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from the editor

Sawdust

In between projects, I've been upgrading my workshop over the last couple of months. I've tweaked my shop layout, picked up a few tools, and added insulation and drywall to the rest of the garage. The payoff is how much more I enjoy my shop time.

As different as woodworkers are, one thing we all have in common is that we like to talk about our shops: the tools we use, the way things work, what we've been up to. We're constantly looking for ideas, tips, projects, and clever solutions to increase our abilities and delight in woodworking.

Allow me to share another way to improve your woodworking — *Woodsmith Unlimited*. As much as we cram into the pages of *Woodsmith*, there's never enough space. (Sounds kinda like our shops, right?) Every project leads to an idea about the skillful use of tools, a jig to make, a router bit to add. That's the sort of information you'll find on *Woodsmith Unlimited*.

If you're looking for project ideas for your home or to build as a gift, you get access to over 1,000 plans. The plans run the gamut from furniture, to shop projects, home improvement ideas, outdoor, and more. There are hundreds of videos that bring to life the topics we discuss in the magazine.

Like a lot of woodworkers, I love to gather ideas and inspiration. But that can take up a lot of space. On *Woodsmith Unlimited*, you get access to all 19 seasons of the *Woodsmith Shop* TV show and the 45+ year collection of *Woodsmith* magazine. You can find what you're looking for faster than digging through boxes of past issues.

New articles, videos, or plans are added every week. It's all produced by me and the rest of the Woodsmithers — woodworkers who love the craft as much as you do.

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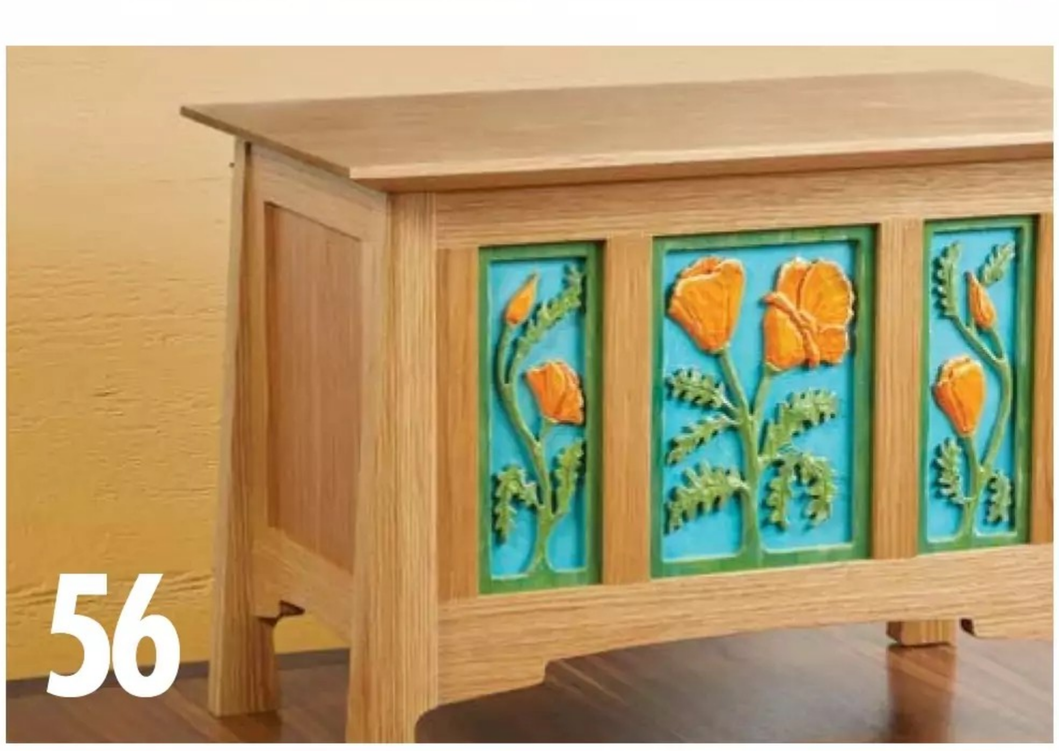
No. 284 • April/May 2026



Projects

Departments

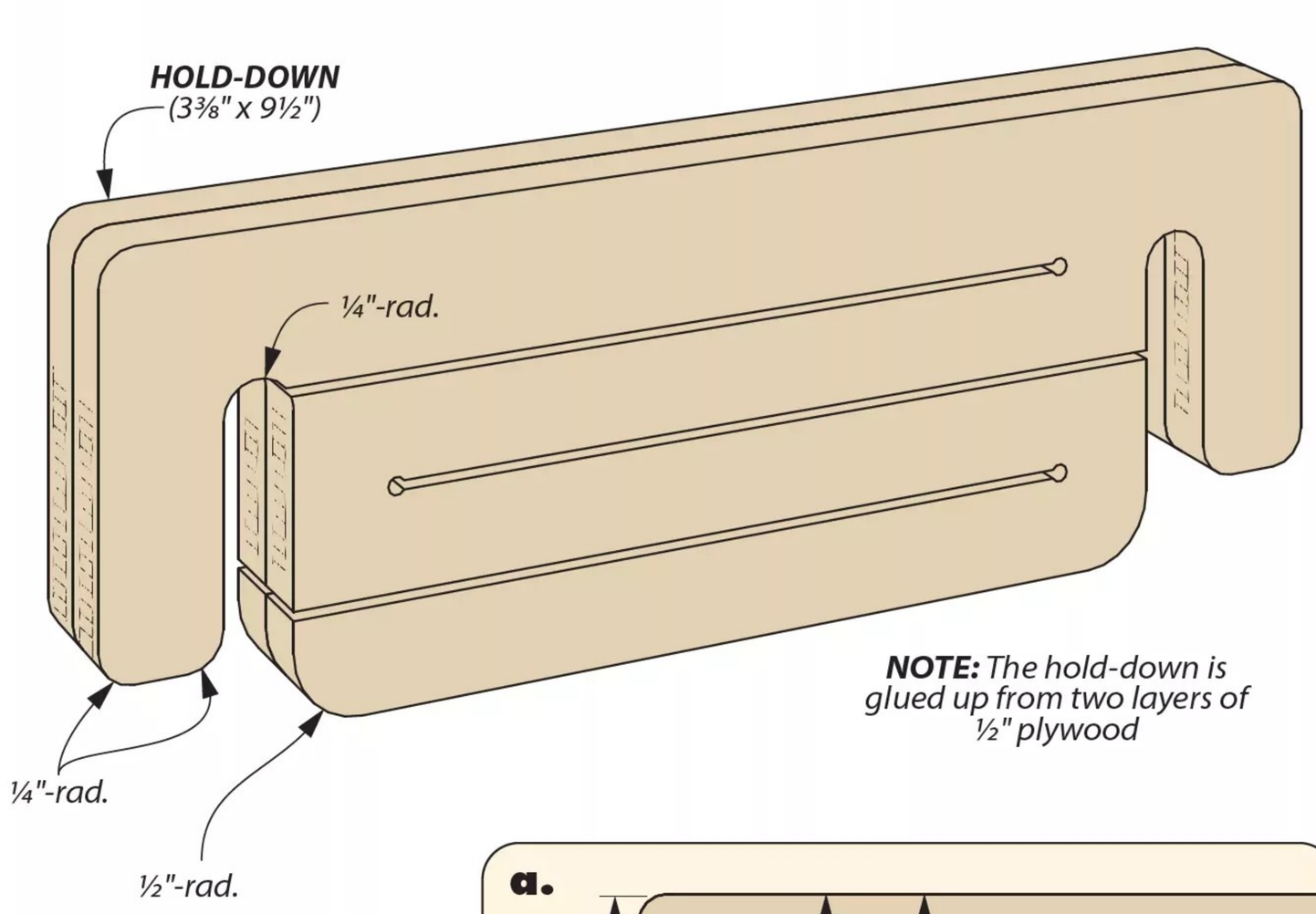
Router Table Hold-Down

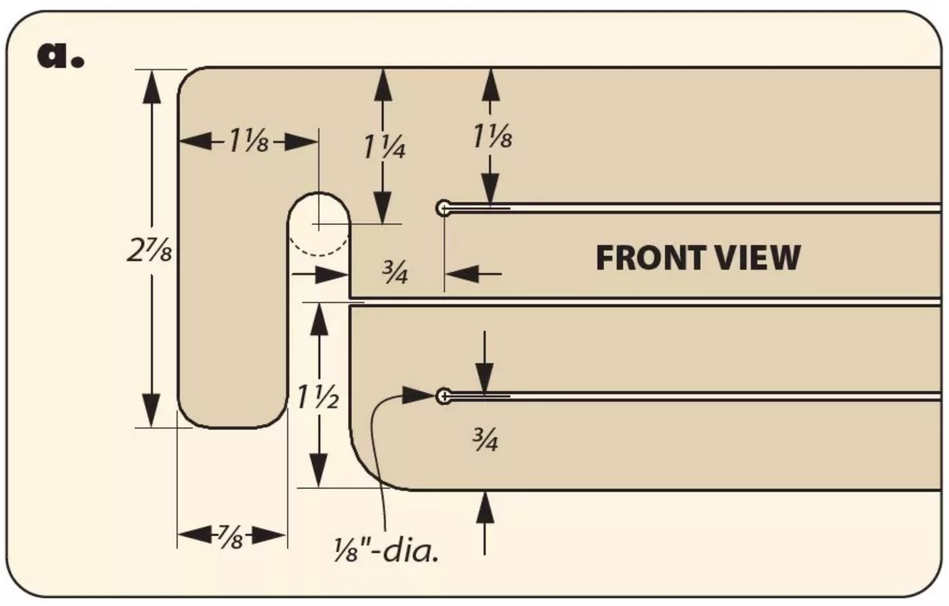
When cutting joinery, especially long joints like the groove you see above, it's important to make sure a cut stays straight. But solid wood has its own shape, which can confound your efforts. To prevent a board from pushing itself up at the middle or on the ends, I use the hold-down you see here.

This hold-down is made from two laminated scraps of plywood I had leftover from a recent project. The idea behind this little accessory is that the holes and kerfs create a spring out of the plywood board. That springiness allows it to press down on a workpiece, keeping the cut at the proper depth throughout.

