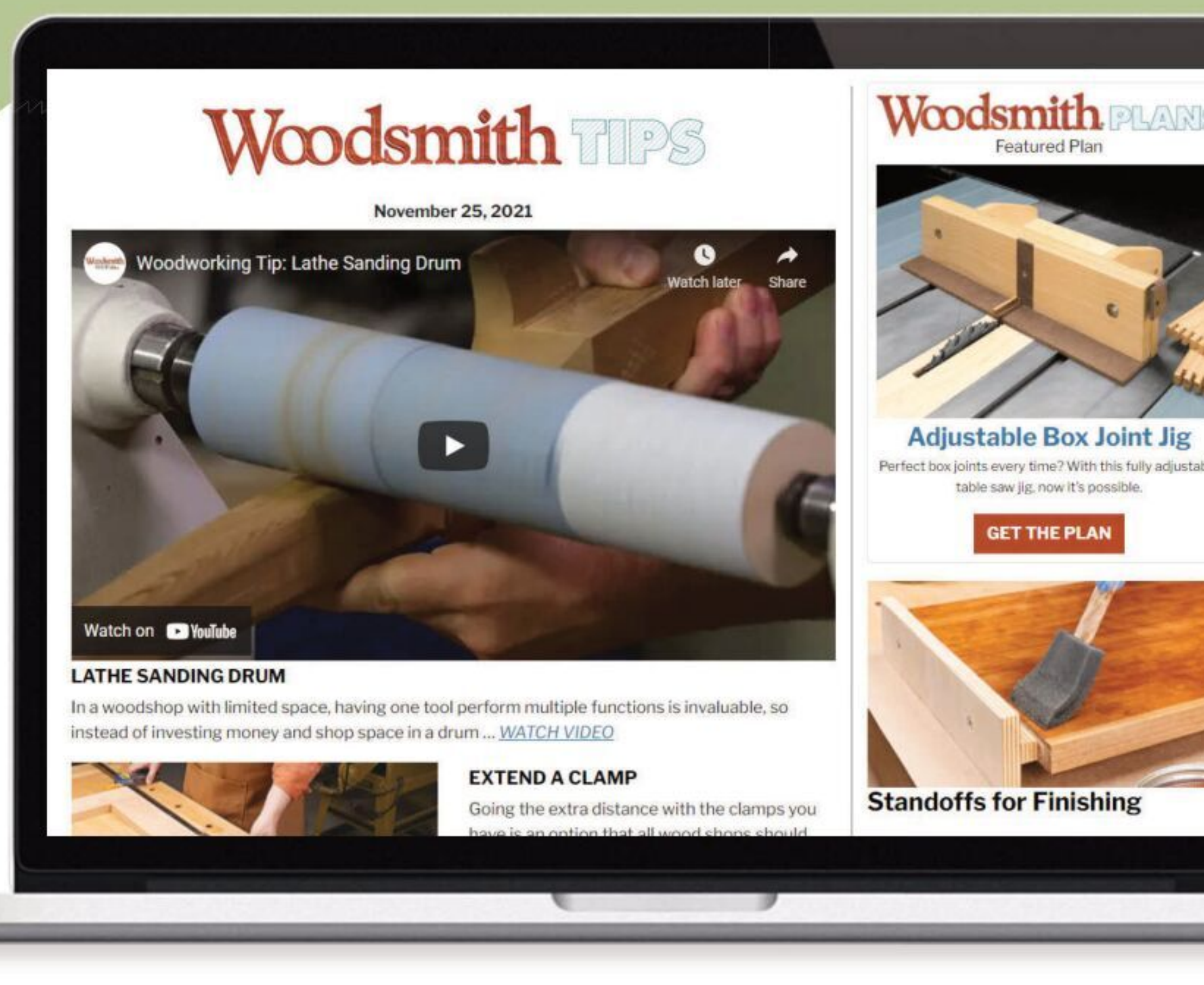
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QUICK TIPS



Ruler Snap Bracelet. John Doyle of Ankeny, IA got an idea when looking at his daughter's snap bracelet. By cutting about 8" off of an old tape measure, he had a measuring tool that he could snap right onto his wrist. Now he's got a ruler at the ready and a daring new fashion accessory.



Small Glue Ups. Logan Whittmer of Runnels, IA was doing a glueup on small pieces when he found a new use for the dogholes in his bench. Placing the cap of his glue bottle in the doghole provided a reservoir for the glue, and a wooden skewer made for easy application.



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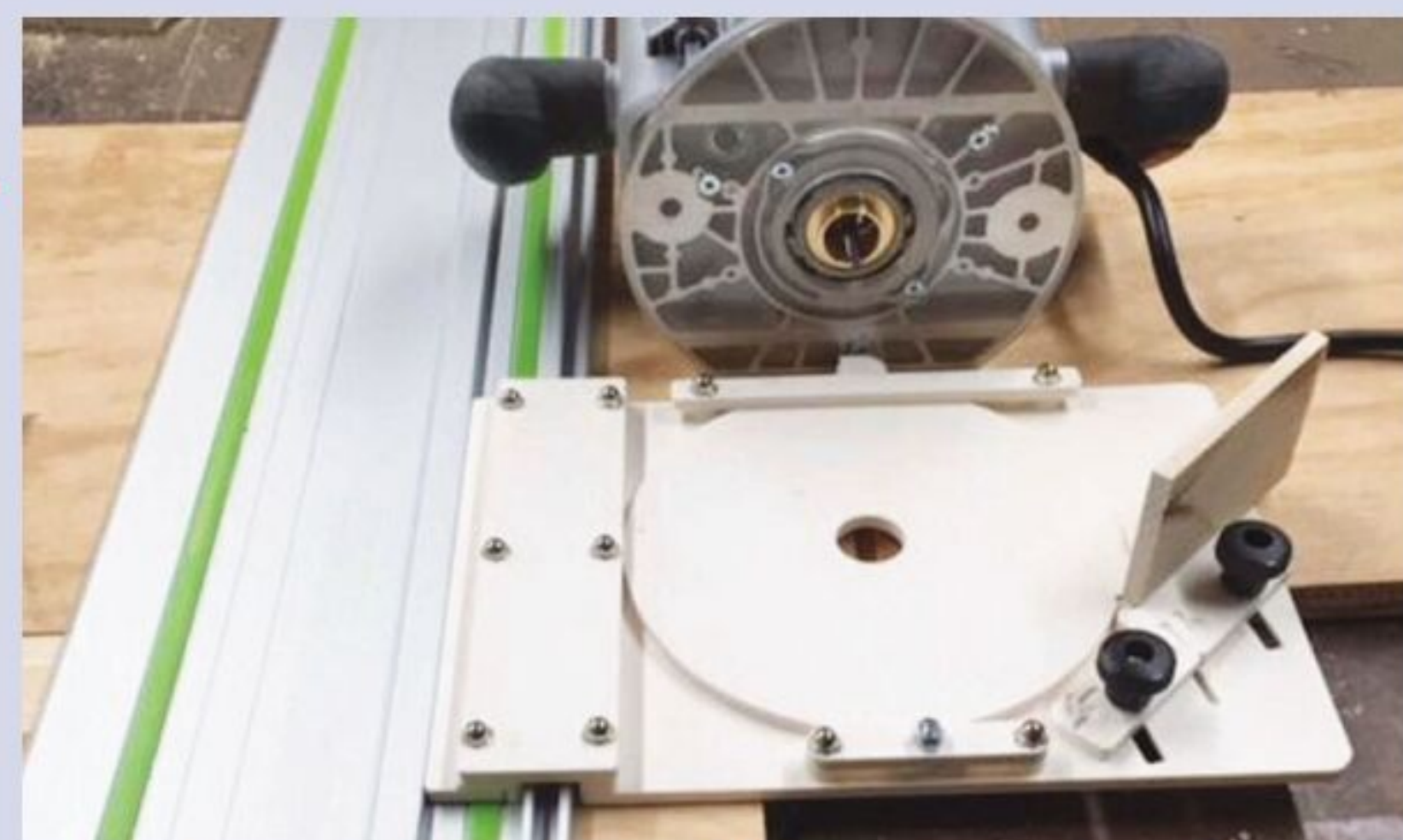


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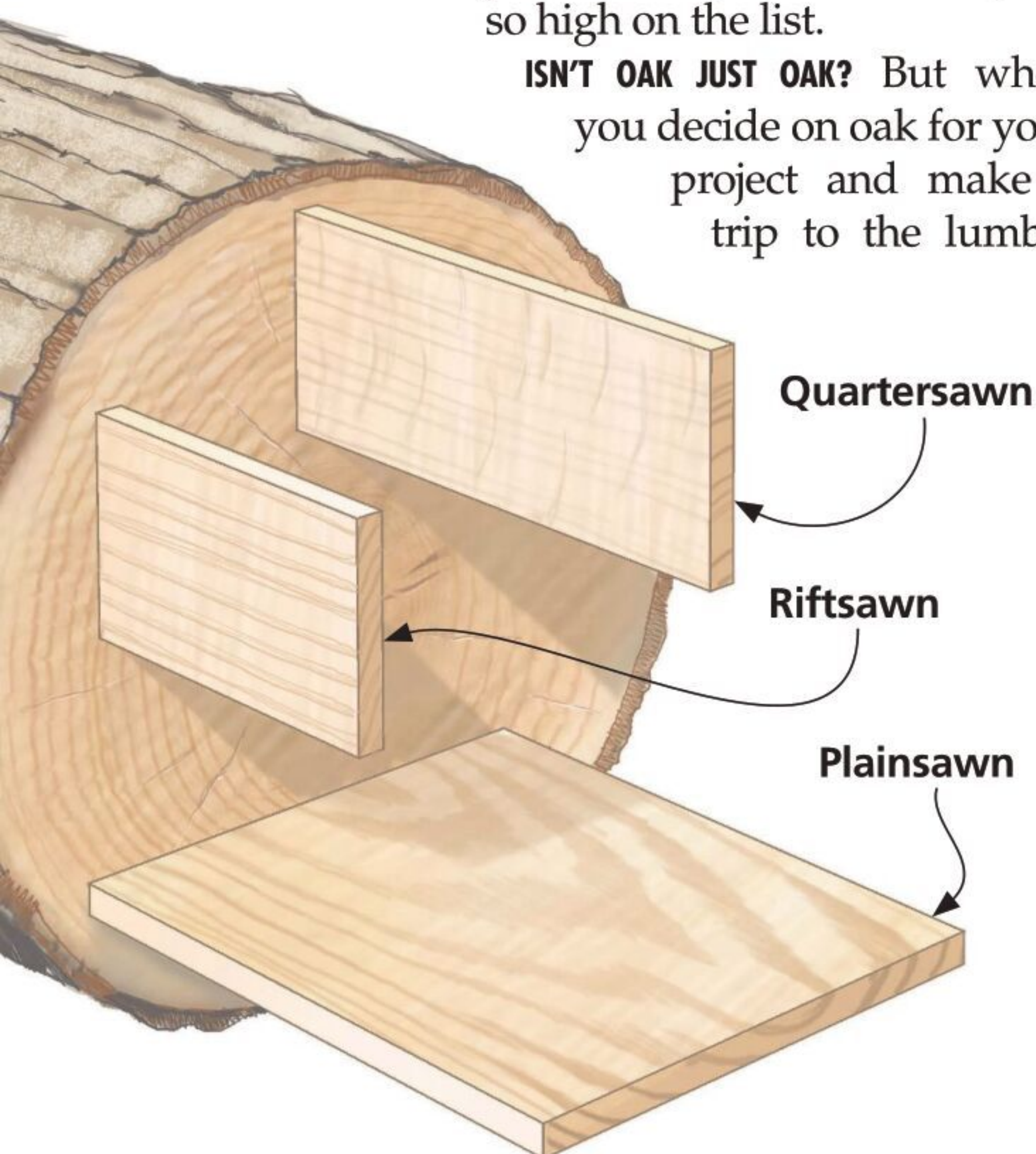
What can we help you make today?

ALL
About

choosing & using Oak

The common thread between the classic Hadley chest and the stylish porch bench in this issue is that ubiquitous material they're both made of — oak. Oak has an unmistakable look. Its strong grain pattern always draws attention. And maybe most importantly for a woodworker, it's a friendly wood to work with, and you can be certain the project will last a lifetime. Top this with the fact that oak is readily available and moderately priced, and you can see why it's so high on the list.

ISN'T OAK JUST OAK? But when you decide on oak for your project and make a trip to the lumber



store to buy the stock, you discover the decision isn't always so simple. Right off the bat, you're confronted with choices about specific species of oak as well as the grain patterns available. So to make the right choice, it's very helpful to have a good working knowledge of the different types of oak.

TWO MAIN TYPES. The many species of oaks are generally divided into two groups — the red oaks and the white oaks. And out of these two groups come the two species that are widely marketed for lumber — Northern Red Oak and Eastern White Oak. True, you'll find other species of oak being used for lumber but not nearly on a level with these two big guns of the oak world.

RED VS. WHITE. Since the appearance of the wood in a project is always a major factor, the differences here are a good place to start. Then I'll get into a few other distinctions that can affect which wood to choose.

When it comes down to it, even experienced woodworkers sometimes have a hard time telling red oak from white oak without a real close look. Both are open-grained woods with fairly large pores. And the pores are concentrated in distinct growth rings. The "ring porous" nature of oak is a major contributor to its appearance.

But take a look at the photos on page 14 and you'll see some of the subtle differences. The pores of red oak are a little larger and more densely bunched, so the grain pattern is a bit stronger. And the smaller pores of white oak make the surface seem a little smoother.

Red oak and white oak also differ a bit in color. But every authority has a different description. To me, red oak has a more consistent tan color from one board to another, and across a single board. White oak is usually slightly darker and is often much more variable from board to board. This difference can be

an important point when choosing which oak to use for a project.

FIGURE. Whether you're talking about red or white oak, one of the things that affects the appearance of a board is the way it's cut from the log. Oak can often be purchased in three different cuts or figures — plain or flatsawn, quartersawn, and riftsawn. The figure difference relates to how the surface of the board is oriented to the growth rings of the tree. The drawing on the opposite page and the photos below illustrate this.

PLAINSAWN. As the name implies, plainsawn boards are cut from the log with no special consideration to grain pattern. The annual rings usually form concentric arcs on the end of the board and the surface grain has a typical cathedral pattern. This is the easiest and most efficient way to cut boards from a log. And this is the type of red oak and white

oak you'll most commonly find at the lumberyard.

QUARTERSAWN. There's another way to cut oak that gives the boards a very unique figure. A quartersawn board is cut so that the annual rings are as close to perpendicular to the face as possible. When oak is quartersawn, the large, flat rays are exposed on the surface. These simply appear as dark, linear streaks on the surface of the plain sawn boards in the photos below. The result of this is the characteristic flake figure often found on Craftsman-style furniture.

The rays of white oak are longer, so white oak usually has a more pronounced quartersawn figure than red oak. For this reason, quartersawn white oak is more sought after and commonly available than quartersawn red oak. But when a slightly more subtle quartersawn figure would look better, red oak can be a good choice.

RIFTSAWN. Riftsawn oak falls in between quartersawn and plainsawn oak. This milling technique takes advantage of the porous nature of oak rings to create lumber with a linear figure. Here the boards are cut so that the annual rings are 30° to 60° to the face. This avoids the flake look of quartersawn oak while emphasizing the almost striped look created by the pores.

On a project, riftsawn oak gives you a very uniform look and makes matching boards much easier. If a strong riftsawn look is what you're after, the larger pores of red oak give it the nod.

While the look of the oak you choose is important, cost can be an issue as well. Quartersawn is going to hit your lumber budget the hardest. Followed by riftsawn then plainsawn. But depending on the size of the project this might not be a deal breaker.

▲ The three "cuts" of oak can be very different in appearance and cost.



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LOOKS AREN'T EVERYTHING. Besides appearance, there are a few other characteristics that can affect your choice. Both oaks own a well-deserved reputation for being hard and heavy when compared to other commonly used woods. White oak can claim top prize in this category. It's about 10% heavier than red oak and consequently a bit denser and harder. Just another point to keep in mind.

As any woodworker can tell you, different woods have their own working characteristics. The two oaks are no exception. I don't think you'll notice too much difference

between red and white oak when working with power tools. Both can be cut, jointed, planed, and routed easily.

But when it comes to hand work, you'll notice a bit of a difference. The hardness and density of white oak can make operations like hand planing or paring with a chisel a challenge. So if your project involves hand work, red oak may be the wiser choice.

AN OUTDOOR PROJECT. Finally, I should mention one other distinction. If you're building an outdoor project that will be exposed to the weather, your best choice is usually white oak. White oak is essentially waterproof (it's the oak used to make barrels) and is fairly decay resistant. Red oak doesn't have these properties and won't hold up to the elements nearly as well.

PLYWOOD TO MATCH? What about mixing solid wood and plywood in a project? Due to availability, this can sometimes be a sticking point. Plainsawn or rotary cut red oak plywood is easy to find while white oak plywood is becoming more common. And both types are sometimes available with a quartersawn or riftsawn figure, but you might have to do some serious searching or put in a special order with your lumber supplier. Patience, in this case, will pay off in the end.

I guess the really good news here is that building with oak gives you lots of options and it's hard to go wrong. Whichever oak you choose, in the end, your project will look great. **W**



▲ **White Oak.** You'll often find a slightly darker color and denser texture in a white oak board.



▲ **Red Oak.** The larger pores and lighter color give red oak a slightly stronger grain pattern.



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Green Wood Tool Essentials

▼ An axe is used to cut a blank to size, then to rough shape. The knives refine the shape, while a spokeshave gives the piece a uniform surface.



The first woodworking I ever did was carving up sticks with a pocket knife. I've had a soft spot for green wood ever since, and I enjoy working with basic hand tools like axes and knives. Here, I'll go through a common green wood carving project, a spoon, and some tools and techniques for working with green wood.

First of course, you'll want a sharp axe. A hatchet or a small forest axe is a good choice. You'll also need tools for the final carving. I use a hook knife to work the curves and a straight knife for the longer lines, as well as a spokeshave for some smoothing.

Lastly, you'll need a space to do the carving on. I prefer a tall, thick hunk of wood for the job. Whatever you choose to go with, make sure it's stable and heavy enough to stay put while you work.

SPLITTING. Now that you're set up, you'll first need to split the blank to the right size. Start by looking for any natural splits in the wood. If your blank has a knot, begin the split so that the knot will be on the lower half.

Use a mallet to bite the axe into the end grain, then use consecutive blows to wedge it apart. Use the same method to split the piece to width and thickness, until you have your blank.

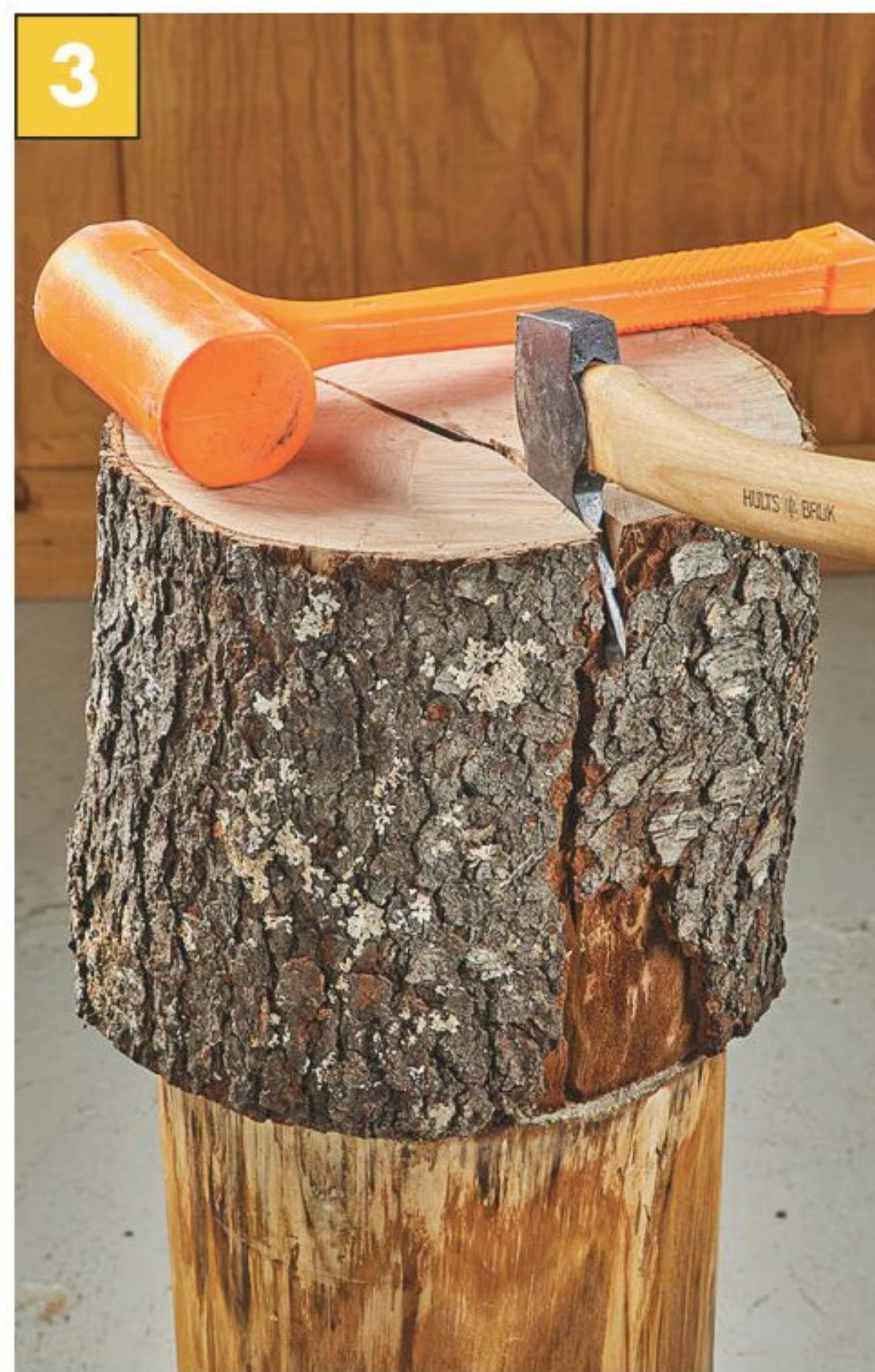
ROUGHING OUT A WORKPIECE WITH AN AXE



Biting In. Use a mallet to get your split started. A natural split will make your work easier and cleaner.



Wedging. To wedge the wood apart, work with the split that shows up, following it with your axe if necessary.



Get the Split. Most blanks will split in a few blows, but more tenacious pieces will take steady, even strikes to split.



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REFINING SHAPES WITH AN AXE



Straight Cuts. The axe bevel will follow the grain of the wood, letting you take off long, straight strips.



Cross-Grain Cuts. Choke up on the axe for greater control, cutting with both stop cuts and larger swings.



Hollow Cuts. To hollow a concave area, notch across the grain and use the axe point to remove the waste.

For more refined work, begin by drawing the spoon's shape. I start with heavy cuts to remove most of the waste, using the grain to help me split. The axe will want to follow the grain, making this a good way to take off large chunks.

When it comes to cutting across the grain, such as on the neck and bowl of the spoon, a

different approach is required. Simply following the grain here could easily split into the bowl. Making stop cuts allows me to cut in a targeted manner, and choking up on the axe gives the most control. Keep your cuts small and precise, taking off the chunks you've weakened with the stop cuts and making more stop cuts as needed.

There are three tools I use to finish up my carving: a hook knife, a straight knife, and a spokeshave. Using the hook knife, I gouged out the bowl with cuts across the grain. A straight knife is useful for rounding over edges and taking down any high spots. Finally, a spokeshave can be used to achieve a uniform look across the piece. **W**

FINAL SHAPING WITH KNIVES & SPOKESHAVE



Curves. Use the hook knife to work the curves of your piece. For me, it's essential on the bowl and neck.



Straighten. To flatten high spots and create even lines, use a straight knife. It's just like peeling potatoes.



Smooth. A spokeshave helps to smooth the piece, reaching a uniform finish across the outside.



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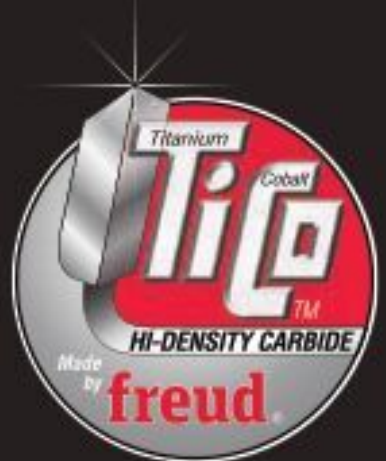
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▲ While a template determines the final profile of the inside of this bowl, most of the waste is removed by making freehand passes across the opening. Working against the bit's rotation ensures a smooth result.

Every summer, I make a couple visits to the Iowa State Fair. One of my favorite parts of the fair is admiring old tractors that have been restored by 4-H and FFA kids.

What does this have to do with woodworking? Those tractors remind me of routers. The *Farmalls*, *Massey Fergusons*, and *Minneapolis-Molines* are versatile power sources for all sorts of farm jobs and accept an equally diverse range of accessories and add-ons suited to specific tasks. Sound familiar?

Fundamental to success with both is control. Fences, jigs, bearings, and guide bushings increase your level of control (as well as accuracy and safety) with a router. However, there are times when you need to operate the router freehand, clear of these guides. Two projects in this issue highlight this concept: the watering can (shown above) and the carved panels on the Hadley chest.

This technique is more common than you may realize. Take the watering vessel as an example. Off the bat, you'd think the project highlighted



▲ On large routed profiles, you can use freehand passes to work your way to the final cut without needing to adjust the bit depth.



▲ Trace the hinge template with a pattern bit then sweep across the waste material to clear away a mortise.



▲ Creating textured carved panels is another application of freehand routing techniques.

template routing. That's true, but much of the waste is cleared by moving the router away from the edge of the template. Other examples are shown on these pages.

There isn't a lot of instruction on freehand routing. So let's look at a few essentials.

BIT ROTATION. Many routing rules still apply when you go off road. One of those is routing against the rotation of the bit. The built-in resistance of the bit eating away the wood provides both feedback and control.

It's easy to get turned around when routing freehand. Routing the same direction as the bit rotation feels erratic.

The solution is to establish a pattern for how you will move the router. I like passing the router left to right with waste material behind the bit (as I'm looking at it). Like a typewriter, return the router to the left without contacting the waste.

TAKE LIGHT PASSES. Almost like a woodworking mantra, murmur "take light passes" as you set up a router. There are two ways to accomplish this. The first is to set the cutting depth of the bit to remove a small amount of material with each sweep across the surface. The lighter the cut, the easier it is to control.

Your other option for a light pass is to set the router bit to its final depth. Then limit the cut by skimming the bit along the waste with each pass. Practically speaking, I aim to take cuts that engage less than half the bit's diameter. This offers a good balance between efficient stock removal and ease of control. This also prevents you from bogging down the router in a heavy cut.



▲ Taking freehand skim cuts along the overhanging edge (right side of image) clears away much of the waste. The final pass only needs to remove a small amount and ends up being much cleaner.

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- ▲ Raising the workpiece on an auxiliary surface not only helps you get a better view of the action, it makes the routing process more comfortable on your body.

BODY MECHANICS

The idea of routing freehand sounds a little nerve-wracking, admittedly. And when you're feeling anxious, the temptation is to take the router in an iron grip as you're about to get started. That will quickly wear you out and often hampers your ability to make clean cuts. So let's look at a few ways to make the process comfortable and successful.

WORK HEIGHT. One of the easiest ways to improve your routing is to raise the workpiece. Position it so you can see the action without having to constantly hunch over. The benchtop bench from *Woodsmith* No. 256 shown above is one option.



- ▲ It stands to reason that small router bits take smaller bites and are easier to control. These are the bits I turn to when freehand routing is on the menu.



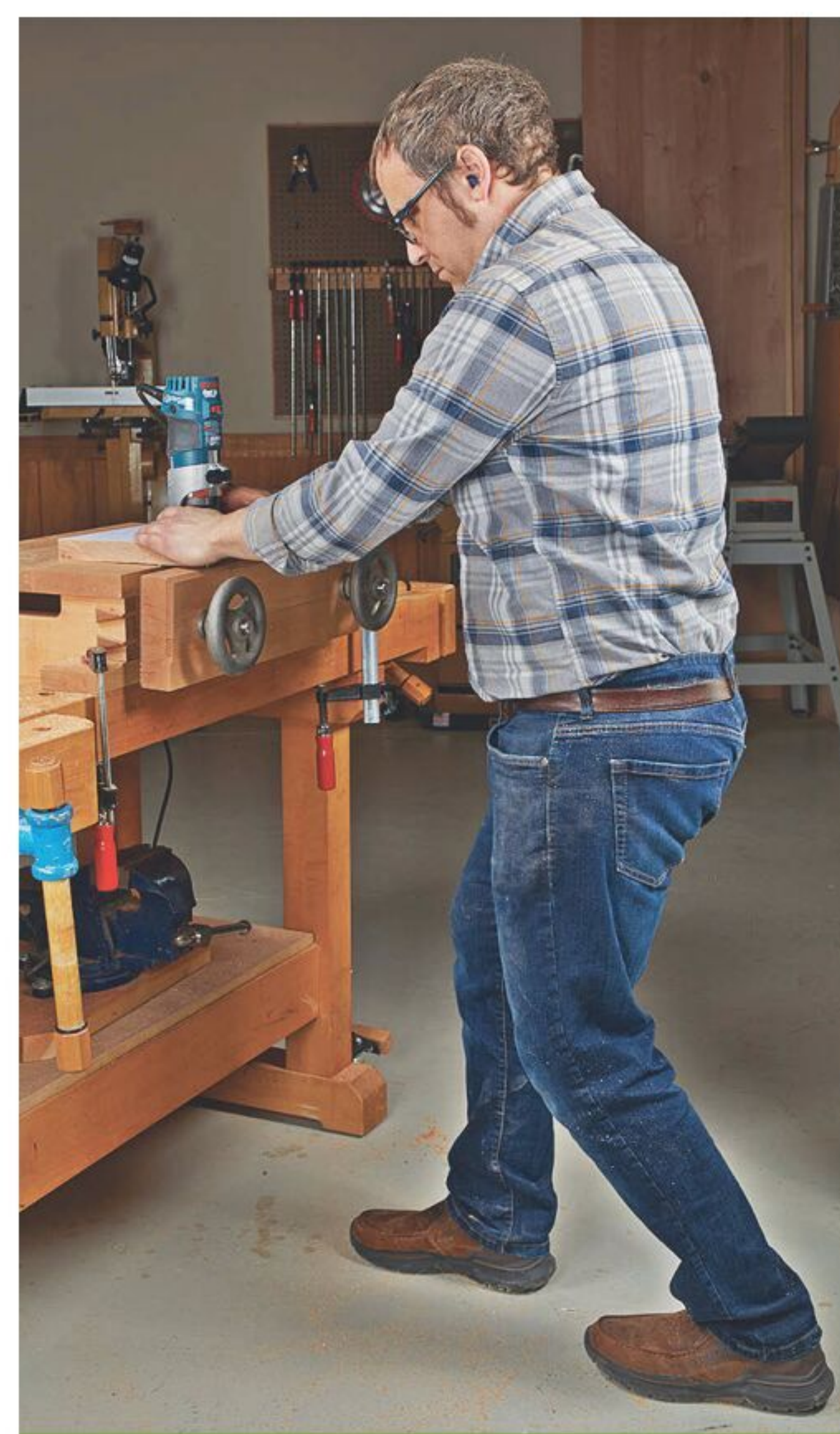
- ▲ A firm, but relaxed grip allows you to control the router with subtle movements of your fingertips and hands. Keep your hands in contact with the surface for better feedback.

Rather than raising the workpiece, another way to accomplish the same goal is to lower yourself in relation to the work. Pull up a chair or stool to your bench for a better view. Sitting also naturally relaxes you, reducing tension.

RELAXED GRIP. You want a solid grip on the router as you work freehand. But that doesn't mean a tight squeeze. Focus on keeping your hands relaxed. This allows you to feel how the bit is cutting.

Speaking of feedback, I like to hold the router so that my hands are also in contact with the workpiece or benchtop, as shown in the upper right photo. This grip stabilizes the router and gives me a greater sense of control for fine, detailed work.

READY POSITION. My Little League coach emphasized standing in a ready position while out in the field. The same holds in routing. The photo at right shows how this can look. My ready position consists of having one leg in front of the other. I'm balanced and relaxed. A knees-bent posture takes the pressure off my back. And loose shoulders and



- ▲ A balanced stance with knees and shoulders loose, engages your whole body in the routing process.

arms minimize tension, allowing me to easily control the router with my hands.

All this focus on body mechanics may seem a little strange. But woodworking is a highly physical activity. And ignoring how our bodies play a role reduces our ability to get the results we're after, and it opens us up to pain and injury. **W**



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Blade & Bit Care



▲ This is a totally self-contained blade and bit cleaning setup. It's an investment that makes cleaning your cutting tools a breeze.

Taking care of my saw blades and router bits is one of those chores that I usually ignore until I smell that toasty odor of neglect — burnt wood. Then my shame kicks in and I drag out the cutoff five gallon bucket and work away at cleaning my sad saw blade.

Well, what looks like a carry-all picnic cooler from the 1970s has changed all that. The *Bladeclean* blade and bit cleaning system from *Microjig* is one of those woodworking accessories that will quietly earn its keep in any wood shop.

This system keeps all of the mess that's associated with the chore of cleaning your saw blades

and router bits contained in one place. And when you're done, it can be stowed away with the cleaning solution that you mixed still inside the secure chambers.

As you see in the photo to the left, the lid has molded place-holders for all the tools you need to use during a routine cleaning.

The next page shows the system in action. You can let the blades and bits soak for a while. But it's surprising how fast my saw blades cleaned up with a few turns in the blade basin.

The system would be an ideal gift for that shop rat who has everything. You can find this gem at Microjig.com. The site will also point you to purchasing outlets.

CLEANING BLADES & BITS



Do the Twist. The blade reservoir contains an abrasive pad that comes with the kit. Use the magnetic handle to lower the blade in the solution and gently rotate the blade.



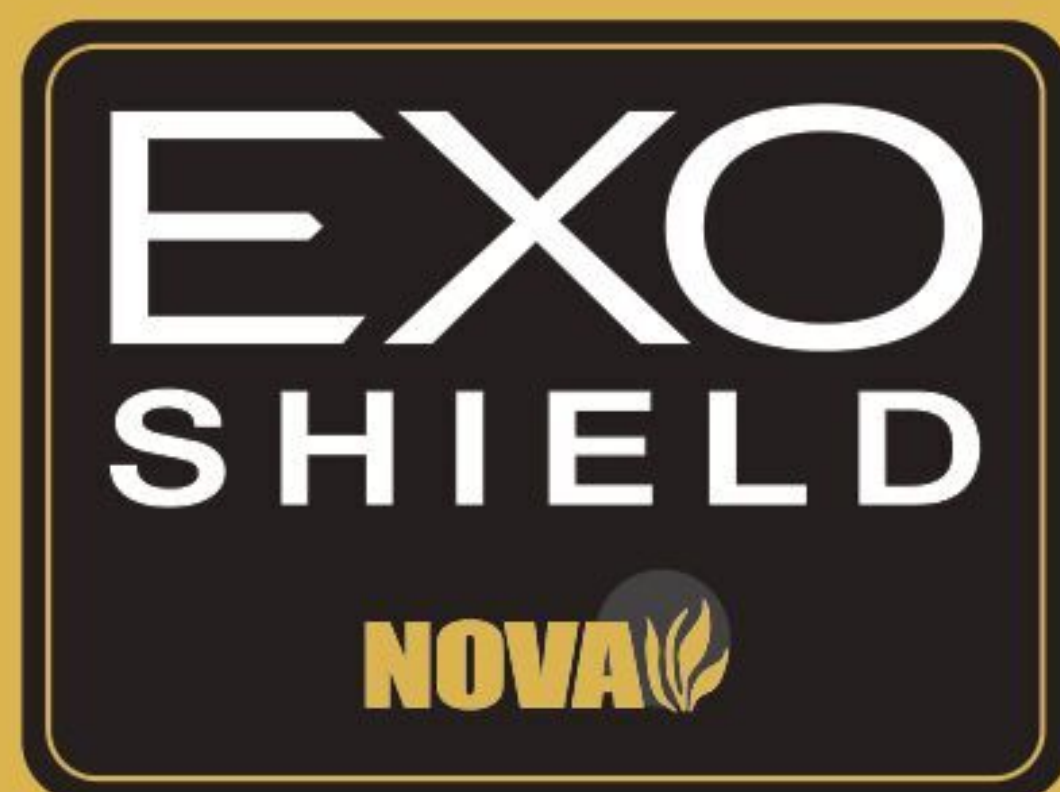
Cleaning Router Bits. Fill the smaller chamber with solution and insert dirty bits in the underside of the lid and soak.



Buff & Shine. After a good soaking, use the included brass brush and buffing wheels to banish any residue and bring a nice sparkle.

PREMIUM TUNG OIL WOOD STAIN

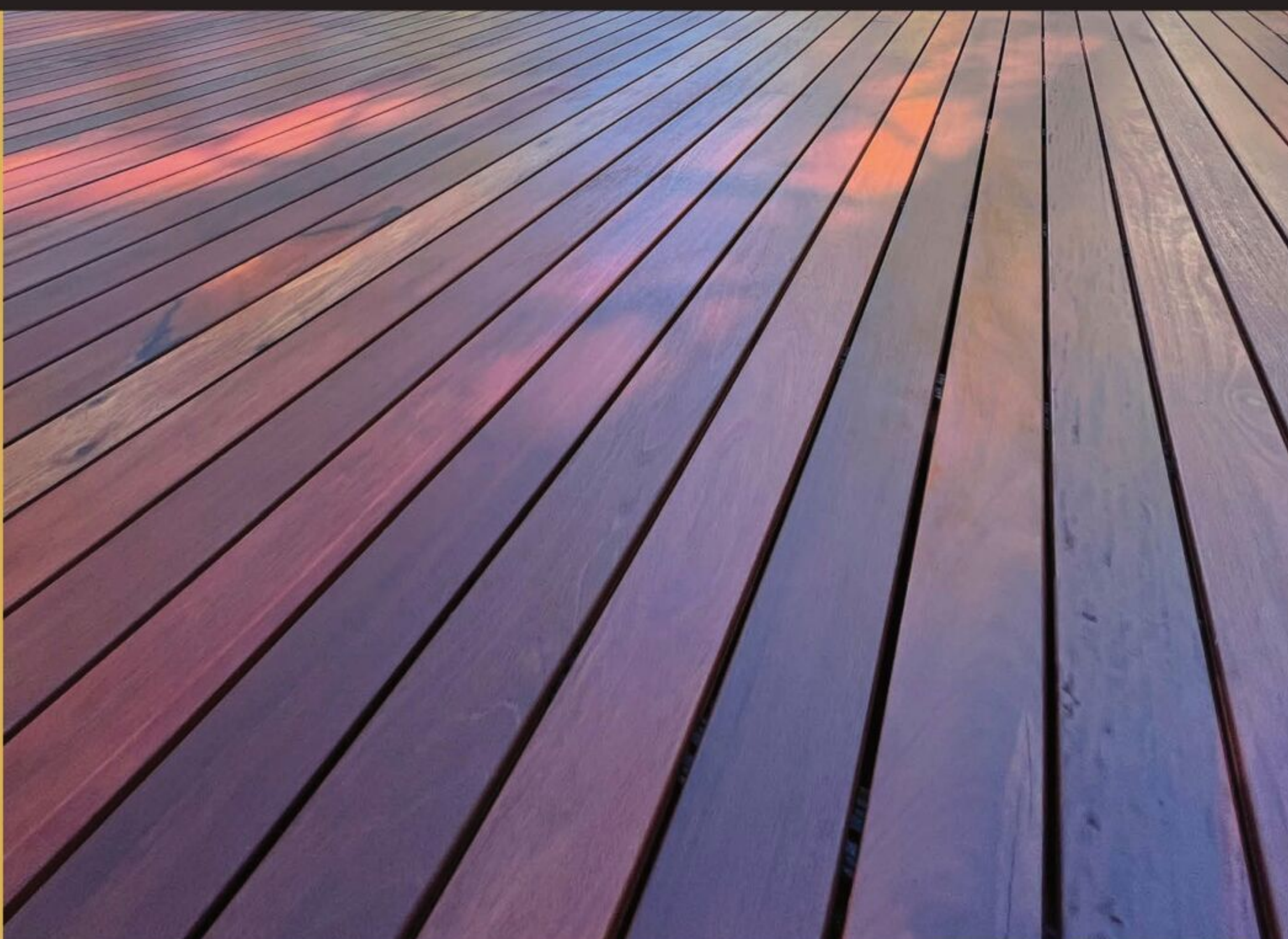
Exterior & Interior



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*Ipe hardwood deck finished with ExoShield Walnut.



- ▲ The six sizes of shims (0.003 to 0.020) let you mix and match them until you dial in on the exact combination that you need for your table saw.

BLADEMATCH ARBOR SHIMS

Most woodworkers face the dilemma of having one table saw and multiple blades for different tasks. The problem is that saw blades vary in thickness. This can be annoying because



it knocks your rip fence ruler out of kilter. But also dangerous if the blade is out of alignment with your riving knife.

Microjig has devised a way to address both of these problems. They provide you with detailed instructions and the set of shims you see in the photo above left packaged as *Bladematch Arbor Shims*. As you walk through the process, you'll arrive at the shim combination and alignment blocks for each one your blades. Making the rip fence ruler, and your riving knife play perfectly together every time.

Making sure your riving knife operates properly is an issue that shouldn't

be taken lightly. And if that's a problem you've had, this shimming and calibrating system could be your answer. *Bladematch Arbor Shims* can be purchased at Microjig.com, woodworking stores, and other online sources.

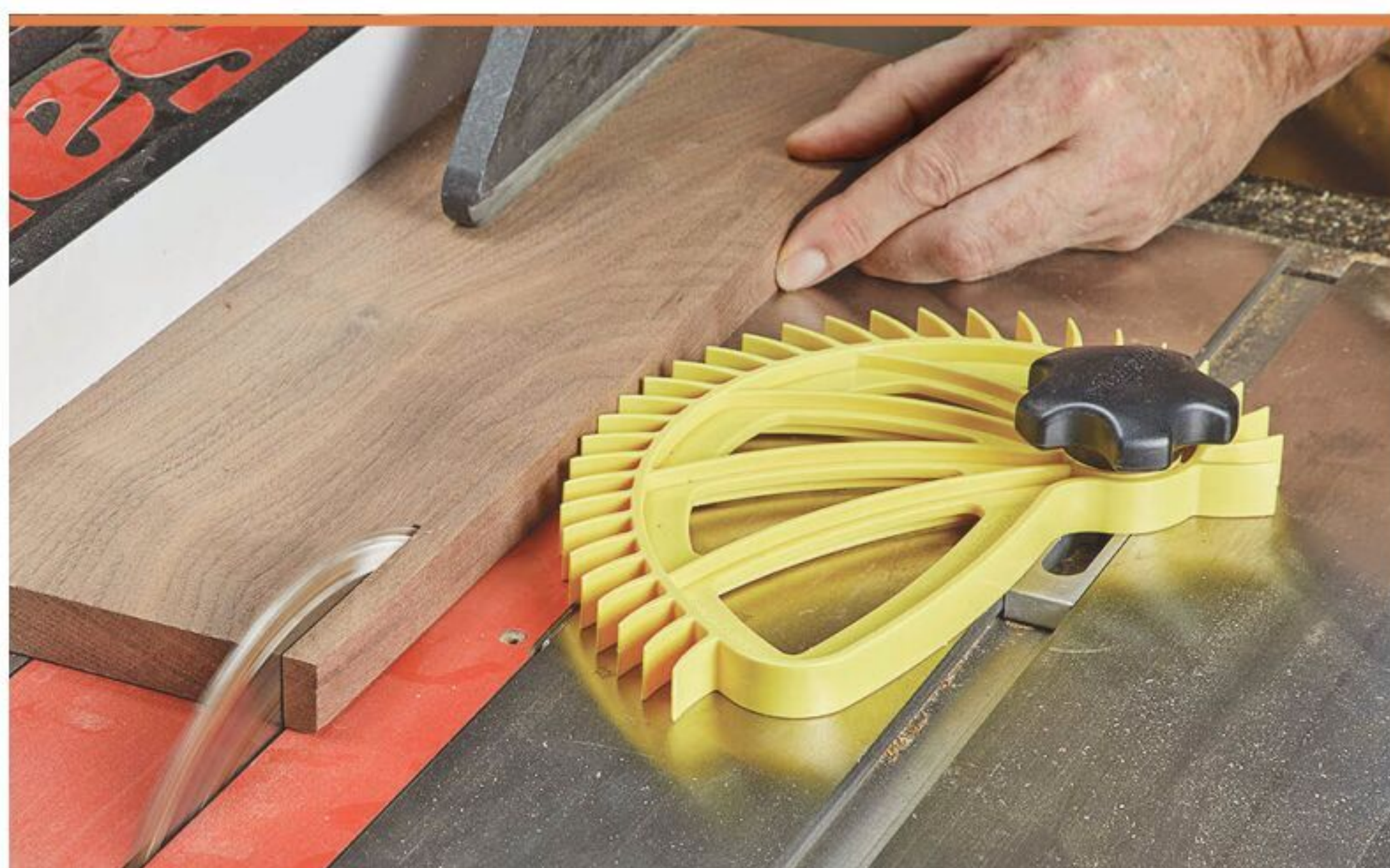
HEDGEHOG FEATHERBOARD

There are some tools that are almost Zen-like in their design and ease of use. The *Hedgehog* featherboard that's made by *Brex International* is one of those tools.