This hold-down functions similarly to a featherboard, and is useful both at the router table and the table saw. Why do I prefer this version over a featherboard? Easy — I can make it right in my shop from any scraps I happen to have.

John Maynard
Murphy, Texas





Compiled by: Rob Petrie; Built by: John Doyle

QUICK TIP

Compound Clamping. *Ed Baxter of Rittman, OH* was ready to sand down a rocking chair when he had an idea of how to hold it steady. By securing the rockers with woodscrew clamps and attaching those to sawhorses with F-clamps, he could keep it stable, and at a perfect height for sanding and finishing.

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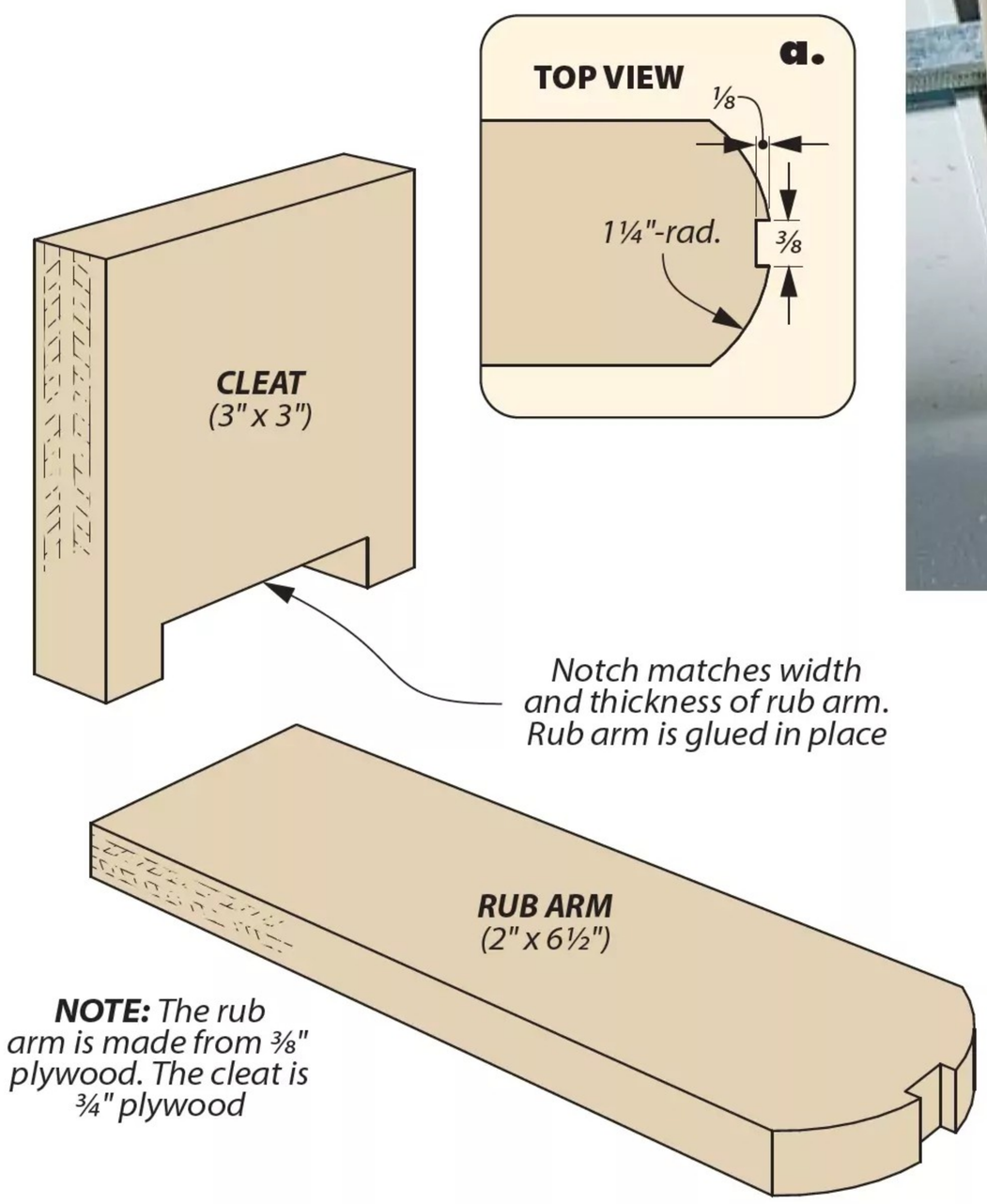
Illustrations: Becky Kralicek



Band Saw Template Guide

There are two parts to shaping a workpiece to a template: rough-cutting most of the waste free, then cutting a clean edge precisely to the template. For the first half of this operation, I use the band saw and the guide shown here.

This template guide clamps onto the fence and registers against the template while I cut. A notch at the end of the arm fits the blade and ensures a slight bit of waste is left outside the template — just enough to rout to a clean edge.

Jim Chambers
Owasso, Oklahoma

QUICK TIP

Paint Saving Packs. *Ryan Ficek of Montgomery, AL* wanted a way to keep the paints he mixed from drying out over time. His solution: seal the paint up in a few inexpensive, plastic flasks. These allowed him to squeeze the air out as he portioned the paint.

QUICK TIP

Glueup Pallet. *Zach Berg of Overland Park, KS* uses plastic ramekins as pallets for his glue when he needs to brush it on for a glueup. They're nicely sized for the amount of glue needed and can be sealed. Plus, they come with most take-out orders, or you can buy them en masse online.

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Bigger, Badder Sawhorses

For a bonus video on these stacking sawhorses, scan the QR code

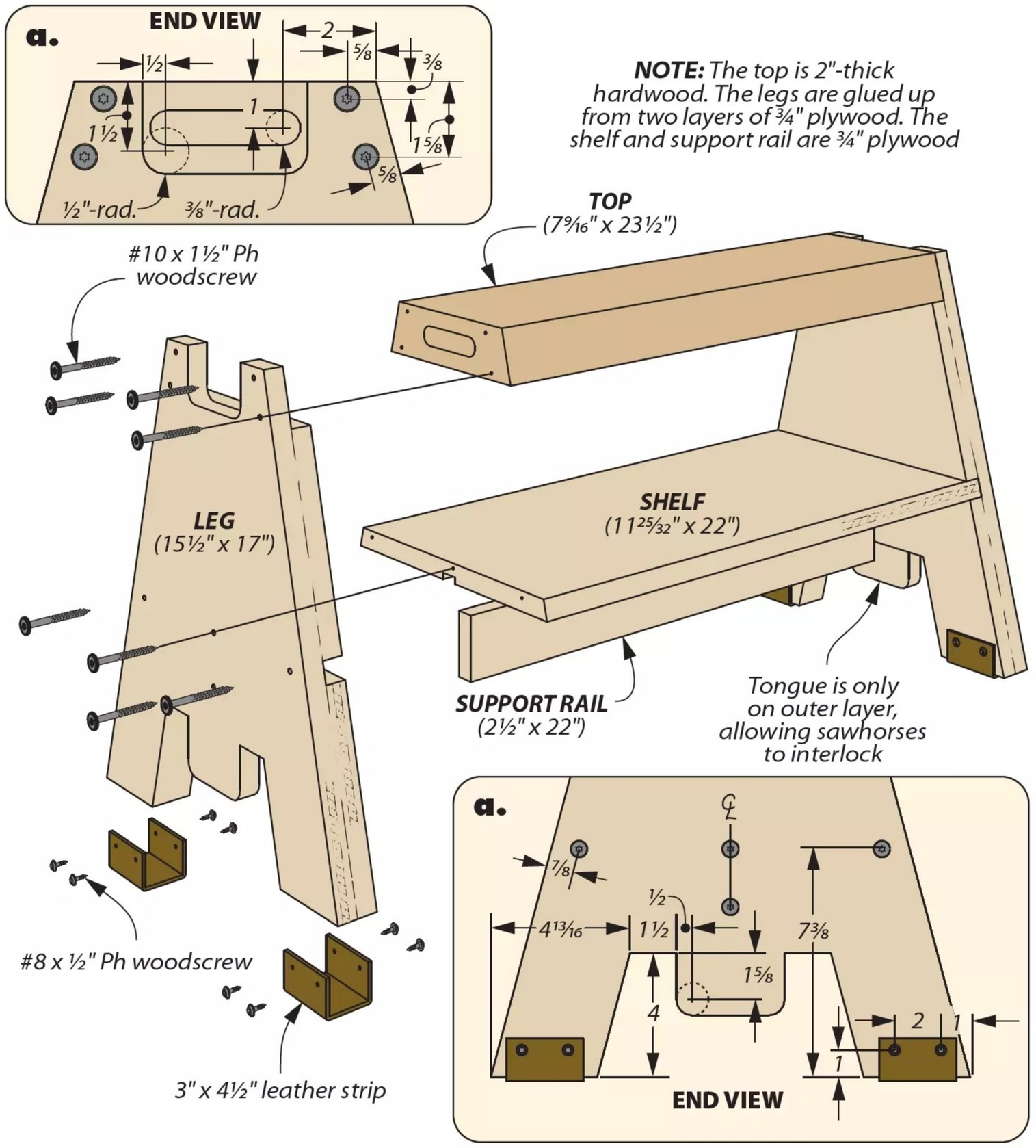
There's a great project all the way back in *ShopNotes* issue 42: a set of stacking sawhorses. (You can see these at the bottom of the next page.) What's so great about them? They're lightweight, compact, and can be made from just one 4' x 8' sheet of plywood. However, I thought I could make a few adjustments to better suit these sawhorses to my own shop.

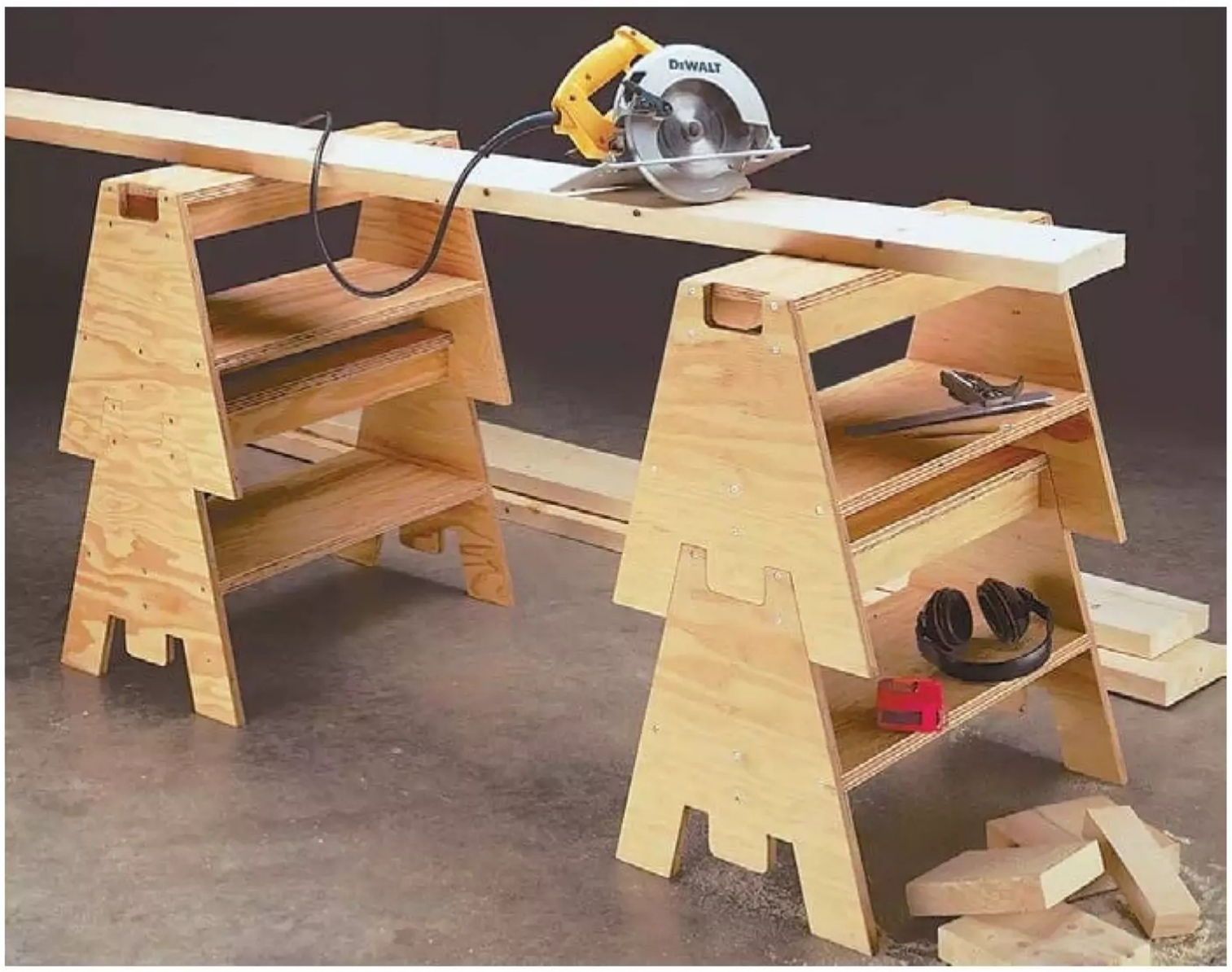
The one you see in photos on this page and illustrated on the next is what I came up with. The most obvious difference is the thicker material for the legs and the top, particularly the 2"-thick oak top I used. I also added leather straps across the feet, which helps absorb vibrations. This upgrades strengthen the sawhorses and make them a more stable worksurface while still keeping them compact.

Phil Huber
Urbandale, Iowa

Leather strips dampen reverberation as you work, and save the feet (or your floor) from a beating.

▲ A thick, hardwood top provides a sturdy support or worksurface, whether you're sawing down stock or chopping out a mortise by hand.





▲ This bulked-up sawhorse is based on an older project from *ShopNotes*. These are easy to build from just one plywood sheet. You can find the original plans at *woodsmithplans.com*.

READER'S Thoughts

Comments & Questions

A VISE FOR ALL WOODWORKERS

Your suggestion for a woodworker's vise is a bit on the exotic side. Unless you have more money than sense, go ahead and buy an over $800 vice.

I would venture a vast majority of woodworkers could not, or would not, buy an overpriced piece of art to hold a piece of wood. Piece of art .... hang it on the wall, and show to your friends, look what I bought! *Harbor Freight* has one that will work for about $64. I would suggest in the future to offer a variety of options for all woodworkers. Even hobbyists who work within constraints make excellent projects on a budget without the latest and most expensive tools.

Look at the craftsmanship of the woodwork in some of the turn-of-the-1900's homes. Not just the Barons, but craftsmanship in an average home. Most, if not all, done with basic hand tools. Some made by the craftsman themselves. You built a very nice bench, but the vice corrupted it.

Subscriber for many years. I miss *ShopNotes*. I started with them when it had no color pics.

Mark Schwomeyer

Hi Mark,

You make a good point. We publish workbench plans regularly. Every version emphasizes a different aspect: construction, materials, features, size, decorative details, hardware & equipment.

The bench's designer/builder wanted to highlight those relatively new vises. A person could very easily build that bench and use a different vise. Any face vise would work for that bench. And the tail vise could be swapped for the inset vise from Lee Valley *and work wonderfully.*

Stay well,

Phil Huber
Executive Editor / Woodsmith

CORRECT BAND SAW BLADE

Hello, when using the bandsaw to cut the lamp shade kerfs, what size blade would work best?

Jeremy Seger

Hi Jeremy,

Thank you for your interest in building the desk lamp. The shade is very cool looking, and I was surprised at how supple the blanks became after designer Dillon Baker cut them. I believe that the blade he used was a new ¼" 4 tpi skip tooth blade. The blade width was ideal because the ¼" size tracks better than narrower blades but has a smaller kerf than heavier, wider blades. The cut was reasonably smooth as the blade was new, and the guides set close. A smoother cut could be achieved with more teeth and/or a regular tooth pattern, which is less aggressive. So, if you can find a ¼" wide, 6-12 tpi blade with regular teeth (preferred) or skip teeth, and tune your saw up, I think you will get the results you want.

All the best,

Chris Fitch
Creative Director/Woodsmith

TRIMMING FINGER JOINTS

This is more of a general question about box joints. I just completed my first project using box joints. It was a ring box. I used a sander to smooth down the fingers that protruded out. Could I have used a flush trim bit? I was concerned about tear-out if I did. What is the best way to trim the fingers?

Steven Hale

Hi Steven,

I think every woodworker has their own methods for dealing with protruding box joint fingers. I will typically go to a stationary belt sander for smaller projects or use a hand-held belt sander for larger projects because it is a "safe" method that will not leave tearout. The only drawback with belt sanding (or an orbital sander) is that the face being sanded will dip a little towards the fingers unless care is taken. It's not a big deal, but if the fingers only protrude a little, I feel safer using PSA sandpaper attached to a hardwood block so that the face remains closer to flat.

Your sense of caution using a standard straight flush-trim bit is justified. Unless the bit is very sharp it will cause tearout. That said, I want to try out one of the flush-trim bits now available with spiral or compression cutting geometries. Woodpeckers has a few:

Flush Trim Router Bits | Solid Carbide | Spiral | USA Made

These bits have more of a shearing action and should do a nice job.

All the best,
Chris Fitch
Creative Director/Woodsmith

BED RAIL HARDWARE

When fastening the bed rail knock down hardware to the bedside rails your plans suggest a dowel be inserted in a hole you drilled in the bottom of the rail in order to receive the screws inserted into end grain. Would it be sufficient to skip the dowel and use a much longer screw in a hole that has been pre-drilled, say 3" or 3 ½"?

Thanks in advance.