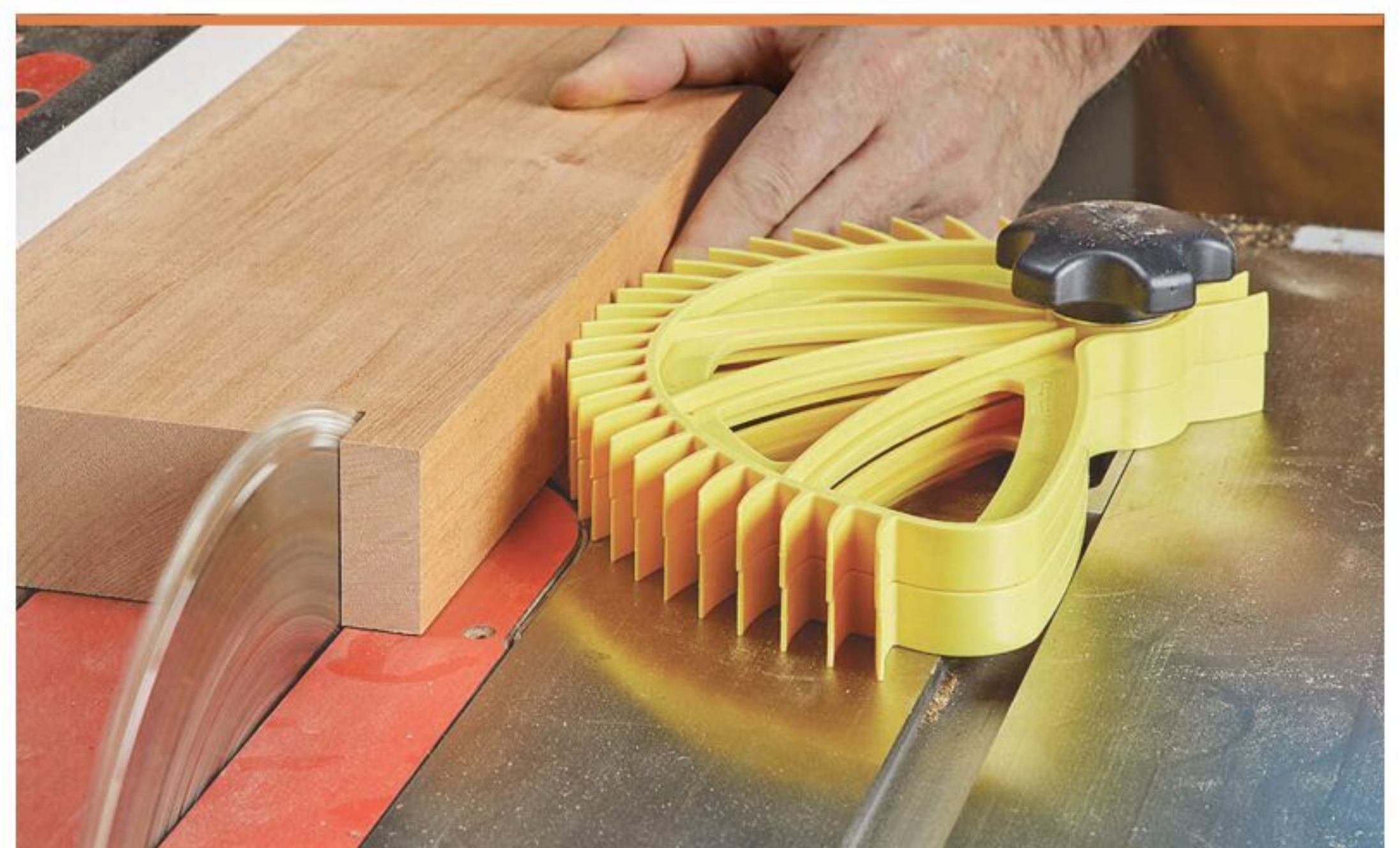
Historically, featherboards have been a clunky kind of setup that involve several knobs and a little fussing to get in place. Not this tool. This one is a lightweight product that has a large knob and aluminum miter



- ▲ The red stacking accessories and longer bolts lets you lock multiple featherboards together.



- ▲ Setting up the *Hedgehog* featherboard is easy. Just drop the miter clamp into the miter slot, press the featherboard against the workpiece, then turn the knob about 2" behind the blade.



- ▲ Stacking the *Hedgehog* gives you more control over thicker pieces of wood. This is always handy at the table saw. But this attribute of the *Hedgehog* really shines at the band saw also.

clamp. The photos below show how you can stack the featherboards for thick material. To be honest, in the past I've avoided featherboards because of the clunky attributes I mentioned earlier. But the *Hedgehog* has won me over. It's available online at their website *Featherboards.com* and other online woodworking suppliers, and *Amazon.com*.

BOSCH DRILL & DRIVER

Drill and driver kits are nothing new in the world of tools. Healthy competition for the world of woodworkers, DIYers, and light construction mean that manufacturers like *Bosch* keep improving their product, and that's a good thing for us.

The drill (PS31) is comfortable in my hand and easy to operate. I like the compactness of the drill and the smooth operation.

The driver (PS41) has the same qualities as the drill. I would've loved to have this duo 25 years ago when I was installing cabinets for a living. The kit is available online and at *Lowes* homecenters.

BOSCH DRIVEN. The *Bosch* bit case that you see in the photo below holds a line of driver bits that *Bosch* calls *Driven* bits. They're designed for impact drivers. I love them because the trays that hold the bits come out easily. They're available online and at homecenters such as *Lowes*. **W**



- ▲ The tiny but mighty 12-volt drill (PS31) and driver (PS41) from *Bosch* comes with Lithium-ion batteries, a charging stand, and a canvas case to carry it all in. Both tools have lights on the front and battery status lights on the side.



- ▲ The 24-piece set of *Driven* impact bits from *Bosch* is designed to take the beating that an impact driver is known to hand out. The case is plenty durable and the trays conveniently pop out.

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DESIGNER Project



▲ The painted and chamfered edges of the Baltic birch plywood form a fascinating color combination alongside the subdued face of the plywood and rich grain of the cherry hardwood and veneer.



Dashing Dresser

With Baltic birch, cherry, and an accent of blue, this dresser offers a handsome collection of colors that bring energy and life to a room.

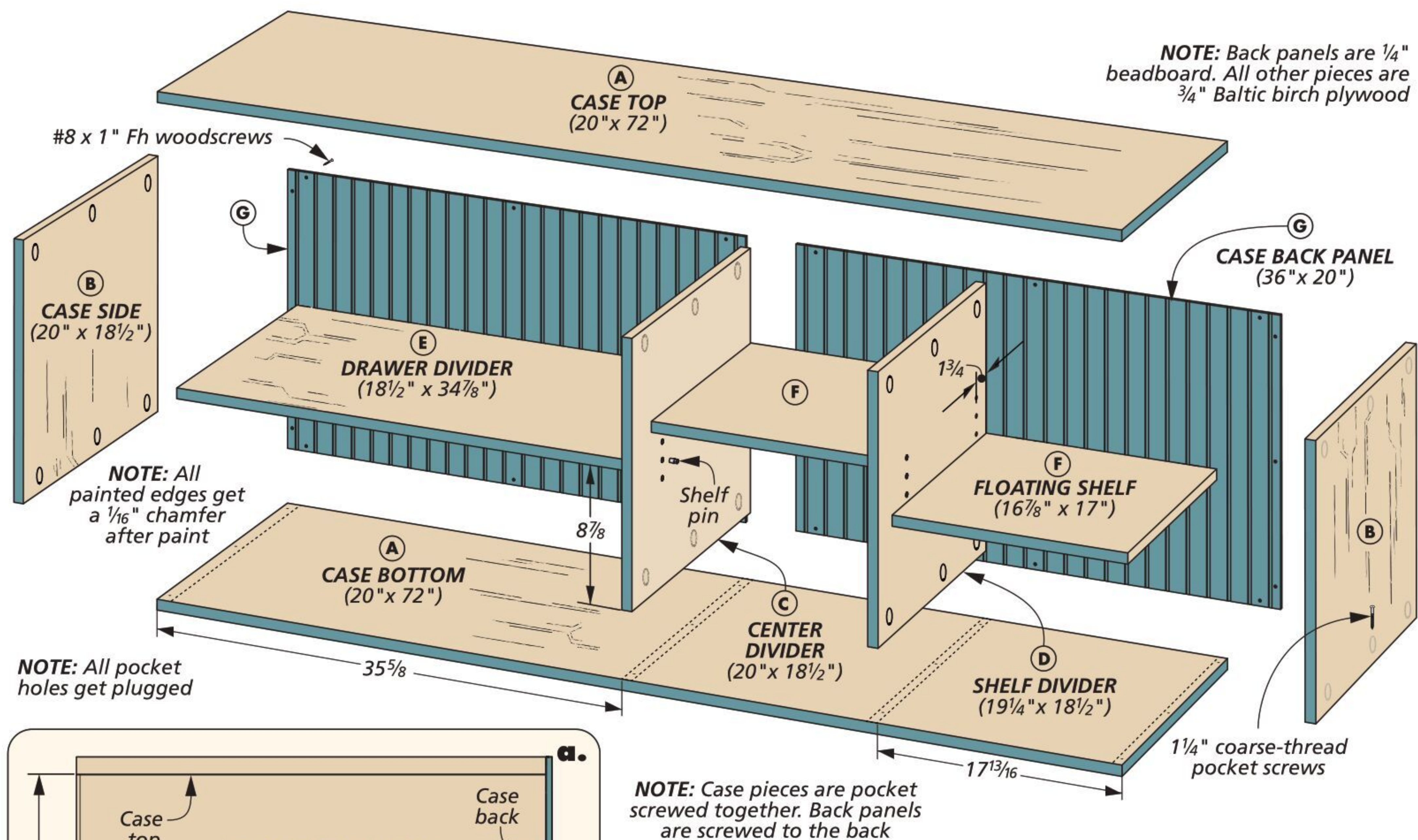
While plywood is certainly a useful building material, I can't say that I would call it beautiful, or that I often see it as the central feature of a project. And yet, this dresser defies my expectations. The painted and chamfered edges add some much desired color and texture, and they contrast wonderfully with the color and grain of the cherry. Although this dresser has a relatively simple design, it really is the contrasts within it that make it stand out the most—along with that vibrant blue of course.

As you can see in the photos, the colors juxtapose quite interestingly. The matte blue of the milk paint is the first thing to draw the eye, then the brilliant grain of the cherry. From the hardwood beneath to the veneer on the doors and drawers, the cherry grain complements the stark blue accents. Both are brought out even more by highlighting the clean, pale surface of the Baltic birch plywood.

The case itself is almost entirely plywood, featuring long, straight lines and crisp corners. On the other hand, those eye-catching, round handles are dished out and curved along the back for an easy hand grip. These shapes also stand in opposition to the broad planks of cherry hardwood that hold it all up. The planks cross at a lap joint at the center of the dresser, and they give a unique sense of depth to the piece as a whole. All in all, this piece proves that plywood certainly has style.

◀ The beadboard back panels, painted to match the Baltic birch edges, add another layer of color and texture to the interior.





Making a CASE

The biggest part of this dresser is actually the easiest to build, and the best thing to take care of first. The case is quite simple: plenty of Baltic birch held together by pocket screws with a beadboard backing screwed on as well.

Start by cutting all the plywood pieces of the case to size. This is best done all at the same time, as many of them share dimensions. The top and bottom are the same size, and the sides and vertical dividers are the same height. By cutting them all in a row, it'll be easier to keep the sizes identical. The case is all butt joints and pocket screws, so any deviation will show. Once all the plywood has been cut to size, cut the two back panels as well.

ADDING STYLE. Once all the case pieces are cut to size, you may find all that plywood is looking a tad bland. To zest it up a little, we chose to add a splash of color, as well as some chamfers for a bit of variety in shape.

First, the paint. The plywood pieces will have a coat of paint over each edge that won't be butted up against another piece, and the beadboard panels will be painted as well. We used *General Finishes' "Blue Moon" milk paint* to match the dresser's companion piece, the "Ageless Armoire," which was published in *Woodsmith* 255.

Before you get to painting though, you'll want to finely sand the edges of the plywood. Once they're smooth, clean the dust off and apply two coats of paint over the edges of each piece. Before putting the paint away, give another two coats to each of the back panels.

SAND & CHAMFER. Once the paint's dry, the case is nearly ready for assembly, but a couple things

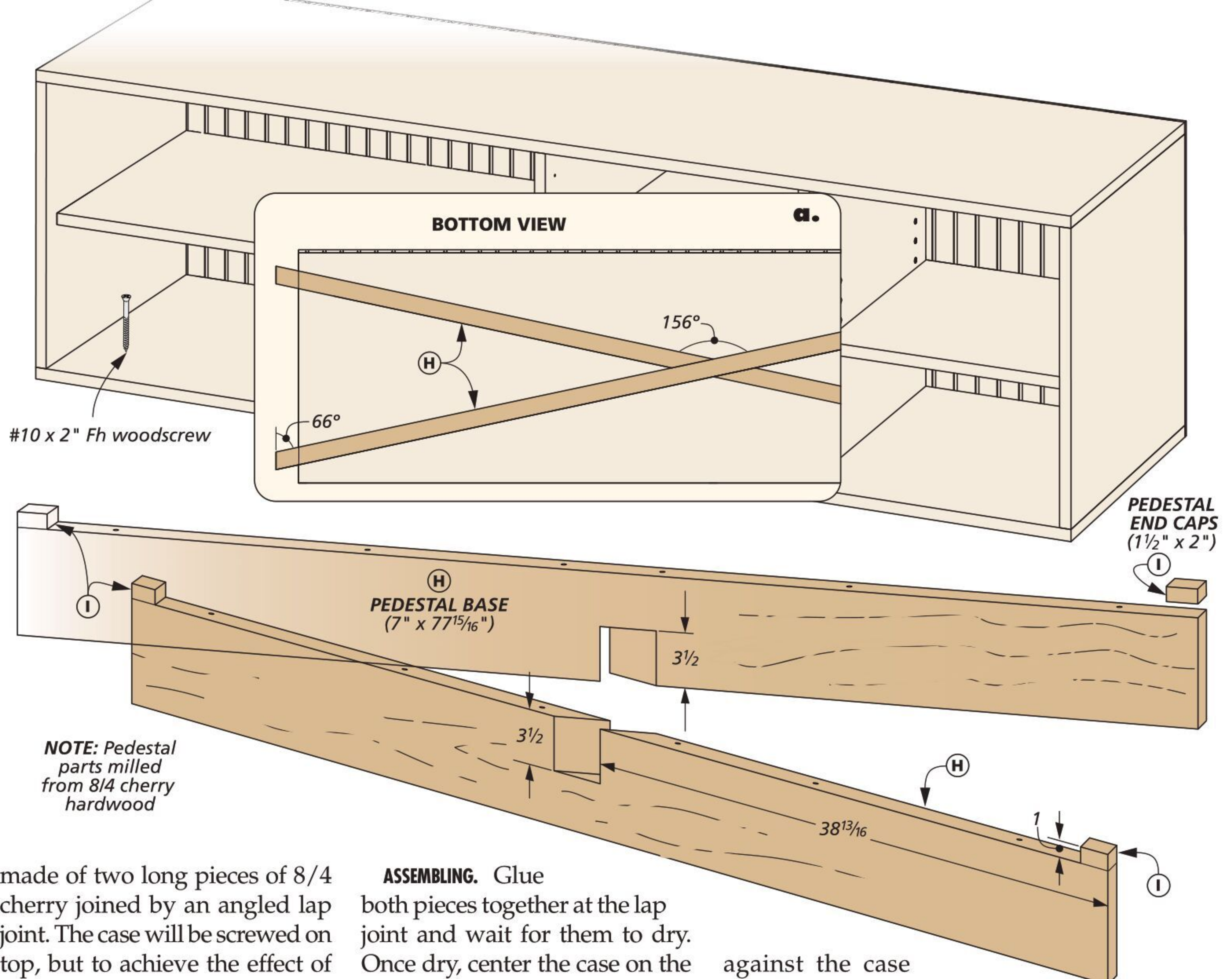
need taken care of first. Sand the top and bottom of each piece. Next, get out the router and a chamfer bit. Chamfer each painted edge. The chamfer softens the corners of the pieces while also ensuring a perfect paint line across each edge.

ASSEMBLE THE CASE. Pocket screws are used to attach the sides, as well as the center divider and shelf divider. The floating shelves are supported by shelf pins. Clamp the case together, then drill the pilot holes and sink in the pocket screws. Three screws go into the top and bottom of all vertical pieces.

The back panels are attached to the case by drilling counter-sunk holes and screwing them in place. Partially attaching the back panels to the top, bottom, and sides can be a help in keeping it all squared up.

UP ON A PEDESTAL

Now that the easy part is done, it's time to get into some more interesting work. The pedestal is



made of two long pieces of 8/4 cherry joined by an angled lap joint. The case will be screwed on top, but to achieve the effect of it sitting within the base pieces, the two bases are longer than the case, and two cherry end caps will be glued on top of the ends of each pedestal base. Start by cutting the top and bottom bases to size. Once they've been cut to size, miter the ends of each base at 66°.

LAP JOINT. The two base pieces interlock with a mitered lap joint that crosses at a 24° angle on each piece. We did this the old fashioned way: drawing the layout lines and getting out a hand saw, a mallet, and a chisel.

Start by laying out the miter angle with a bevel gauge on the top and bottom edge of the base pieces respectively. Mark out the thickness of the lap on either side, then use a hand saw to define the outer edges. Use a chisel to pare out the waste and define the horizontal faces of the lap joint.

ASSEMBLING. Glue both pieces together at the lap joint and wait for them to dry. Once dry, center the case on the pedestal and screw it in place.

Now to finish up the pedestal by making those end caps. Cut them to fit the ends of base pieces as close as you can. The closer you are, the less you'll have to sand. Glue them on top

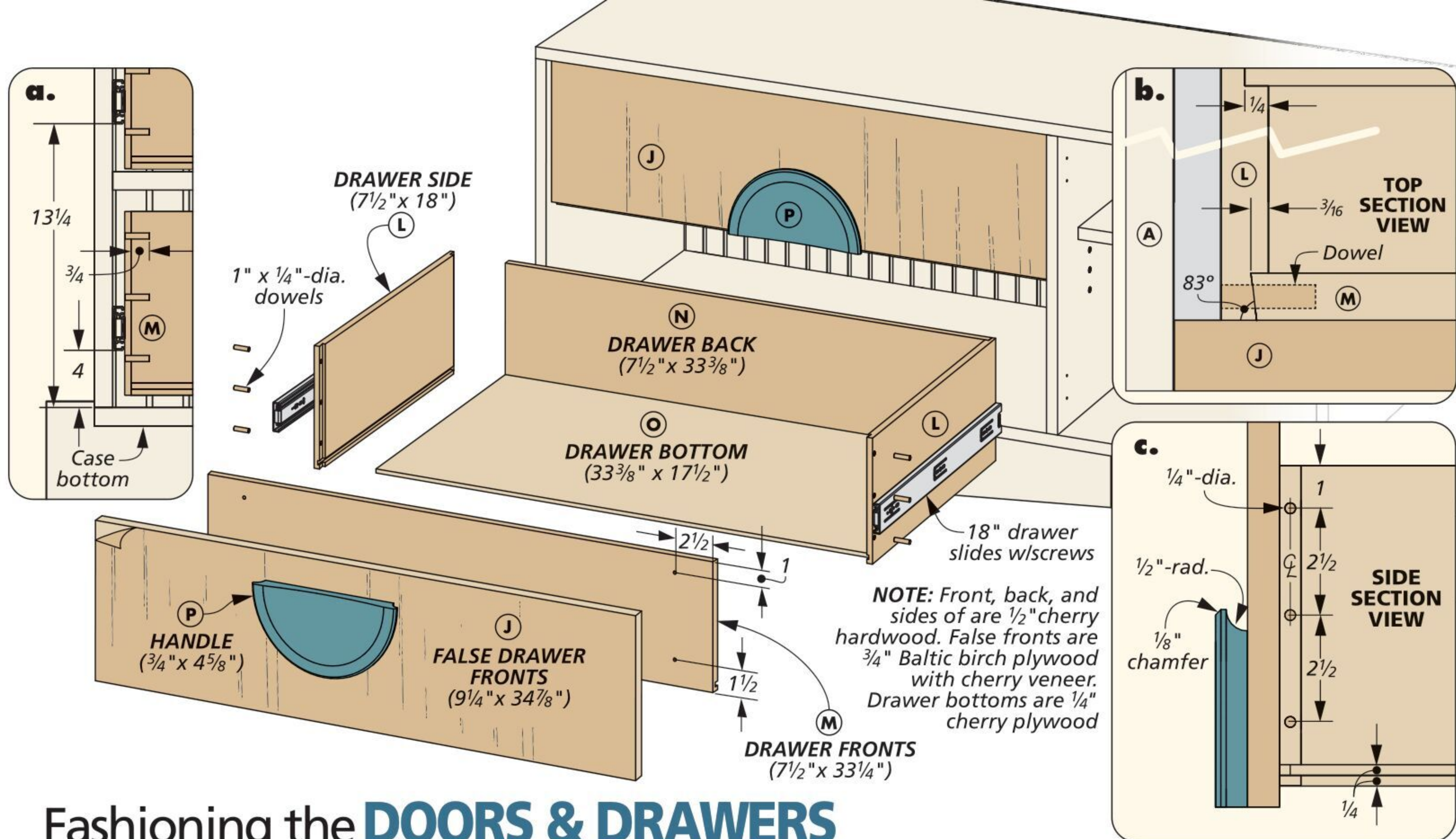
against the case sides, then clamp them tight. Once the glue has dried, sand the blocks flush to the pedestal ends. Thankfully, these pieces are thick enough that a random orbital sander will work here, instead of doing it all by hand.

CUTTING THE LAP JOINT



Lap by Hand.

Lay out the lines of the lap joint, then establish the edges with a hand saw. Remove the waste with a chisel. When approaching the layout lines, fit the pieces together as you pare them down to ensure a snug joint.



Fashioning the **DOORS & DRAWERS**



To find out
how to make
the jig for the
handles, go to:

Woodsmith.com/260

The last pieces of this puzzle are the doors and the drawers. The drawers are made from cherry hardwood with plywood bottoms. The drawer false fronts and the doors are Baltic birch, but they'll be covered with cherry veneer to match.

DRAWERS

We started building with the drawers themselves. The front, back, and sides of the drawers are cherry hardwood, while the

drawer bottoms are made from cherry plywood. The front pieces fit into the sides with angled rabbets (detail 'b') while the side pieces have a rabbet to accept the back, and the plywood bottom fits into a groove in each piece. Start by cutting the front end of the sides, using a dovetail bit on the router table. Then take the front pieces to the table saw, cutting them to match the sides.

Next, cut the rabbets along the back end of the sides, which will

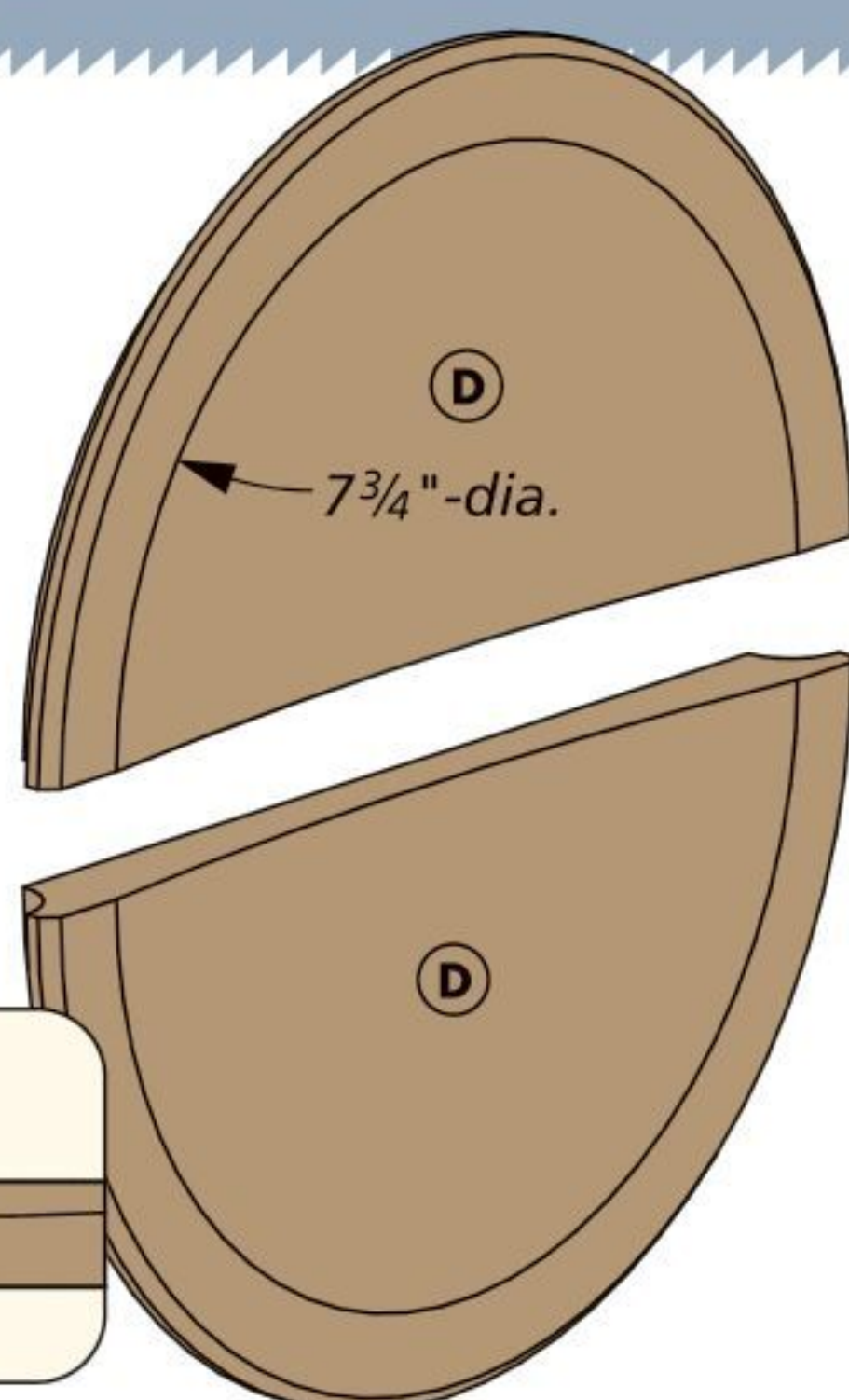
hold the drawer backs. Finally, cut a groove into the bottom of the side, front, and back pieces to accept the plywood bottoms.

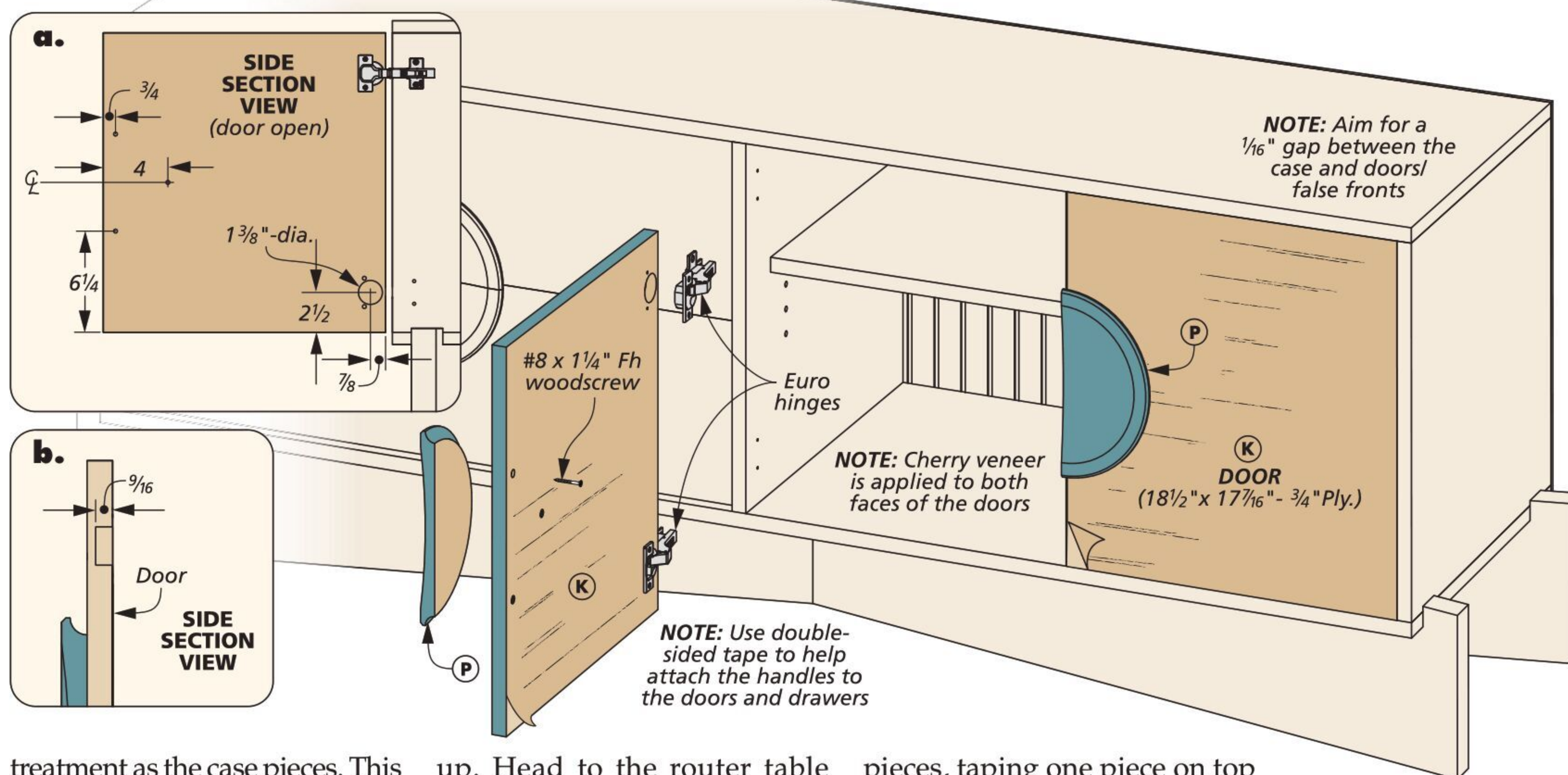
With the pieces ready, glue up the drawer. After the drawer is dry, install the dowels (detail 'b') and trim them flush.

Now come the false fronts. One the pieces are cut to size, apply the veneer to the front of the fronts. On these pieces, the veneer will run vertically. The false fronts will also get the same

DISHING OUT THE HANDLES

Scooping Jig. To achieve the unique contour of the handles, we used this jig. The router is moved along the rails, rotating the seat between passes for an even, concave shape.





treatment as the case pieces. This means sanding and painting the edges, then adding a chamfer.

DOORS. The doors are done in the same manner as the false fronts: veneer, sand, paint, and chamfer. Except here the grain will be running horizontally, and both the fronts and backs of the doors get veneered.

Now to attach the doors and drawers to the case. The drawers operate with full-extension slides and the doors are each hung on a pair of hinges. This is also a great time to screw the false fronts in place, as it's useful to fit the drawers and fronts into the case to ensure precise alignment.

HANDLES. To make the four handles, start with two pieces of Baltic birch. Each piece will be cut into two handles, so size them appropriately, accounting for the kerf. Once they're cut, your next step is to cut them into circles (which is their real "size"). We used a circle cutting jig, found at Woodsmith.com/260.

Once the handles are rounded up, it's time to dish out their centers. Here we used the jig you see in the box to the left, details for which can be found online.

With the handles mostly shaped, it's time to finish them

up. Head to the router table and chamfer the front of both workpieces. Then switch to a core box bit to create the pull on the back side.

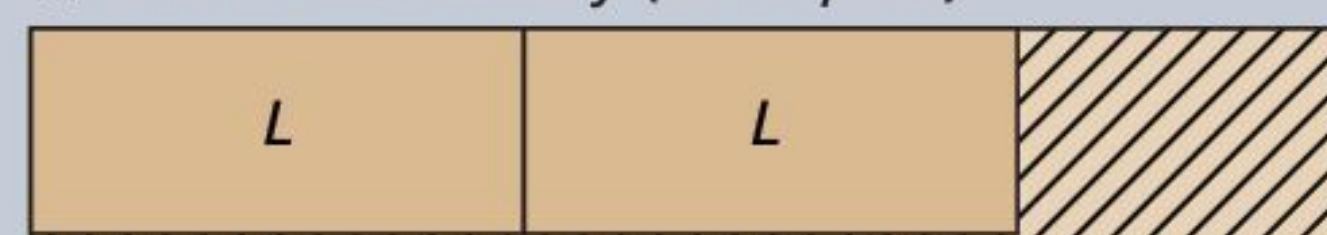
Finally, use a thin blade on the table saw to cut the pieces in half. We ripped two pieces of scrap to the same width as our

pieces, taping one piece on top of each scrap and setting the fence to rip the pieces in half (again, accounting for the kerf). Then sand and paint all four. Attach the handles using double-sided tape to position them, and be sure their edges are flush to the doors and false fronts. **W**

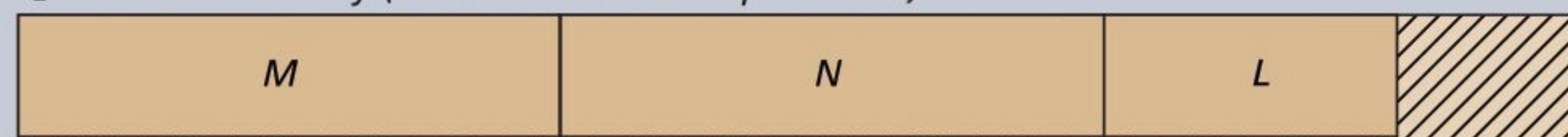
Materials, Supplies & Cutting Diagram

A Case Top/Bottom (2)	3/4 ply. - 72 x 20	M Drawer Fronts (2)	1/2 x 7 1/2 - 33 1/4
B Case Sides (2)	3/4 ply. - 20 x 18 1/2	N Drawer Backs (2)	1/2 x 7 1/2 - 33 3/8
C Case Divider (1)	3/4 ply. - 20 x 18 1/2	O Drawer Bottoms (2)	1/4 ply. - 33 3/8 x 17 1/2
D Shelf Divider (1)	3/4 ply. - 19 1/4 x 18 1/2	P Handles (4)	3/4 ply. - 4 5/8-radius
E Drawer Divider (1)	3/4 ply. - 34 7/8 x 18 1/2		• (18) #8 x 1" Fh Woodscrews
F Floating Shelves (2)	3/4 ply. - 17 x 16 7/8		• (12) #8 x 1 1/4" Fh Woodscrews
G Back Panels (2)	1/4 beadboard - 36 x 20		• (12) #10 x 2" Fh Woodscrews
H Pedestal Bases (2)	1 1/2 x 7 - 77 15/16		• (24) 1 1/4" coarse-thread pocket screws
I Pedestal Caps (4)	1 x 1 1/2 - 2		• (2) 18" drawer guides
J False Fronts (2)	3/4 ply. - 34 7/8 x 9 1/4		• (4) soft-close 110° Euro hinges
K Doors (2)	3/4 ply. - 18 1/2 x 17 7/16		• (32) 1/4" shelf pin sleeves
L Drawer Sides (4)	1/2 x 7 1/2 - 18		• (8) 1/4" shelf pin supports
			• (12) 1/4-dia. x 1" wooden pins

1/2" x 8" - 48" Cherry (2.7 Sq. Ft.)



1/2" x 8" - 96" Cherry (Two Boards @ 5.3 Sq. Ft. Each)



1 1/2" x 8" - 96" Cherry (Two Boards @ 7.8 Bd. Ft. Each)



ALSO NEEDED: One 4' x 8' sheet of cherry veneer. One 5' x 5' sheet of 1/4" cherry plywood. Two 4' x 8' sheets of 3/4" Baltic birch plywood



Mobile Air Filter

Time to send the box fan and furnace filter combo out to pasture. This shop-made version works better and is whisper-quiet.

Woodworking is messy. Nests of shavings pile up after a hand planing session and a blizzard of chips sprays from a router. At some point, the mess needs to get addressed.

The hardest of all to manage is the fine fog of dust that drifts around after sanding or working with MDF. It coats everything in my shop (and the rest of the garage) with a gritty haze. More troublesome is that this same dust can lead to breathing problems over time.

Collecting dust at the source is the best option, but no matter the

solution, fine dust still migrates throughout the shop. The solution to that is an air cleaner. This project makes a strong case for going your own way rather than buying a commercial air cleaner.

THE INNARDS. The guts of this setup are off-the-shelf components: a canister filter and a blower motor. The pleated filter is rated to eliminate 99% of dust particles down to 1 micron in size. The blower motor has six speeds, moves a lot of air (800 CFM), and is shockingly quiet at 39 dBA. Air is drawn through the filter and blown out the top.

A lot of air cleaners hang from the ceiling. But our version is fitted with casters, letting you park it wherever you need it.

DESIGN MATTERS. The design approach is somewhat skeletal. The motor and filter are connected by a series of plywood rings and joined with threaded rods and acorn nuts. Throw in a sheet metal shroud, and a metallic spray painted finish, and there's a resemblance to a space-travelling droid. This version is earth-bound but just as faithful, doing its job keeping the air in your shop clear.



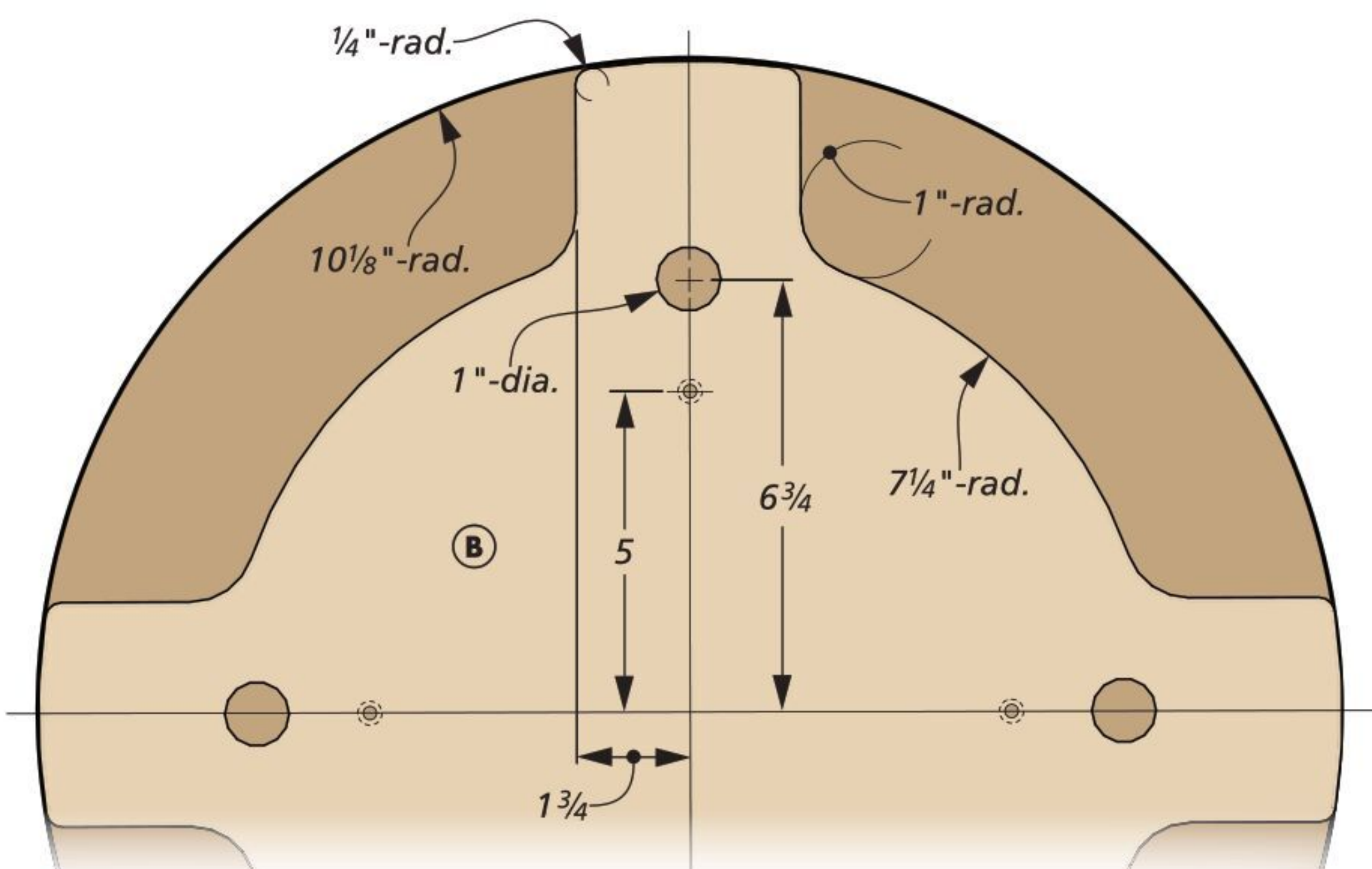
▲ The six-speed controller is mounted to the top for easy access. Hardware cloth caps the air cleaner to keep debris out.



▲ The canister filter is a compact 12¾" x 26" so the air cleaner doesn't take up much floor space in your shop.



▲ Smooth-rolling casters attach to a wide bottom ring for greater stability and mobility in a small space.



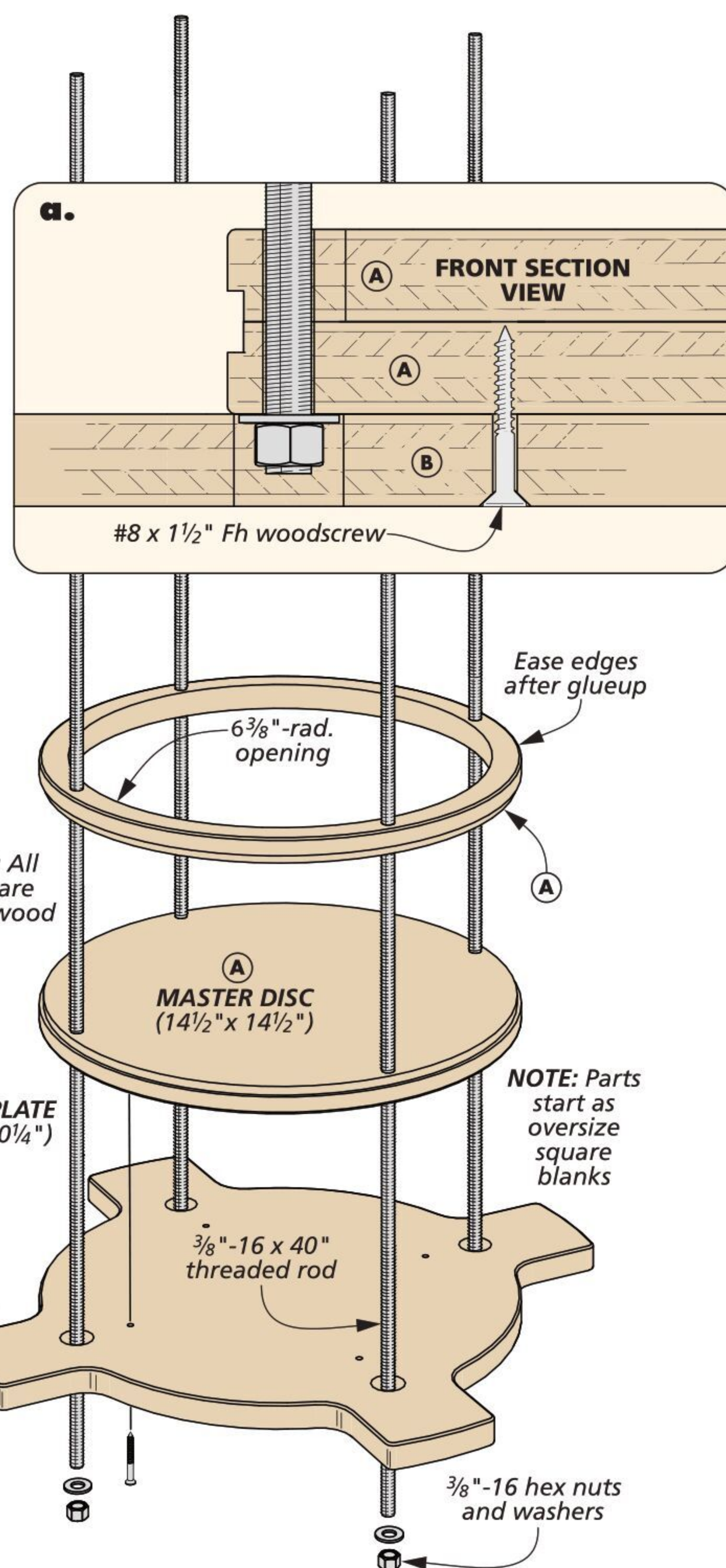
Routing plywood **DISCS**

Circles, lots of circles. All the parts you need for this air cleaner are some kind of circle. There are three sections: base, center, and top, made up of three discs each.

ROUTER TRAMMEL. I relied on an adjustable router trammel to make consistently sized discs and other details. If you don't have one already, check out my version at Woodsmith.com/260.

BOTTOM UP. The drawing at right shows the starting point: the base assembly. And while the parts end up round, I began cutting oversize square blanks for all the parts at the table saw.