Chris Kovach

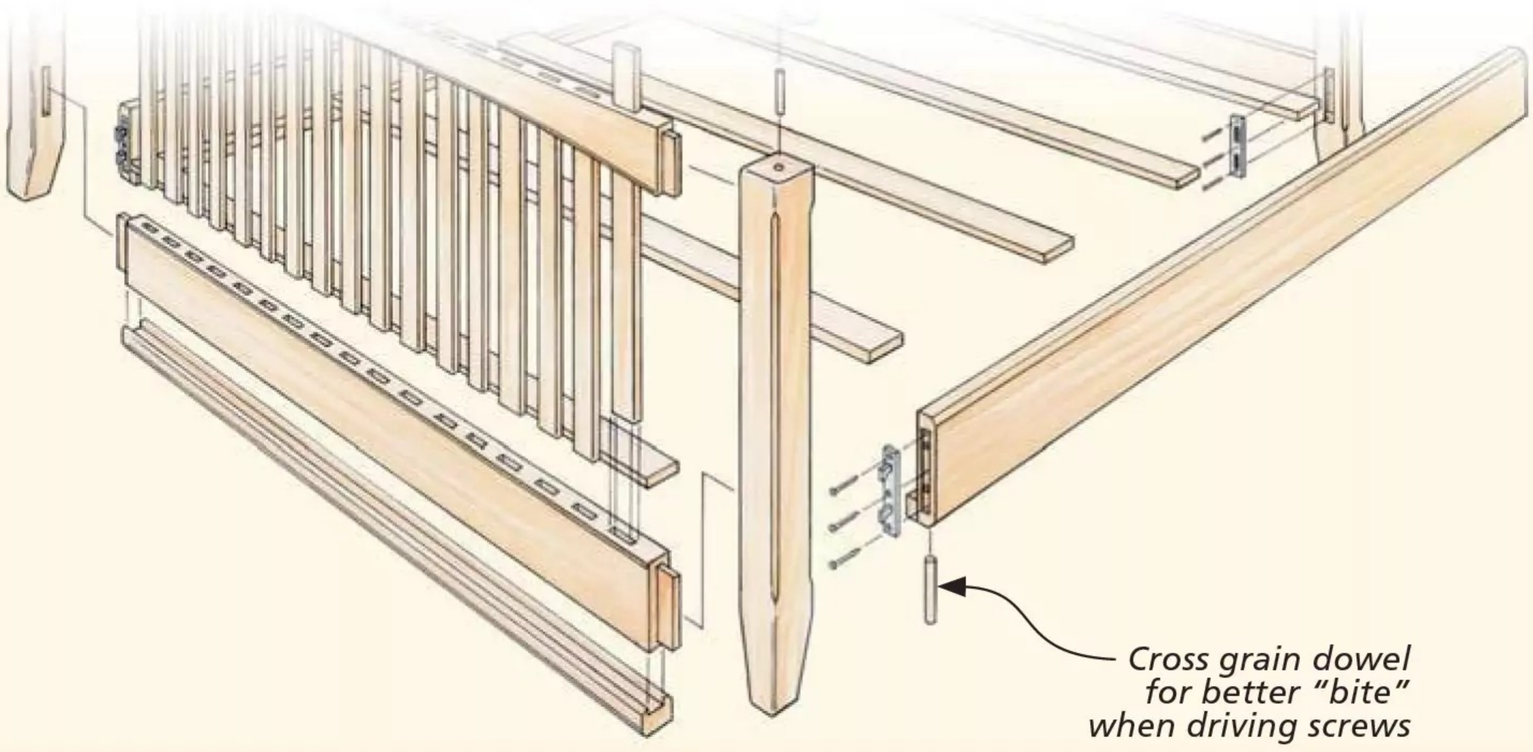
Hi Chris,

Putting screws into end grain always requires some thought. The dowel tip works well and will provide a point of solid purchase for the screw threads (see illustration below). Your idea of using a longer screw will work just as well. It is important to use a screw with large, coarse threads and a heavy size such as a #10 or #12. I was recently looking at boxes of construction screws at our local lumberyard and saw plenty of good choices. Sometimes I will choose to use countersunk head sheet metal screws because they have no smooth shank – all coarse threads for similar situations.

Trust your judgement and use the screws.

All the best,

Chris Fitch
Creative Director/Woodsmith



BOOK
Review

Whittling Wildlife

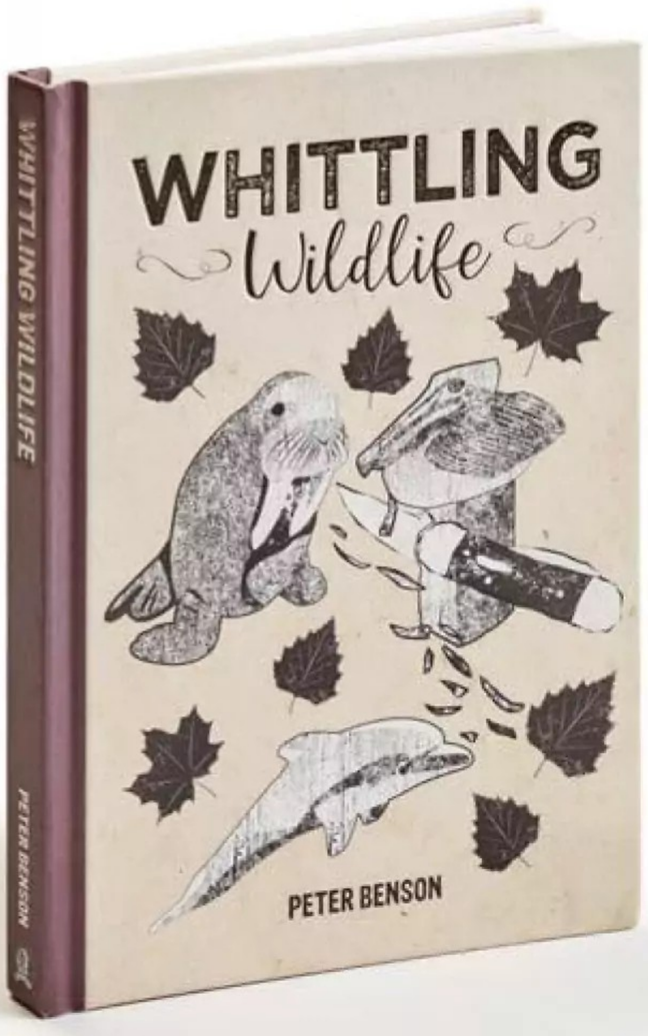
Carving is a unique joy in woodworking. It differs strongly from most of the work we do, relying more on one's ability to visualize and actualize distinct shapes, than to make cuts at precise measurements. It's a chance to let creativity take the wheel and engage your intuition rather than just your logic.

The subject of this issue's book review takes the matter of intuitive woodworking to its extreme. *Whittling Wildlife* by Peter Benson is a book not just on carving, but a unique subset called whittling.

WHAT'S WHITTLIN'? To begin, let's look at what whittling is. Whittling primarily means knife carving, though palm gouges and other small tools will certainly be employed. The workpieces are miniatures, allowing them to be held in a hand as they're worked on, which is required for safe and effective knife carving.

As the title indicates, the projects in this book are animals. Mammals, birds, and fish make good subjects, as they require less overall detail than an insect, a plant, or a piece of architecture, yet they offer places where detail can be focused on: the feathering of a bird's wings, the whiskers and tusks of a walrus, and especially the eyes of any creature. Nonetheless, Benson is a skilled carver, and some of his later projects in the book incorporate additional scenery into the carving, resulting in impressive — if challenging — projects.

At its core, *Whittling Wildlife* is a book of projects. Benson provides guidance on what tools to use, how to use them, and how to tackle specific elements (like the eyes), but the heart of the book is the animals Benson has created. In that spirit, I'll spend the next couple pages showing some examples of the projects in *Whittling Wildlife* to give you a taste of what the book contains.



◀ **Whittling Wildlife** by Peter Benson, GMC Publications, RRP $19.99, available online and from all good bookshops.

Written by: Rob Petrie; Photographs provided by *GMC Publishing*

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WHITTLING PROJECTS

Whittling Wildlife is primarily about its projects. Yet, it begins with some of the basics that any neophyte might need to get to work on some whittling.

THE BASICS. The discussion begins with tools. Benson recommends a few: either a coping saw or a band saw when initially shaping the blanks; a few knives with differently shaped handles and shorter blades; and palm gouges, preferably in a few small sizes with round and V-shaped blades.

At this point, Benson also discusses safety, sanding and finishing, and choosing what wood to use. Beyond this, he begins to get into some practical techniques. This starts with how to make basic cuts using a knife; again, good fundamentals for a beginner. But, what I found really helpful in this section was the discussion of eyes.

Benson spends six pages going through different methods of making eyes, getting them to match, and what to consider about the creature they're on. For instance, glass eyes can be glued on to make a fish look more lifelike, but they look uncanny on a creature that has eyelids. While the beginning of this book will be review for more experienced individuals, there are still gems of wisdom to pickup.

THE PROJECTS. As I said, the projects are where the meat of this book really lies. There are fifteen projects within *Whittling Wildlife*. These begin with simpler shapes, typically just the subject at rest, then evolve to ones with movement: an albatross in flight or a fish swimming. The latter projects begin to incorporate the subject's environment as well, culminating in the elaborate carving of the diving kingfisher shown at the top of this page.

For each of the projects, Benson presents a series of numbered

▲ Benson's carvings range from simpler, still forms, such as a sleeping duck or a pelican at rest (left photo), to intricate, moving designs, like a sea lion swimming through reeds or a kingfisher diving at its prey (right photo).

▲ Benson provides profiles to guide the initial shaping of the blank, which is done by saw.

▲ Photographs indicate how to redraw the layout lines as the carving is further sculpted.

▲ Eyes are an important topic within this book, and Benson provides several options, one being to use a length of dowel or a bit of horn, then trim it down and pare or sand it flush.

steps, each accompanied by an in-process photo. The first phase of each project is to rough out the profiles. Patterns are provided that you can sketch yourself, or photocopy and apply to the blank.

Once the blank is shaped, the work focuses on sculpting the rough shape of the subject. This involves defining the main parts: head, torso, limbs and wings, and for the more advanced projects, key parts of the scenery. It's important to redraw the layout lines as they're removed, and Benson's photos provide guidance. You can see one example with the octopus on the previous page. This project requires the carver to work in layers: first the head and eyes, then the mantle, the tentacles, and eventually the rocks beneath it.

After the broad strokes of shaping are done, Benson moves onto the finer details. This begins with contours, such as the pelican's beak on the previous page, or separating parts, such as the tusks of the walrus. This process concludes with texturing, like the lines hinting at a bird's feathers or the walrus's fins. How far you push this step will depend on your skill. To see how far the details can go, look back at the photo of the kingfisher once more.

IN SUMMARY. *Whittling Wildlife* offers a pathway for people interested in knife carving. Benson lays out the fundamentals for beginners while also offering practical advice for more complex problems.

ABOUT THE AUTHOR

Peter Benson has always been a passionate carver. On his retirement from a career of teaching in 1996, Benson established the Essex School of Woodcarving. He also served as Chairman of the British Woodcarvers' Association for 14 years, heading a number of projects over that time including a 2.5 ton, life-sized polar bear carving. Alongside *Whittling Wildlife*, Benson has authored a number of other books on carving in miniature, including *The Art of Carving Netsuke* and the *Whittling Handbook*, both published by GMC Publishing.

The projects begin with a low skill floor, only requiring a few key details to form the animal, but they build up to grand projects that will test the skills of any whittler. Throughout, Benson's projects incorporate a number of different carving techniques. *Whittling Wildlife* offers a unique form of woodworking, but is approachable, requires few tools, and easy to start learning. If whittling interests you, then I strongly recommend you give Benson's book a try. W

Carved Panels

▼ Only a few carving tools are required and all are available online.

Relief carved panels can add warmth and visual action to your woodworking. Difficult? Not at all. The approach I often choose to create them combines the efficiency and ease of using a router to remove the background with the organic, handcrafted look that only traditional carving tools produce. It is a simple, direct method that uses only a few tools, goes quickly, and adds an artistic element to your work that you will be proud of.

Choosing a subject for relief panels can be daunting. I find botanical forms are a good choice as they come in an infinite variety and are very approachable to carve. The design of the sample panels was inspired by a variety of poppies growing in my home's flower beds. If you need some help, antique ceramic tiles offer inspiration and a place to start. As with most decorative details, it's best to keep the forms simple; the panels should add to the overall appearance of a project, not overwhelm it.

Here are a couple of hints to help get started:

- Choose fine-textured, consistent grained wood that mills cleanly when routed and carves predictably.
- Use a mallet and rapid light blows for the best control and no "uh oh" moments from a misguided cut.
- A carving knife is handy for the spots that you can't get a carving chisel into.
- Sharp tools cut cleanly, dull tools tear the wood, so take the time to sharpen your tools (there are only 4!)

Written by: Chris Fitch

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CLEAR THE BACKGROUND

The first step in making the panels is to create a paper pattern. Using a paper pattern rather than drawing directly on the wood allows you to make changes easily. Plus, with the aid of a printer, you have a record of the project should you want to repeat it. If you are making the poppy panels, download and print off the patterns. With pattern in hand, apply it to the carving blank using a temporary spray adhesive for easy removal.

The background waste is cleared with a palm router fitted with an oversized base. The oversized base provides the router with plenty of support so that the background surface is smooth and consistent. Use a sharp straight bit or upcut bit. You can use large bits for wasting out large areas or smaller bits for fine detail, however resetting the depth to leave a perfectly flat background can be tricky, so I think it's best to stick with one size of bit for the whole project if you can. I find a ⅛" bit works well for most furniture scale panels.

Once you have completed the routing, peel off the remaining paper pattern. A clean, routed background will enhance your hand work, so clean up any "fuzzies" on the panel. A knife and a palmetto scrub brush will help with this task, getting into all the tight corners and recesses.

▲ After gluing on a pattern for the panel, clean out the bulk of the background with a hand-held palm router and a sharp ¼" straight bit or spiral upcut bit.

DEFINE THE CARVED FEATURES

With background cleared, begin carving by separating features such as the end of the stem and the flower petals with the V-tool. This is done to allow the removal of material without fear of chipping out adjacent areas. Use a mallet and a light, fast tapping blow which will give precise control and a clean exit. As you carve down areas, such as the flower petals, it may be necessary to redefine them with the V-tool a second or third time.

CARVE THE FLOWERS

With the flowers divided into individual petals, carve each petal down to its own level and dive into the next one using the #3 x ½" gouge. View the flower as a whole and how each petal will relate to its neighbor to create a rounded form with well-defined petals. You may wish to add an undulating upper edge to the petals with the #9 x ½" gouge. Use all the height of the wood, carving from the top down to the background level to maximize form and texture. Undercutting is used to create a sense of separation and a shadow line, turn the V-tool on its side and slightly undercut overlapping petals where they intersect.

CARVE THE LEAVES

The leaves are an opportunity to create a very active shape that

▲ Using a sharp V-groove gouge makes quick work of defining and separating the petals, leaves, and stems.

▲ Carefully carve each petal into fluid, organic form that dives under or overlaps the next one using the #3 x ½" gouge.

▲ To create a rolling durface, the leaves are carved with an opposing series of cuts using the #9 x ½" gouge.

contrasts well with the flat background. They are carved with an opposing series of cuts using the #9 x ½" gouge to create a rolling surface. Think about how the panels will be viewed and cut the leaves deeply so that less edge will show at the top (more exposed to the eye) and more at the bottom (hidden from the eye). The last step is to use the V-tool to cut a vein in the center of the leaves to create symmetry and add detail.

▲ The stem and frame shaping is cut using a combination of the #3 x ½" gouge and knife.

SHAPE THE STEM & FRAME

Use the #3 x ½" gouge and shape the stem, rounding the wood and having it subtly dive in and out of the flat plane. The stem needs to be shaped all the way to the background. Tight areas such as where the stem diverges for a leaf are best handled with the knife. The flower stem "grows" from the frame of the panels, so once you have shaped the stems continue onto the edges of the frame creating a modest faceted round over. This will reduce the contrast of the router cut background and side walls with the carved texture of the poppies.

STAMP THE BACKGROUND

The background can be left plain or textured with stamps. If your background is routed cleanly, then you may enjoy the look of the flat plane contrasting with the carved flowers. If your background isn't flat and uniform, or if you would like to add some visual character to the panels, stamping is the answer. Stamps come in a variety of shapes, so there is always one that will fit in the various spaces. Try to keep the depth of the stamping consistent, so while you may need to hit the larger stamps solidly to leave a good impression, the small stamps should be struck lightly to prevent overdriving them. W

▲ Working from one end to the other, I struck the stamp, then repostioned it being careful to not overlap the previous impression. Rinse and repeat.

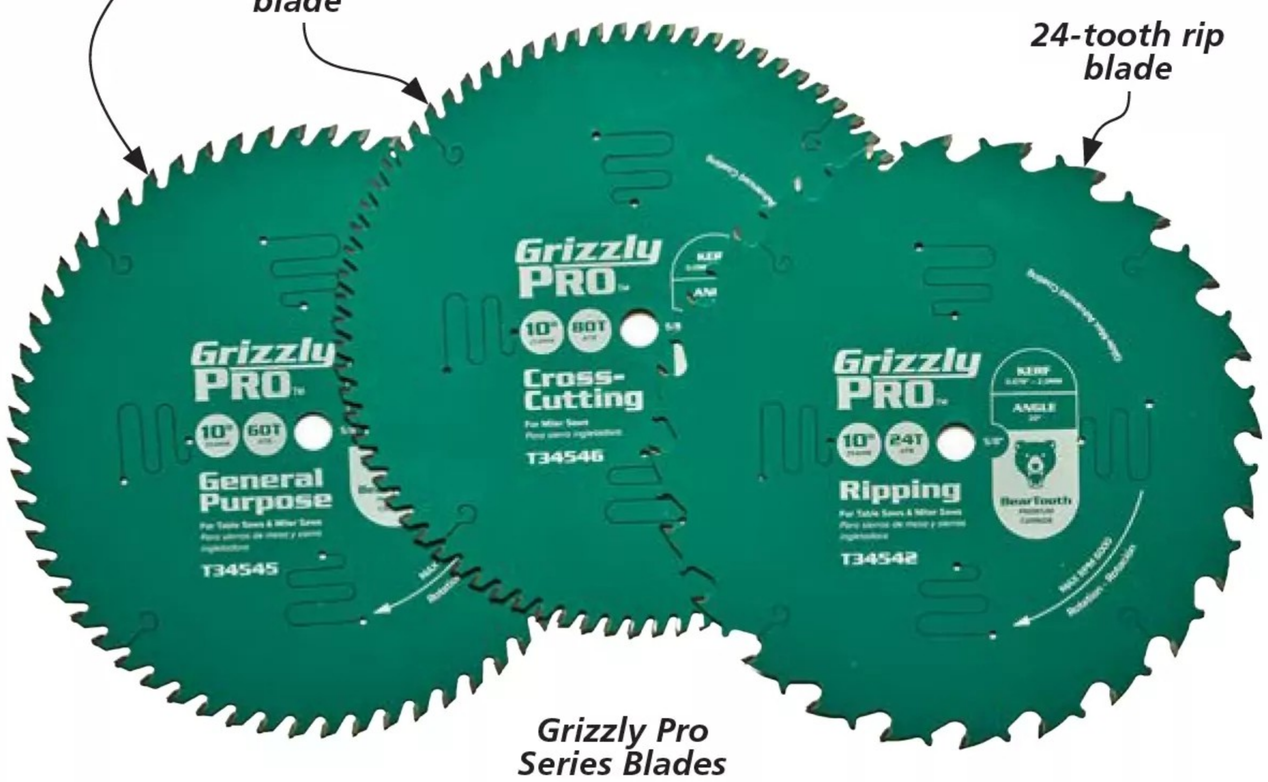
▲ Stamping tools come in a variety of shapes to get in between those tight spaces.

GREAT Gear

Talking Table Saw Blades

The table saw is one of the most-used tools in the shop. From dimensioning workpieces to cutting joinery, there's a wide array of tasks for which it's the most accurate and effecient tool of choice. And, the biggest factor that affects the quality of your work is the blade you use.

For this issue, we'll take a dive into a few table saw blades offered by two companies: *Grizzly* and *Woodpeckers*. At the end, we'll also be taking a look at a few layout tools from *Woodpeckers* — it's always handy to have a square beside your saw.



Grizzly Pro Series Blades

GRIZZLY BLADES

The first blades I'd like to discuss are two sets from *Grizzly*. You can see their "Pro Series" at left and their "Extreme Series" on the next page.

PRO SERIES. The "Pro" blades are priced from $30 (for the ripping and combination blades) to $40 (for the crosscut blade). The ripping blade features 24 teeth and is considered thin-kerf, with a thickness of 5/64". The crosscut blade has 80 teeth, and the combination blade strikes the mid-ground with 60. Like most modern table saw blades, the teeth on these are carbide with an alternating top bevel (or ATB). All in all, these are what I expect of a standard table saw blade: they do the job well and at a price that won't break the bank.

EXTREME SERIES. Things get a bit interesting with the "Extreme Series." These are marketed as the high-end option, running you $60, $70, and $90 (going from left to right in the photo on the next page) — but there's a reason for that.

Primarily, that reason is materials. Just holding the two blades, you can feel a difference in the weight; the Extreme blades are notably heavier. This is because they're made from thicker steel, which keeps them more stable and more durable over time.