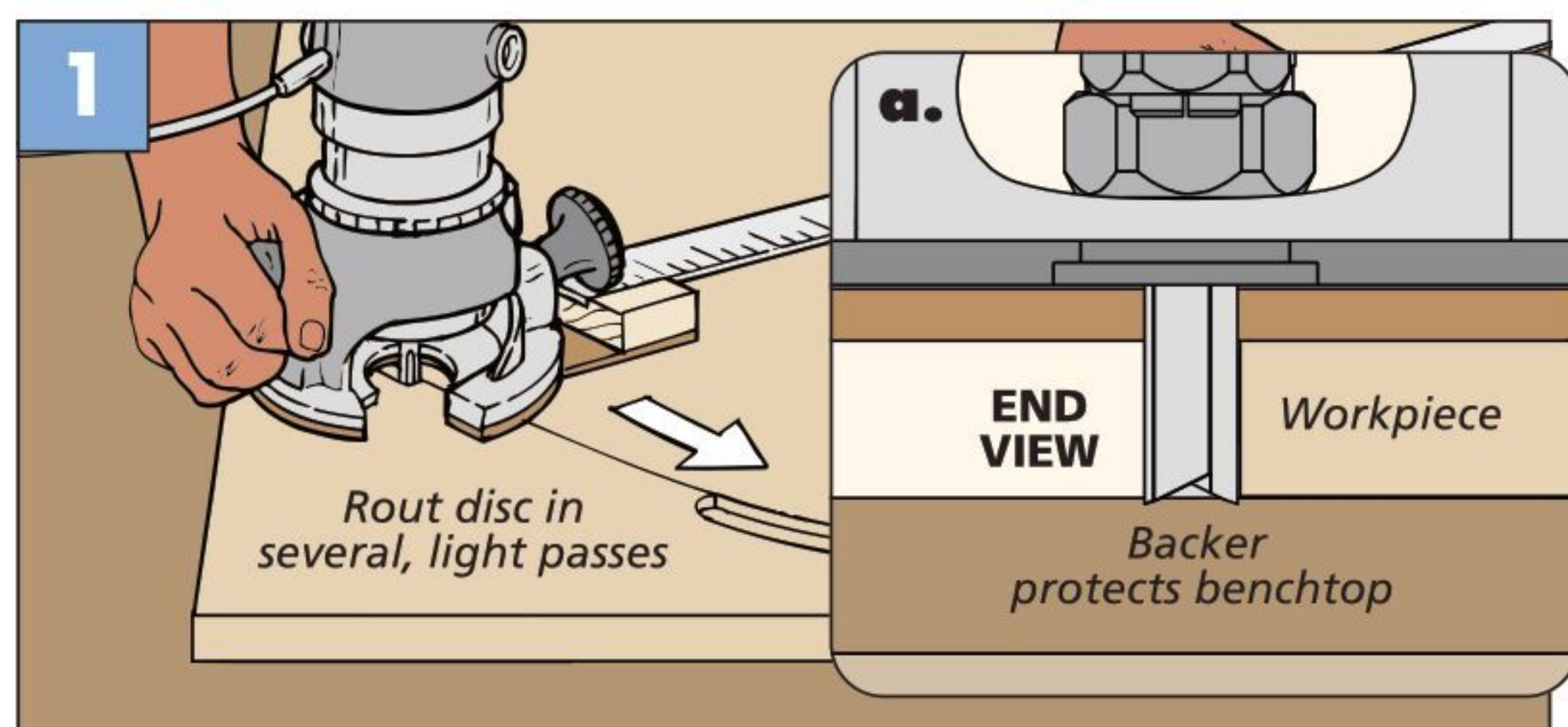
Seven of the parts have the same diameter. Logically, you would make those sequentially. But for the purposes of



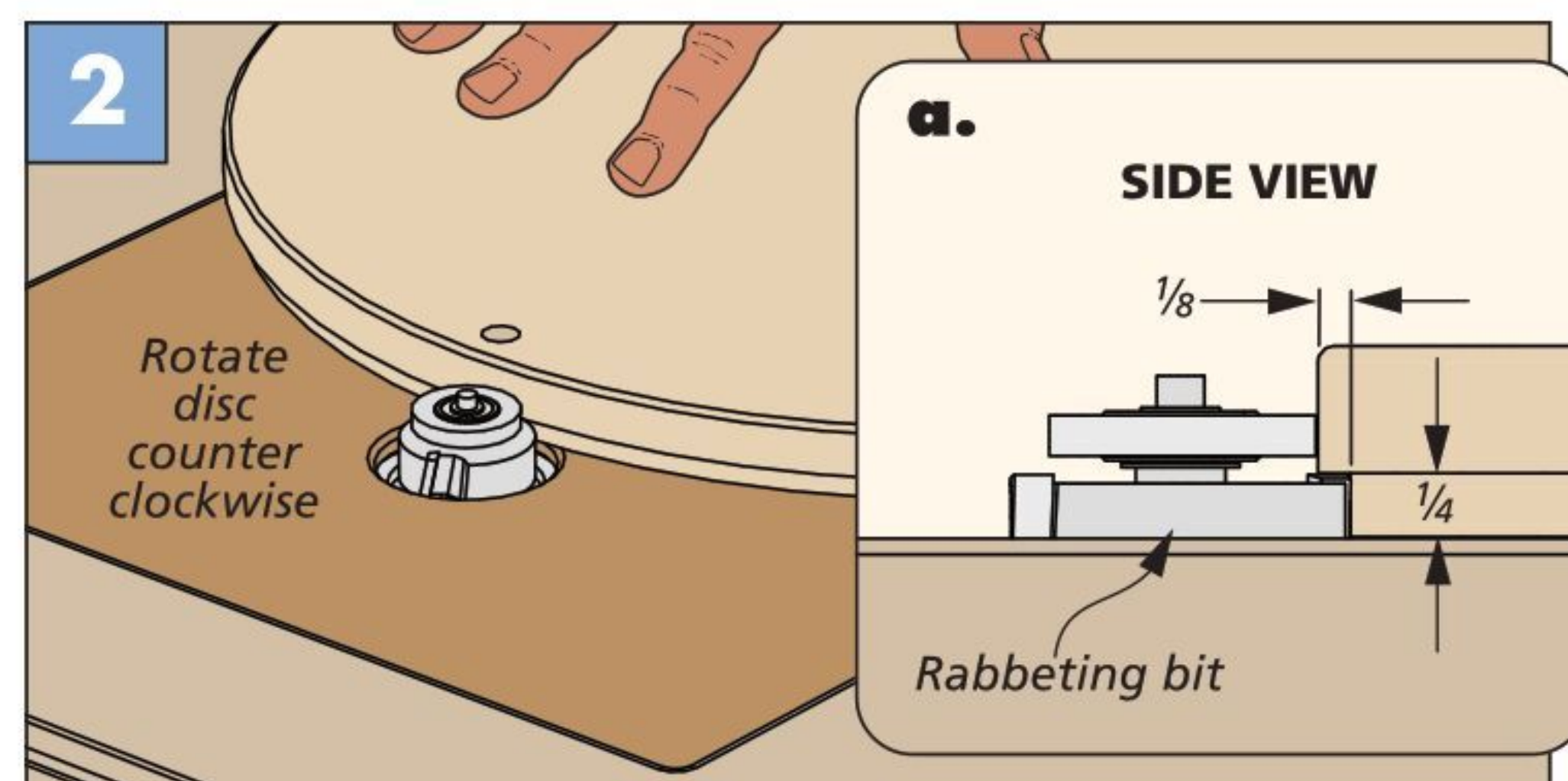
For plans and a video to build a router trammel, go to:

Woodsmith.com/260

ROUTER TRAMMEL & RABBETING



Adjustable Trammel. Attach the blanks to a backer board with double sided tape. Cut the outer perimeter first.



Rabbeting Bit. A shallow rabbet on the edge of the discs adds a subtle detail to the completed sections.

explanation and illustration, I'll work my way up.

The center of the lower assembly is the simplest, so I used that as a master template. Draw lines from corner to corner to find the center. (You'll do this step on all the blanks.) Use these lines to mark the location of the holes for the threaded rod.

Route the circle with the trammel after drilling the center pivot hole and the mounting holes. To protect my benchtop, I covered it with a sacrificial piece of MDF. The blanks can be secured with double-sided tape. Complete the piece with a decorative rabbet on the upper edge.

REPEAT. With this same trammel setting, I recommend routing out the other six rings before going any further. Also, use the master disc to drill holes for the threaded rods. Label the blanks and set them aside.

The next piece to grab from the stack is the canister ring. It has a cutout sized to house the filter and a rabbet on the lower edge. (A word to the wise: there's a nearly identical ring in the middle assembly. So ...)

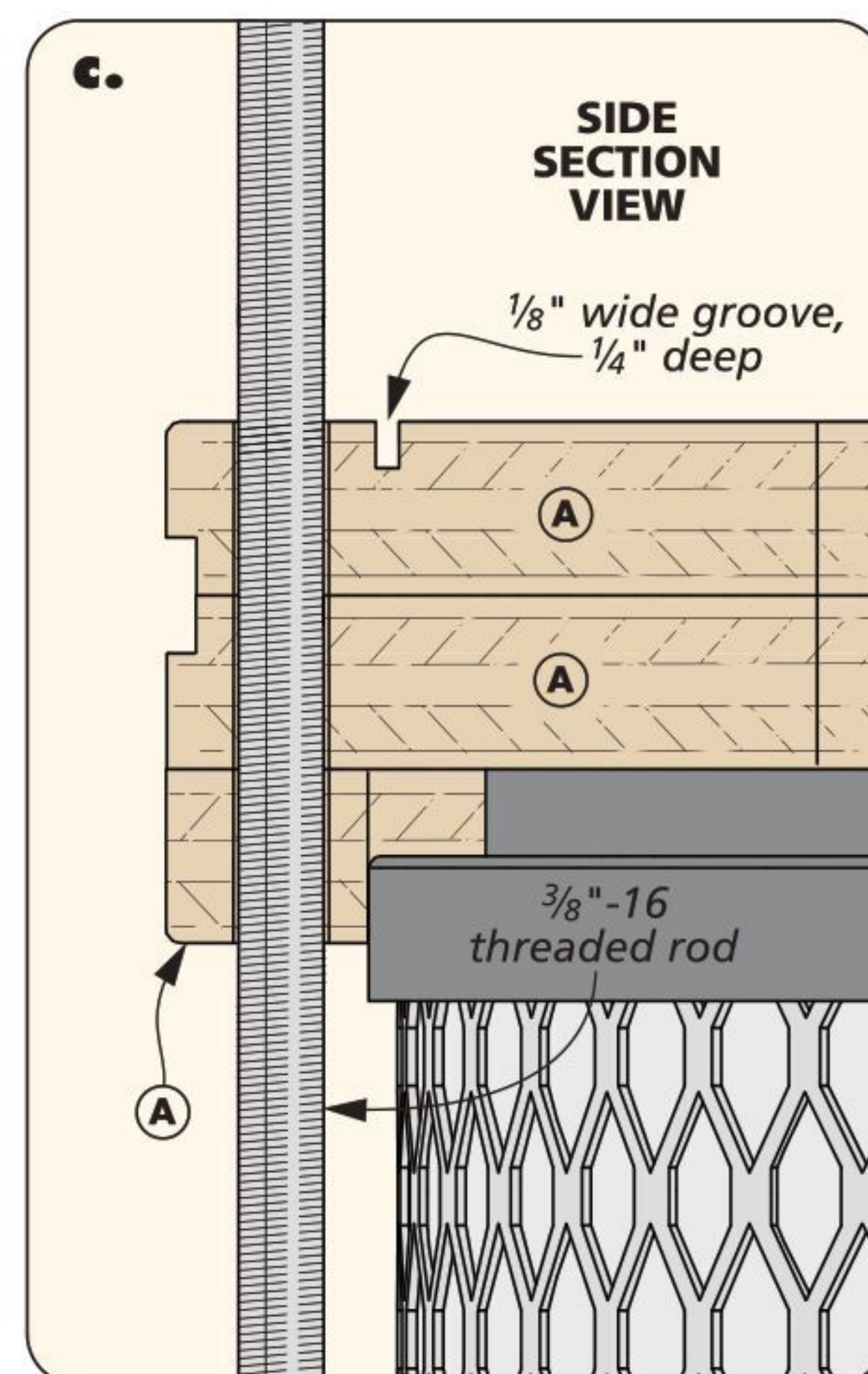
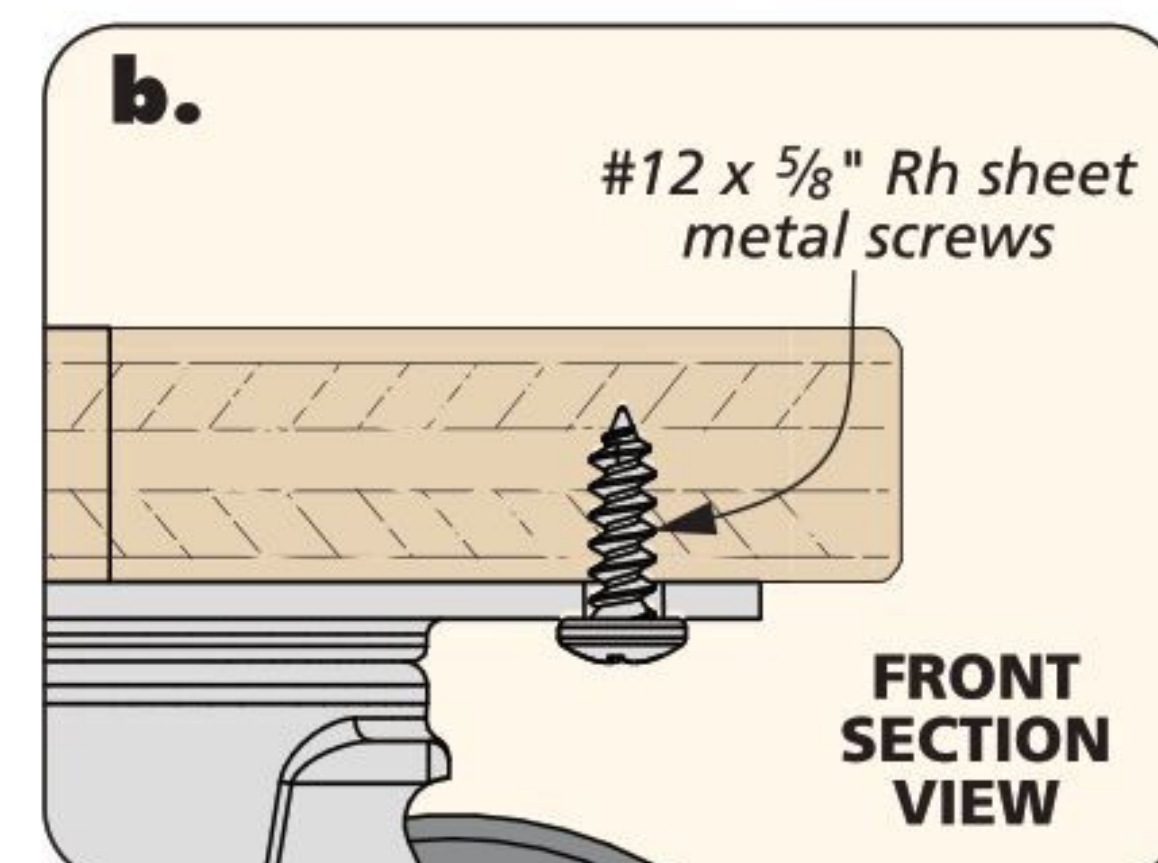
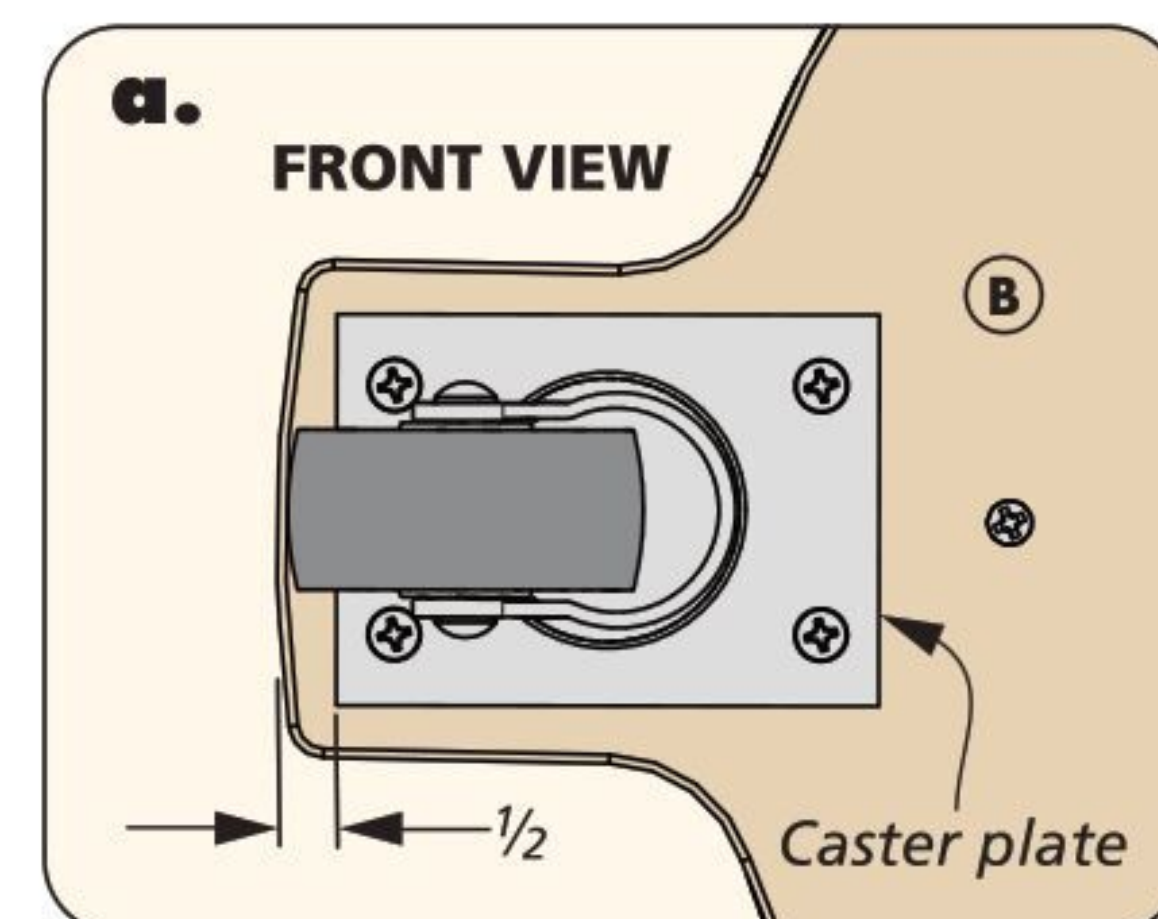
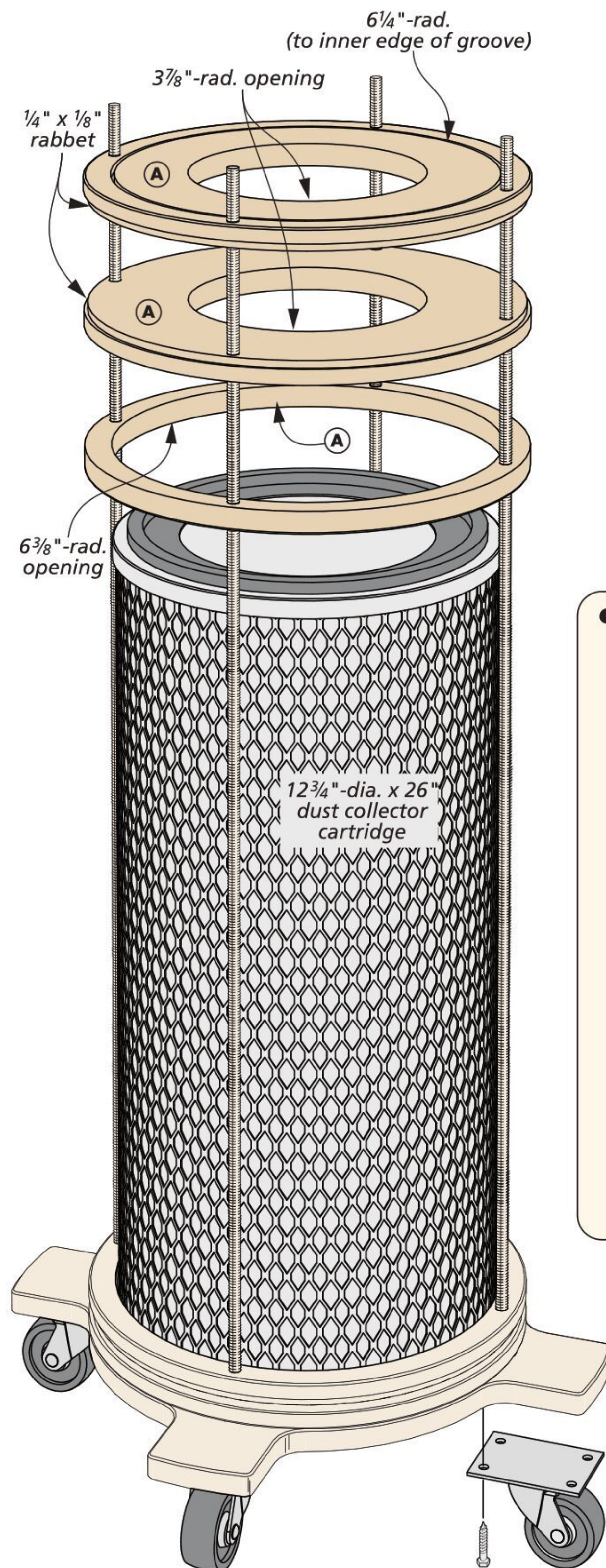
The two lower pieces can be glued together. I used dowels in the threaded rod holes to register the parts as the glue dried.

CASTER PLATE. The caster plate wraps up the lower assembly. There's a little more going on here. Based on the diagonal lines, lay out the arms that support the casters. This is shown in the upper left drawing on the previous page.

Set the router trammel to cut stopped arcs at each of the arms. Reset it to cut the inner set of arcs. Connect the dots with a band saw, cleaning up the edges with files and sandpaper. Then glue and screw this to the other parts.

CENTER SECTION

The three parts of the middle are all the same size, as shown in the



drawing above. As I said, the lower ring is similar to the one in the base. Holes in the middle and upper ring accept the end of the fan housing.

The upper ring features a groove in its top face. This is

formed with the trammel to hold a sheet metal shroud that encloses the fan. Do this before cutting the middle hole. Rabbets in the mating edges provide the same decorative detail. Glue these three parts together.

A powerful FAN

The filter in the lower part of the project cleans the air, but it can only do its job if the air is moving. An 8"-dia. in-line fan handles this. You can see this in the drawing at right. The openings in the rings of the two sections housing it are sized for a snug fit around the intake and exhaust sides of the fan. Gravity (with an assist from the clamping pressure from the threaded rods) does the work of keeping it in its place.

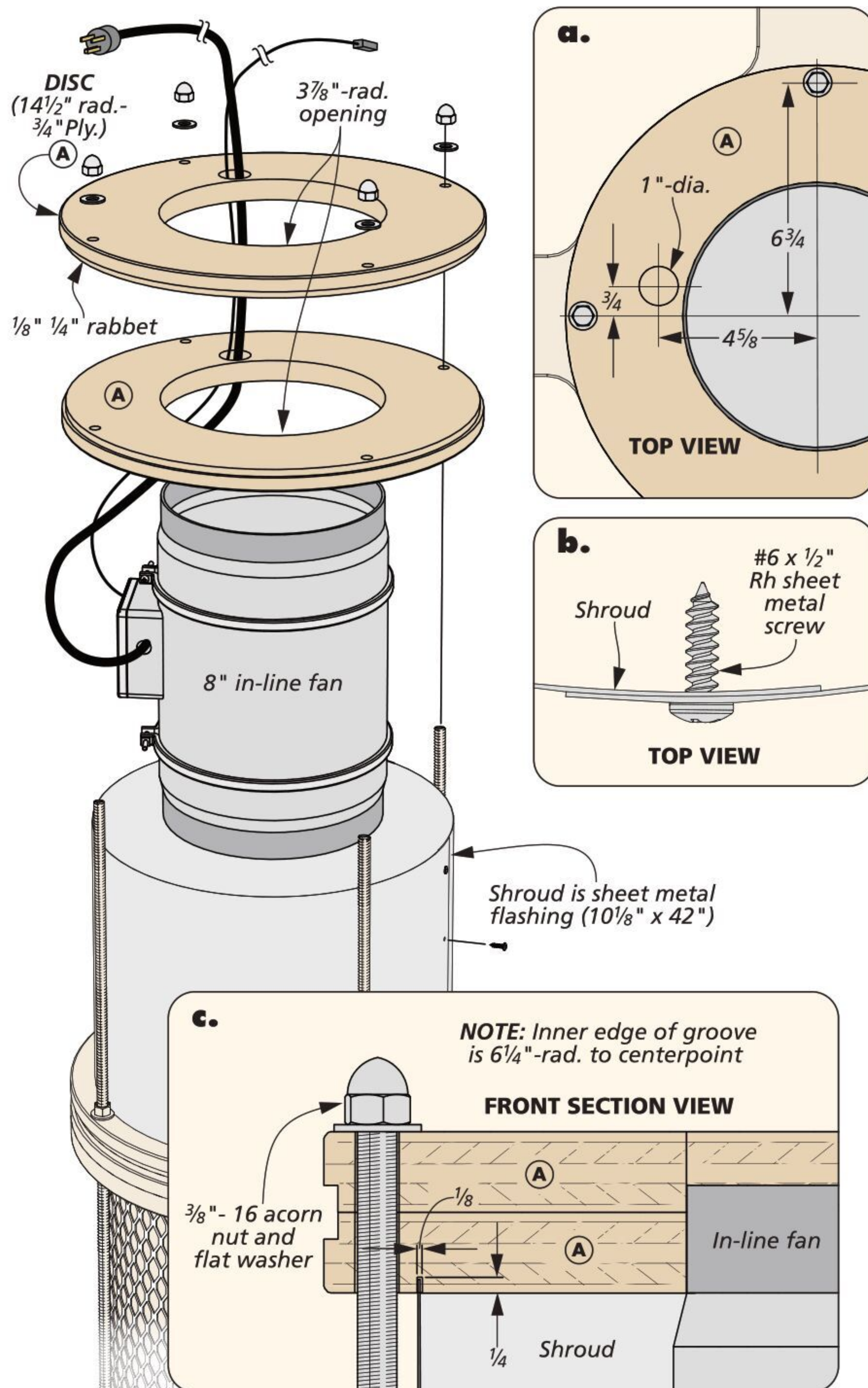
UPPER ASSEMBLY. The drawing also shows the next two discs you need to make. A groove cut in the bottom face of the lower disc with a trammel matches the groove in the center section. Then cut out the center hole and drill the threaded rod holes. Also note the hole shown in detail 'a.' This allows the cord set from the motor to pass through.

These two parts have rabbets routed on the mating edges. You've done this already a couple of times, but the effect makes the completed project look better. Just wait until you get it painted. You can glue up these two discs at this point.

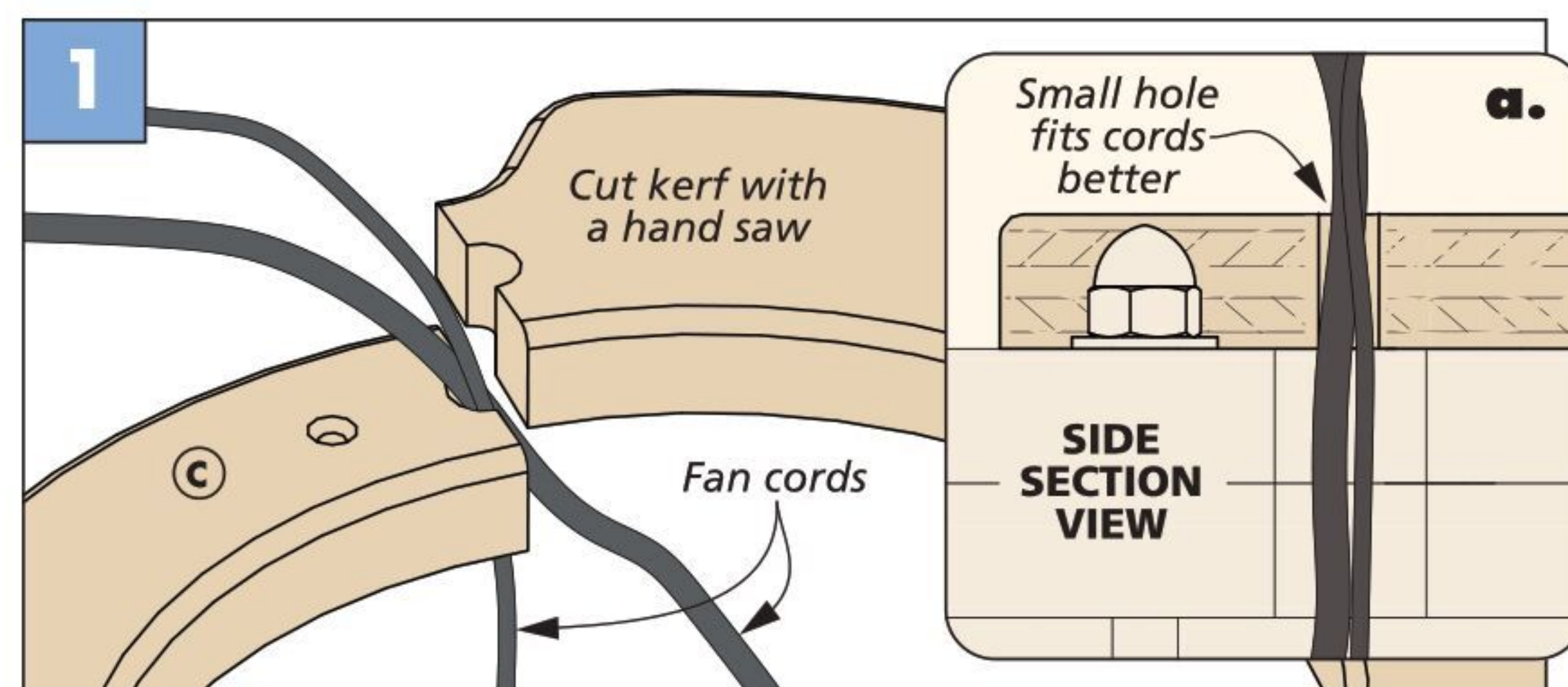
SHROUD. The fan is concealed by a sheet metal shroud that fits into the grooves. I fit an extra-long length of sheet metal into the groove to gauge the final size. Aim for the sheet metal to overlap by 2" or so.

Use double-sided tape to temporarily secure the ends while you drive self-tapping sheet metal screws to fix the final shape, as shown in detail 'b.'

PARTIAL ASSEMBLY. Place the fan in the middle section and thread the cords through the hole in the discs you just made. Then slip the discs over the threaded rods and onto the shroud and fan. The threaded rods are secured with washers and acorn nuts as you can see in detail 'c.'



CLEVER CORD ACCESS



A Little Flex. A kerf through the cord hole allows you to flex one side up to fit the cords through.

TOP DISC

The final part you need to make is the cap. The drawing at right shows the other bits and baubles that complete this project.

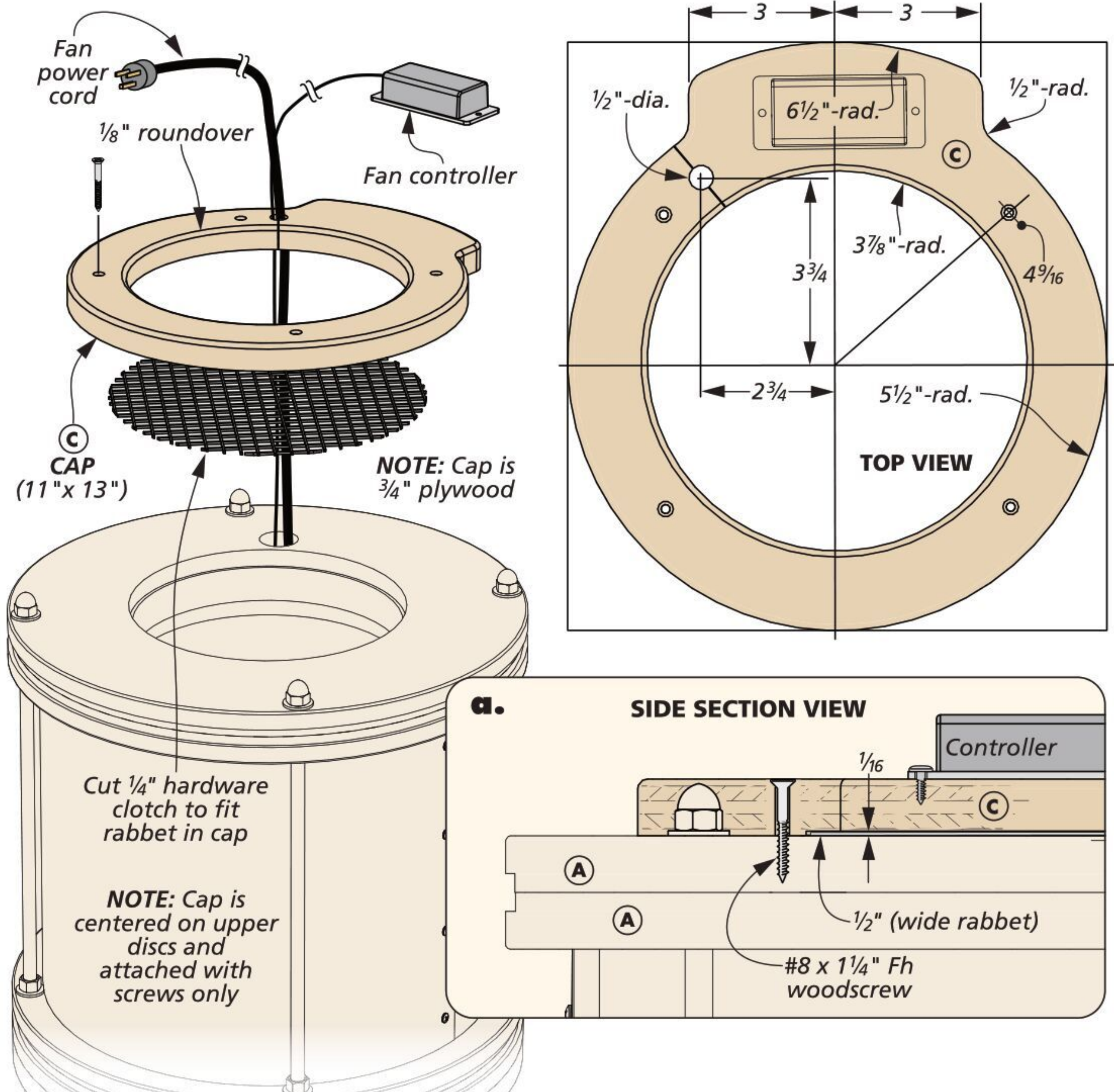
The cap is round, mostly. There's an extension pad on one side that supports the speed control for the fan. You can shape the cap in a similar fashion to making the caster plate that's at the bottom of the air cleaner.

Lay out the center point of the blank with diagonal lines. Use one of those lines to mark the pad that's shown in the upper right drawing.

FINAL CIRCLES. One last time, get out the router trammel. First make a stopped arc defining the outside of the pad. Reset the trammel to cut the perimeter of the cap. The final trammel cut shapes the center opening.

HOLES. A few holes remain. Drill holes to mount the cap. Then there's a hole for the fan's cords. This one is smaller than the ones drilled in the two previous rings. I did this to create a cleaner look. (Be sure to ease the edge of the hole.) In order to get the plugs to pass through, use a hand saw to slice through the cap, bisecting the hole. This is highlighted in the box below.

I routed a shallow rabbet around the lower edge of the



opening, as shown in detail 'a.' This rabbet captures a piece of hardware cloth that you'll cut to fit. It's a barrier to prevent debris from falling down into the fan without affecting the air-flow. And the controller box is screwed to the pad.

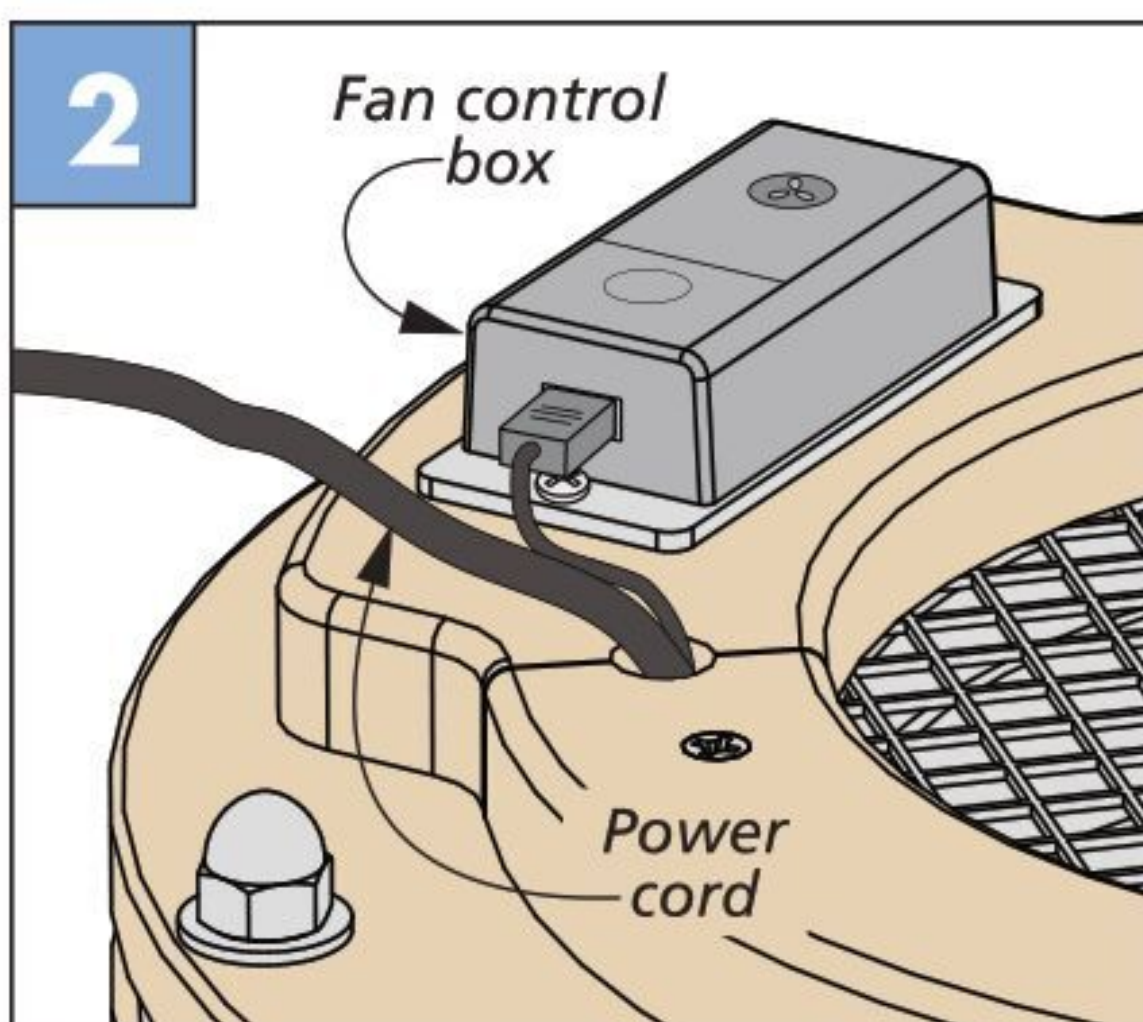
SPRAY PAINT. After a final check of the parts, I disassembled the unit to prime and paint the plywood parts (refer to page 66 for color information). A silent, hardworking shop buddy like this is difficult to come by. So this one is a breath of fresh air. **W**

Materials, Supplies & Cutting Diagram

- | | | |
|---|------------------|----------------------------|
| A | Discs (7) | 3/4 ply. - 14 1/2 x 14 1/2 |
| B | Caster Plate (1) | 3/4 ply. - 20 1/4 x 20 1/4 |
| C | Cap (1) | 3/4 ply. - 11 x 13 |
- (1) 8" In-Line Fan & Controller
 - (1) 12 3/4"-dia. x 26" Dust Cartridge
 - (4) 2 1/2" Swivel Casters
 - (16) #10 x 5/8" Sheet Metal Screws
 - (4) 3/8"-16 x 48" Threaded Rods
 - (4) 3/8"-16 Acorn Nuts
 - (4) 3/8"-16 Hex Nuts
 - (8) 3/8" Flat Washers
 - (8) #8 x 1 1/4" Fh Woodscrews
 - (1) 9" x 9" 1/4" Hardware Cloth
 - (1) 12" x 48" Steel Flashing
 - (6) #6 x 1/2" Rh Steel Metal Screws

ALSO NEEDED:

One 48" x 96" sheet of birch plywood



Controller. Attach the control box to the pad on the cap.

HEIRLOOM Project



Hadley Chest

This chest has a delicate charm and solid construction that's peppered with creative accents. All this is sure to get your shop skills firing on all cylinders.

If you've ever wanted to make a historical piece of furniture for your home, the chest you're looking at here answers that bell and a lot more. But it may not be the type of historical biography that you would expect. First off, Hadley is a place, not a person. Hadley, Massachusetts is where — under the evolution of many hands — this chest emerged.

Its ancestry hints at William and Mary English furniture from the 1600s that, taken into Yankee hands, grew in all sorts of ways. Some moved towards a folkish feel with brightly painted colors. Others had initials carved in the front and served as hope chests for young brides. But let's brag on the chest that you're looking at here for a moment.

MATERIALS WITH HISTORY. You can't go wrong with oak — and there's a lot of it here. From the sturdy legs and carved panels, to the drawer pulls and hinge pins, it's all oak. Yep, the drawer sides and back are oak also.

In the pursuit of keeping things historically real, the planks for the chest bottom along with the drawer bottom are made from resawn fir. No plywood here, thank you.

But there's plenty of diversity when it comes to making the parts of the chest: carving the front panels, dovetail work on the drawers, and turning the pulls and hinges. All of your tools and skills will get a workout on this project, so you better get after it.