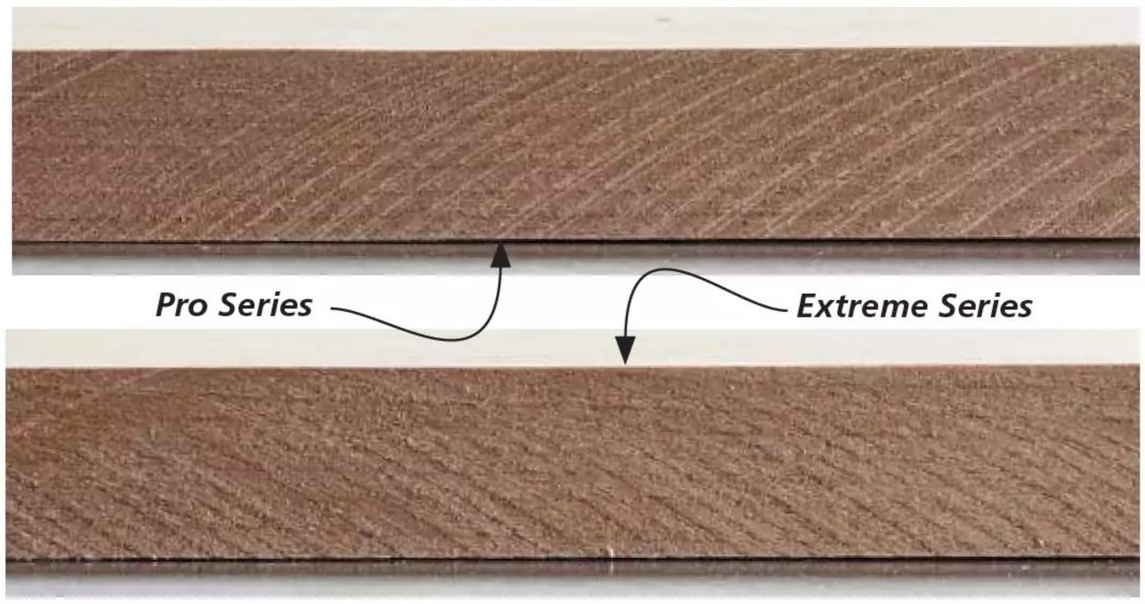
Written by: Rob Petrie

Grizzly Extreme Series Blades

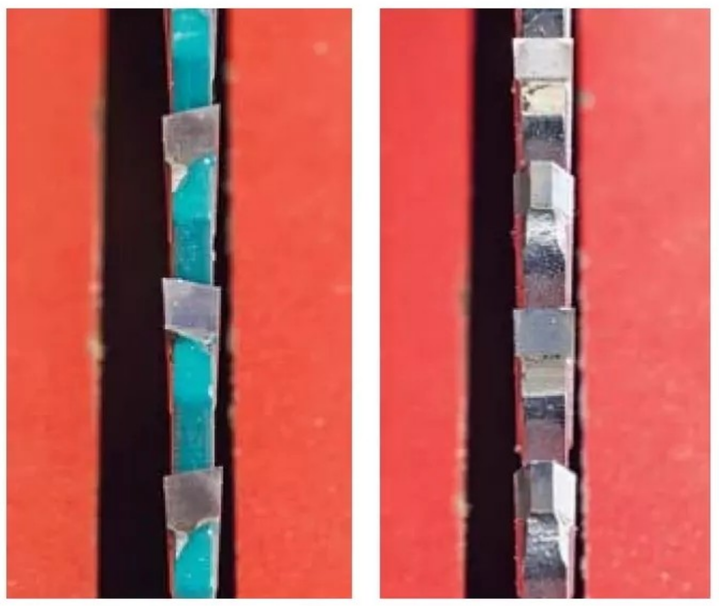
Additionally, a different carbide alloy is used on the teeth of the Extreme series and the Pro series. The Pro blades have C4 carbide teeth, which is the common form of carbide used on cutters due to its high wear resistance, allowing it to hold an edge very well. By contrast, the Extreme blades have C9 carbide teeth. This alloy contains a higher degree of cobalt, maintaining the wear resistance of C4 while also making it significantly tougher. This means the blades are less likely to chip in hard material or through constant use.

One final difference between these sets is on the tooth grind of the crosscut blades. You can see what I'm talking about in the upper right photo. The Pro crosscut blade has a typical ATB grind, like you'll find on most blades. The Extreme blade has a triple chip grind (or TCG), which is made up of the trapezoidal teeth in the photo alternating between different bevel grind teeth. The intent is for the trapezoidal teeth to remove the center waste while the beveled teeth remove the corners to create a smoother cut.

THE RESULTS. To show you how these blades actually work, I've included the photos at right and below. It should be noted that these blades are fresh out of the package, so each is plenty sharp and cuts well. The true test will come with time, as I expect the thicker blades and tougher carbide of the Extreme series will hold up longer. *Grizzly* claims the Extreme Series has nearly twice the durability of their Pro Series, and if that's true then they'll be worth their cost and more.



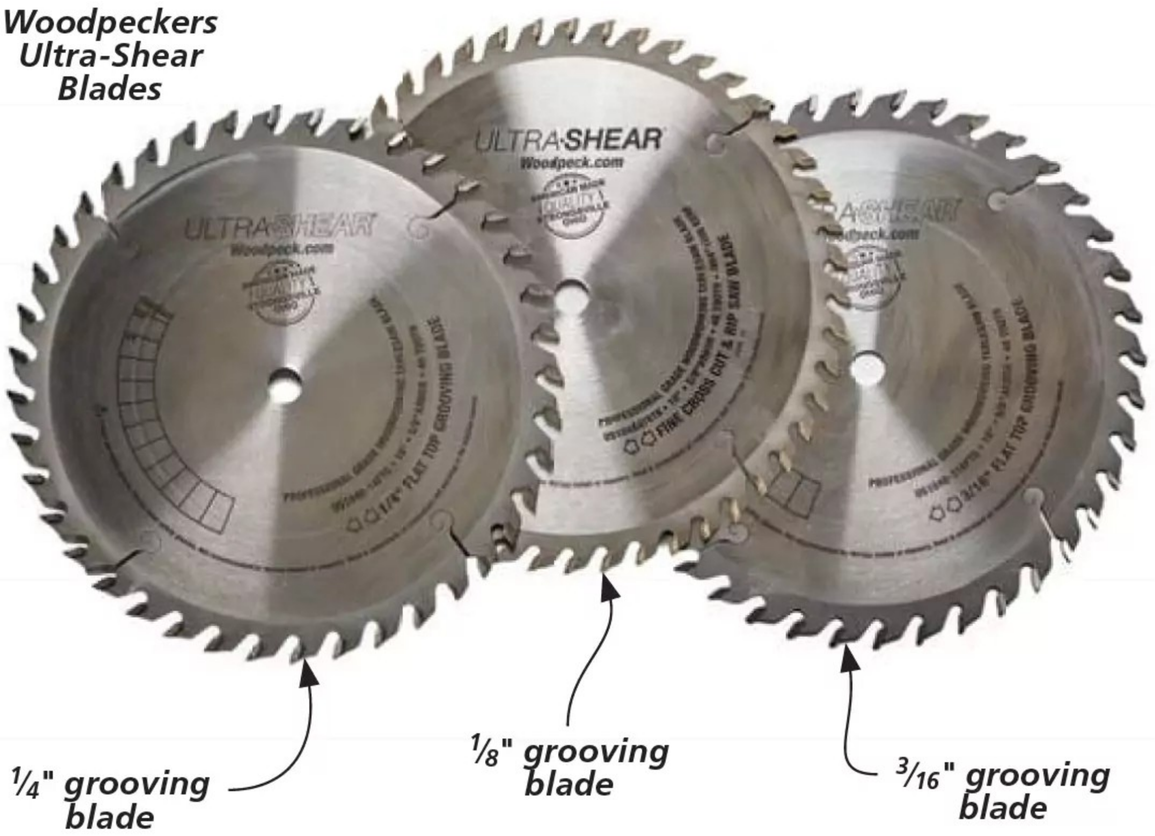
▲ Shown above are rip cuts using the Pro and Extreme series blades respectively. Though the difference is less pronounced than the crosscut, the extreme series leaves a cleaner edge.

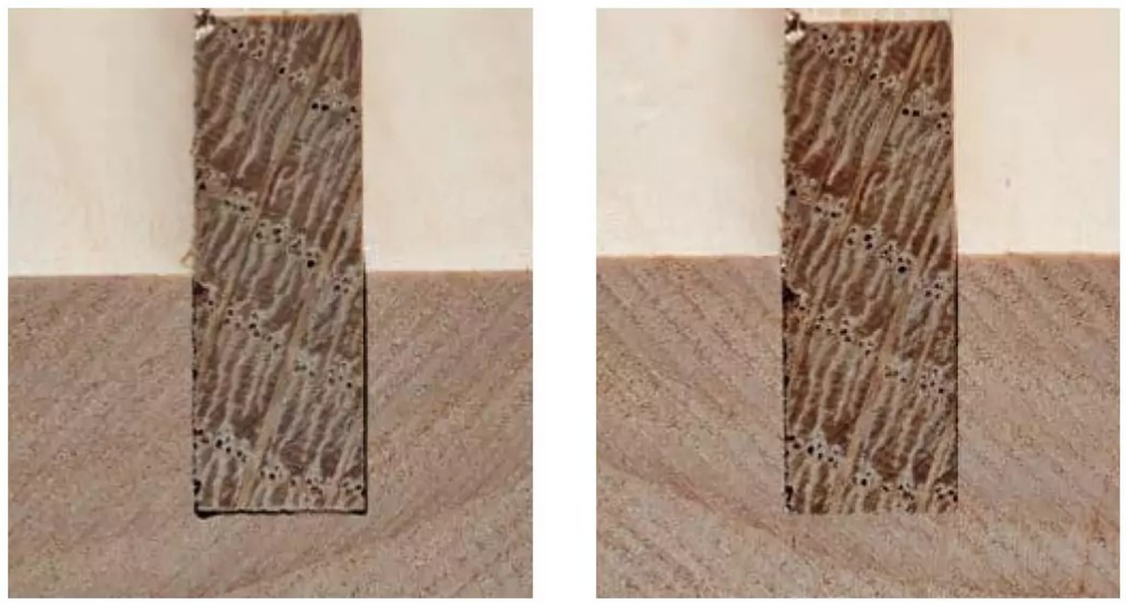


▲ The pro crosscut blade (left) has a typical alternate top bevel (ATB) grind, whereas the extreme crosscut blade (right) possesses a triple chip grind (TCG).

◀ Here you can see the difference on crosscuts between the pro and extreme series. Both cuts are clean, but the extreme series was notably smoother.

Woodpeckers Ultra-Shear Blades





▲ A standard dado blade has bevel-top teeth on its outer blade, which aid in cutting but leave "vampire fangs" in their groove or dado (left photo). By contrast, a flat-top grooving blade can be used to create square-cornered channels (right photo).

WOODPECKERS GROOVING BLADES

The next set of table saw blades to look at is from another reliable manufacturer: *Woodpeckers*. I often use jigs and guides from *Woodpeckers*, but their bits and blades are up their with the best as well. Their "Ultra-Shear" line of table saw blades has received a recent addition, so it's worth giving them a look.

GROOVING BLADES. The first blades I want to take a look at are the grooving blades. These come in three sizes (shown above) and have a flat-top grind. A flat-top grind means they cut a flat-bottomed groove or dado (right photo above). By comparison, the tips of the outer blades' teeth will cut slightly deeper on an ATB grind, leaving behind a pair of "vampire fangs" (or "bat ears" — whichever metaphor suits your fancy) at the corner of your joint. If you intend to cover a joint up with edging or the like, this is something you may never need to consider, but on exposed joinery a flat-top blade makes a world of difference.

In terms of performance, you can see how they work in the photos at the upper right of this page. The left photo shows a dado made with a standard ATB-grind set and the right shows one cut with the Ultra-Shear grooving blade. The blades will run you from $170 to $200 individually, or $540 as a set. This is a fairly median price for grooving blades, and even on the low end when looking at higher-budget manufacturers. If you often work with exposed joinery, then a grooving blade is a must-have, and this set is a good deal for some high-quality blades.

Woodpeckers Ultra-Shear Dado Set

▲ The Ultra-Shear dado set has a few unique aspects. The first you'll likely notice is each chipper has 12 teeth. These have a spoke-like shape to reduce their weight.

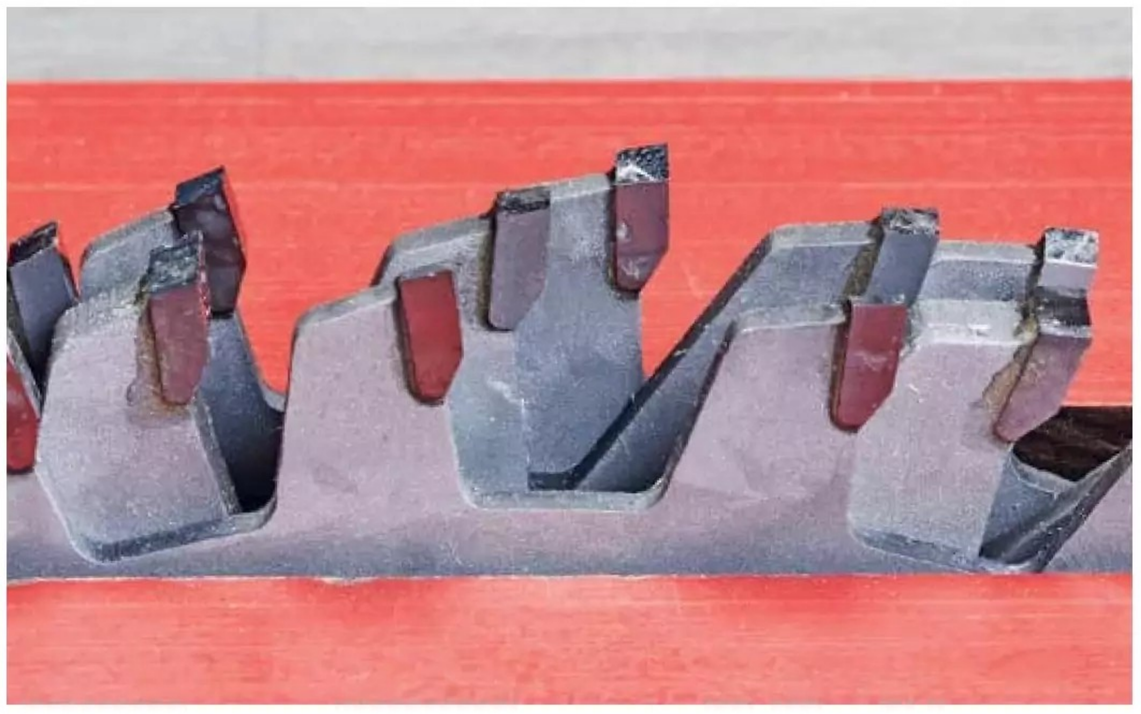
WOODPECKERS DADO SET

The second set of blades I'd like to look at from *Woodpeckers* is the newest addition to the Ultra-Shear line: their dado set (or their "Ultimate Dado Set 2.0" to be exact). There are a few things that make this dado stack stand out among others and improve on its last iteration.

THE CHIPPERS. The first thing to catch your eye on this dado set will likely be the chippers. To minimize how many chippers you need to add to a stack, *Woodpeckers* included three thicknesses: a thin 1/16" chipper, two 1/8" chippers, and a broad 1/4" chipper. Additionally, each chipper has 12 teeth rather than the usual 4. Now, you may be thinking that this sounds like one heavy dado stack, but they found an interesting way to cut down on the weight — page 22 gives you a good view of how. The 1/8" and 1/4" chippers are shaped like spokes, with cutouts inside to minimize material.

OUTER BLADES. There are two things to note about the outer blades on this dado set, starting with the hook angle. As you can see in the right photo on the opposite page, the teeth on these chippers have a positive hook angle, set slightly forward, which helps cut a nice, flat bottom on a joint. However, the outer blades are set at a negative hook angle. This aids their shearing action as you cut, making for cleaner edges on the joint and minimizing the risk of chipout with more fragile materials, like a plywood face veneer.

▲ Th Ultra-Shear dado set has three sizes of chipper: 1⁄16", 1⁄8", and 1⁄4". This saves on the number of chippers you need to install.

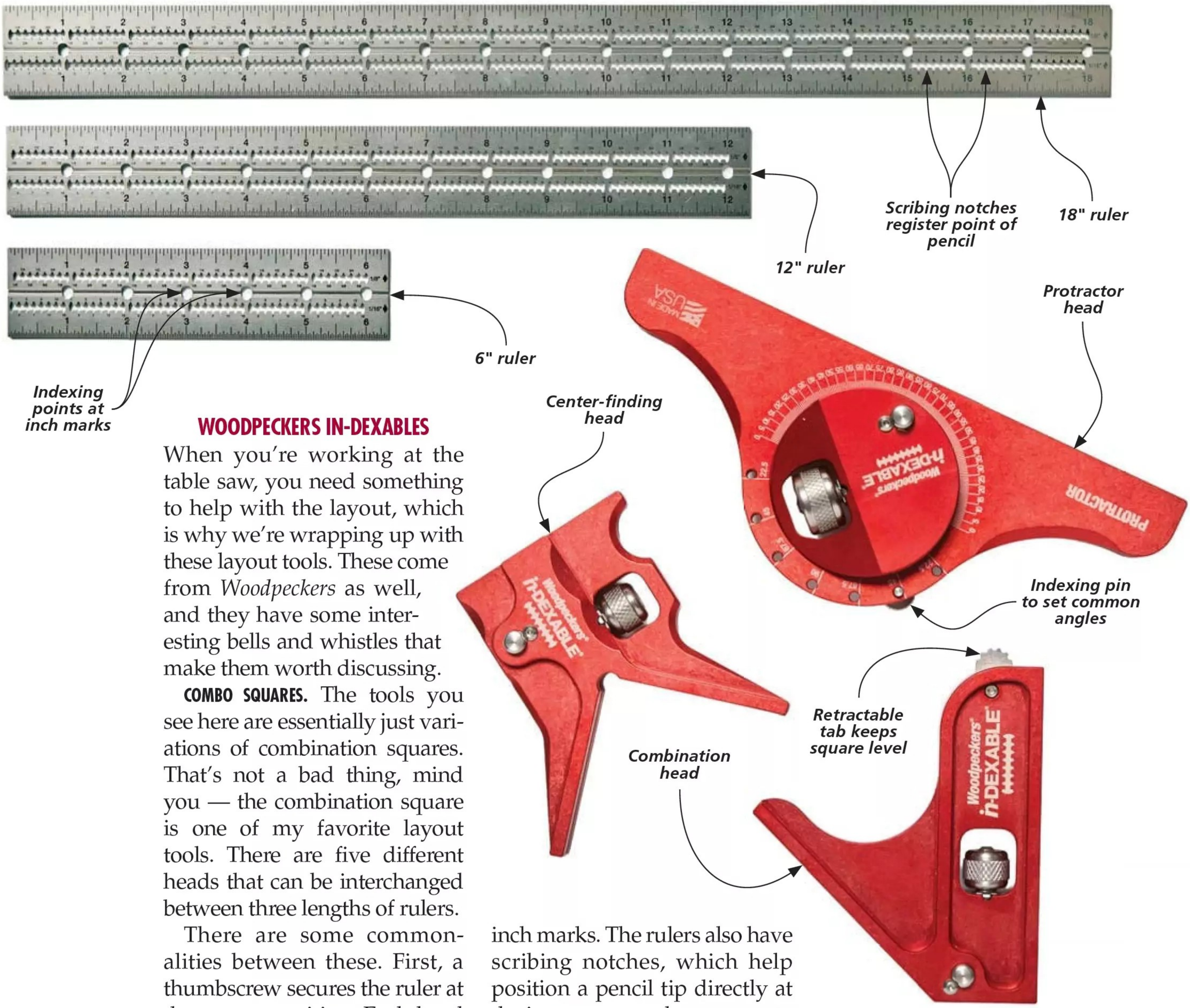


◀ The negative hook angle of the outer blades' teeth helps cleanly shear the sides of a joint, while the positive hook angle and high tooth count of the inner chippers creates a flat bottom.

The second note regarding the outer blades is that they can be swapped out for a set of flat-top blades, similar to the 1⁄8" grooving blade. This option is excellent for cutting exposed dadoes; while you could make a few cuts with a grooving blade, the dado can do it all in one fell swoop, no fangs or ears included.

ASSESSMENT. So, is the Ultra Shear dado set worth the buy? With a pricetag of $350 for the standard dado set and $380 for the flat top one (or $700 for both), these are high-end options for dado blades. While *Woodpeckers* does reside on the higher-budget end of woodworking tool manufacturers, the performance here doesn't disappoint. The additional teeth do make for a cleaner dado or groove, and having a flat-top dado set is certainly a boon in the shop. For what it's worth, this dado set also runs a bit quieter than most, likely because the chippers don't have long arms batting at the air as the blade spins.