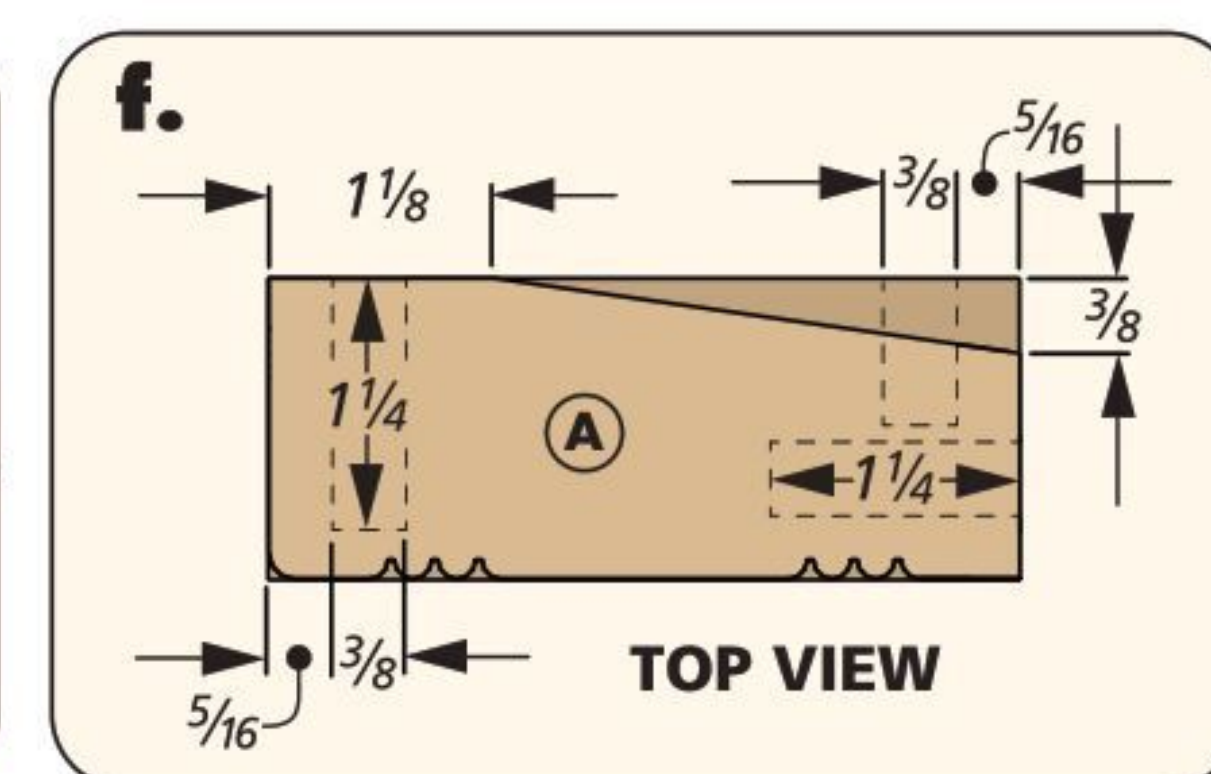
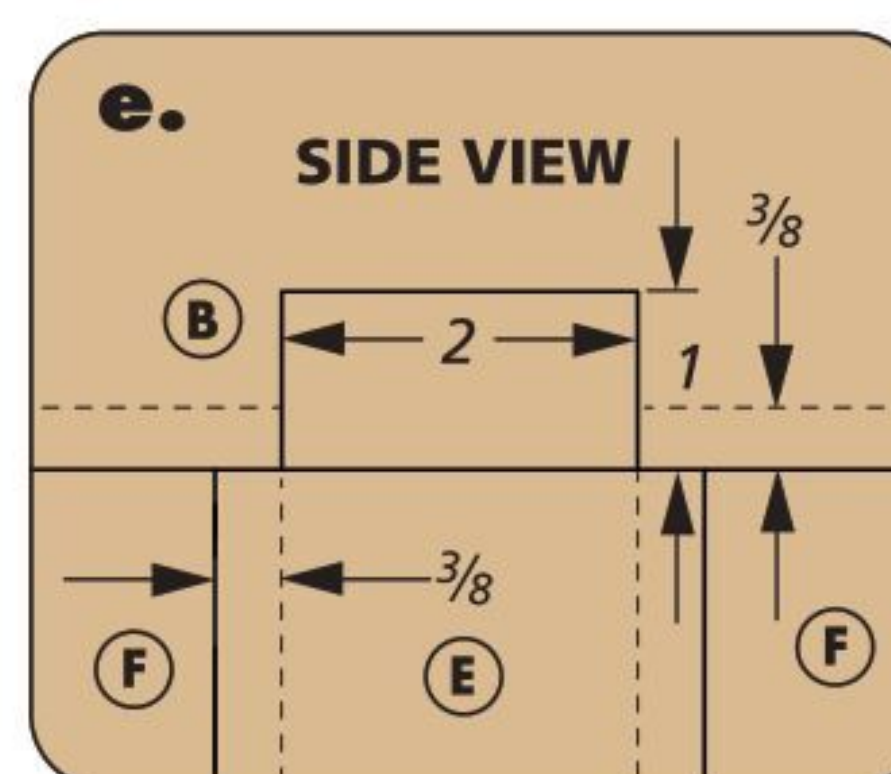
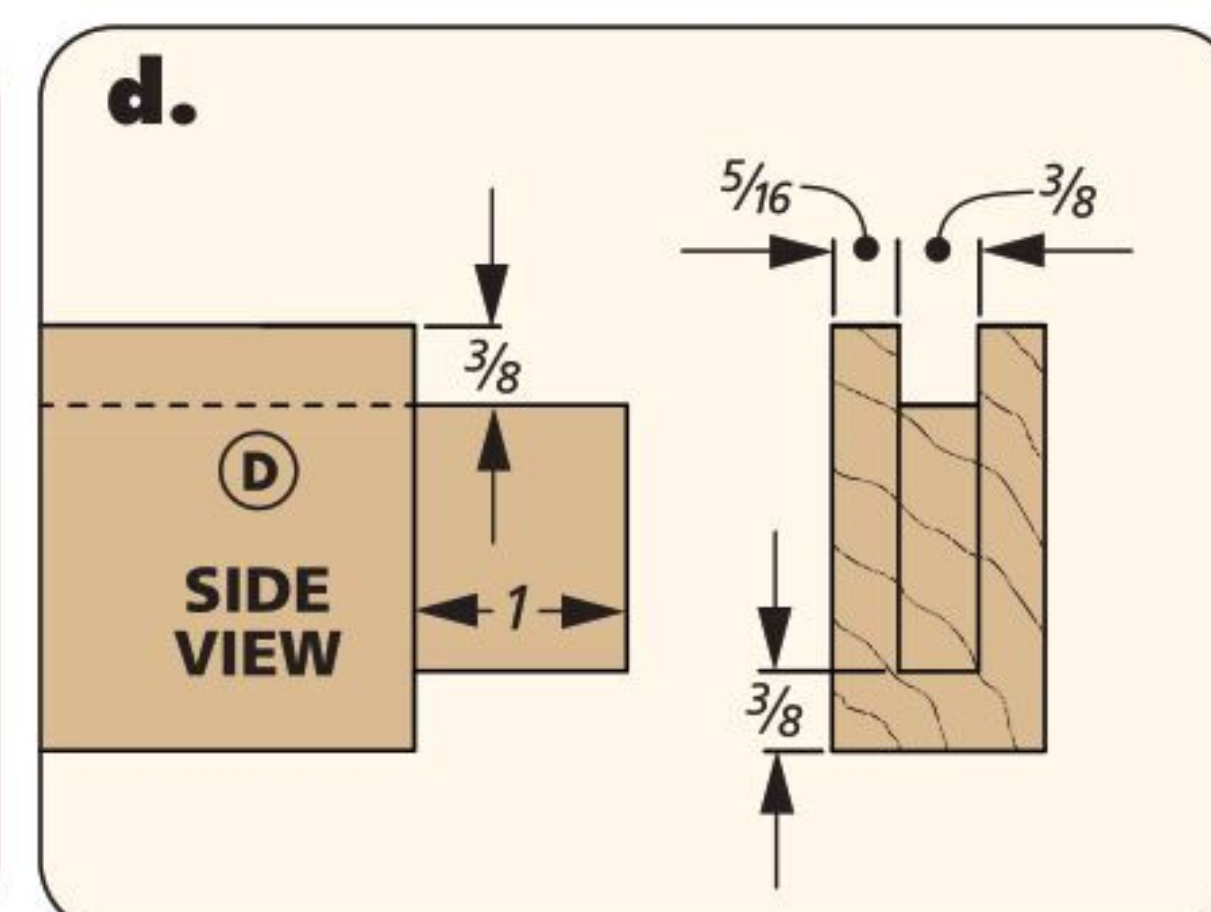
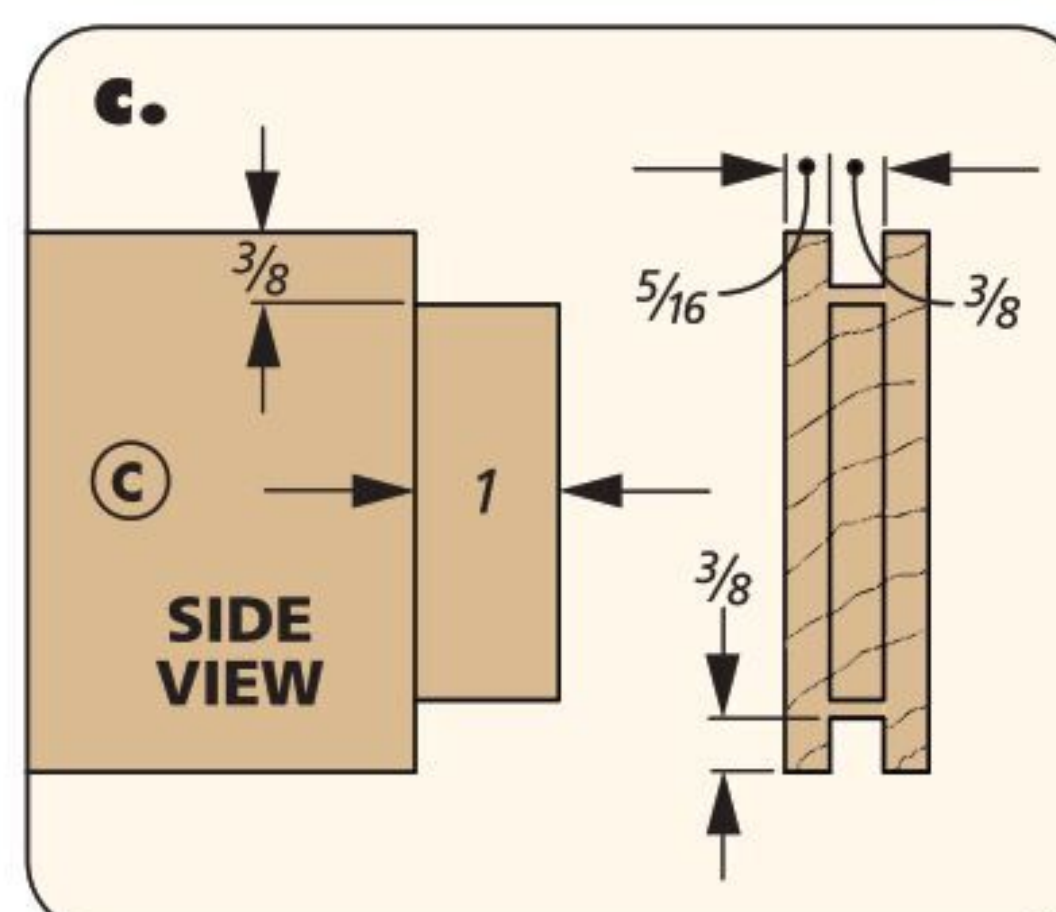
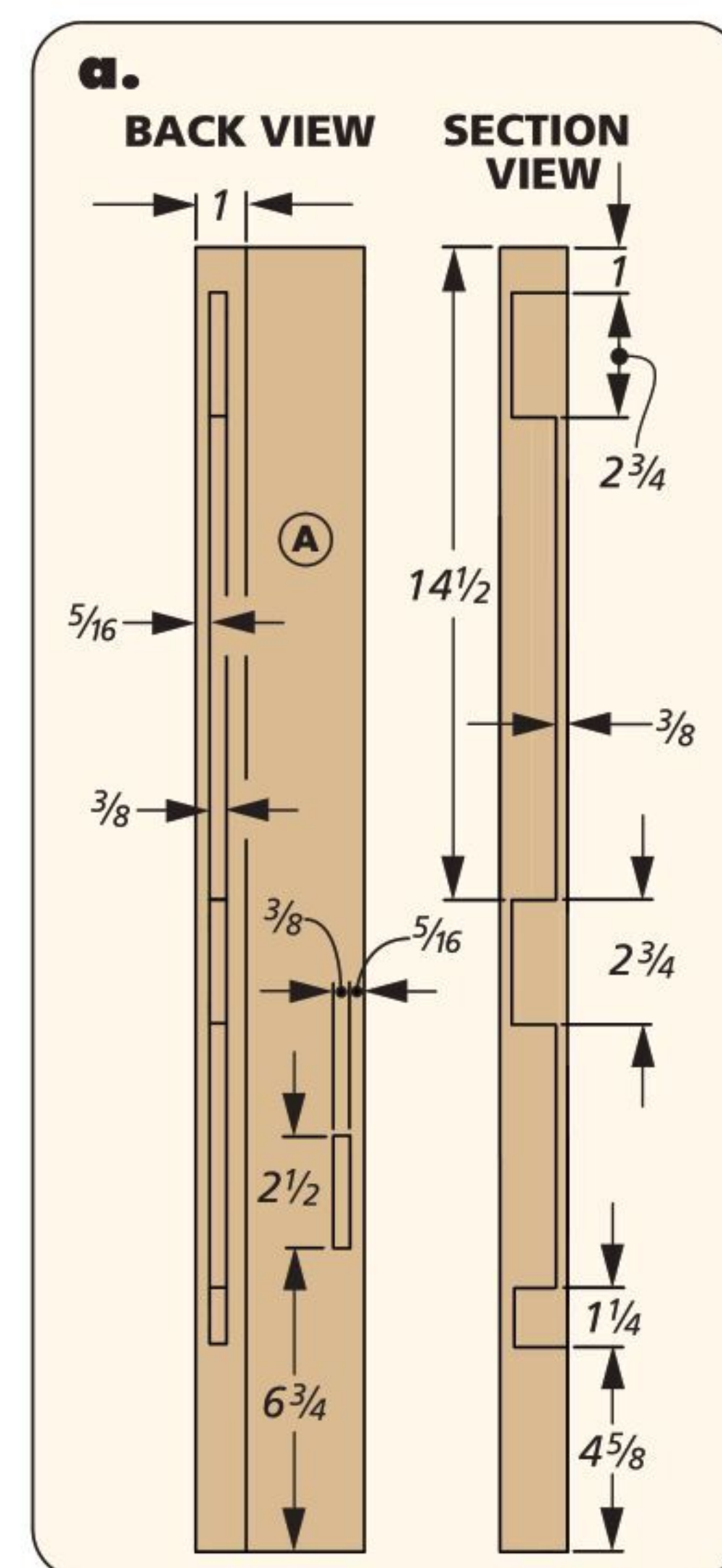
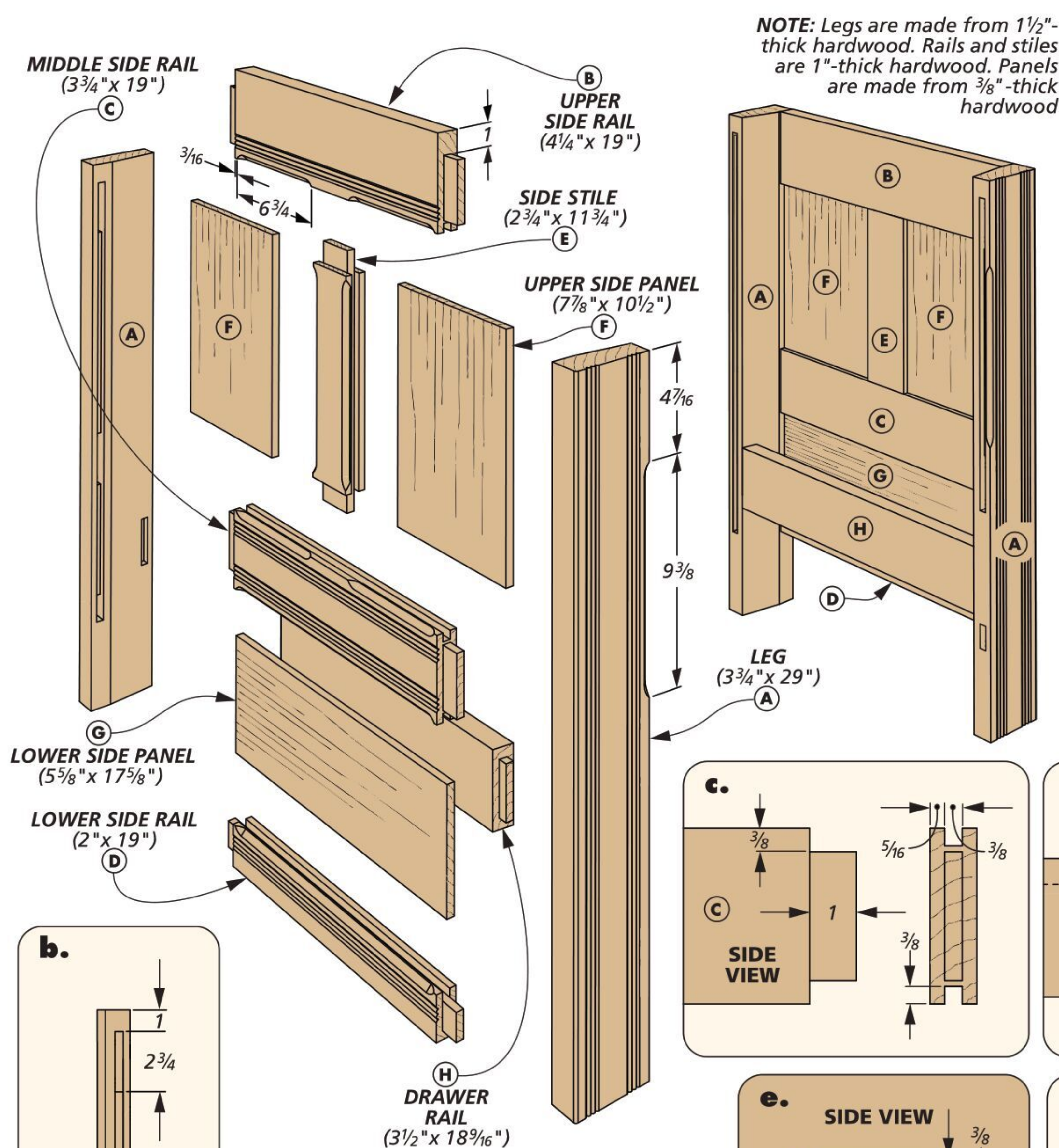
▲ The front panels bring the creative energy of the chest into sharp focus. You can choose to tackle this step by hand, or with a digital file you can download for your CNC machine.



▲ Although the shop-made hinges are large, they seem to disappear into the side of the chest. The hinges pivot on a pin that you'll make from a dowel and a block of oak.



▲ Oak is the wood of choice for not only the chest, but the drawer parts as well. The large dovetail that joins the sides and front couldn't be simpler or stronger.



First up, the SIDE ASSEMBLY

Like most projects, the work starts with making the legs. As you see in the drawings and details above there are a lot of parts that connect to the legs. Three layers worth to be exact. There are the traditional parts that make up the sides (rails, stiles, and panels). Likewise for the front and back of the chest. But in this case there's the added layer of the drawer rail on the inside edge of the leg.

The drawer rail is the tail that's wagging the dog, which we call a smooth assembly. It's easier to

bring the legs, side parts, and drawer rails together first. Then deal with the large front and back pieces later. All this being said, you can start by selecting and sizing the parts for the legs.

LAYOUT & MARKING. Once selected, mark the tops of each leg. Draw the location of all the grooves and mortises before starting work. As you see in detail 'f', there's joinery on two faces of the leg to contend with.

MORTISES FIRST. Details 'a' and 'b' above show all the mortises. Some are buried in grooves,

some are not. Figures 1 and 2 on the next page show making the mortises then the grooves. The front legs also have two stopped mortises. One is on the inside edge for the lower front rail. And a second mortise is on the back for the drawer rail. The back legs have a mortise for the other end of the drawer rail. After removing most of the waste at the drill press, square up the mortises with a chisel.

BIG BEVELS. The inside face of the legs have a large bevel (detail 'f'). Once those are cut you can

focus on the other parts of the side assembly.

GROOVES & TENONS. The rails and stiles need grooves and tenons. First, like the legs, I cut the mortises in the rails for the stiles (detail 'e' previous page). Then at the table saw, I cut the centered grooves and tenons you see in details 'c' and 'd' on the previous page.

Next up are the panels that fit in the grooves. After they are

sized and planed to thickness, there are some decorative details to take care of on the parts that surround the panels.

CHAMFERS. Figure 3 below shows how to make the chamfers that accent the panels. All of the chamfers start and end $\frac{3}{16}$ " in from the corners.

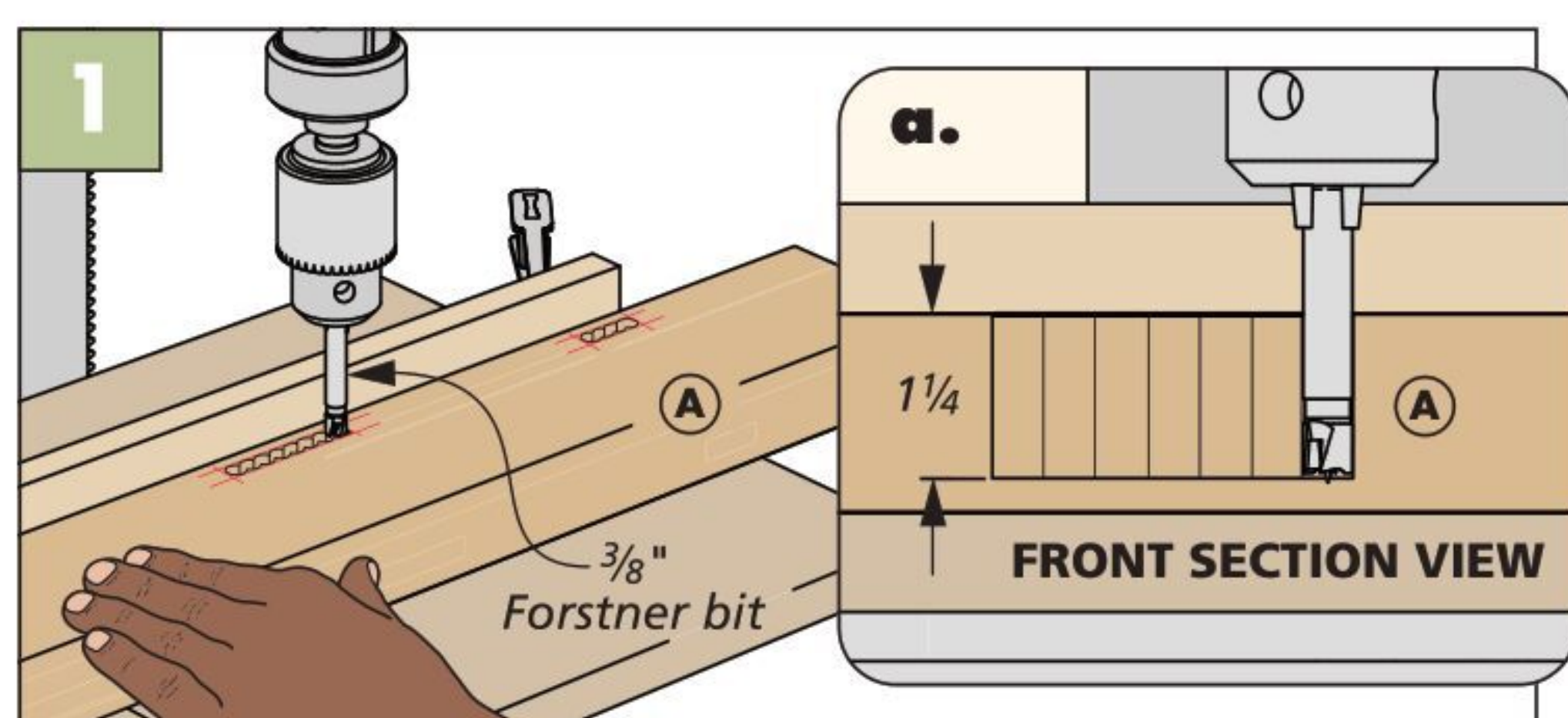
BEADING. The decorative bead that trims the front of the legs, and all of the rail and stile faces are created at the router table.

The double-beading bit is buried in the router table fence.

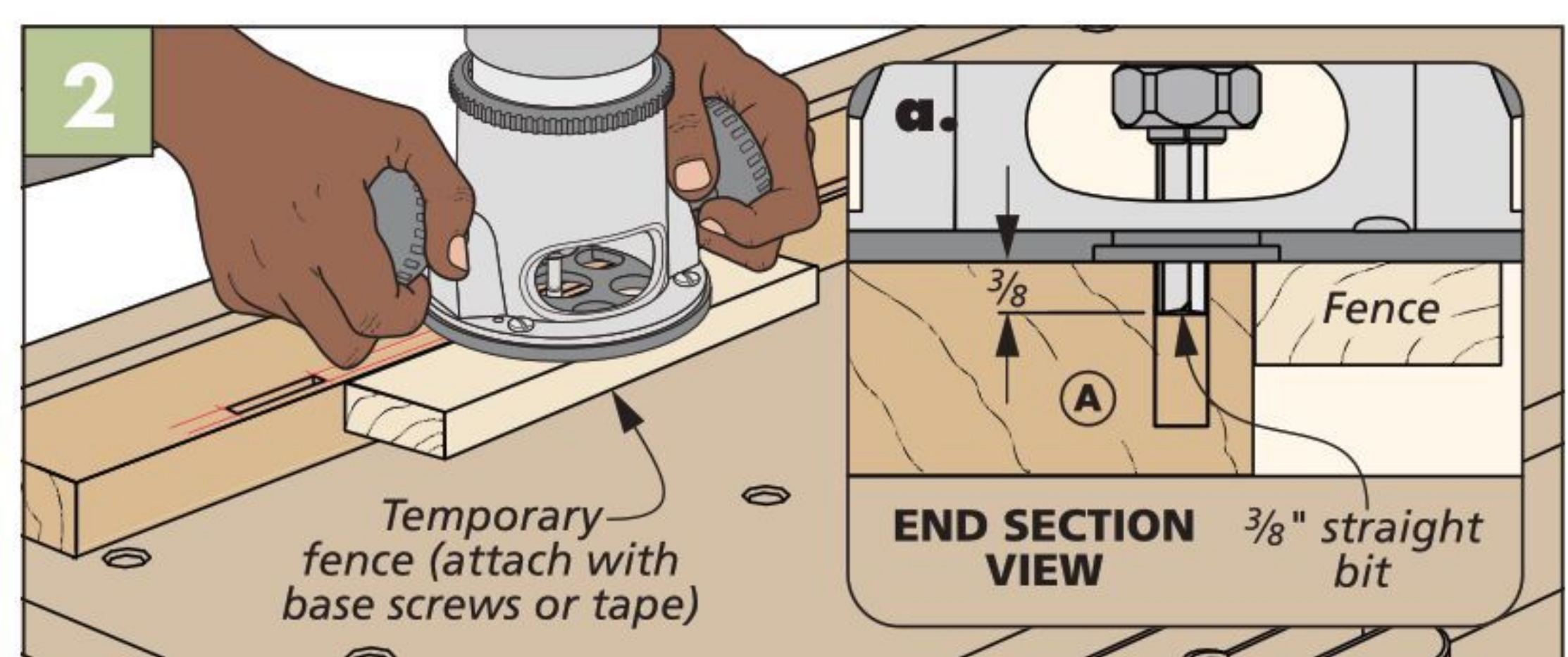
DRAWER RAIL. The drawer rail is the last part to make before you assemble the sides. Figure 5a shows you what the end of the rail looks like.

A dry run assembly of all the parts is the safest way to confirm the size of this last piece of the puzzle is accurate. When you're happy with the fit of the rail, you can glue up the side assembly.

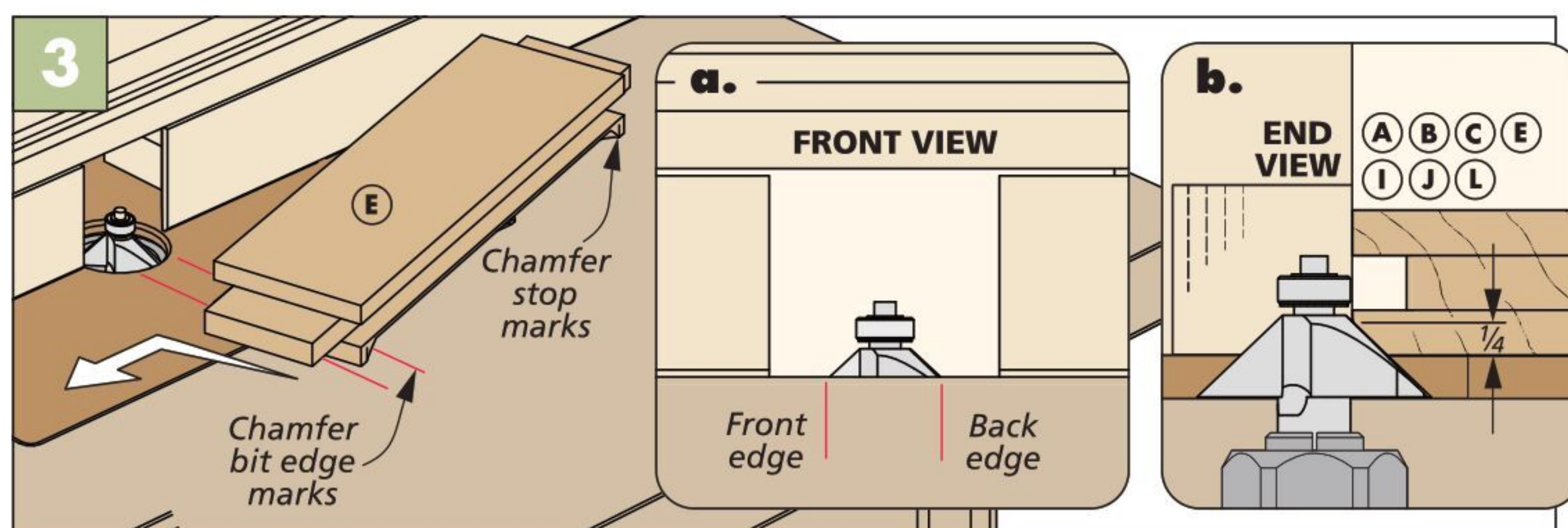
MORTISES, GROOVES, CHAMFERS, & BEADS



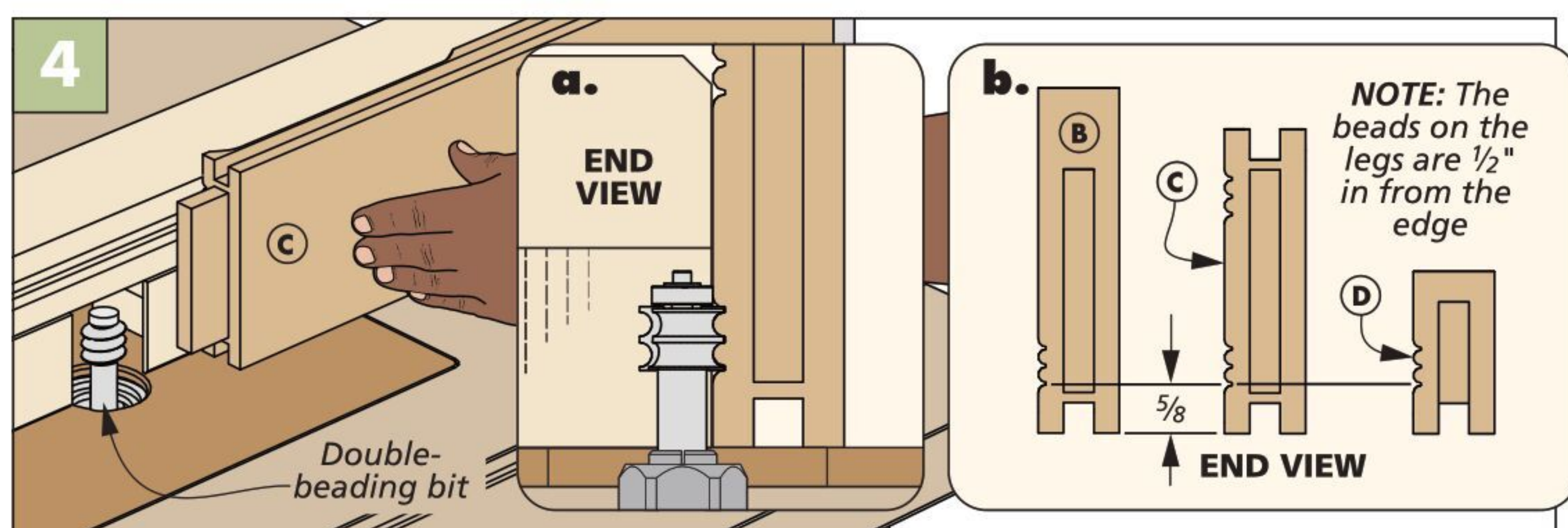
Mortises for Rails & Stiles. The stopped mortises for the rails and stiles are done at the drill press with a Forstner bit.



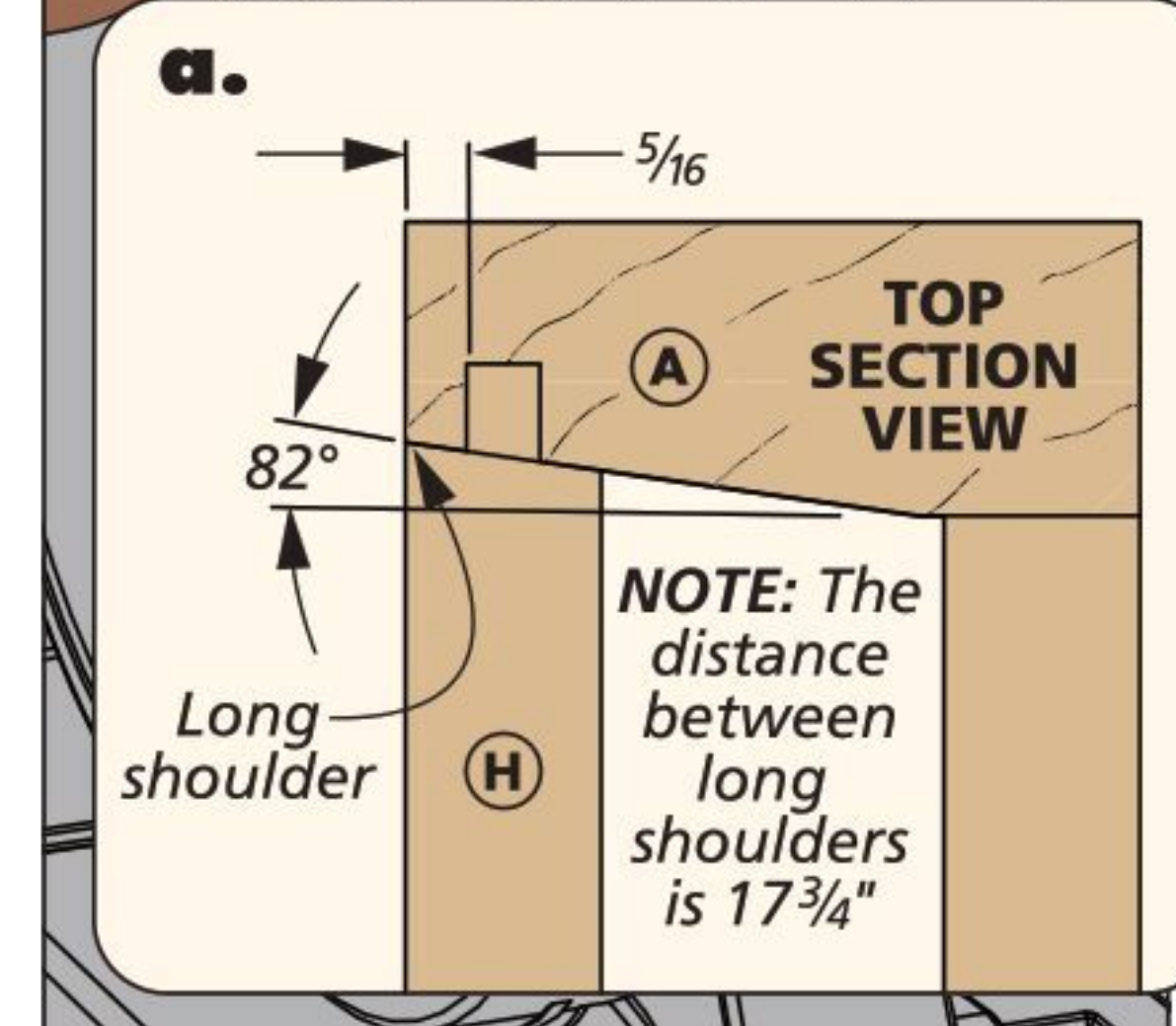
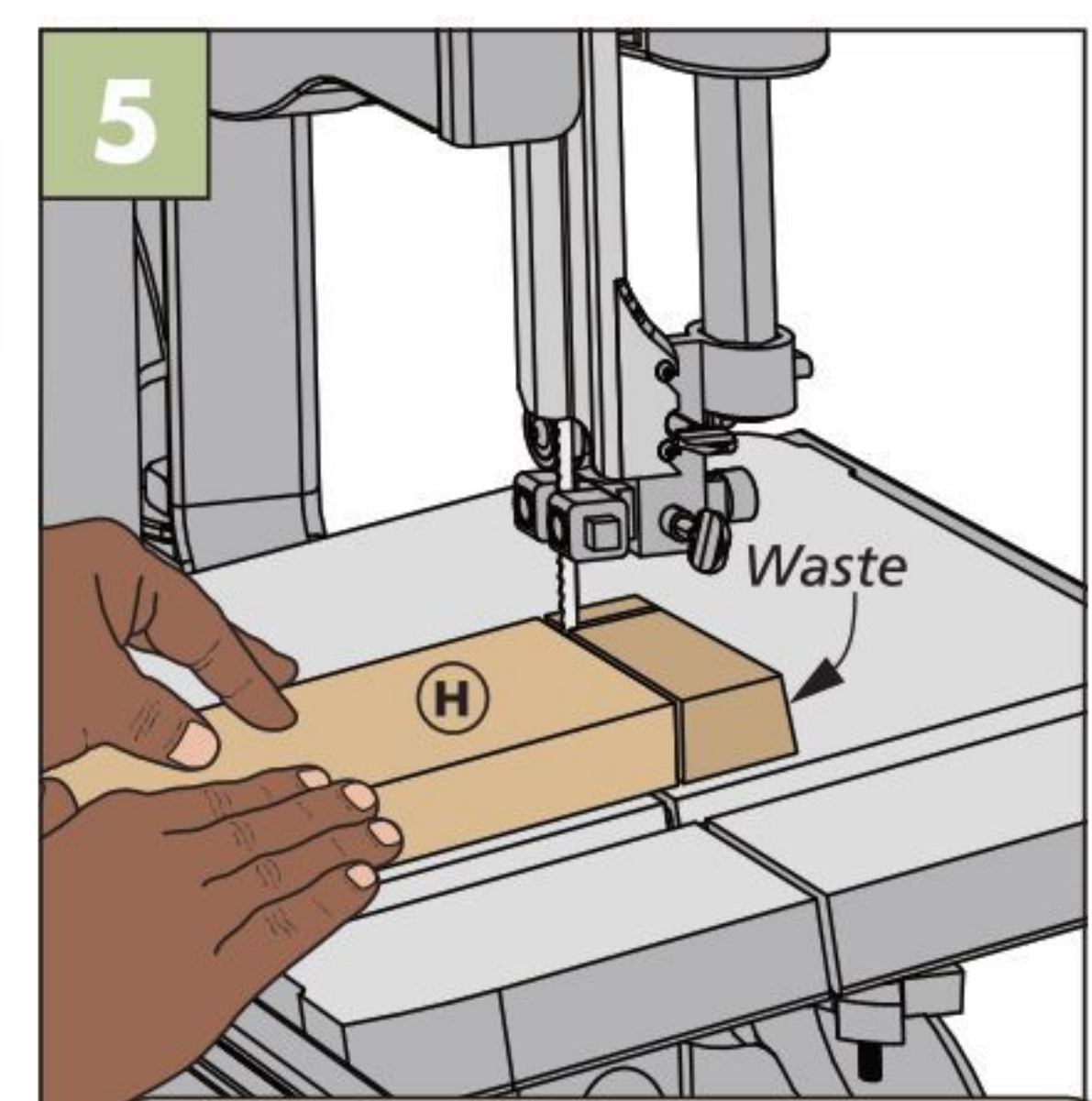
Grooves for Panels. A temporary fence attached to the base of your router is all that's needed to make the grooves.



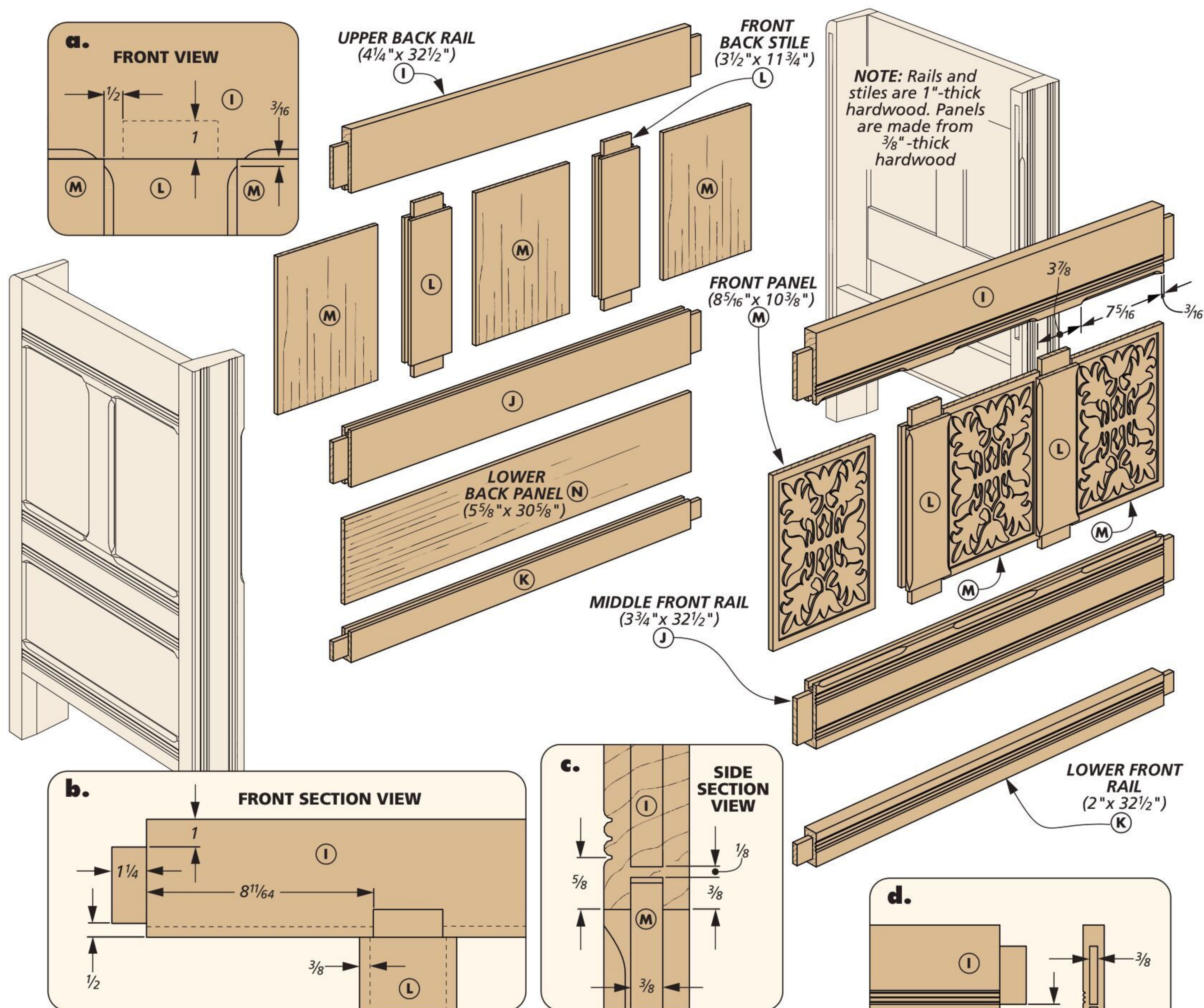
Chamfers Next. To make the chamfer that's on the stiles and rails, start by marking the bit edges on the insert plate. And mark the start and stop points on each workpiece.



Beading Details. Your router table will be your ally when routing the decorative bead in the chest parts. The rails and stiles on the back of the chest are left plain.



Drawer Rail. The angled shoulders of the drawer rails are easy to cut at the band saw.



Next in line is the **FRONT & BACK**

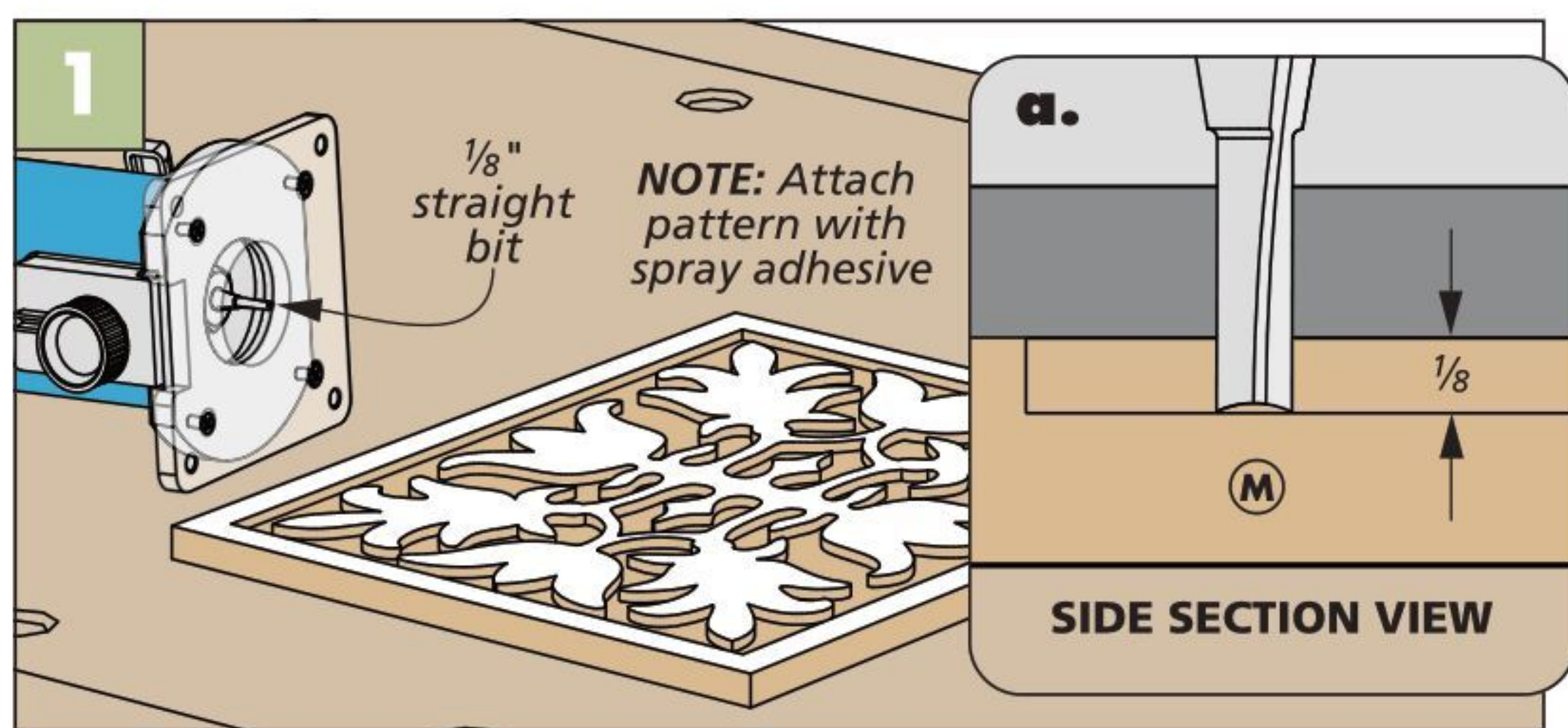
With the side assemblies cooling in the corner, you can attack the parts that bring them together. This is not going to be difficult because, as you see in the drawings above, it's mostly a repeat of what you did for the sides. Yes, the parts are longer (nothing gets by you) and there are the decorative panels in the front that are definitely different, but we'll get to those in a little while. Let's review the parts that you need to make for the front and back of the chest, starting with the rails.

MORE OF THE SAME. The rails you see above are the same thickness and width of their colleagues in the side assemblies. The only difference is in the front, middle, and lower rails. As you see in detail 'd,' there are no grooves in the edges where the drawer slides into the chest.

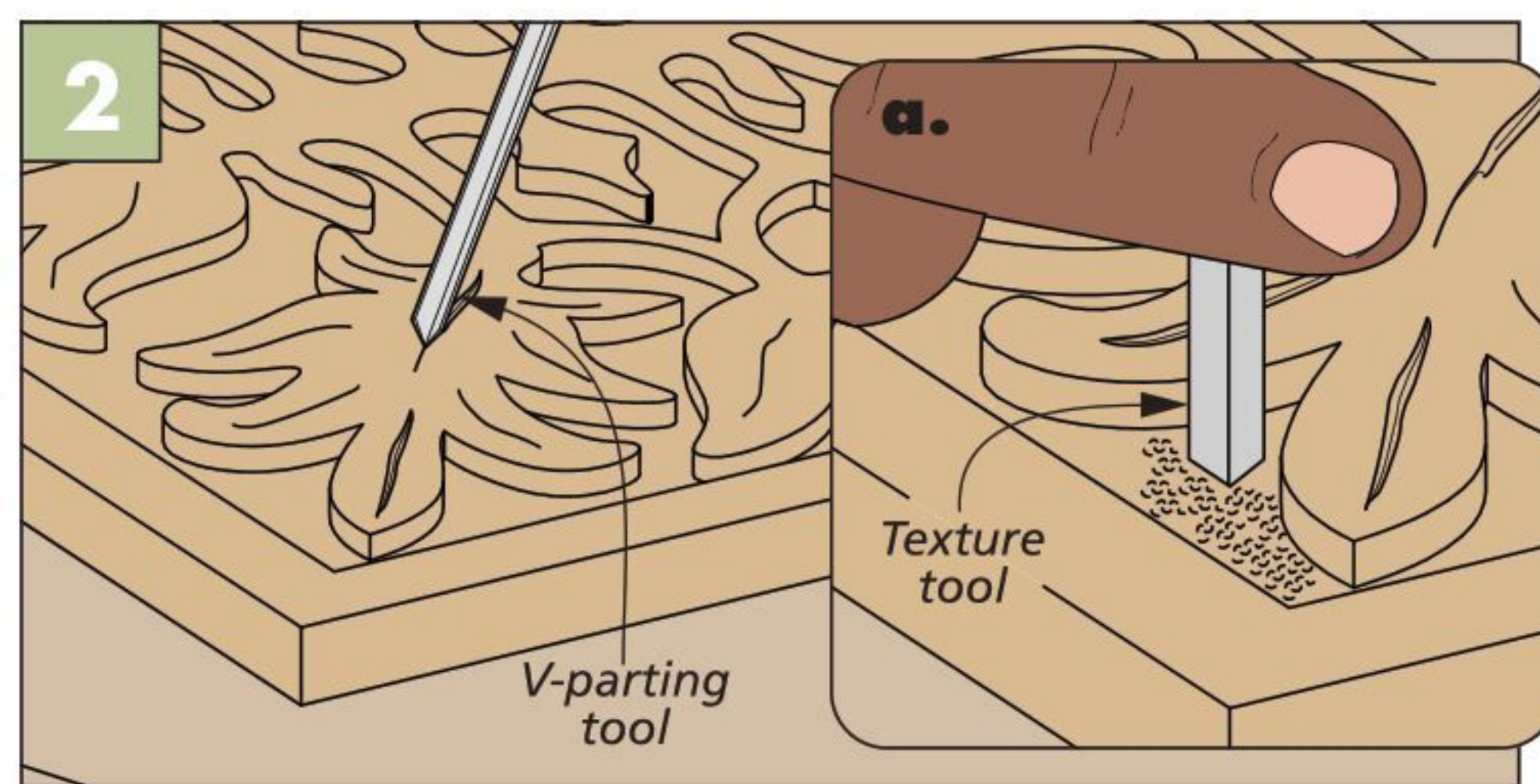
Details 'a' and 'b' show you the mortises to make for the stiles. Following the mortises are the grooves for the panels and stiles. Like before, this is the point where you add the chamfers at

the router table. Then change out the bit to address the beading. Remember, there's no beading detail (or chamfers) on the back side of the chest. Not that you couldn't go off script and add the beads — it's your chest.

CREATING THE DECORATIVE PANEL



The Big Shapes First. Using your palm router and a straight bit is an excellent way to start shaping the decorative panels.



Details Second. A V-parting tool accents the leaves of the panel. Texturing punches create a contrasting background.

PANELS

As you see in the drawings on the previous page, there are seven panels that reside in all the parts you've just made. The upper ones in the front and back of the chest are identical in size. The lower in the back occupies the space where the drawer is on the front of the chest. After planing them to thickness, I trimmed all of them to final size, and, I set aside all but the three front panels. It's time to carve.

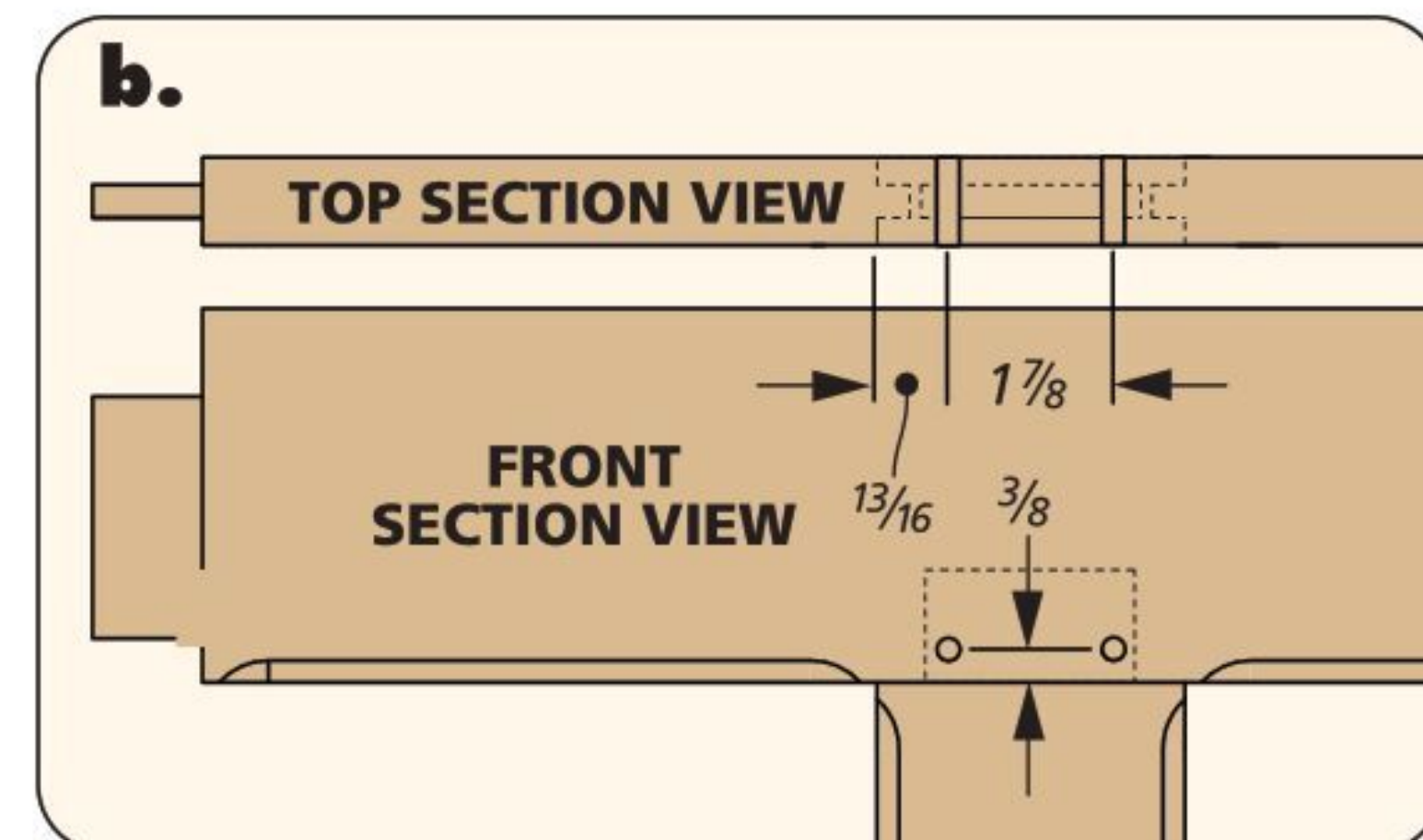
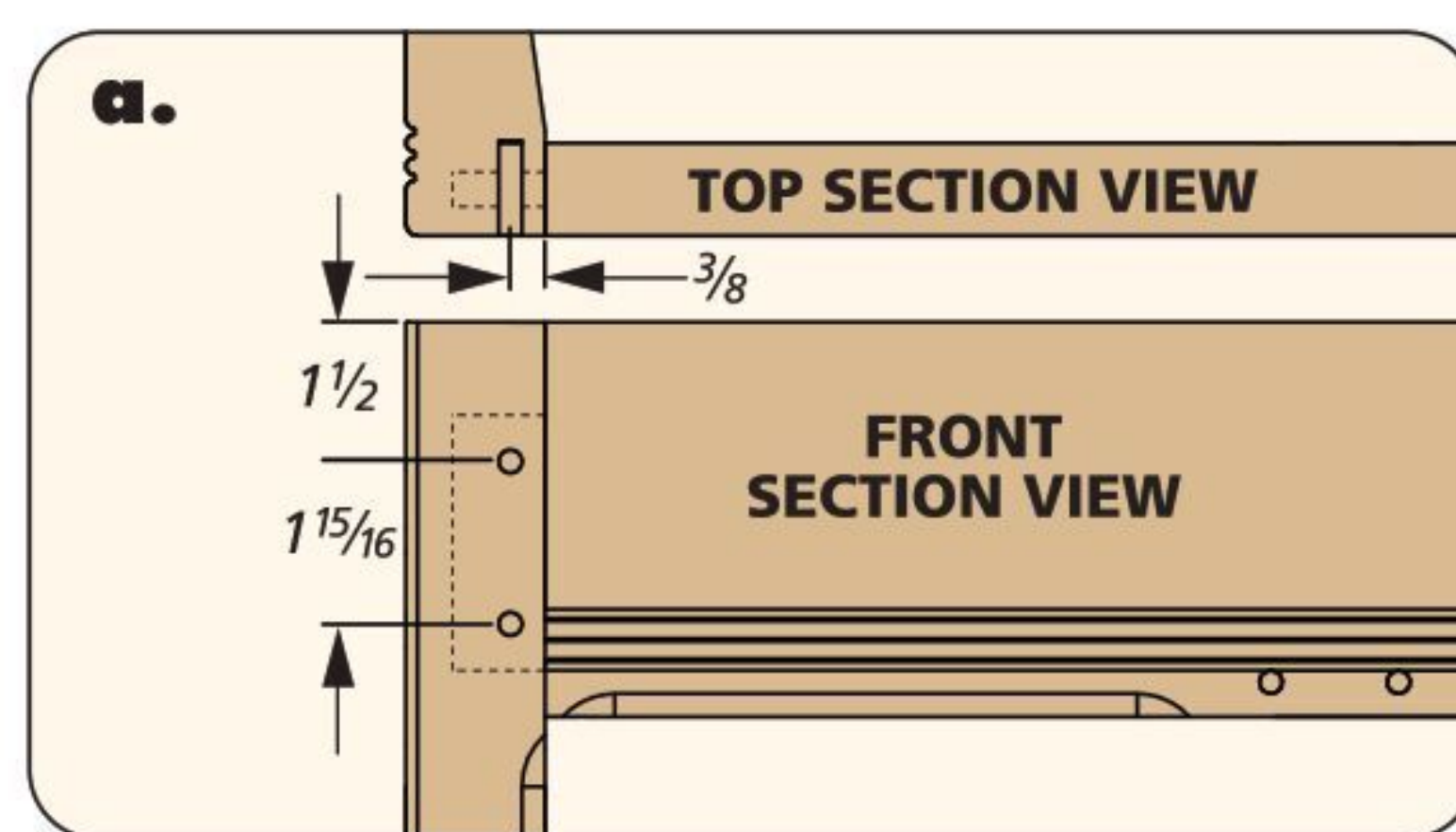
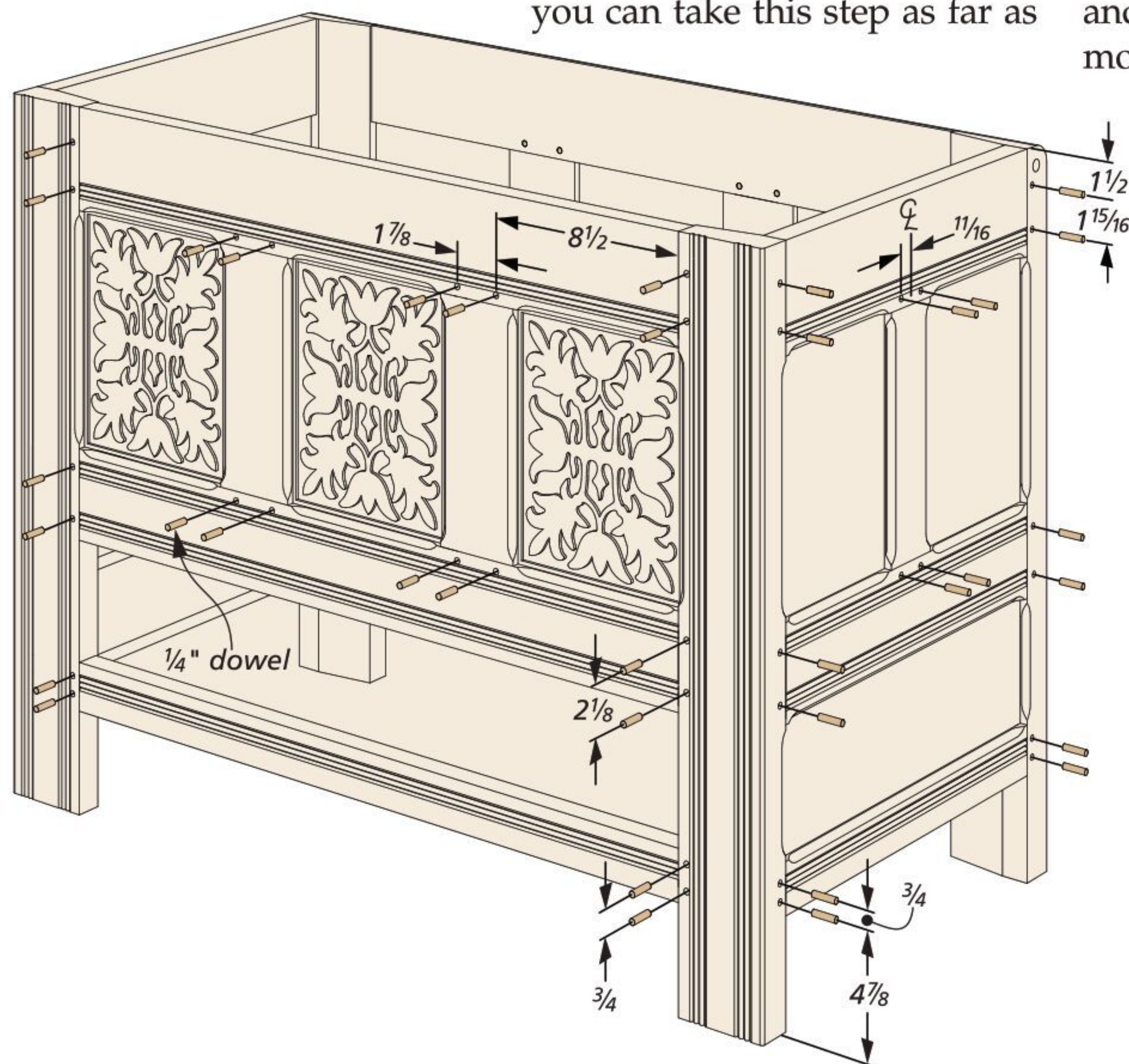
ROUTING OR CNC. The beautiful floral pattern on the front panels

can be created several ways. If you're into the CNC routine, there's a file online that you can use to make the base pattern. There's also a pattern online that you can use with a router and straight bit (Figure 1).

The pattern will also be a perfect guide if you want to do something crazy, like carve them all by hand. Even with that done, there's still more work beyond the profile to complete the look. Add some veining to the flowers and leaves with your favorite V-parting tool (Figure 2). Frankly, you can take this step as far as

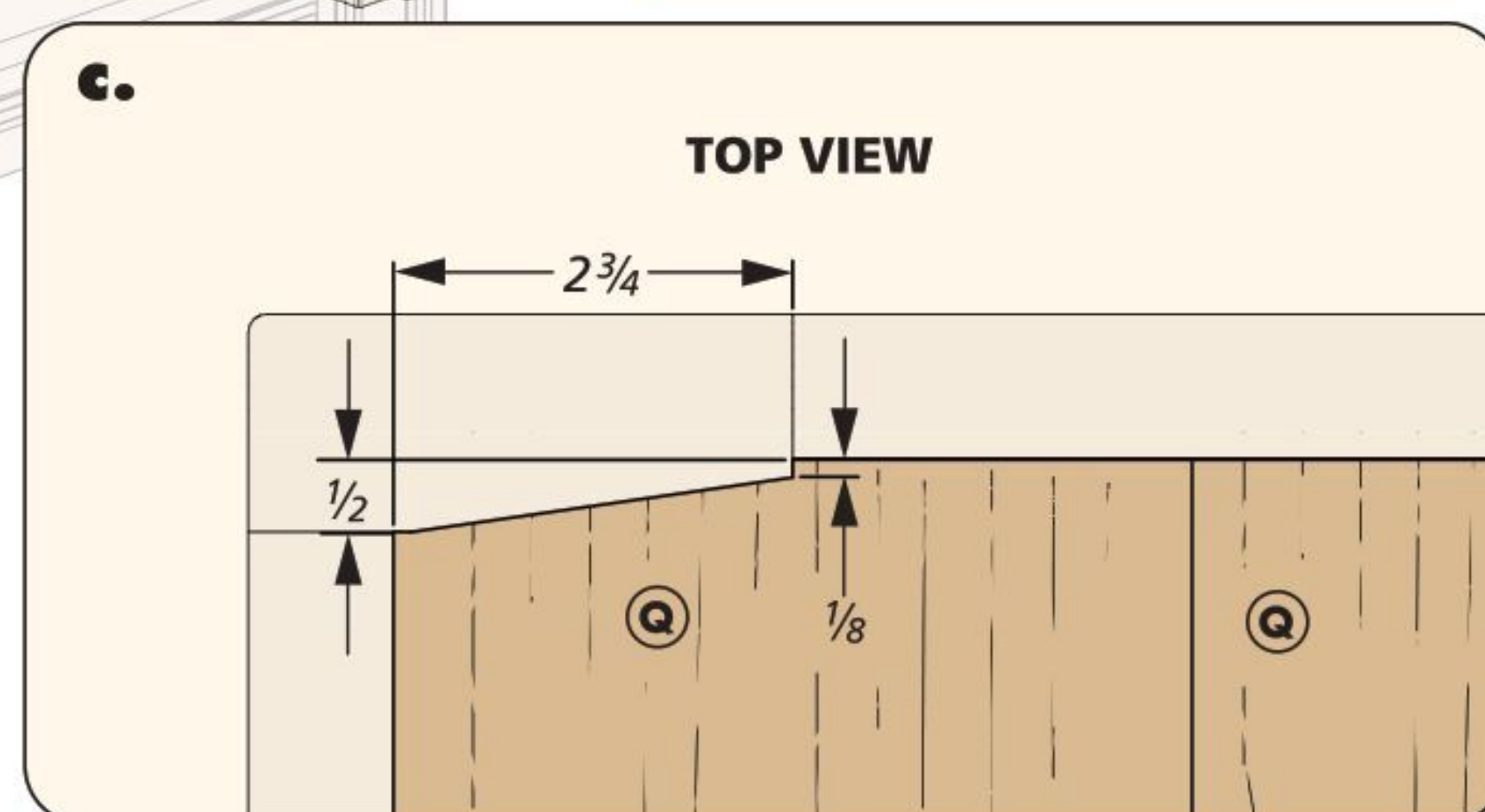
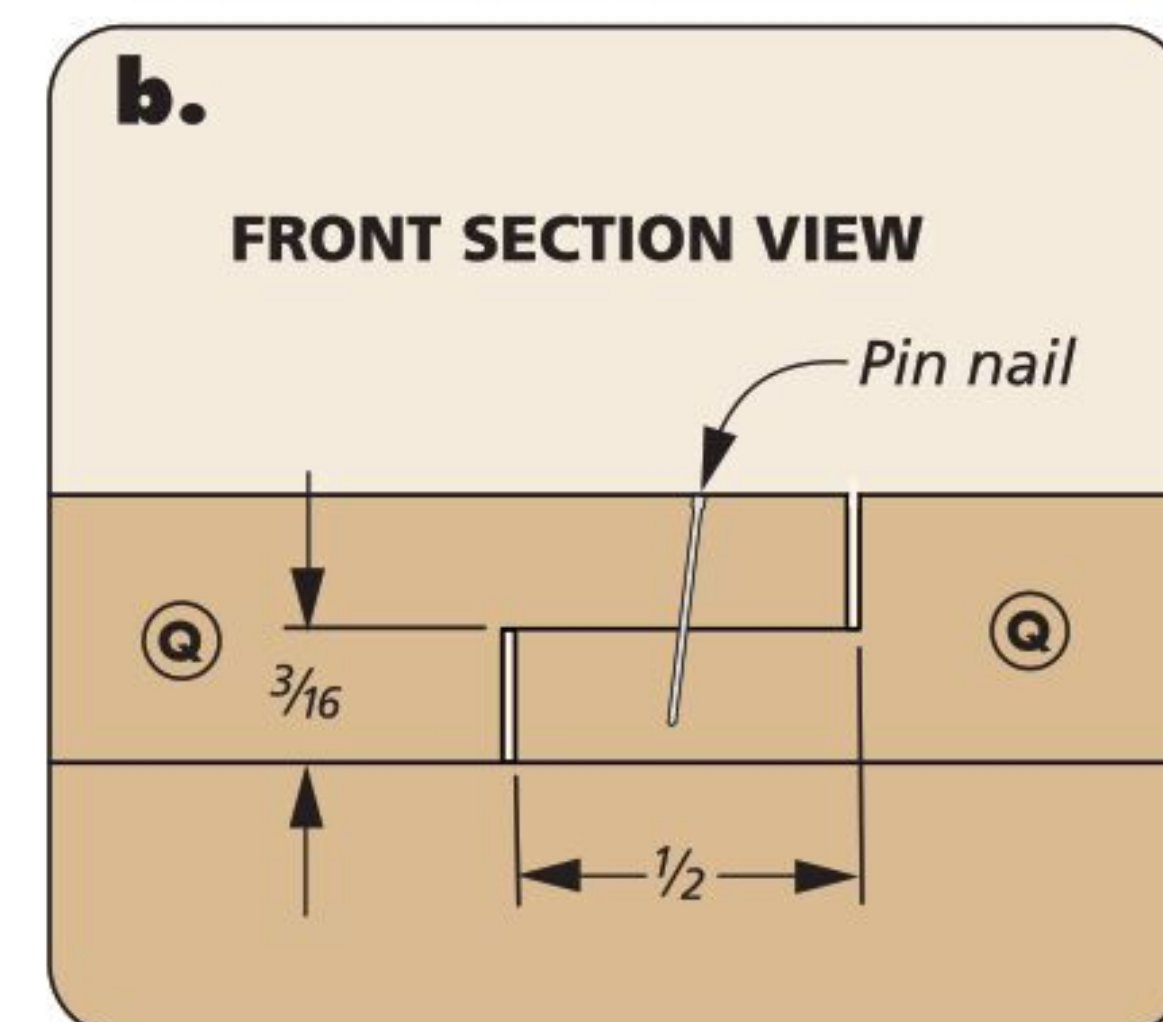
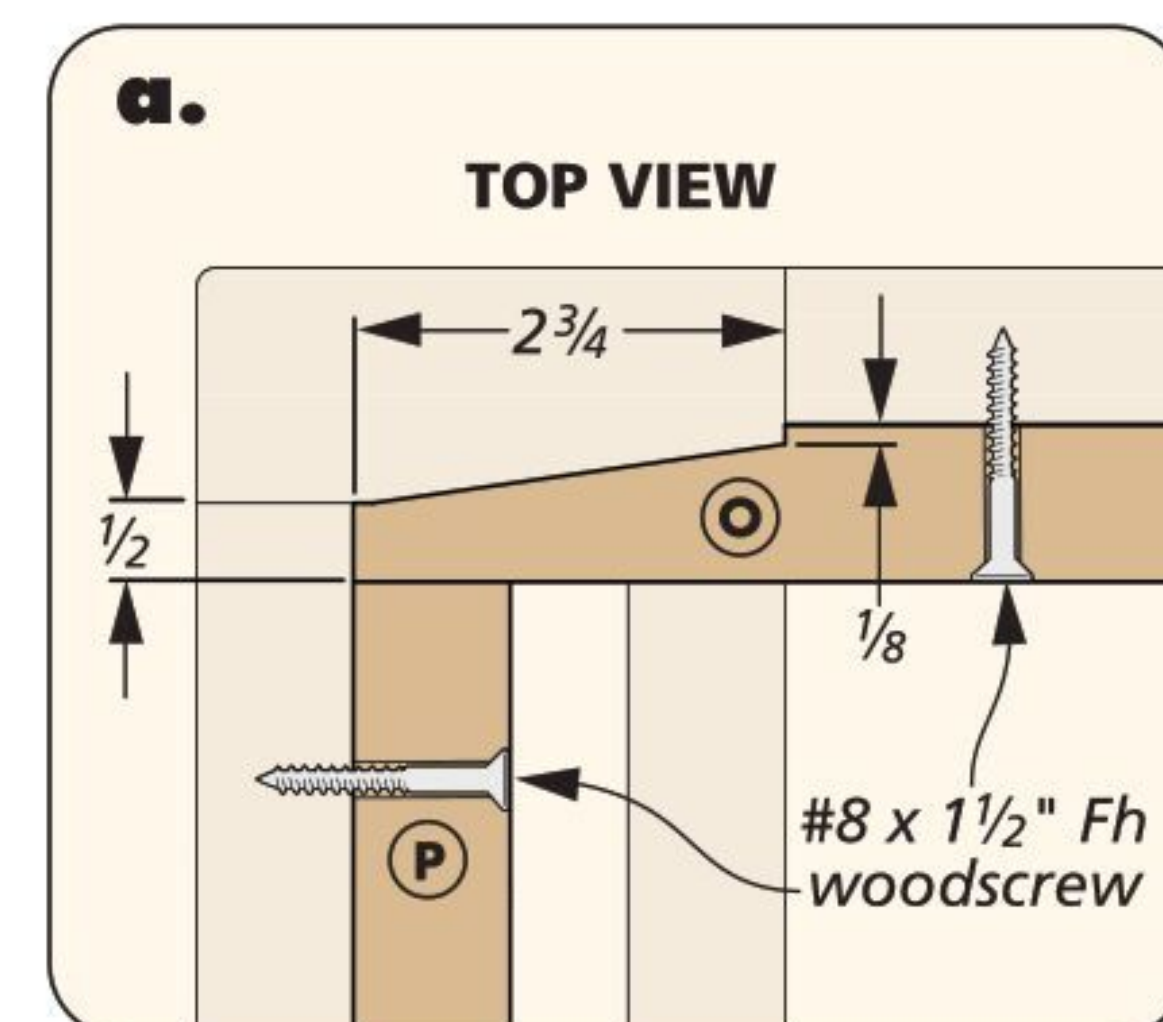
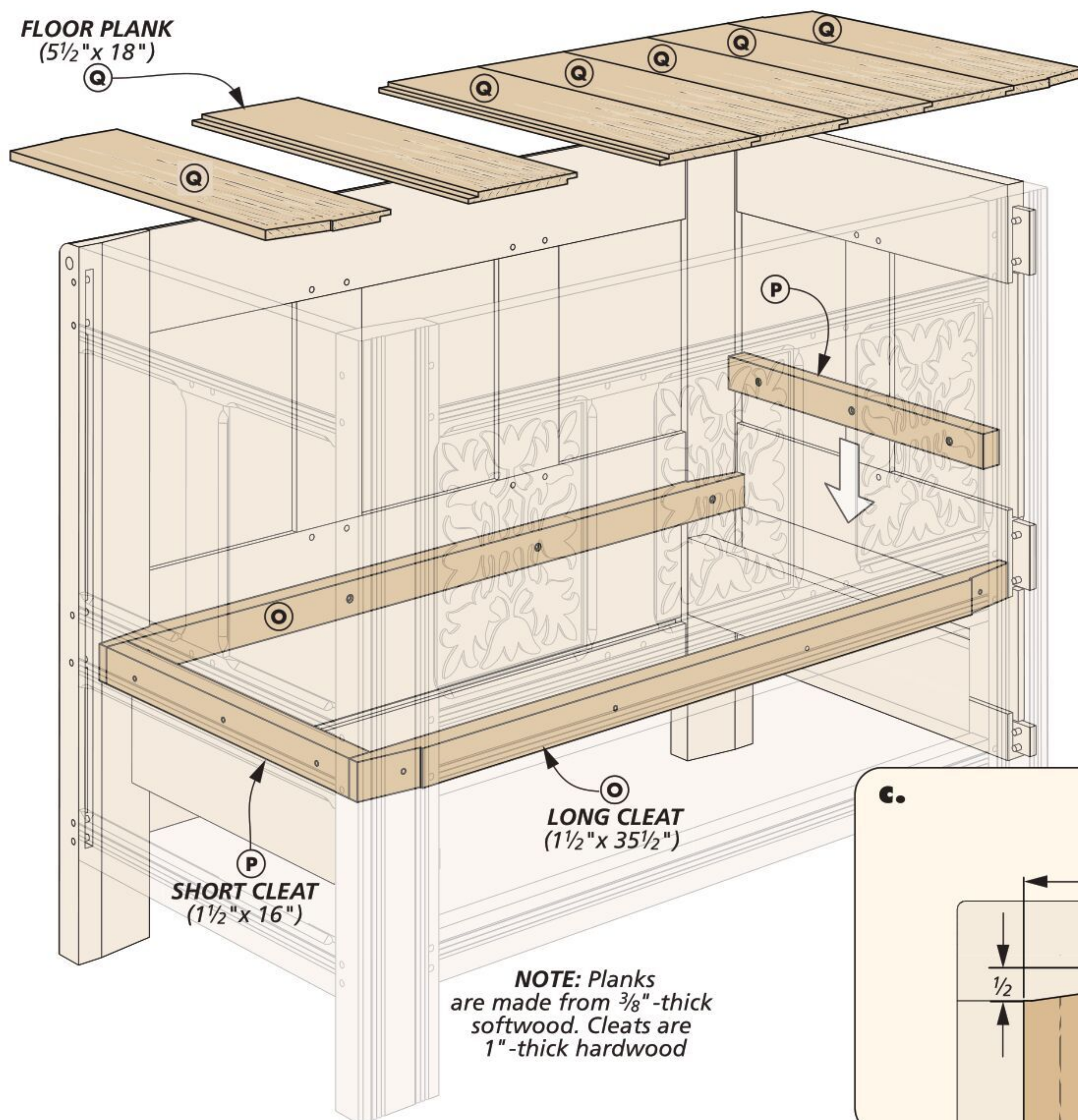
you like; additional shaping to the petals and leaves is another way of making the chest your own. To make the pattern stand out, try texturing the background (Figure 2a). Our shop craftsman, Steve Johnson used a set of wood texturing tools reminiscent of leather working tools. How you choose to texture the background will give the chest your personal touch.

PIN JOINERY. Finally, the drawing and details below show the locations for the dowels that join with the tenons. Cut them flush and sand them smooth before moving on to the chest bottom.



For full-size patterns of decorative panels, and CNC files go to:

Woodsmith.com/260



The 411 on the **BOTTOM & TOP**

In keeping with this chest being a period piece, you'll notice above the seven bottom planks of the chest are made up of secondary wood (fir in our case). They are held in place by cleats that could have been secondary wood as well, but we used oak. Start with making the cleats.

CLEATS FIRST. The long cleats you see above travel over those pesky bevels on the legs. Not to worry though, detail 'a' shows how the ends need to be notched. The short cleats are just short boards, without bevels or notches — a nice break from all the fussy work. The long cleats are screwed in place first, then the short ones. Then it's time to move on to the planks.

PLANKS. If you want to make the chest fancy, you could use red oak for the planks. But like I mentioned earlier, we made the planks out of a secondary wood. After planing the material to thickness, it's off to the table saw to cut the rabbets in the edges of the planks (detail 'b'). You'll also notice in detail 'c' that the end planks are notched in the same way the long cleats were. For now, just notch the starting plank that's at the right side of the chest.

INSTALL THE PLANKS. The planks get one nail through the rabbets to tie them to the cleats. This allows for wood movement. When you come to the last plank on the left, don't be scared, just confirm the

size of the notch needed and cut it out at the band saw. When it's nailed in place, you can move on to making the top.

THE TOP

The top is a glued-up panel that attaches to the chest with a shop-made hinge and hinge pin. Let's kick off with gluing up the panel for the top. When the clamps are off and stowed away, you can haul the top to the table saw and trim it to its final size.

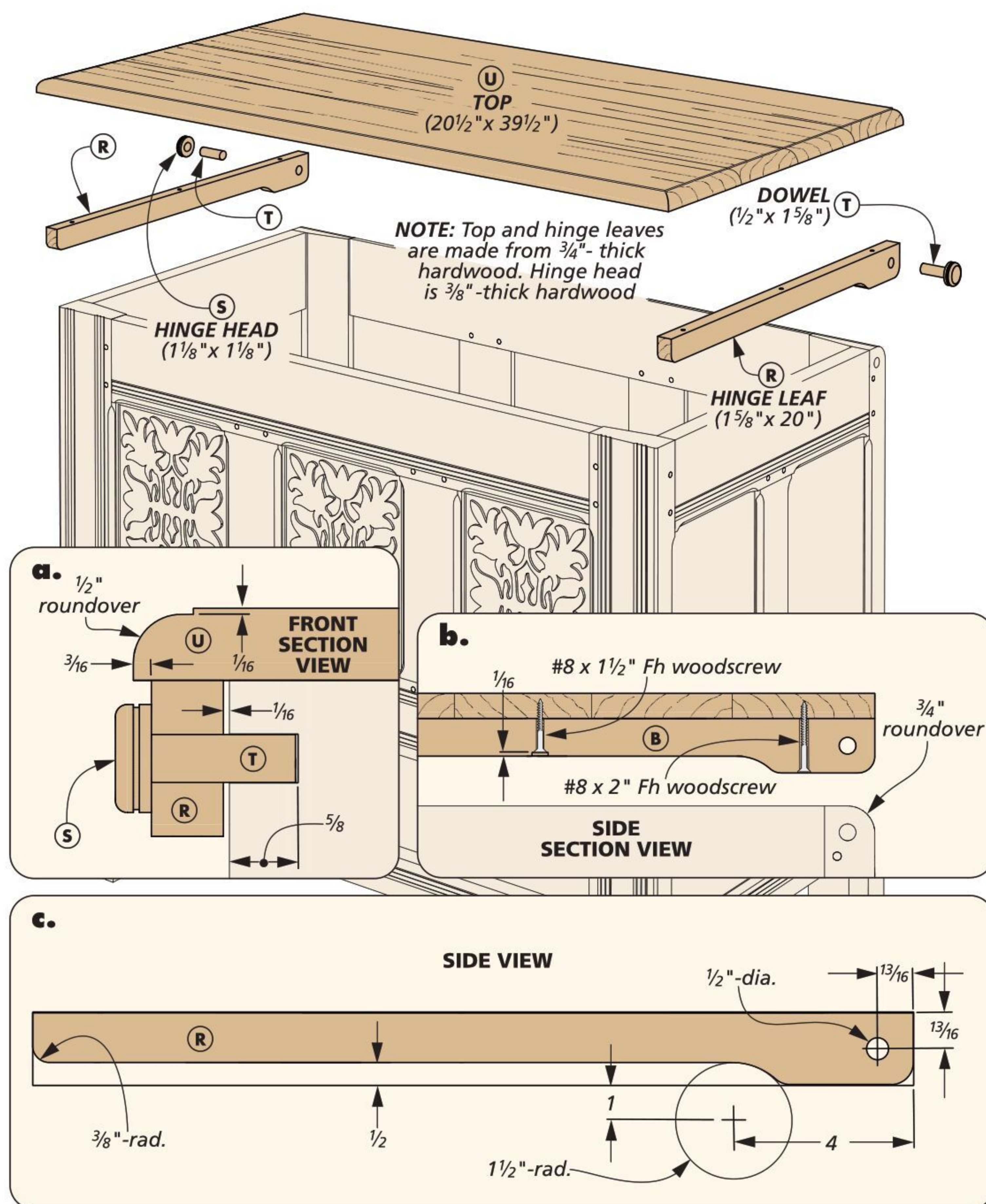
ROUND OVER. Detail 'a' on the next page shows the roundover you need to put on the front and sides of the top. It's a big enough profile that you might want to do it in several passes. Now you get to make hinges.

HINGES. The hinges for the top are simple enough, and all the parts are made by you. Let's look at the long leaf that you see in the drawings here. Detail 'c' shows the wider back-end details that provide more strength around the hinge pin. The narrower front has oversized holes for screwing the hinge to the top (detail 'b'). The band saw creates the profile. The drill press does the rest.

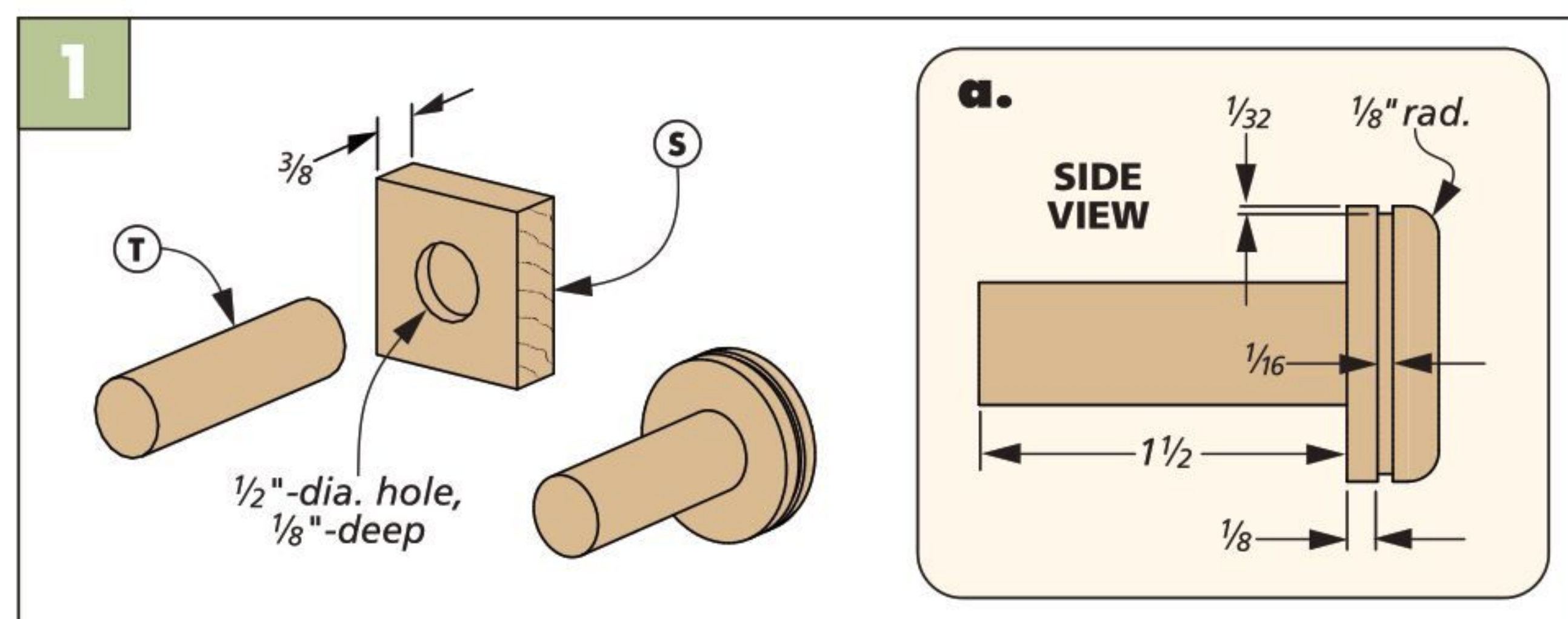
HINGE PINS. The hinge pins (and drawer pulls) are a fun diversion that brings your lathe into the picture. Start off by drilling a hole in a red oak blank (Figure 1) and glue a length of dowel in the opening. Then you can chuck the pin in your lathe and turn the end to the specifications you see in Figure 1a.

ATTACH THE TOP. Before you can attach the top, you need to round over the back edge of the chest as shown in detail 'b.' This provides clearance and lets the top open and close smoothly on the chest.

Next, position the top on the case and hold it in place with double-sided tape. Now drill the stopped holes for the hinge pins (Figure 2). When you've cleared out the holes, you can tap the pins in with a hammer, no glue needed. Let's go make a drawer.

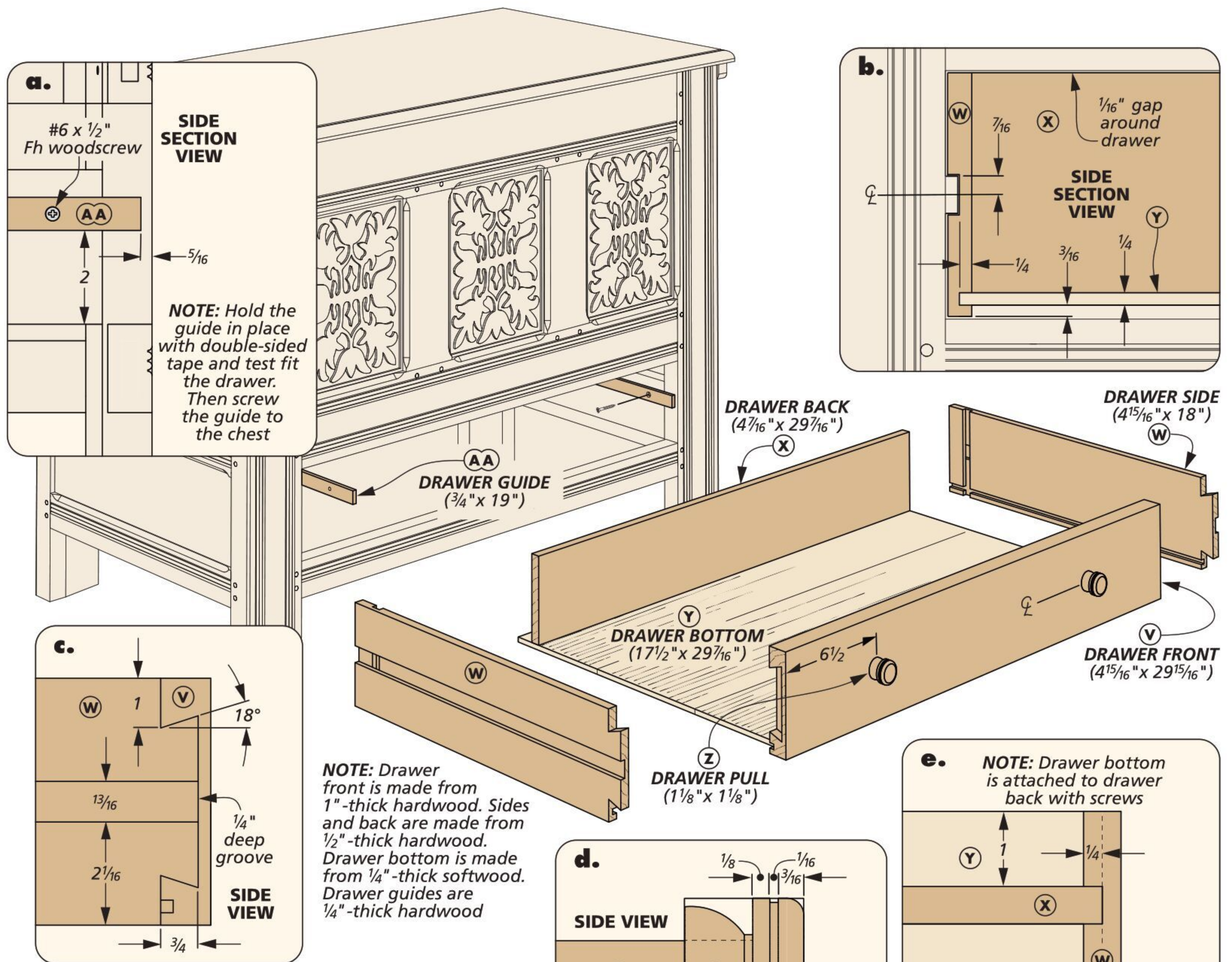


MAKE & INSTALL THE HINGE-PIN



Hinge-Pin Assembly. The hinge pin is made of two parts. A standard dowel acts as the shaft. The head is a piece of oak that will be shaped on the lathe.

Hinge Hole. Double-sided tape holds the top in place while drilling the hole in the legs.



A big ol' DRAWER

A generously sized drawer, hand-crafted by you, is the last stop in this journey. It runs in and out of the chest on the guides that are attached to the drawer rails you made a while back. And as you see in detail 'd' above, the profile of the pulls echo the style of the hinge pins you just made. Once again, in staying true to the history of the chest, the bottom is made from secondary wood, not plywood. Let's start with all the drawer parts.

DRAWER PARTS. Mill all the parts to the final size that's shown in the main drawing above. Note that the drawer front is thicker and sized to fit in its opening with a little clearance for operation. It's a good idea to check

your drawer front in the same manner, just to avoid work later. Now let's focus on the sides.

GROOVES. Cut the grooves in the sides for the guides (detail 'c'). Next, resize your dado set and cut the dados in the sides for the drawer back (detail 'e'). Finish up at the table saw with the grooves for the drawer bottom (detail 'b'). Now it's time for a little hand work.

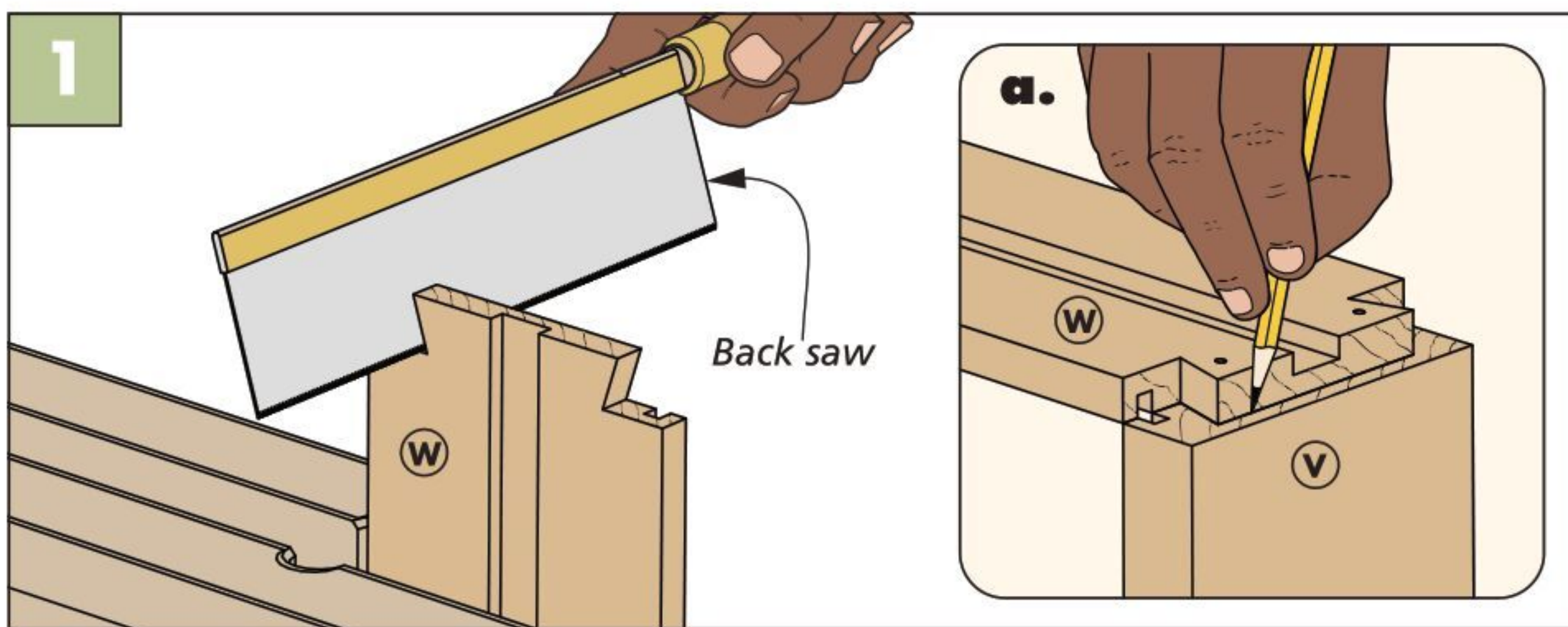
TAILS FIRST. Detail 'c' above shows the configuration of the dovetail joinery. With a back saw and a little quiet time at the bench you'll have these knocked out before you know it.

Figure 1 on the next page shows this. Figures 1a and 2 show how to make the socket. Before putting the drawer together, drill the holes for the drawer pulls.

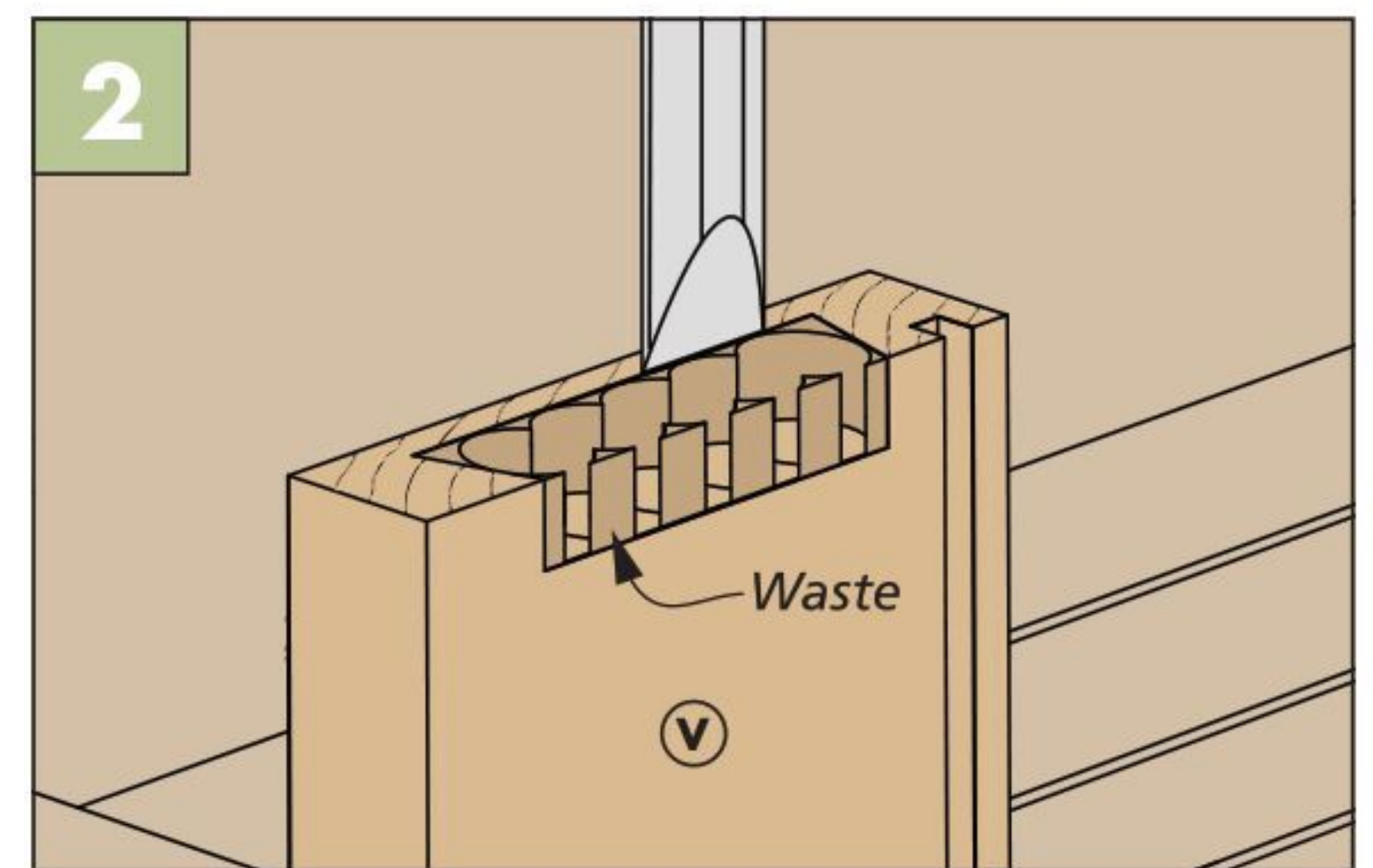
GLUE UP & MORE. While the glue of the drawer is drying in the clamps, you can plane the boards for the bottom to thickness and glue it up as well. The bottom slides into the drawer under the back. This also gives you the option of replacing the drawer bottom if need be.

After you glue the pulls in place — the ones that you made at the same time you made the hinge pins. (I didn't tell you to do that, but you're clever that way.) Finish up the chest by installing the drawer guides **W**

DOVETAIL & SOCKET



The Tail First. With the drawer side held firmly in place in your vise, use a back saw to cut out the profile of the tail. Then use the tail to trace a matching outline on to the drawer front (detail 'a').



Socket Second. A Forstner bit will remove most of the waste. Use a chisel to remove the remaining waste and clean up the socket.

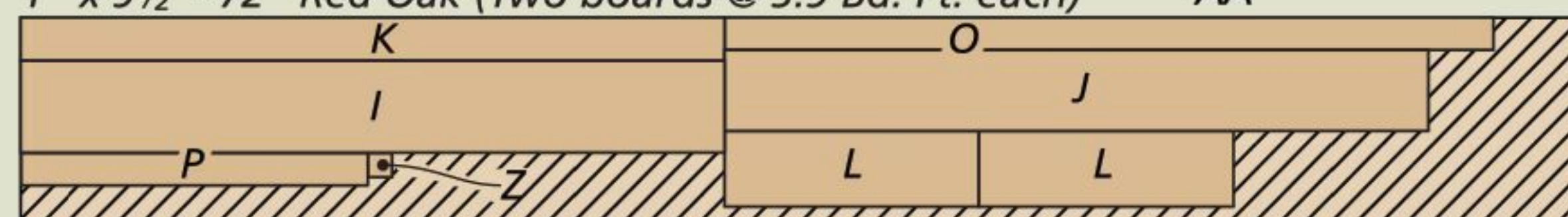
Materials, Supplies & Cutting Diagram

A Legs (4)	$1\frac{1}{2} \times 3\frac{3}{4}$ - 29	K Lower Front/Back Rails (2)	1×2 - $32\frac{1}{2}$	U Top (1)	$\frac{3}{4} \times 20\frac{1}{2}$ - $39\frac{1}{2}$
B Upper Side Rails (2)	$1 \times 4\frac{1}{4}$ - 19	L Front/Back Stiles (4)	$1 \times 3\frac{1}{2}$ - $11\frac{3}{4}$	V Drawer Front (1)	$1 \times 4\frac{15}{16}$ - $29\frac{15}{16}$
C Middle Side Rails (2)	$1 \times 3\frac{3}{4}$ - 19	M Front/Back Panels (6)	$\frac{3}{8} \times 8\frac{5}{16}$ - $10\frac{3}{8}$	W Drawer Sides (2)	$\frac{1}{2} \times 4\frac{15}{16}$ - 18
D Lower Side Rails (2)	1×2 - 19	N Lower Back Panel (1)	$\frac{3}{8} \times 5\frac{5}{8}$ - $30\frac{5}{8}$	X Drawer Back (1)	$\frac{1}{2} \times 4\frac{7}{16}$ - $29\frac{7}{16}$
E Side Stiles (2)	$1 \times 2\frac{3}{4}$ - $11\frac{3}{4}$	O Long Cleats (2)	$1 \times 1\frac{1}{2}$ - $35\frac{1}{2}$	Y Drawer Bottom (1)	$\frac{1}{4} \times 17\frac{1}{2}$ - $29\frac{7}{16}$
F Upper Side Panels (4)	$\frac{3}{8} \times 7\frac{7}{8}$ - $10\frac{1}{2}$	P Short Cleats (2)	$1 \times 1\frac{1}{2}$ - 16	Z Drawer Pulls (2)	$\frac{7}{8} \times 1\frac{1}{8}$ - $1\frac{1}{8}$
G Lower Side Panels (2)	$\frac{3}{8} \times 5\frac{5}{8}$ - $17\frac{5}{8}$	Q Floor Planks (7)	$\frac{3}{8} \times 5\frac{1}{2}$ - 18	AA Drawer Guides (2)	$\frac{1}{4} \times \frac{3}{4}$ - 19
H Drawer Rails (2)	$1 \times 3\frac{1}{2}$ - $18\frac{9}{16}$	R Hinge Leaves (2)	$\frac{3}{4} \times 1\frac{5}{8}$ - 20	• (18) #8 x $1\frac{1}{2}$" Fh Woodscrews • (2) #8 x 2" Fh Woodscrews • (8) #6 x $\frac{1}{2}$" Fh Woodscrews	
I Upper Front/Back Rails (2)	$1 \times 4\frac{1}{4}$ - $32\frac{1}{2}$	S Hinge Heads (2)	$\frac{3}{8} \times 1\frac{1}{8}$ - $1\frac{1}{8}$		
J Middle Front/Back Rails (2)	$1 \times 3\frac{3}{4}$ - $32\frac{1}{2}$	T Dowels (4)	$\frac{1}{2} \times \frac{1}{2}$ - $1\frac{5}{8}$		

$\frac{1}{2}$ " x 6" - 66" Red Oak (2.8 Sq. Ft.)

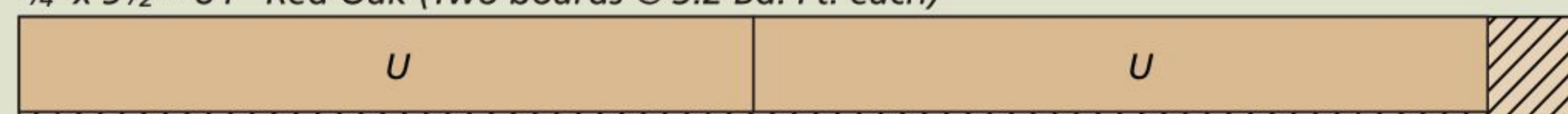


1" x 9 $\frac{1}{2}$ " - 72" Red Oak (Two boards @ 5.9 Bd. Ft. each)



ALSO NEEDED: Two $\frac{1}{4}$ " x 48" Oak dowels

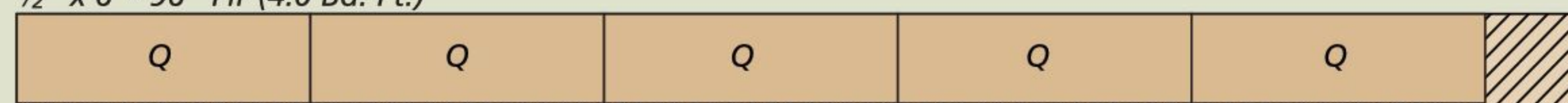
$\frac{3}{4}$ " x 5 $\frac{1}{2}$ " - 84" Red Oak (Two boards @ 3.2 Bd. Ft. each)



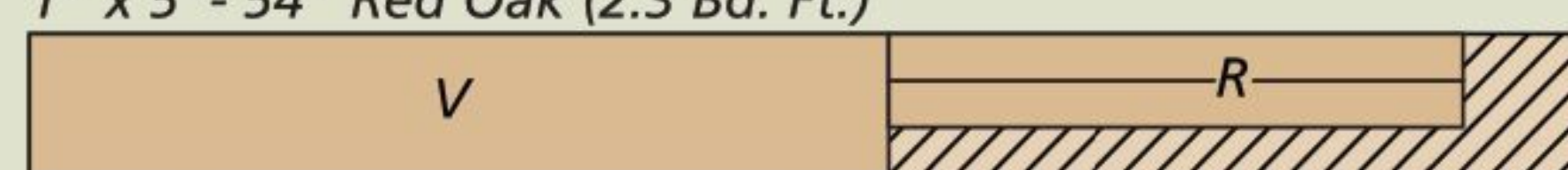
$\frac{1}{2}$ " x 8 $\frac{1}{2}$ " - 90" Red Oak (Two boards @ 5.3 Sq.Ft. each)



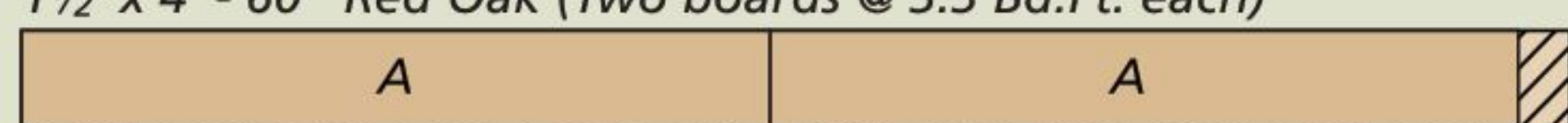
$\frac{1}{2}$ " x 6" - 96" Fir (4.0 Bd. Ft.)



1" x 5" - 54" Red Oak (2.3 Bd. Ft.)



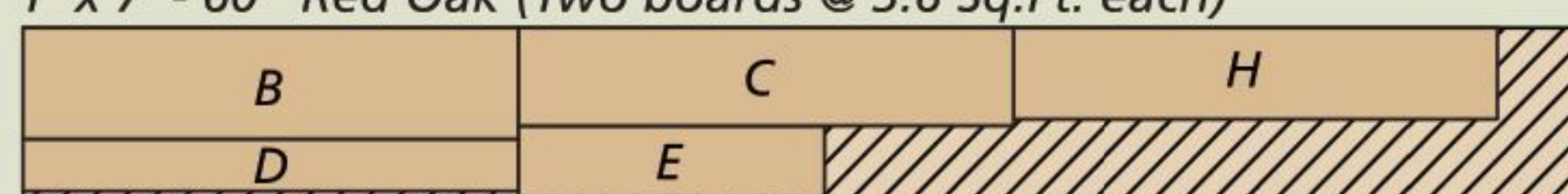
$1\frac{1}{2}$ " x 4" - 60" Red Oak (Two boards @ 3.3 Bd.Ft. each)



$\frac{1}{2}$ " x 9" - 48" Fir (Two boards @ 3.0 Sq.Ft. each)



1" x 7" - 60" Red Oak (Two boards @ 3.6 Sq.Ft. each)



Porch Bench

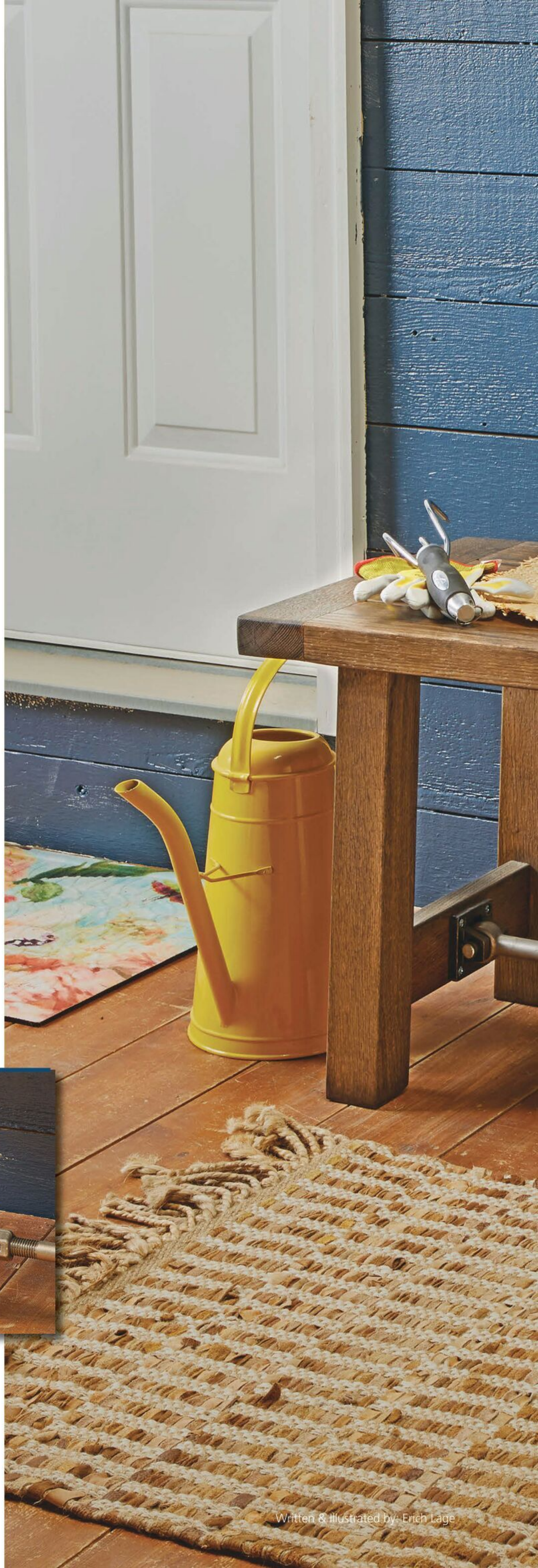
Simple, sturdy, and stylish — you can't ask for much more when it comes to a bench that lives on the porch.

It can be a harrowing event moving from messy outdoor activities to the indoor domain. You need a buffer that can take the hit of shedding the boots, coats, and other mud-caked paraphernalia. If you don't have a mud room, you can park the good-looking bench you see here by any entryway.

SERIOUSLY SOLID. It's surprising how solid and strong this bench is for no more than it weighs. 8/4 oak was the wood of choice for all the parts of this project. The thick legs are glued up from this material and gives you the opportunity to put the best face forward. You'll also notice that the legs are angled outward; it's subtle, but it adds a little more stability to the bench. Not to mention its eye appeal.

You can't see them but there are tenons at the top of the legs that are epoxied to mortises in the bench. The bench's bread-board ends are held in place with big lag screws. They pair well with the hardware that's attached to the bench via the stretchers.

All of these components add up to a bench that's fun to build, durable enough for outdoor weather, and handsome enough to reside at the main entry of your home. I'm thinking that building more than one is a good idea.

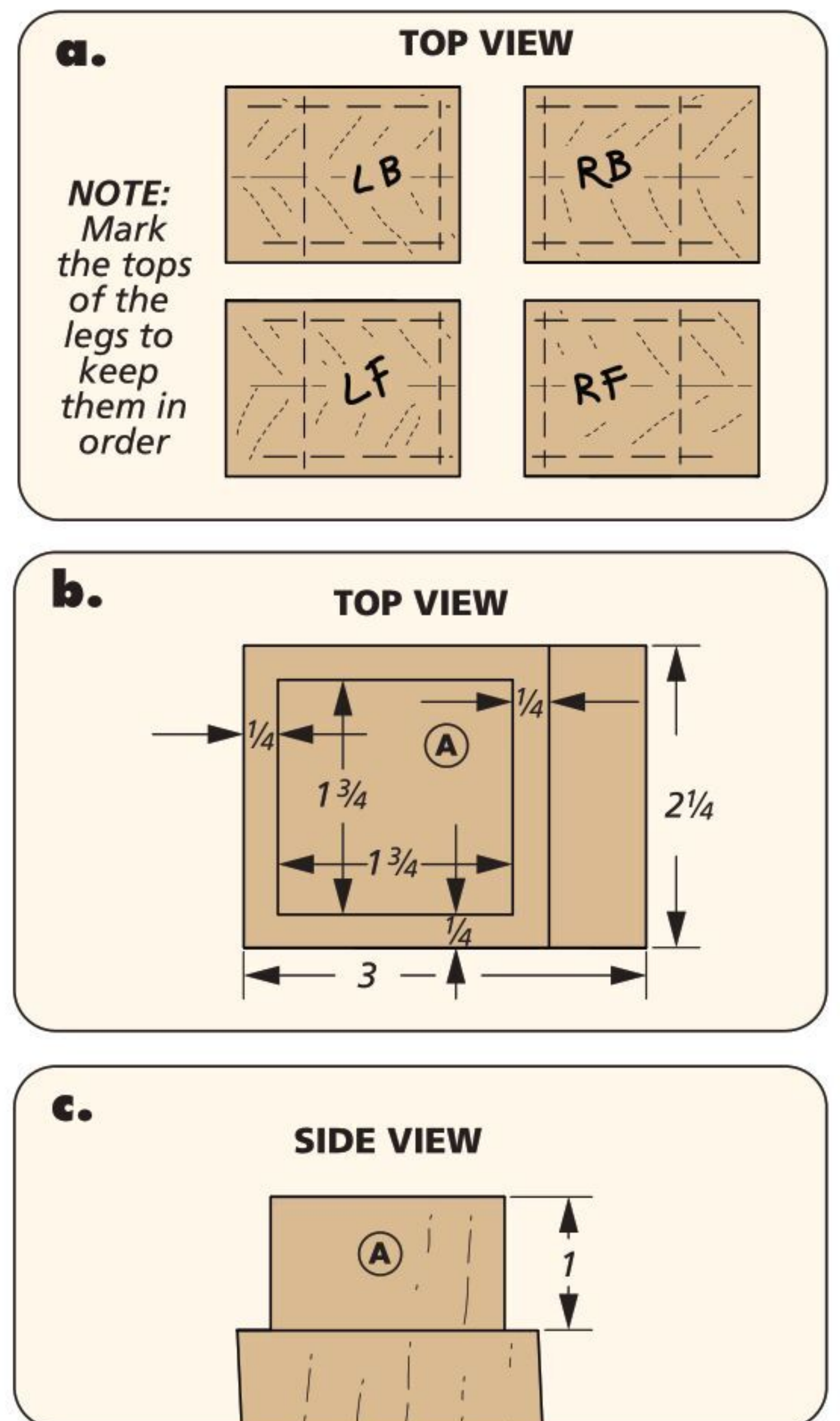
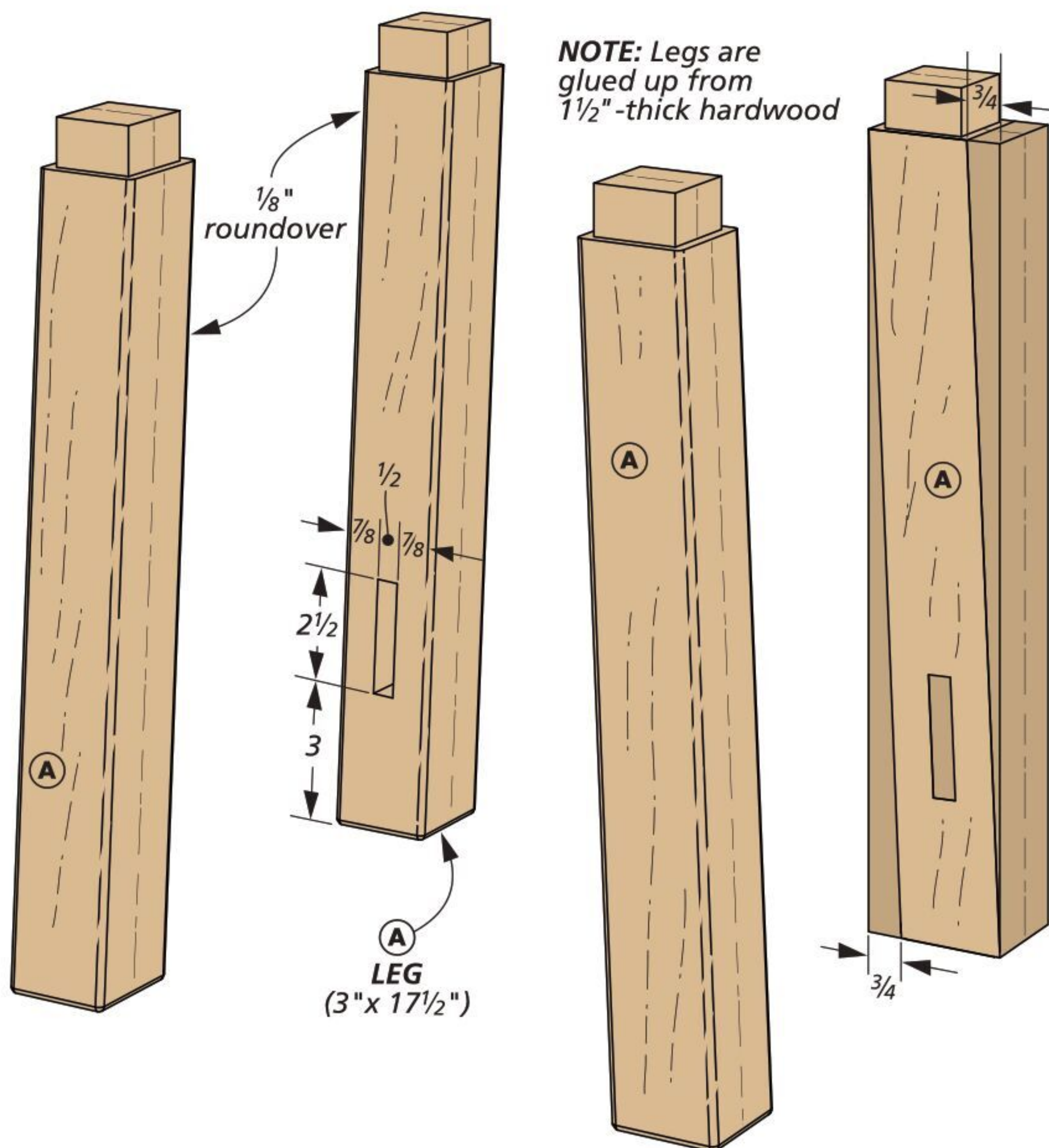


▲ The hardware that ties the legs of the bench together is not your everyday hardware. The trio of the brackets, rods, and turnbuckle guarantee that the bench is up to any abuse that could be thrown its way.



▲ The breadboard ends are a classic touch that adds rustic charm to the bench. It's also a pragmatic way to cap the ends of the bench's seat. The ends are held in place with lag screws that will last a lifetime.





Crafting the **LEGS & STRETCHERS**

The hefty legs you see in the drawings above start out as big rectangular blanks. They have large tenons that are offset on the top to join with the mortises in the underside of the bench.

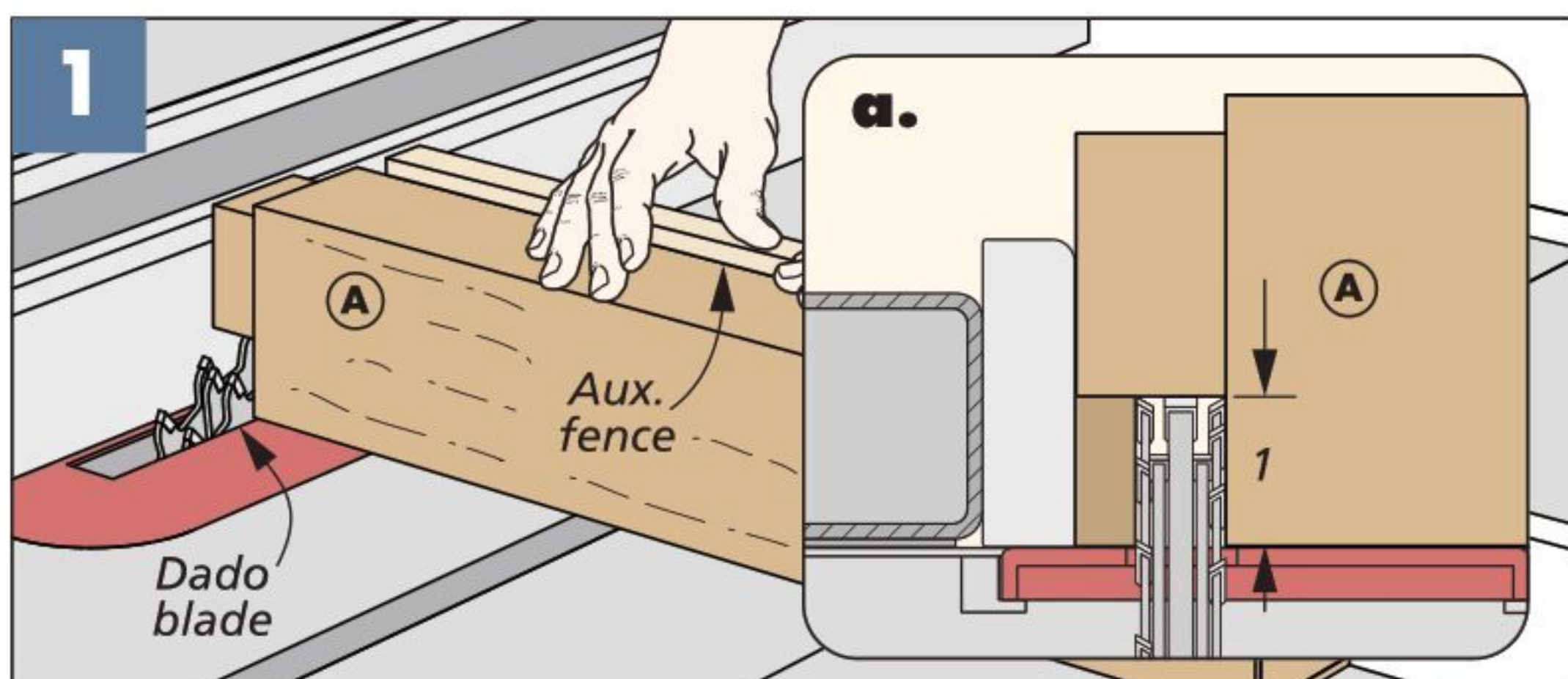
As I mentioned earlier, the legs are angled to add stability. To arrive at the angles, the legs are tapered on opposite sides. First you need to glue up the blank.

GLUE UP & SIZING. Take some time to select the best faces of the legs to face outward. Then mark the tops accordingly like you see in detail 'a'. Sizing the leg blanks involves, ripping, gluing, clamping, cleanup, packing clamps away, scraping squeeze out, and sanding. Nothing to it, right? Do any squaring-up needed on the ends at the miter

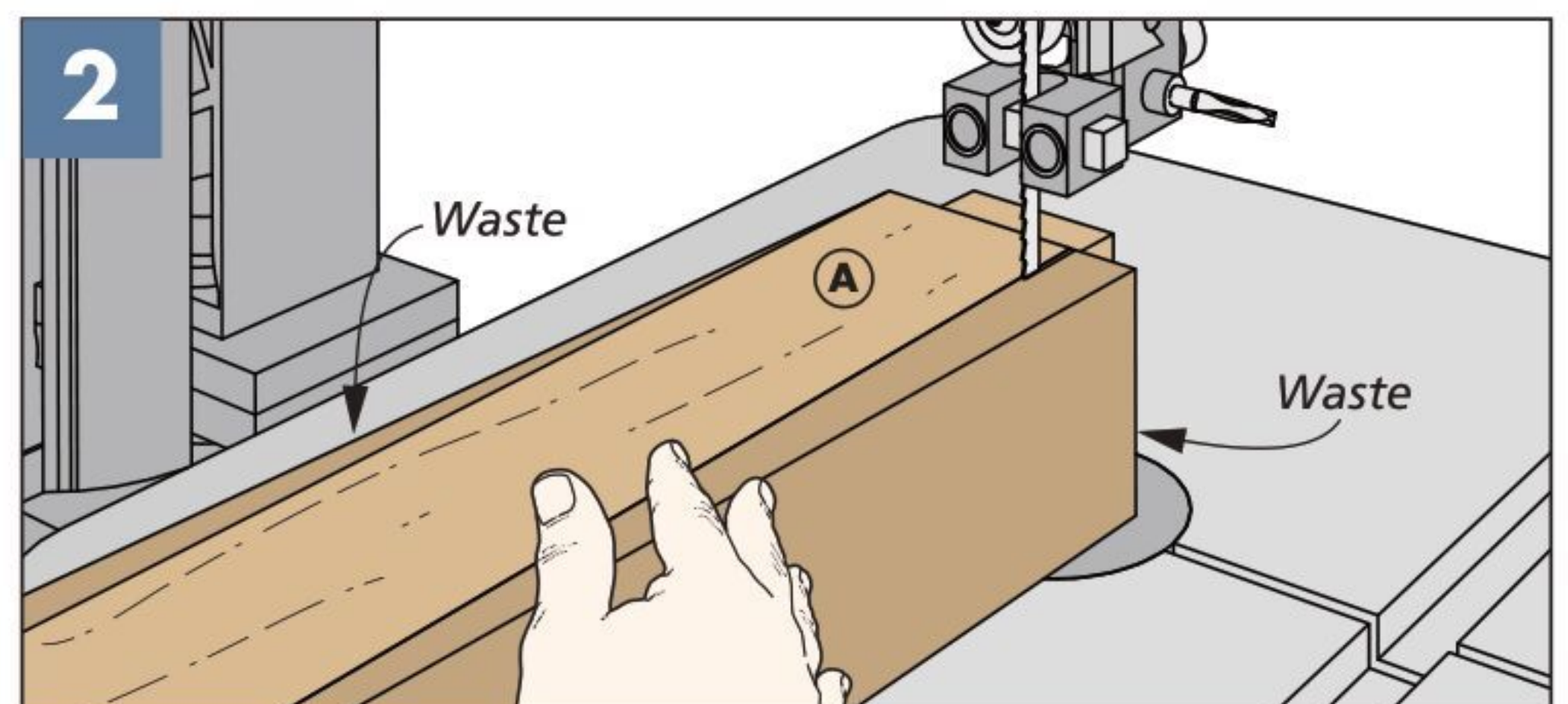
saw. Then you can sand the bottoms of the legs smooth.

Although the legs are angled to the bench, the tenons are not. So cutting the offset tenons on the top of the legs while the legs are square is next on the agenda. Technically, after you taper the legs in the next step the tenons will be centered like you see in details 'a' and 'b' above. I used

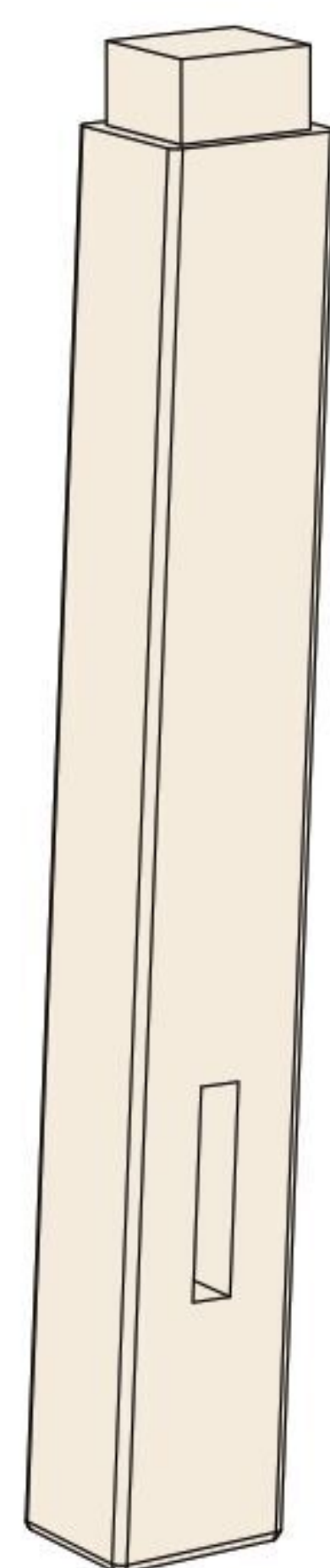
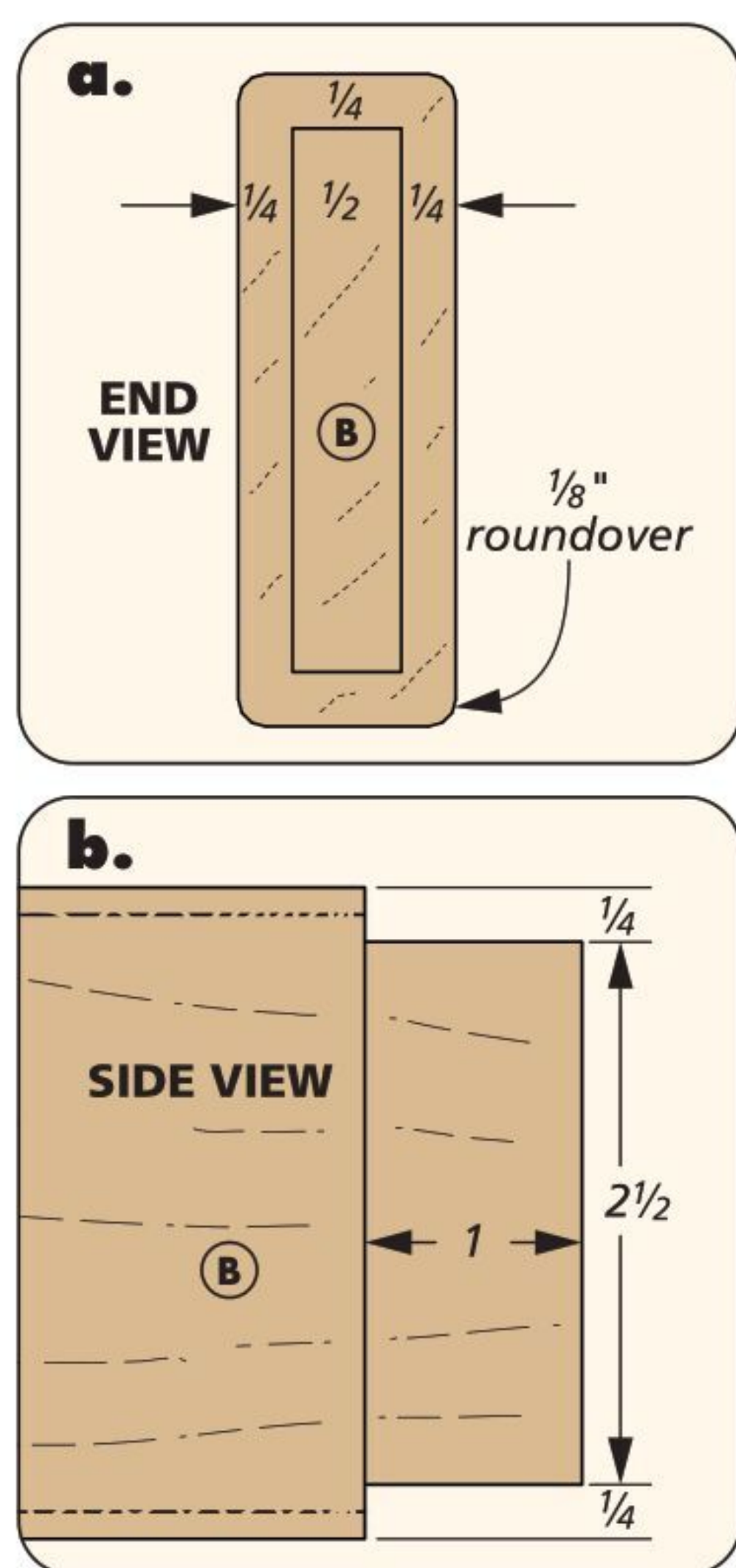
TENONS & TAPERS



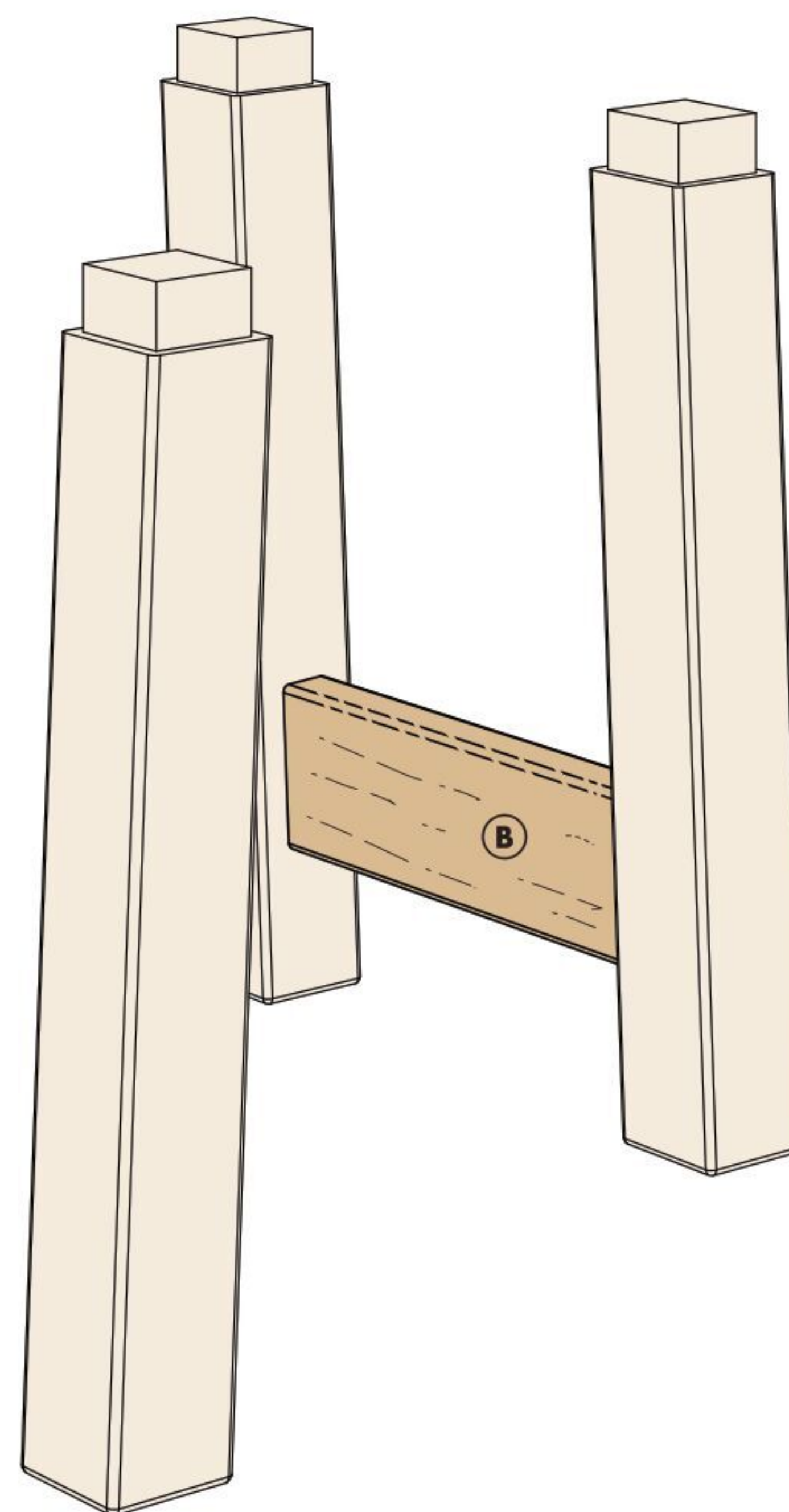
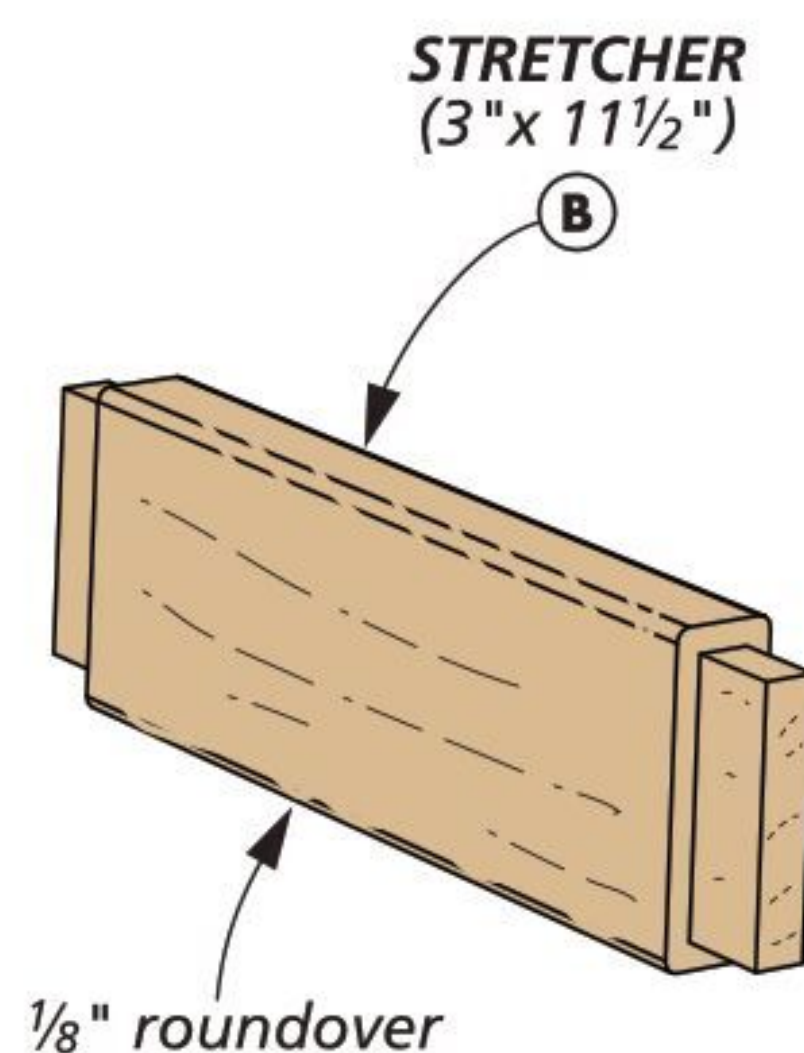
Shaping the Tenon. The table saw rip fence is used to locate the shoulders of the tenon. To finish the cheeks just back the leg away from the fence after each pass.



Taper Times Two. Your band saw will make short work of cutting the tapers on the sides of the legs. Stay on the waste side of the layout line as you make the cut.



NOTE: Stretchers are made from 1 1/2"-thick hardwood planed to 1" thick



the quartet of the table saw, the rip fence, miter gauge, and a dado blade to define the shoulders of the tenons. The rip fence is the stop. The miter gauge holds the leg square to the blade. Figure 1 at the bottom of the previous page shows cutting the offset cheek. Now you can focus on tapering the legs.

TIME FOR TAPERS. The main drawing on the previous page shows dimensions for the tapers that you need to cut on the sides of the legs. The tapers are simple really, just refer to the marks

you made earlier on the tops of the legs when drawing the cut lines on the leg faces. Then it's off to the band saw, to cut to the waste side of the line on all the legs (Figure 2, previous page). That will leave you some meat to plane the legs smooth. Making the stretchers is on the horizon, but first let's make their mortises in the legs.

MORTISES. Cutting the mortises on the inside faces of the legs couldn't be easier. It's just a matter of using your combination square to mark the walls and the ends of the mortises. The dimensional information is in the main drawing on the previous page. A Forstner bit in the drill press hogs away most of the waste in the mortise. The box to the left shows this in action. Then back at the bench you can square up the walls and corners of the mortises

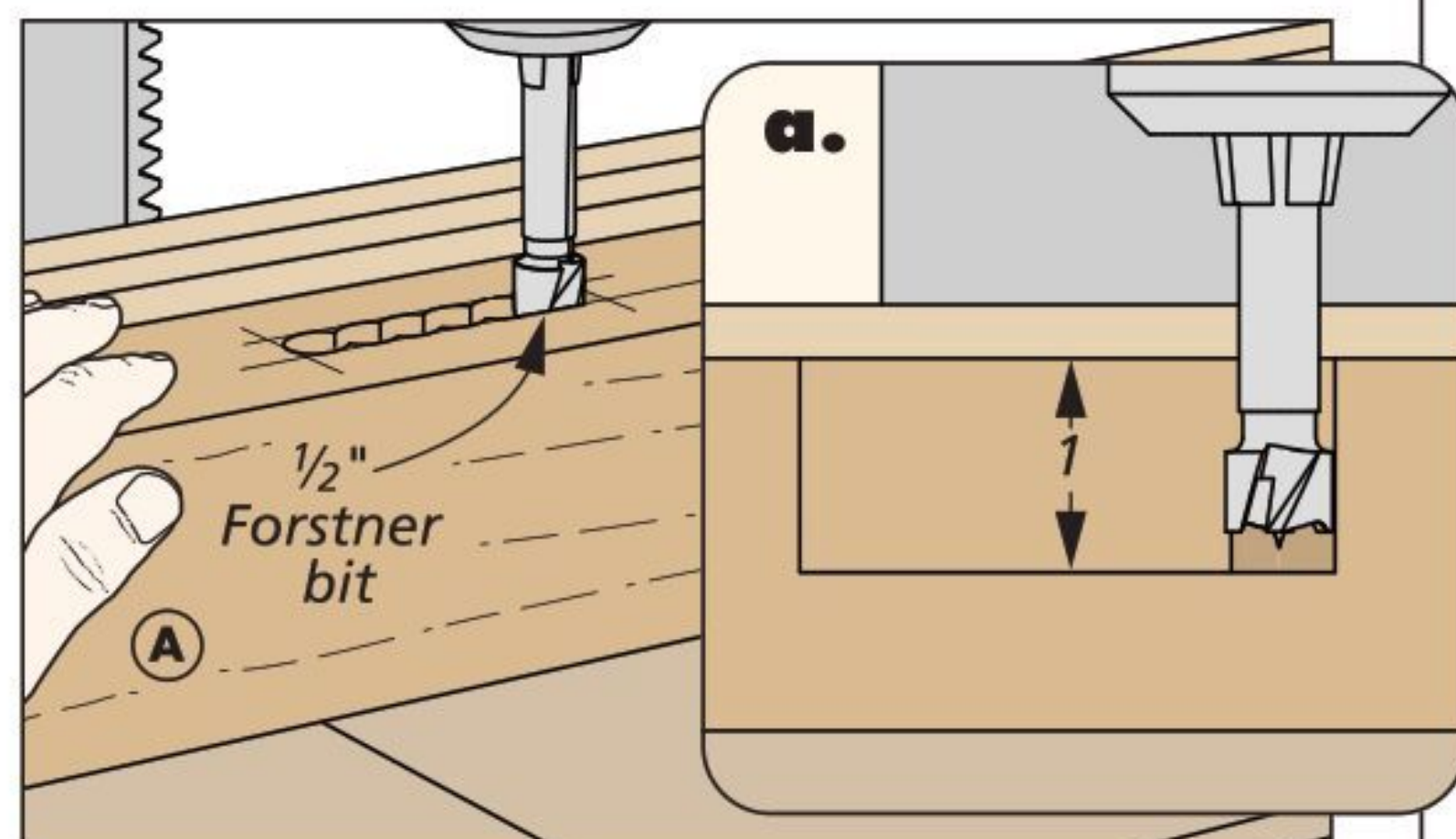
with a chisel. With that, you can head over to the table saw to make the stretchers.

STRONG STRETCHERS

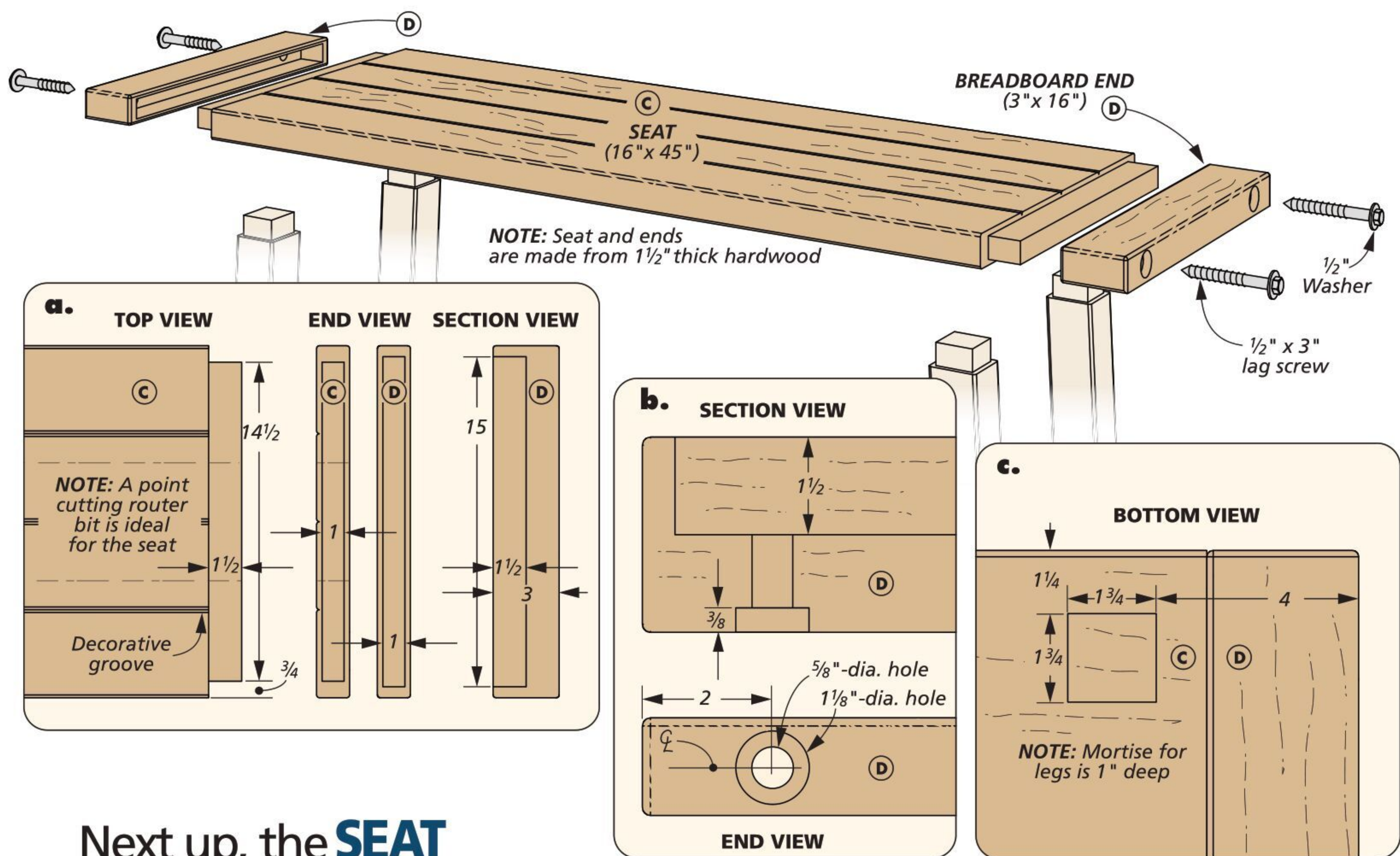
The stretchers that tie the front and back legs together are every bit as beefy as the legs. After cutting the two pieces to size, you'll need to install a dado set to make the tenons. Since the tenon is centered on the stretcher, making the tenons has one less step than the tenons you made on the legs (Details 'a' and 'b' above). Just set the fence to define the shoulders. As you did with the legs, finish the cheeks by backing the stretcher away from the fence.

Gluing up the legs and the stretchers is a simple affair. But it's wise to make sure the legs are square to the stretcher. A quick confirmation with your combination square is a good idea. Removing any squeezeout with a warm wet rag saves clean-up time after the fact. Now it's time to make the seat of the bench.

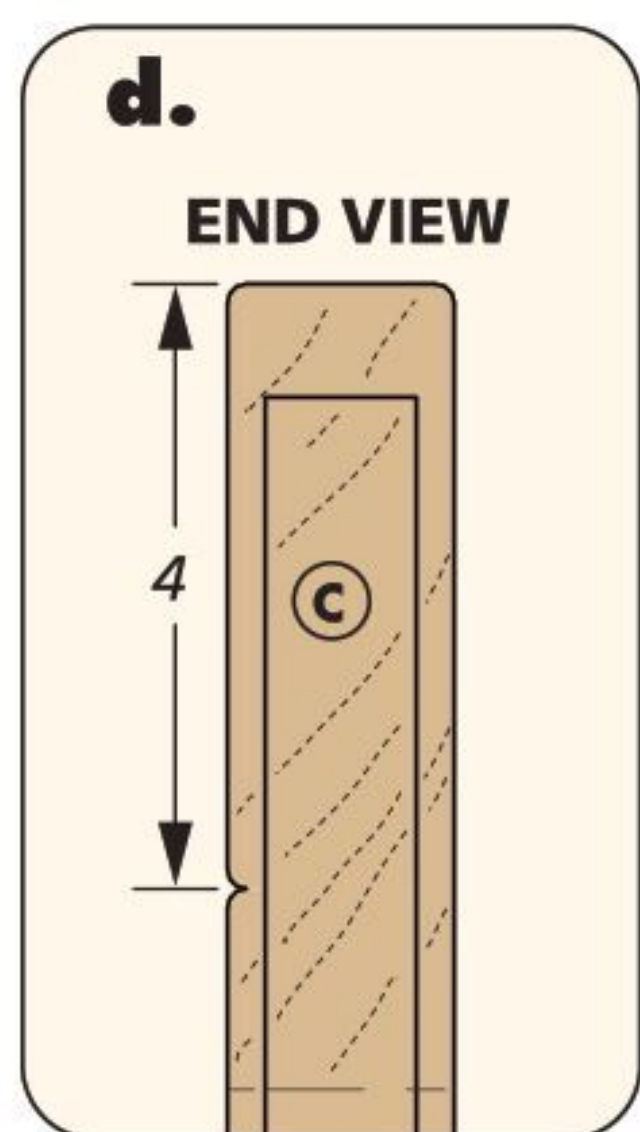
STRETCHER MORTISE



Forstner to the Rescue. A Forstner bit lets you nibble away the waste to create the mortises for the stretchers.



Next up, the **SEAT**



As you see in the main drawing above, thick boards make up the seat of the bench. They're complemented by the no-nonsense breadboard ends that are screwed to them.

Breadboard ends perform several tasks. Structurally they prevent the seat they're attached to from cupping. Visually, they hide the end grain of the seat.

More on the virtues of breadboard ends later, let's start on the boards for the seat.

SEAT BOARDS. At first glance it's easy to assume that the bench is glued up from four boards of equal width, but they're not. They could be, but it's less work to glue up the panel without regard for the width of the boards you're using and

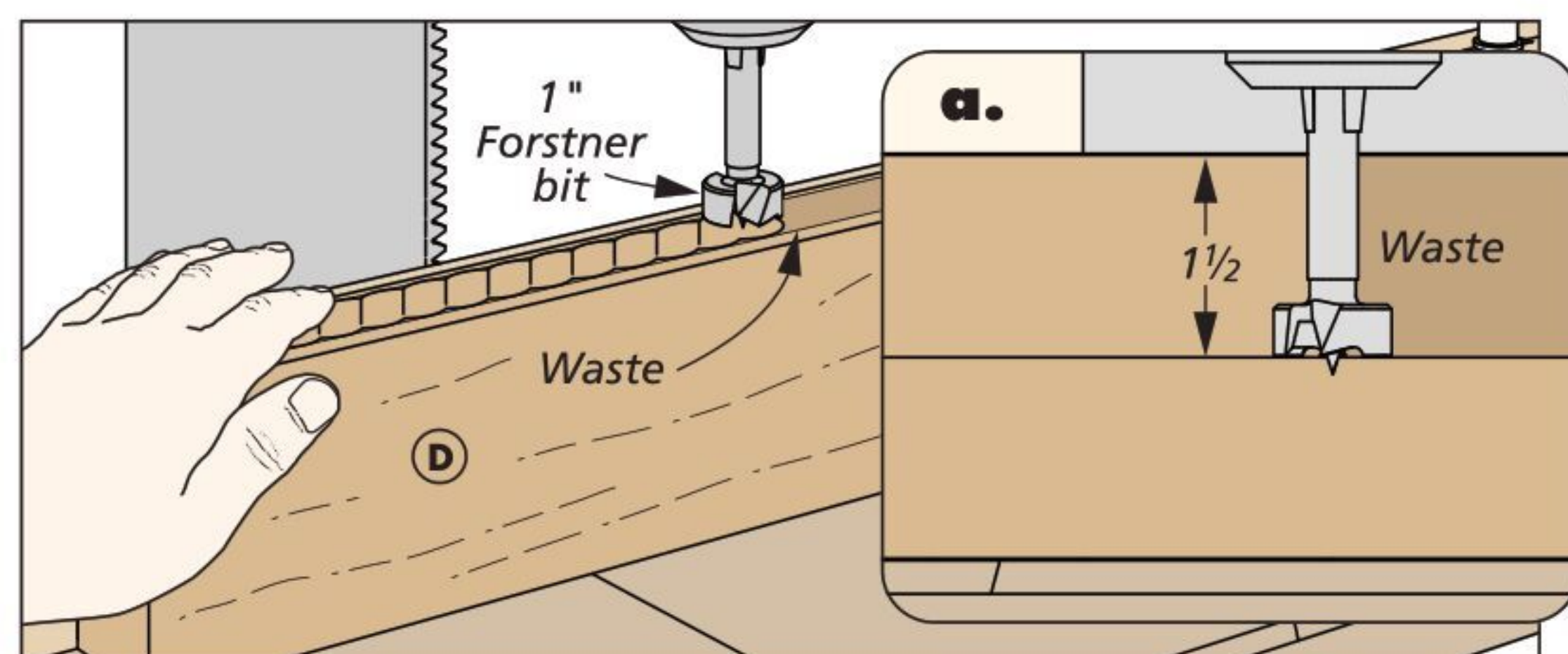
create the look later with a router bit. This way, there's no glue squeezeout between the finished roundovers to worry about. And you're not required to have boards of a specific width. So once the clamps are put away and the seat is scraped clean, you can focus on making the tenons.

TENONS. Forming the tenons called for a trip to the table saw where I installed an appropriate dado blade. The rip fence acted as a stop while cutting the shoulders and cheeks on the top and bottom face.

To finish the tenons, cut the edge shoulders with a back saw at the bench. Detail 'a' above shows the dimensions.

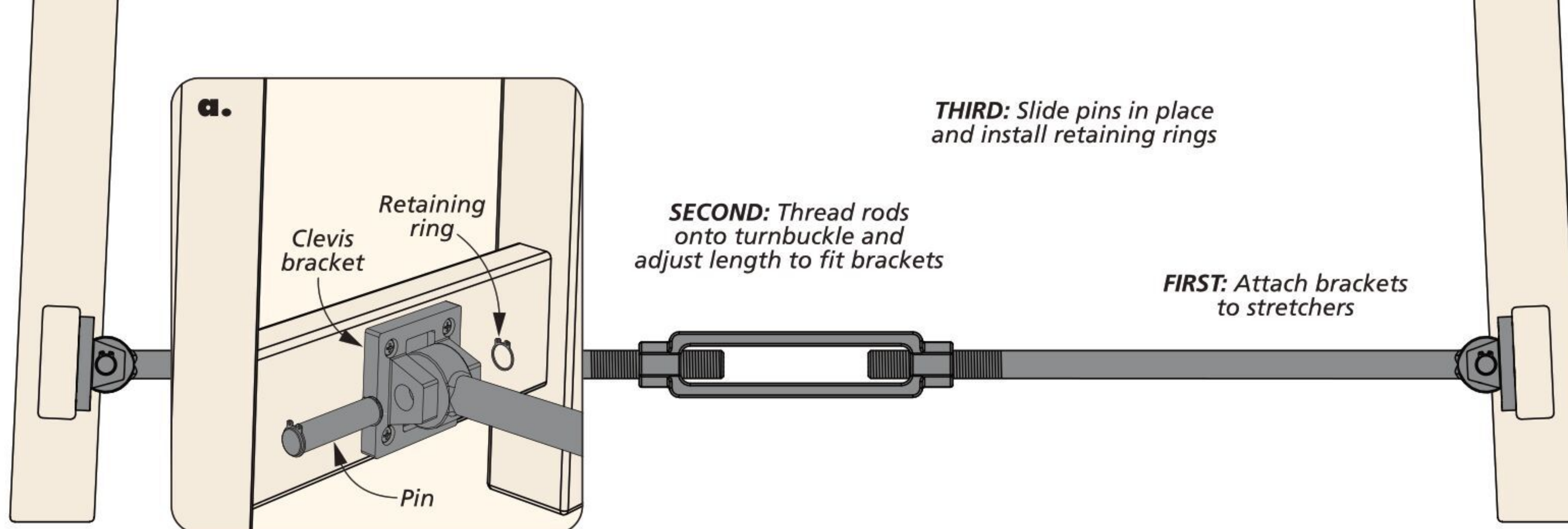
To get the look of four uniform boards requires a trip to the router table. There, you need to install a point cutting roundover bit (photo at left). Rout the center grooves, then the outer two grooves. The breadboard ends are next on your list.

BREADBOARD MORTISE



Drill Press to the Rescue. Patience is a virtue when it comes to making the deep, long mortises in the breadboard ends. A Forstner bit along with a chisel will clear out the long mortise.

▲ The point cutting router bit is from Amana Tool (56123).



BREADBOARD ENDS

The breadboard ends have a large mortise on the inside edge. Notice in detail 'a' on the previous page that the mortise is longer than the tenon. This is to allow for the expansion of the seat. After cutting the ends to size, I used the drill press and a Forstner bit to remove most of the waste. The box below left shows how to pull this off. When you're done with the mortise, square up the corners and sides with a chisel.

Now you need to drill a series of holes in the breadboard ends and the edges of the bench for the lag screws. Start with a Forstner bit in your drill press to drill the counterbores for the head of the lag screw. Next, still at the drill press, drill the shank holes with a brad point bit (Detail 'b' previous page).

PILOT HOLES. To locate the pilot holes in the tenons of the bench, slip the ends over the tenons and use the shank hole bit to locate the center of the pilot holes. Then you can screw the lags smoothly in place after applying a little beeswax to the threads. There's one more woodworking chore to do to complete the bench — the mortises on the underside of the seat for the leg tenons.

BIG MORTISES. Detail 'c' on the previous page shows the information you need to make the mortises. You can make a template and use a dado clean-out bit in your router. Or, you can draw the mortise locations and free-hand the mortises. Either way you choose, you'll have to make multiple passes to get to the final depth of the mortises. Then square up the corners with

a chisel. Now it's time to bring the legs and the bench together.

EPOXY TIME. Using epoxy to attach the legs to the bench solves two problems. First, epoxy answers the riddle of how to clamp the legs to the bench — you don't have to. Epoxy also adds an extra level of strength to the bond between the legs and the bench that glue doesn't. Once the epoxy has cured, you can apply the finish. At Woodsmith.com/260 there are instructions for a finish that will give the bench an aged look.

The turnbuckle hardware is the last box to check on the list. After attaching the clevis brackets to the stretchers (detail 'a'), the rods and turnbuckle can be maneuvered into place and tightened. And there you have it — one handsome looking bench for your porch. **W**



For more on applying a weathered finish to the bench, go to:

Woodsmith.com/260

Materials, Supplies & Cutting Diagram

- | | | |
|------------------------------|--------------------|---|
| A Legs (4) | 2 1/4 x 3 - 17 1/2 | • (4) 1 1/2" x 3" - Lag Screws and washers |
| B Stretchers (2) | 1 x 3 - 11 1/2 | • (2) Clevis Brackets with screws |
| C Seat (1) | 1 1/2 x 16 - 45 | • (1) 3/4" x 16 1/2" Right Threaded Rod End |
| D Breadboard Ends (2) | 1 1/2 x 3 - 16 | • (1) 3/4" x 16 1/2" Left Threaded Rod End |
| | | • (1) 3/4" x 6" - 4" Turnbuckle |

1 1/2" x 6 1/2" - 48" Red Oak (4.3 Bd. Ft.)

A	NOTE: Part 'B' is planed to 1" thick	B	D
A		B	D

1 1/2" x 6 1/2" - 66" Red Oak (Three Boards @ 6.0 Bd. Ft. Each)

A	C
A	

Watering Vessel



► Our designer for this project, Dillon Baker, was inspired by the swan carvings done by his grandfather.



Organic shapes aren't always common in woodworking. Most tools are better suited to cutting straight lines and square corners, but this wooden watering vessel defies expectations in more ways than one. The shape of this project was inspired by the swan carvings done by our designer's grandfather. The swooping curves of the vessel are designed to evoke the look of such carvings.

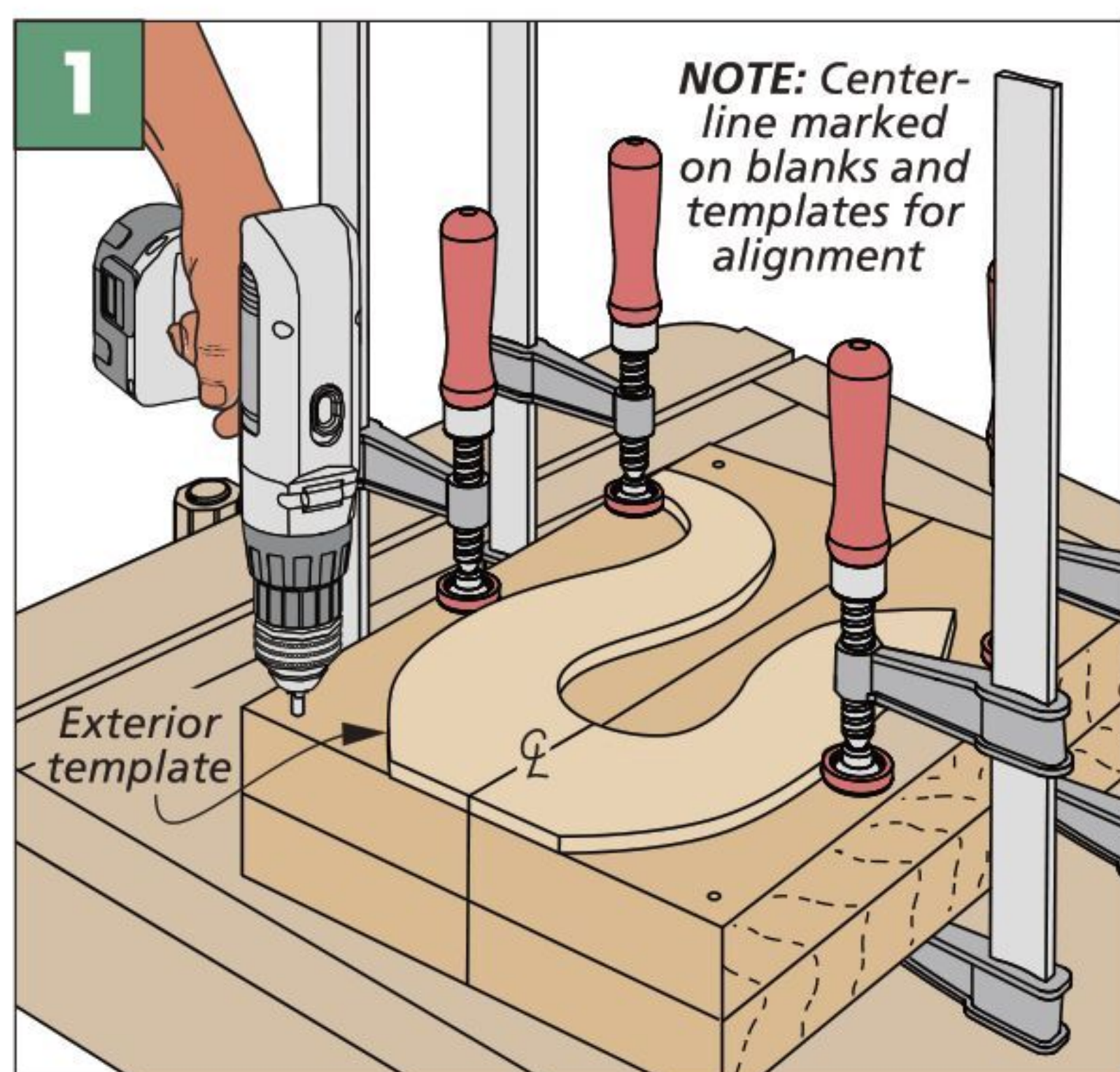
Templates and a router do a lot of the work here. They're used to create the interior channel and the stepped

basin on two halves of the vessel. The halves are then glued together, and another template is used to form the rough profile of the exterior.

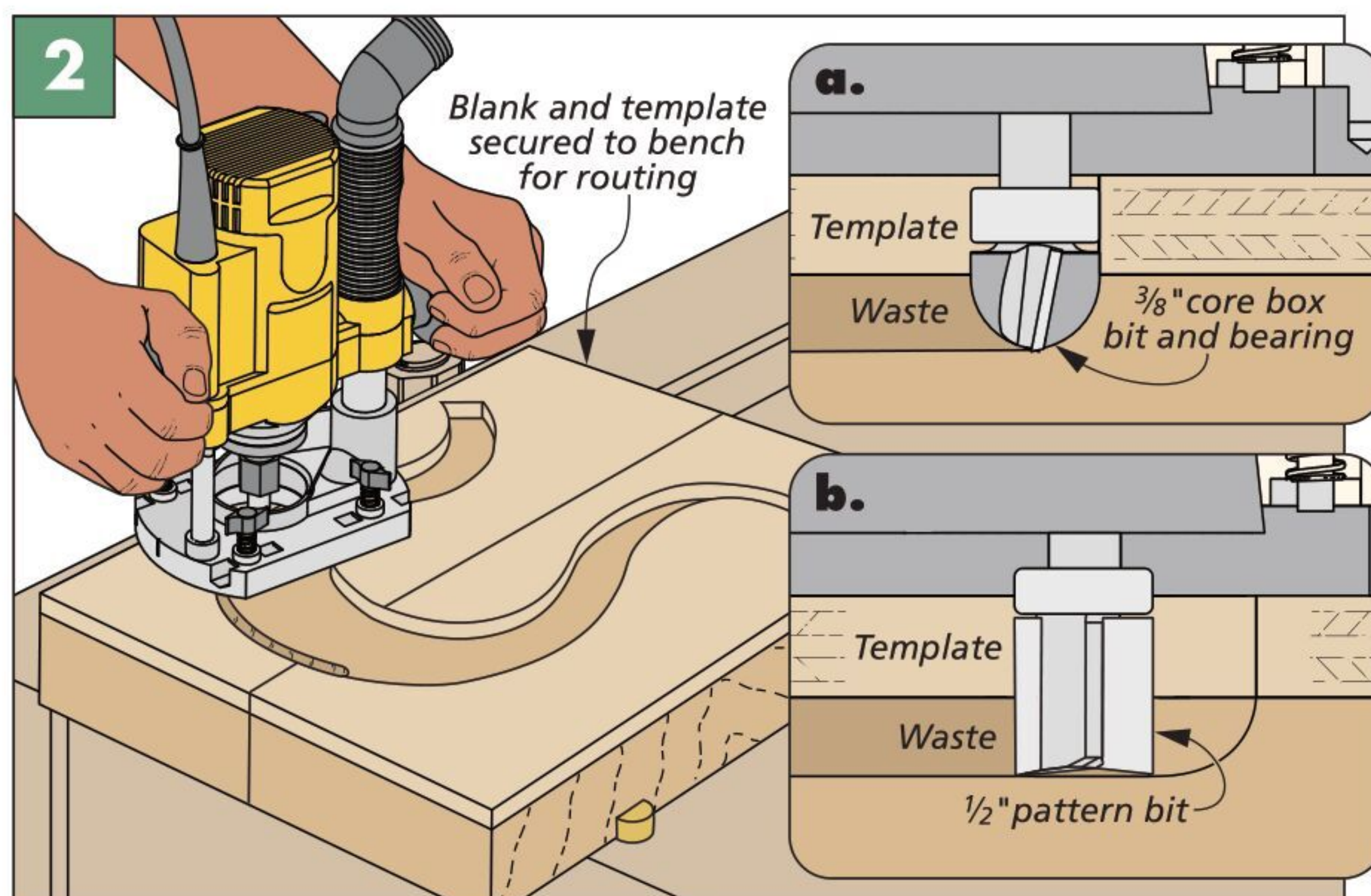
PREP THE PANELS. Start by gluing up a panel from 8/4 stock (we chose walnut). Once dry, mill it down to 1½" and crosscut the panel in half to form the two sides of the watering vessel.

Next, print out the patterns (Woodsmith.com/260), transferring them onto plywood to make the templates. First, you'll need to clamp the halves together and lay out the centerline on

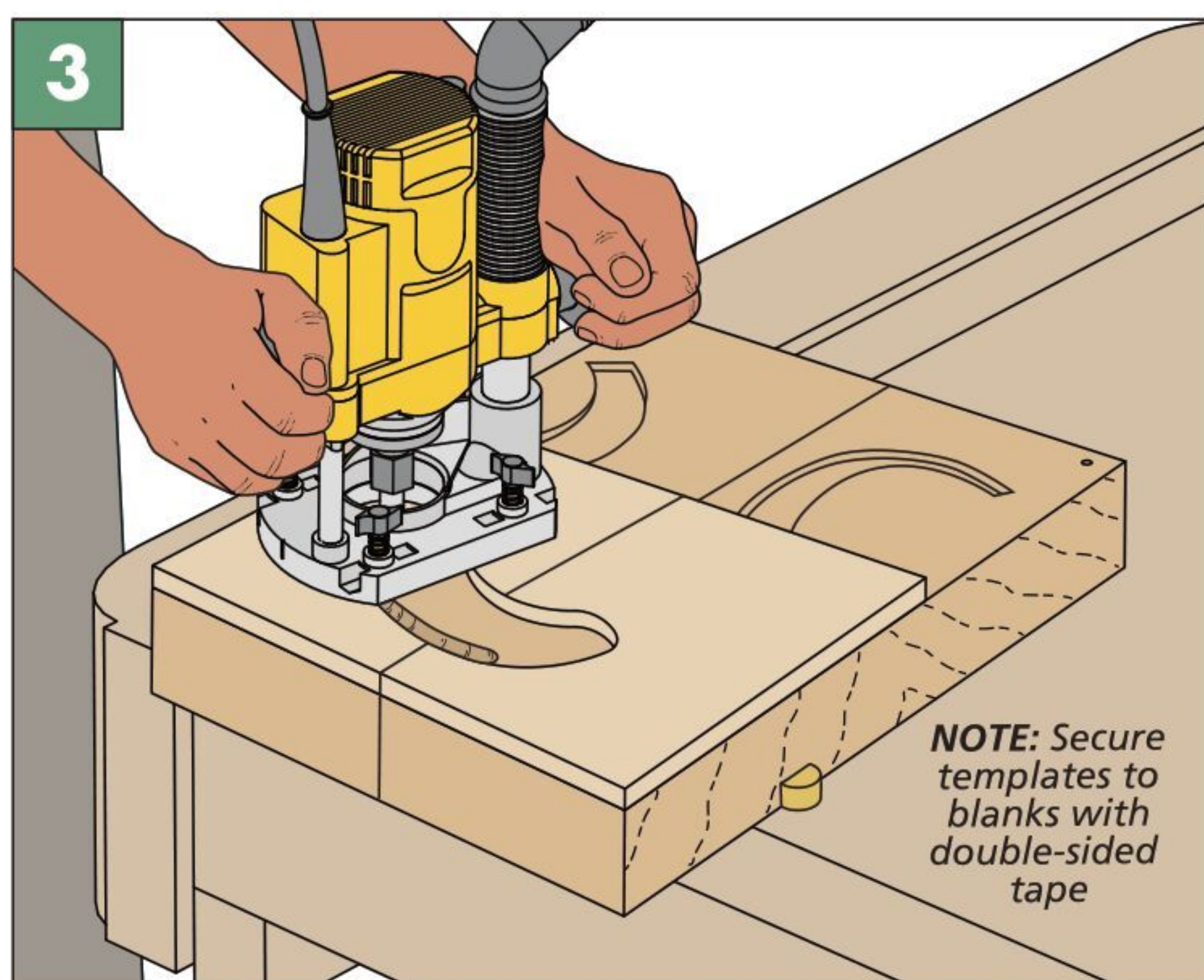
ROUTING THE STEPPED BASIN



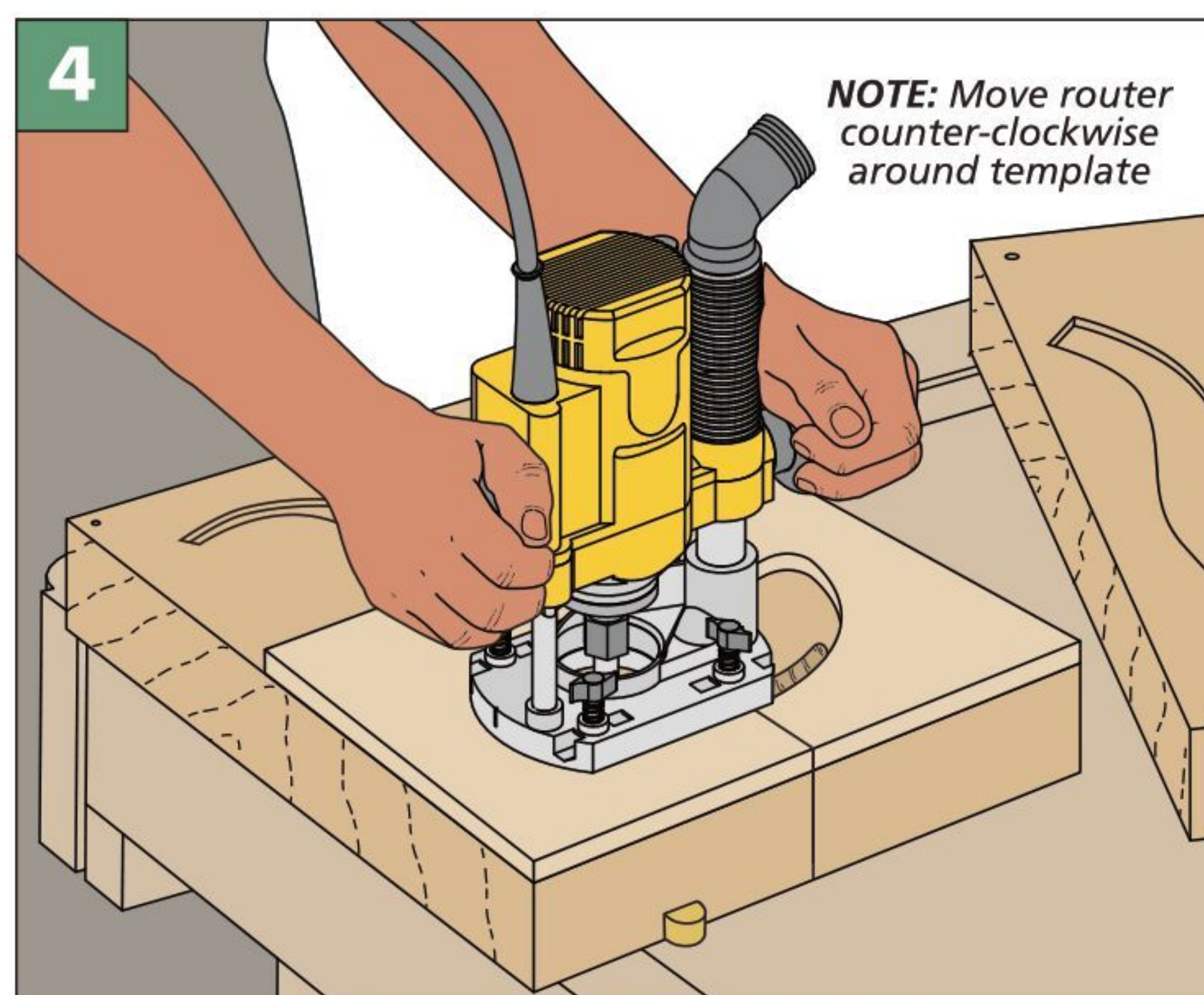
Getting Prepped. Clamp the two panel halves and attach the exterior template, aligning their centers. Drill registration holes in each corner of the waste and trace the profile onto the blank.



Main Template. Attach the main inner template with double-sided tape and remove $\frac{1}{4}$ " of material with a plunge router and $\frac{3}{8}$ " core box bit. Then, use a $\frac{1}{2}$ " pattern bit to remove the remaining waste.



Basin Templates. To rout the basin, start with the largest template and work your way down. Lower your router an additional $\frac{1}{4}$ " for each of the successively smaller templates.



Mirror Templates. Once you've routed one half, flip the templates over and repeat the process on the other panel, creating the profile and working your way down the basin.

each piece. This is also a good time to drill the registration holes through both halves, which will key the two together during the glueup. Lay the profile template on top, trace the shape out, and drill holes into the waste at each corner (Figure 1).

To start routing the interior, begin with the main interior template. Stick the template to

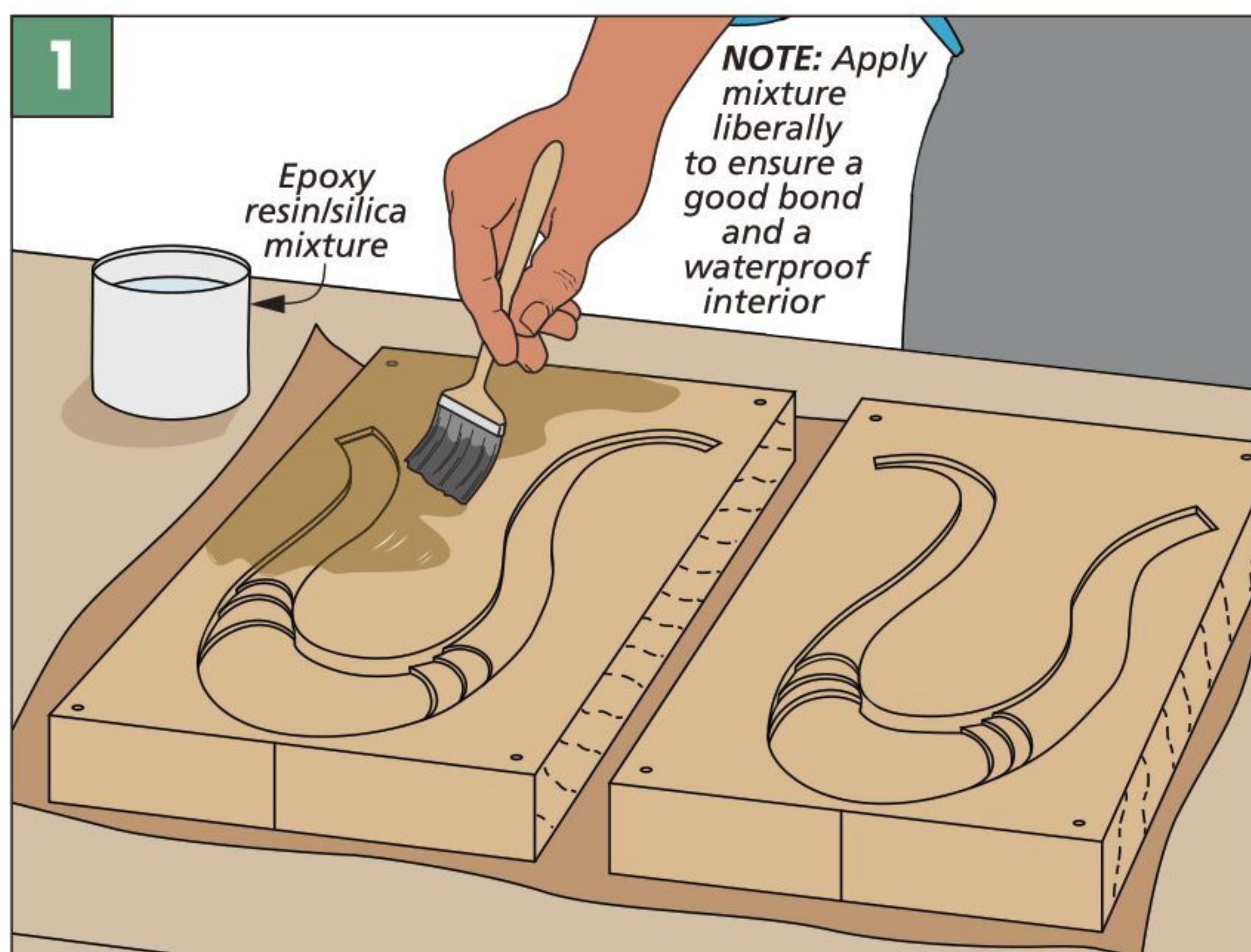
the piece with double-sided tape. Using a plunge router, follow the template with a core box bit and bearing to establish the shape (Figure 2). Next, to remove the remaining waste in the center, switch to a pattern bit and run it over the waste, as in detail 'b.' Be sure to rout against the rotation of the bit while clearing this out (see page 20 for more on this).

After removing the waste in the center, rout the basin. Start with the largest basin template. Increase the depth on your router and rout out the area, repeating this process for each of the templates. Once you've finished routing the basin, follow the same steps on the opposite blank, flipping the templates to create a mirror image basin.



For full sized water can patterns go to:
Woodsmith.com/260

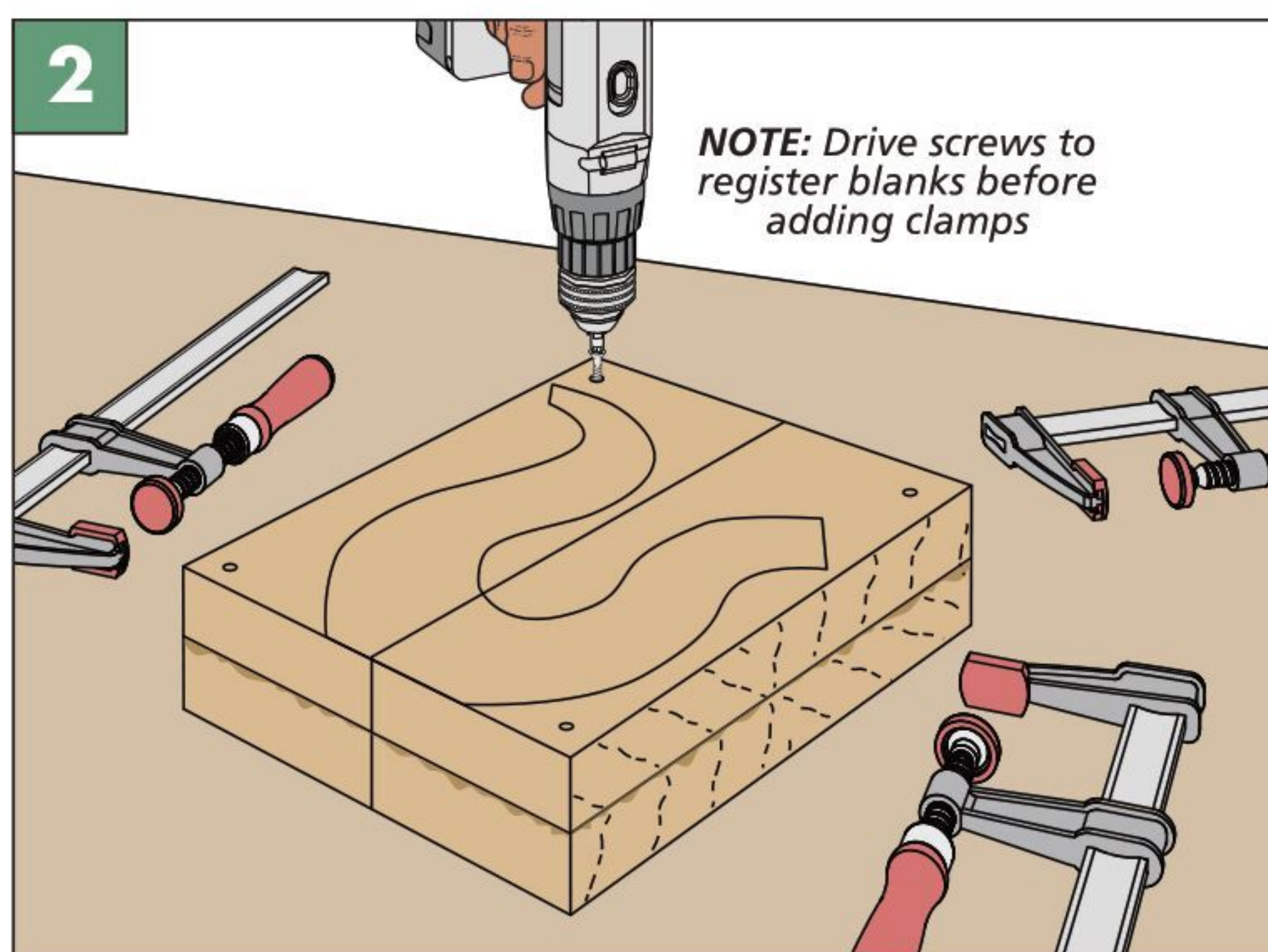
JOINING THE HALVES



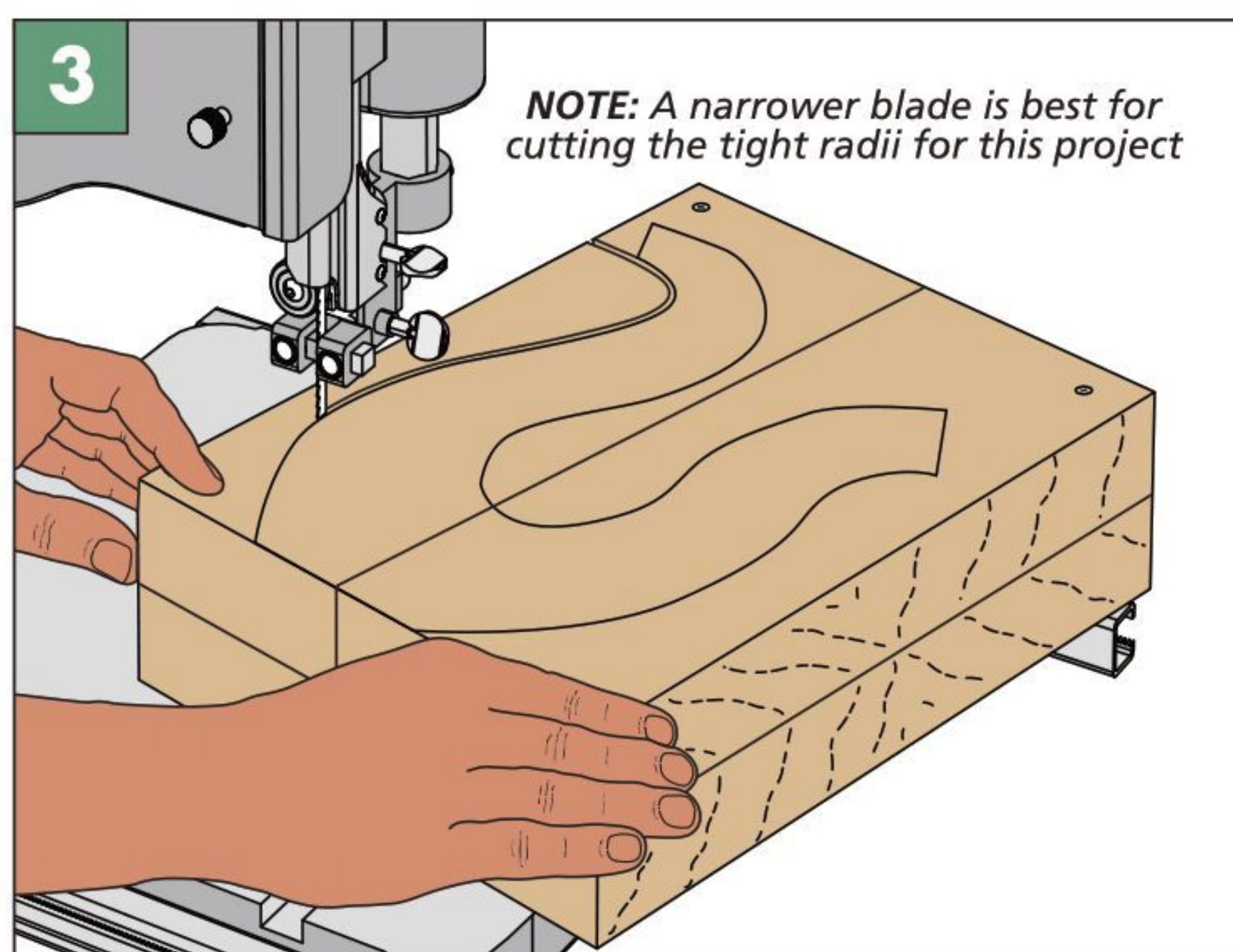
Seal It Up. The same epoxy is used to both join the two halves and seal the interior. Just brush the epoxy/silica mix onto each half, coating both the interior and the flat faces of each panel.



▲ **Epoxy.** We went with West System's 105 epoxy. Mix it with colloidal silica until you reach a peanut butter-like consistency before applying.



Screw & Clamp. To prevent any movement during the glueup, run screws through the registration holes drilled earlier, keeping the two halves aligned while clamping.



Rough Shape. Cut the vessel to rough shape on the band saw, keeping to the waste side of the line. Smooth blade marks with a sanding drum and edge sander.

Bring it TOGETHER

With the interior shaped, the vessel now needs to be sealed to make it waterproof. This can be done with the same epoxy you'll use to join the two halves: West System's 105 epoxy. Coat the interior of both halves using a natural fiber brush or a silicone glue brush. We also used

West System's colloidal silica to thicken the epoxy to a peanut butter-like consistency. This keeps the epoxy coating in the interior from running and pooling in the basin's bottom.

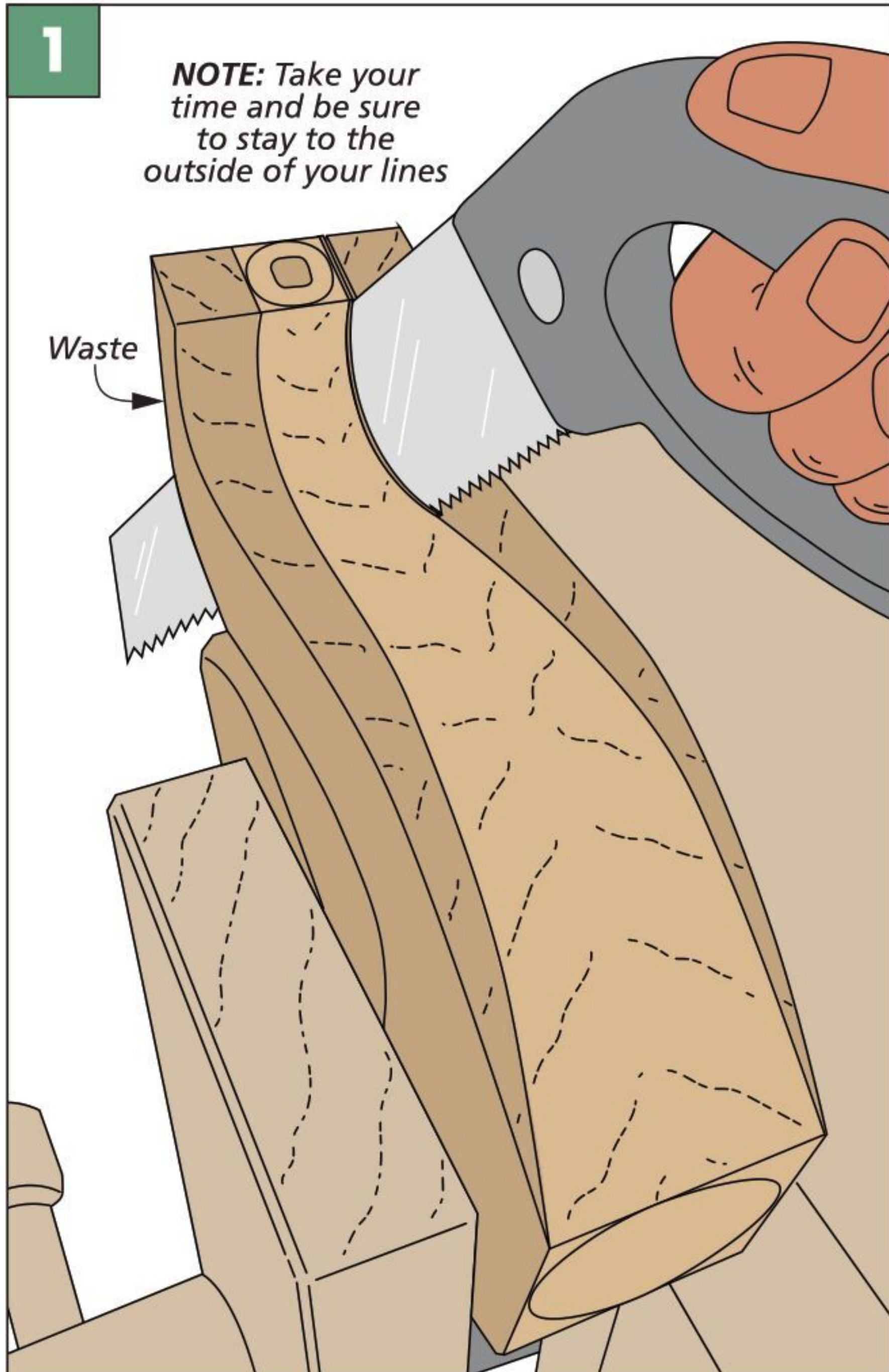
Now apply the epoxy to the mating faces of each piece. Sink screws into the registration holes

you drilled earlier to ensure the pieces stay aligned when clamping them down.

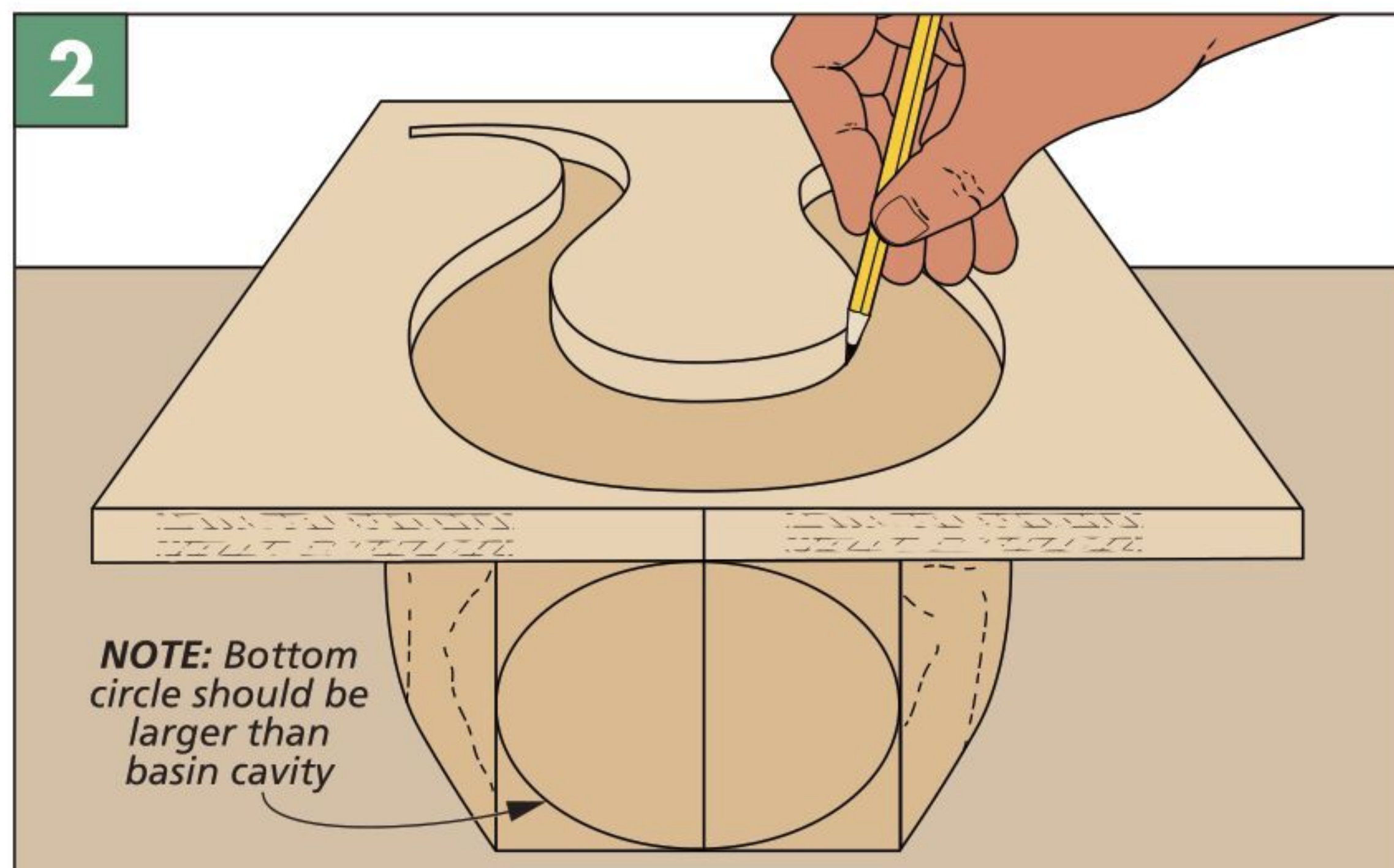
Once the pieces are clamped, clean your brush right away with lacquer thinner. If epoxy cures on your brush, it's toast.

ROUGH SHAPE. Before getting into the finer shaping, you'll need to

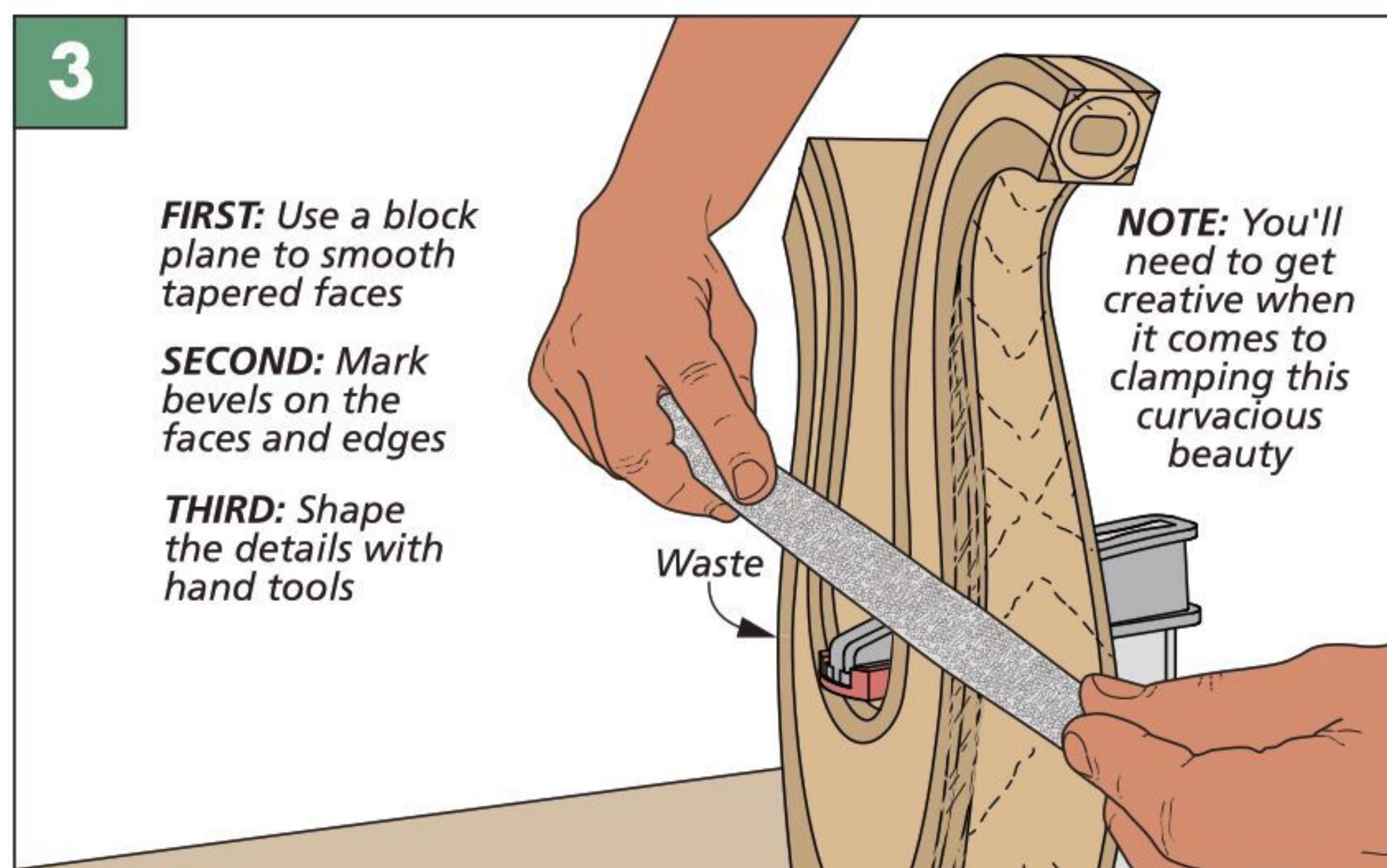
SHAPING THE VESSEL



Layout & Taper. The bottom circle should be roughly the size of the base, while the ones around the fill port and the spout are up to you, and will define the shape of your vessel. Draw lines from the spout and port to the base circle to guide the taper.



Mark the Interior. To ensure you won't be cutting through to the inner cavity while shaping, use the inner profile template to mark out the channel and basin.



cut the vessel to its rough profile. Head to the band saw and follow the profile line traced earlier to achieve the rough shape of the vessel.

FINAL SHAPE

The final shaping begins by creating layout circles (diameters of your choosing) around the spout and fill port of the vessel. These act as guides for both the taper and the shaping. Draw another reference circle on the bottom side of the vessel to help establish the taper from the spout and port down to the bottom while avoiding the routed interior.

Mark lines from the spout and fill port circles down to the base circle, then clamp the vessel in a vise and cut the taper using a rip saw (Figure 1 above). After you have the tapers cut, use a block plane to smooth the transitions between the two sides. Keep in mind where your interior channel and basin are in relation to the exterior while cutting.

Before getting deeper into the shaping, trace the interior profile of the vessel onto the modified blank to act as a reference while you refine the vessel. Now, using a spokeshave and rasps, shape the exterior to your liking.

The idea is to strike a balance between what will be comfortable in the hand and what's going to be pleasing to the eye.

As you can see from our lead photo, we chose to keep the sides flat, with two strong bevels joining them to the rounded ridge and underbelly. This is a great opportunity to get creative with your shaping and experiment with some hand tools.

Once you're satisfied with the shape, use a card scraper and sandpaper to reach a smooth, finished surface. Lastly we gave our vessel two coats of lacquer for a brilliant sheen. **W**

Wiping Varnish



▼ Combine two parts varnish to three parts thinner to make your own.

Applying finish causes the most confusion in the woodworking classes that I teach. The process can feel shrouded in mystery and luck. However, I think the real secrets to success lie in practice and patience.

Oil-based wiping varnish is a popular choice

because it's easy to apply and celebrates wood and delights the senses with a barely there film.

Getting a finish that matches the care you put into the construction requires practice, following a thoughtful method, and patience to see it through.

PREPARED SURFACES. You knew I was going to start here, right? Smooth surfaces count for so much in finishing. Yet it's a place that's often short changed.

Since the aim of a wipe-on finish is to minimize the appearance of the built-up finish, then starting with the smoothest possible surface is essential. I sand up to at least 220-grit on most projects, with 400-grit not uncommon — especially small projects.

Large surfaces are easy to focus on. However, don't neglect joints where the adjacent faces need to be flush. Another easily overlooked place is the inside edges of door frames.

Vacuum the project and wipe it down with a tack cloth to remove the loose dust. Remaining dust hardens in the finish and leaves a nubby surface.

APPLYING FINISH. This is the point you've been anticipating, seeing the finish transform the look of your project. That first coat seems to make it come to life.

I prefer to use some kind of cloth to apply a wiping varnish. It can be cotton from old t-shirts or even disposable shop towels. They hold the right amount of



finish and provide the maximum amount of control.

Wiping varnish dries quickly, but you still have plenty of time to work the finish around a surface for an even coat. The key is to keep it thin.

On the first coat, a lot of the finish will be absorbed right away. You're looking to create a surface that looks wet but free of puddles or running finish.

Temperature, airflow, and humidity all play a role in how long it takes to dry. I usually let

it dry overnight. Then scuff the finish with 320-grit or 400-grit sandpaper. The finish should sand into a powder. If it gums up, then it isn't quite dry yet. Should you find drips or runs, a few swipes with a card scraper will eliminate them.

Here's where the temptation to quit while you're ahead comes in. The wood looks great and feels smooth. But taking the time to apply at least three coats will pay off in the end.

The process is the same for follow-on coats. What changes is the feel. These coats flow on a lot easier. The second coat unifies the sheen of the finish eliminating patchy dry spots. Once this coat is dry, sand it lightly only to level any dust nibs caught in the finish.

Coats three and four are your insurance policy, building durability. Since we're working with light coats, you won't notice the finish building up, but the piece takes on a nice glow.

FINISH THE FINISH. You aren't done yet. The final coat



doesn't need a sanding, but you should rub it down with some grocery bag (Kraft) paper. There's just enough grit here to remove dust and even out the look. On small projects that invite close inspection, I apply a coat of paste wax, rubbing it out to a satiny glow.

Now, at last the project is ready to take its place. Beautiful on its own, but also showcasing your improving skills as a woodworker and finisher. **W**

▲ The oil-based resin in wiping varnish warms up walnut, makes oak outstanding, and cheers up cherry.



▲ Regular varnish is syrup-thick (left). Thin wiping varnish is watery — making it easy to apply successfully.

EASY APPLICATION STEPS



▲ Fold a cotton cloth or a disposable shop towel into an applicator pad for applying the wiping varnish.



▲ Wipe on a thin coat. It should wet, not drenched. Then after a few minutes wipe off any excess finish.

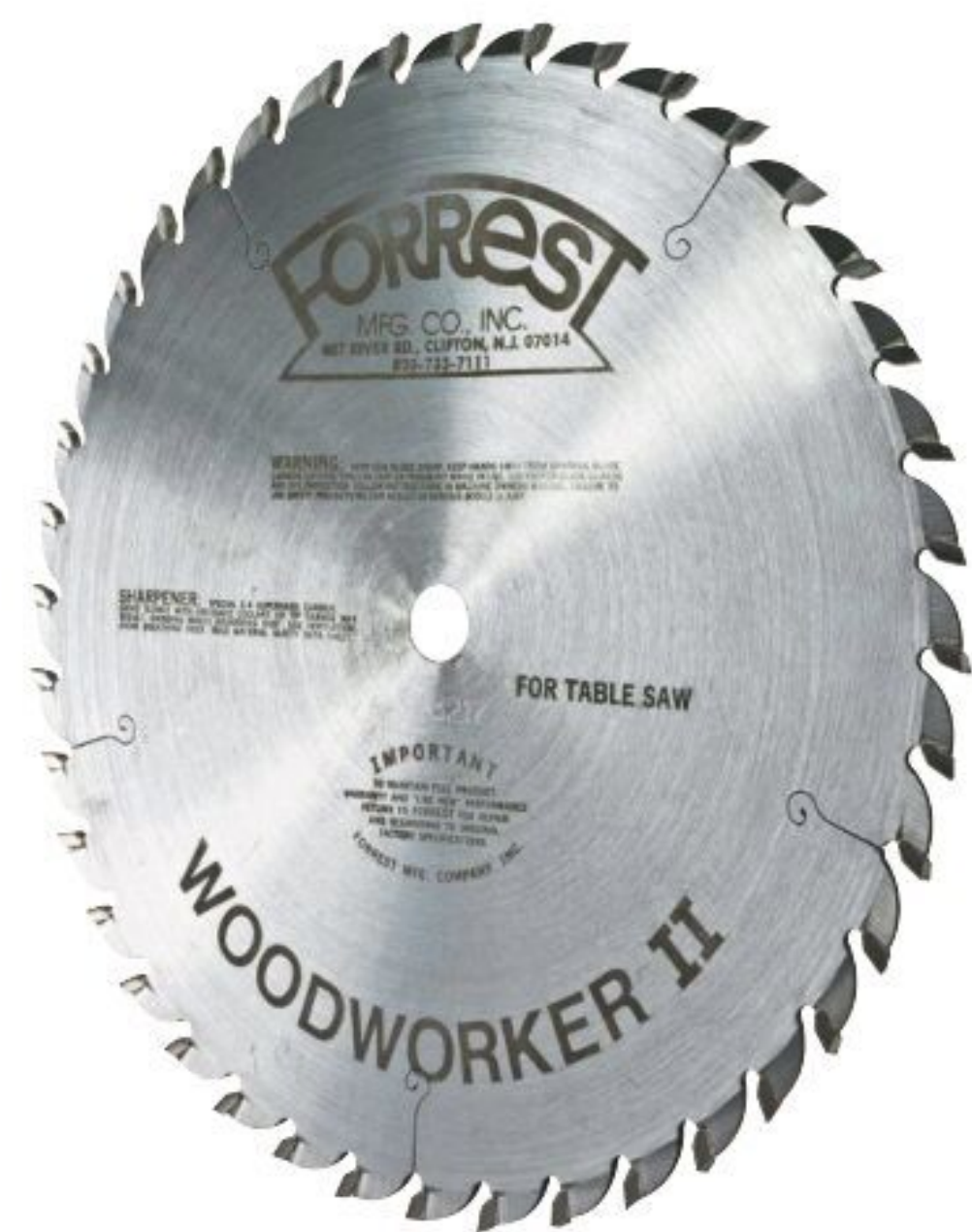


▲ Scuff sand between coats to remove dust nibs and to level the finish. Use Kraft paper after the final coat.

MASTERING the Table Saw



Crosscut Showdown: Table Saw vs Miter Saw



▲ This 40-toothed crosscut blade is an excellent choice for crosscutting on the table saw.

When it comes time to make a crosscut, what tool do you choose? There are numerous options, but I find it almost always comes down to the table saw or the miter saw. The table saw, the real workhorse of most shops, is steady, reliable, and able to easily cut miters and bevels. Of course a good compound sliding miter saw can do all that too, and with minimal set up. So, if you've got both in your shop (or if you're just starting out in woodworking and looking at what to buy) what's the best choice? Which tool crosscuts the best?

APPLES TO APPLES. I think it's important to look at things "apples to apples" in this case. That is to say, tools of comparable value. A high-end table saw with a premium blade will almost always get better results than a cheap miter saw, and vice versa once you start looking at top-tier miter saws. Keeping that in mind, we'll look at the design of each tool and the benefits and drawbacks of each.

CONSIDERING THE CROSSCUT. Before digging in, it's good to consider what's needed for a quality crosscut. How do you get a crisp, clean edge, free from tearout?

BLADE. A crosscut blade is a great start. Having two to four times as many teeth as their ripping counterparts, crosscut blades are far better suited to slicing into wood fibers rather than tearing them apart.

AUXILIARY FENCE. A good blade will get you a crisp edge, but to prevent tearout, you'll need to support the wood fibers while cutting as well. On both tools this primarily happens on the back and bottom of the piece.

To address the back tearout, you'll need an auxiliary fence. On the miter saw, this can be done by attaching a piece of $\frac{1}{4}$ "-plywood or hardboard to your saw's fence and cutting in a kerf for the blade (left photo below). On the table saw, an auxiliary fence can be made by simply attaching a long, straight board to the miter gauge (right photo below). This backs up the fibers and gives you more stability during a crosscut.

ZERO-CLEARANCE INSERT. When it comes to preventing tearout on the bottom of the piece, a zero-clearance insert is the answer for both saws. Just as with the auxiliary fence, backing up those fibers will give you a cleaner cut.

From there, the big questions are ones of stability, accuracy,

and consistency. How easy is it to keep a piece where it needs to be during the cut? How precise is the cut? How long does it take to set up for a cut? Is that set up easily repeatable for multiple pieces? What about when it comes to odd cuts, such as breaking down panels and long pieces of lumber?

STABILITY. When it comes to stability, I won't lie: I'm already on the table saw's side. Just look at these two tools and you can see they're designed for very different purposes.

STATIONARY. The table saw (which usually sits around 300 pounds on its own) is made to live in a shop. Even ones with a quality set of casters on the bottom can still be a pain to maneuver around. This also means the table saw is one of the most stable things in my shop, and I'm far more concerned about my own error when cutting on the table saw than anything moving on it.

PORTABLE. The same can't be said of the miter saw, and that's by design. The miter saw (most weighing in at a lean 60 pounds) is a portable tool. That means when it's time to do a crosscut, some work has to be done to make sure the miter saw's stable and the supports are situated



▲ Where the table saw's home is the shop, the miter saw is a portable tool, and is relatively easy to move from the shop to wherever it's needed.

correctly. But what about once it's set up? I still have to take the table saw's side.

My big issue with the miter saw is its points of articulation. There are a lot of ways to move the blade, and not only are these points that could be set off of square, but they're also possible points for wear to develop as the saw is used and moved around. Overall, I find a stationary machine like the table saw to be the more stable option.



▲ A zero-clearance insert and a piece of plywood as an auxiliary fence are enough to back up the fibers of the wood to help prevent tearout when cutting with a miter saw.



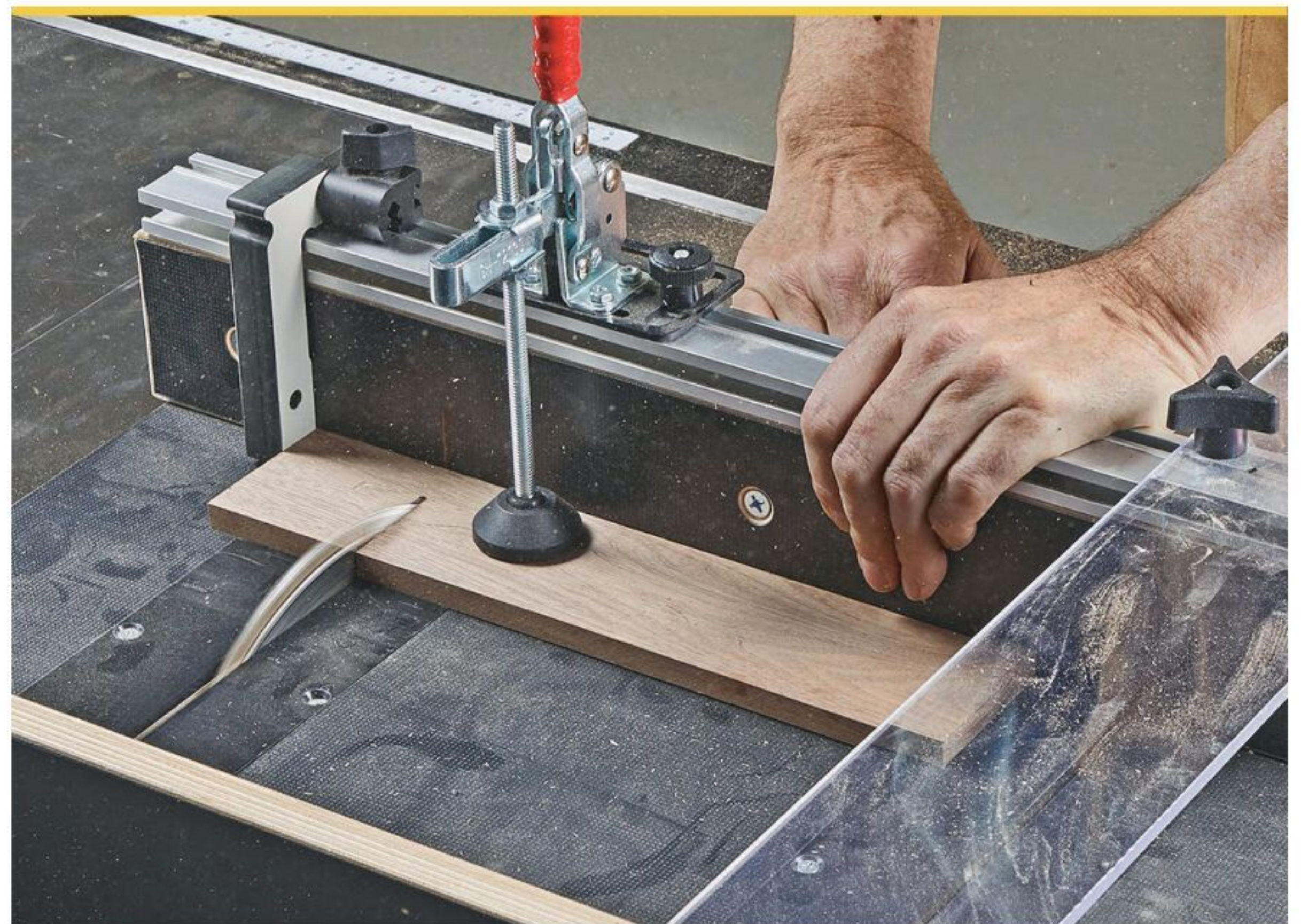
▲ An auxiliary fence attached to a miter gauge both prevents tearout and improves accuracy on the table saw. A strip of self-adhesive sandpaper helps prevent the piece from slipping.



▲ A crosscut sled for the table saw reduces friction on the piece during a cut and provides more stability than a miter gauge, making for more precise crosscutting.

ACCURACY. Articulation in the miter saw leads me into the next category: accuracy. But let me digress and discuss the table saw first. When ripping with the fence, the table saw is the king of accuracy, and I'd argue that a quality miter gauge or a well-made crosscut sled can be just as accurate. You could eyeball the cut, but using a stop block on a crosscut sled gives you precise, repeatable cuts.

A stop block can be used on the miter saw as well for better precision, but the problem of articulation returns. As a miter saw swings and slides, those articulating joints can slowly move off of calibration. Eventually, that adds up, and even a degree makes a difference. As a result, miter saws need to be tuned up with use to preserve accuracy. This issue isn't present with the table saw, and while tuning and calibration can get your miter saw cutting on-angle again, I still have to give accuracy to the table saw. Few things



▲ Specific crosscutting sleds can be bought (or made) that provide a safe, easy way of crosscutting a number of small pieces. A stop block, a toggle clamp, and a zero-clearance kerf are all welcome additions when crosscutting.

are as frustrating as realizing your miter saw is off after you've made the cut.

While on the topic of accuracy, I want to bring up one point about the miter saw. Many finish carpenters routinely use their miter saws to install trim and molding at just about every angle. However, installing trim in a house is a different task than most woodworking we do here.

Homes are rarely square and straight, so most finish carpenters measure and mark angled workpieces. An experienced hand can measure, mark, and cut these joints on the miter saw and work around a room without ever measuring an angle.

CONSISTENCY. Now we come to consistency. If I have a number of similar crosscuts to make, I don't want to waste time setting

up for each cut. In this sense, I consider the miter saw the winner here, but with one caveat.

SET UP. Either tool can be used for a series of consistent cuts, but the table saw will take more initial set up. I consider a cross-cut sled a necessity for the table saw. Not only does it make crosscutting safer and easier, but once it's made, a stop block can be set up to save you the hassle of measuring after each cut.

Similarly, a stop block on your miter saw fence is enough to let you perform a series of cuts without having to measure and mark every time. The advantage of the miter saw of course is that it's always ready to make a cross-cut, no set up required. While I may take issue with the accuracy, I think a well-tuned miter saw takes the victory in this category.

THE CAVEAT. When it comes to smaller pieces however, the table saw can be preferable. After cutting a small piece on the miter saw, it's tempting to lift the saw right away. However, if that piece gets caught as you lift, then you've got a painful projectile on your hands. This can be prevented by letting



▲ While the miter saw is limited by how far its arm can slide, a table saw can cut whatever can be run across it. For accurate cuts on large pieces like plywood panels, the table saw is my go-to tool.

the saw come to a full stop after making a cut, but it does make for relatively slower cutting on small pieces when compared to the table saw.

THE ODD CUTS. Their own cross-cutting abilities aside, I think it's vital to consider where each tool stands out specifically as well. For instance, the table saw can break down panels with ease. While cutting plywood may not exactly be crosscutting, the table

saw is invaluable for making accurate cuts on large panels, and you'll be hard pressed to find a cleaner cut on plywood than you'll get from using a crosscut blade on the table saw.

On the other side of the coin, you'll never see me getting out my crosscut sled to try taking down a freshly-milled hunk of 8/4 walnut, or to slice up long, narrow trim. Even if I muster all my supports, there's still plenty of other reasons not to try it. Here the sliding miter saw is unparalleled. The miter saw can quickly and easily break down anything from trim to lumber.

CONCLUSION. So, which is better for crosscutting? The miter saw is a convenient tool, and one which can be moved to where it's needed, but I have to go with the table saw. It's a machine built for stationary, in-shop use, offering more stability, which in turn means a cleaner, more accurate cut. For fine woodworking, I could scarcely ask for more. Both tools offer excellent results, but the tune-ups required for consistent accuracy on the miter saw will often have me resorting to the table saw for my precise cuts. **W**



▲ Crosscutting long pieces and thick lumber is undoubtedly the job of the miter saw. The speed and ease-of-use make it clear why the miter saw is the tool of choice for most when installing trim and molding as well.

Sources

Most of the materials and supplies you'll need to build the projects are available at hardware stores or home centers. For specific products or hard-to-find items, take a look at the sources listed here. You'll find each part number listed by the company name. See the left margin for contact information.

MAIL ORDER SOURCES

Project supplies may be ordered from the following companies:

Woodsmith Store
800-444-7527
store.woodsmith.com

Rockler
800-279-4441
rockler.com

amazon.com

AC Infinity
626-923-6399
acinfinity.com

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800-445-0077
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Black Forest Imports
800-824-0900
blackforestimports.com

General Finishes
800-783-6050
generalfinishes.com

Lee Valley
800-871-8158
leevalley.com

Lowe's
lowes.com

Minwax
800-523-9299
minwax.com

McMaster-Carr
630-833-0300
mcmaster.com

Woodcraft
800-225-1153
woodcraft.com

Varathane
Varathanemasters.com

GREAT GEAR (p.24)

- **Woodcraft**
Bladeclean Kit 181579
Bladematch Shims 872748
- **Amazon**
Hedgehog B078L82HLT
- **Lowe's**
Drill/Driver Kit 2675382
24pc. Driver Set 2670837

The products featured in Great Gear can all be found at the listings in the article. Here we are providing additional sources that we have found.

DASHING DRESSER (p.28)

- **Rockler**
Drawer Guides 48022
Euro Hinges 34807
Shelf Pin Sleeves 22872
Shelf Pin Supports 22781

The dresser was painted with

General Finishes' "Blue Moon" milk paint, then lacquered on all surfaces without paint.

HADLEY CHEST (p.40)

- **Amana Tools**
Double Beading Bit 54294
- The chest was finished with multiple coats of General Finishes' Seal-A-Cell wiping varnish.

AIR CLEANER (p.34)

- **McMaster-Carr**
Dust Cartridge 3636K49
- **AC Infinity**
8" In-Line Fan AI-CLS8

The plywood parts of the air cleaner were primed and sprayed with several coats of Rustoleum's Metallic paint line in "Blue."

PORCH BENCH (p.50)

- **Farmhouse Hardware**
 $\frac{3}{4}$ " x $16\frac{1}{2}$ " Single Set . . . Search
- **Amana Tools**
Point Cutting Bit 56123
- **McMaster-Carr**
 $\frac{1}{2}$ " x 3" Lag Screws . . 95452A142

To give the bench an aged look treat it first with the Varathane's Weathered Wood Accelerator. When you're happy with the results, apply two coats of lacquer to finish the project.

WATERING VESSEL (p.56)

The wooden watering vessel was glued up and sealed inside with West System's 105 epoxy, using their 406 collodial silica as a thickener. The exterior was simply finished with two coats of lacquer.

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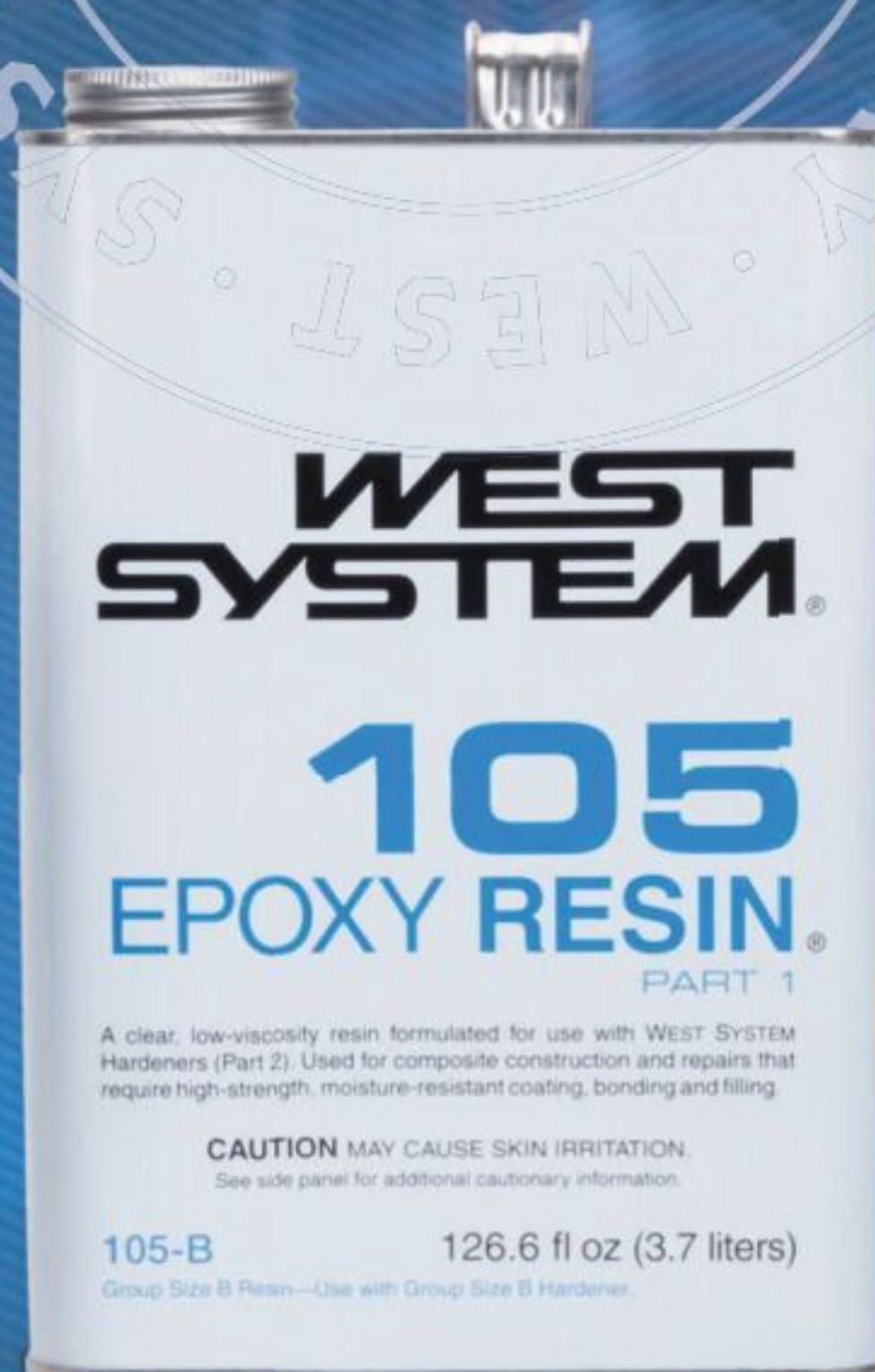
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