If you're looking to upgrade your dado set, there's a lot to appreciate here. If you're just building out your shop and looking for your first dado set, this maybe a pricier option than many, but you've learned why. Regardless, if you're willing to spend the money on a high-quality dado set, then I don't think you'll go wrong with this one from *Woodpeckers*.

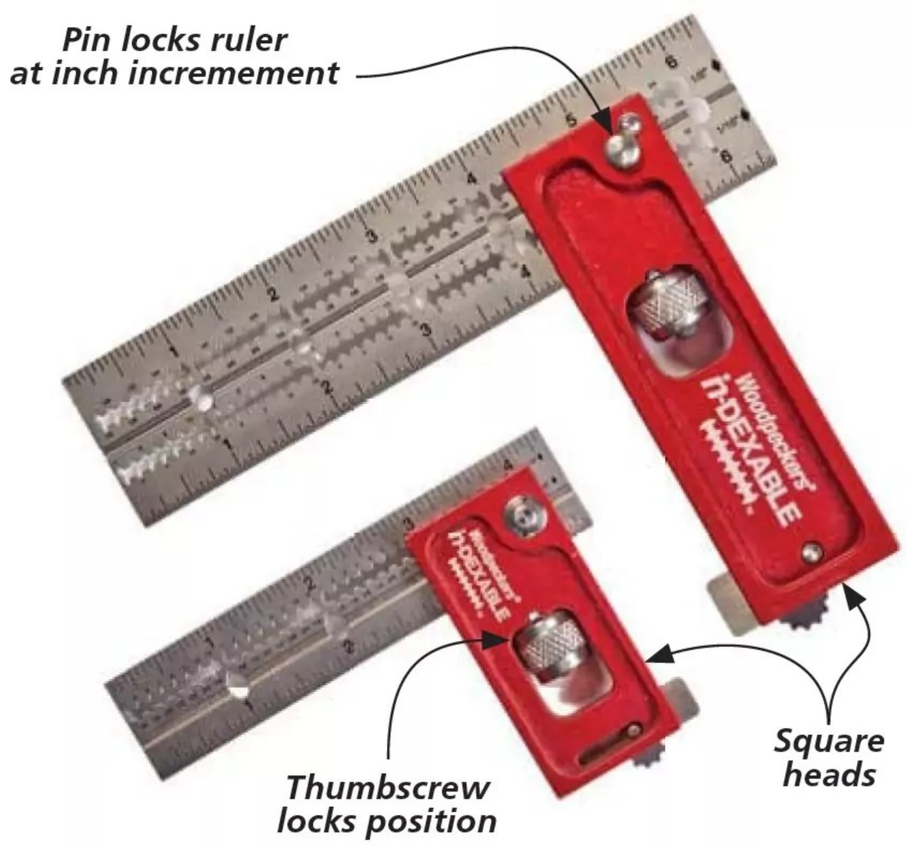


WOODPECKERS IN-DEXABLES

When you're working at the table saw, you need something to help with the layout, which is why we're wrapping up with these layout tools. These come from *Woodpeckers* as well, and they have some interesting bells and whistles that make them worth discussing.

COMBO SQUARES. The tools you see here are essentially just variations of combination squares. That's not a bad thing, mind you — the combination square is one of my favorite layout tools. There are five different heads that can be interchanged between three lengths of rulers.

There are some commonalities between these. First, a thumbscrew secures the ruler at the proper position. Each head has a pin that can be pressed down to index into holes at the inch marks. The rulers also have scribing notches, which help position a pencil tip directly at the increment mark.



SQUARE & COMBO HEADS. To dive into the specific heads, I'll begin with the three simpler ones: the two sizes of square heads and the combination head. These serve the same purpose as they would on any square, yet they do have one nice addition. On the end opposite the ruler, they have a retractable tab. The tab is pushed out to keep the square from tipping as you work along the edge of a piece.

CENTER-FINDING HEAD. The center-finding head is V-shaped at its front to straddle either the corner of a rectangular workpiece or just the side of a circular one. The ruler runs down the apex of the V, allowing you to quickly find centers, or to measure precisely off of a corner.

PROTRACTOR HEAD. The final head of the bunch is the protractor, and it's made to mark out angles. The ruler rotates, with a thumbscrew underneath to lock it in. Common angles can be set quickly using an indexing pin.

These layout tools will run you from $140 to $250 individually. However, I quite enjoyed them. If one interests you, I recommend giving it a try. You might like it enough to get the rest. W

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ShopNotes
project

Craftsman Tool Cabinet

▲ ***Extra Storage.*** *The four drawers of this cabinet provide extra storage for small items that don't need to live on the shelves, yet still keep them close at hand.*

The Craftsman style of furniture is one that's stood the test of time. Even today, you can walk into a furniture store and find examples of this style. So why not bring some of that classic design into your shop? That was the idea behind this Craftsman-style tool cabinet. With beautiful quartersawn white oak, details such as the square plugs, and bold hardware, this tool cabinet not only proudly displays some of your most loved tools, but it also shows off your woodworking skills.

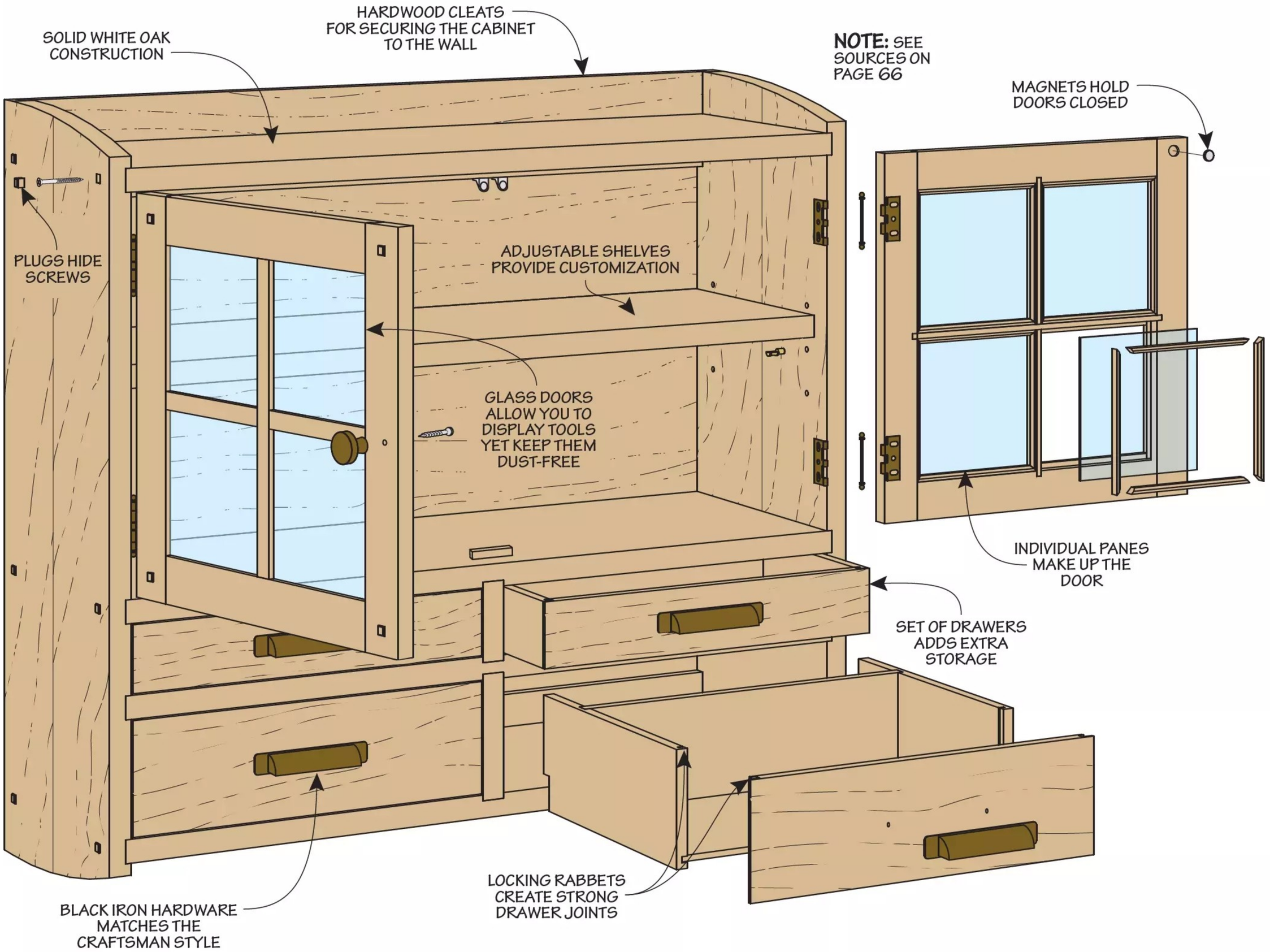
Now, all of that isn't to say that this cabinet can only be used in the shop. In fact, I know many people who would refuse to put a piece of furniture this nice in their dusty shop. I could easily see this cabinet hanging in a home office, entryway, or anywhere else you want to display your prized possessions.

As I alluded to before, the construction of this cabinet uses some traditional joinery techniques. Digging into it, you'll find dado case joinery, haunched mortise and tenons, and locking rabbets. All of these will help hone your woodworking skills. So, let's pour a cup of coffee, step into the shop, and start surfacing some white oak as you begin working on your own tool cabinet.

Written by: Logan Wittmer; Project Design: John Doyle

Exploded View Details

OVERALL DIMENSIONS:
12"D x 36"W x 33"H



materials & hardware

CASE

A	Sides (2)	1 x 12 - 33
B	Bottom/Divider (2)	1 x 11¾ - 34½
C	Top (1)	1 x 11¾ - 34½
D	Horizontal Divider (1)	1 x 11¾ - 34½
E	Top Vertical Divider (2)	1 x 11¾ - 3½
F	Btm. Vertical Divider (1)	1 x 11¾ - 5½
G	Cleats (2)	¾ x 4½ - 35
H	Back (1)	25 x 35 - ¼ Ply.
I	Shelf (1)	1 x 10¾ - 33⅞

DOORS

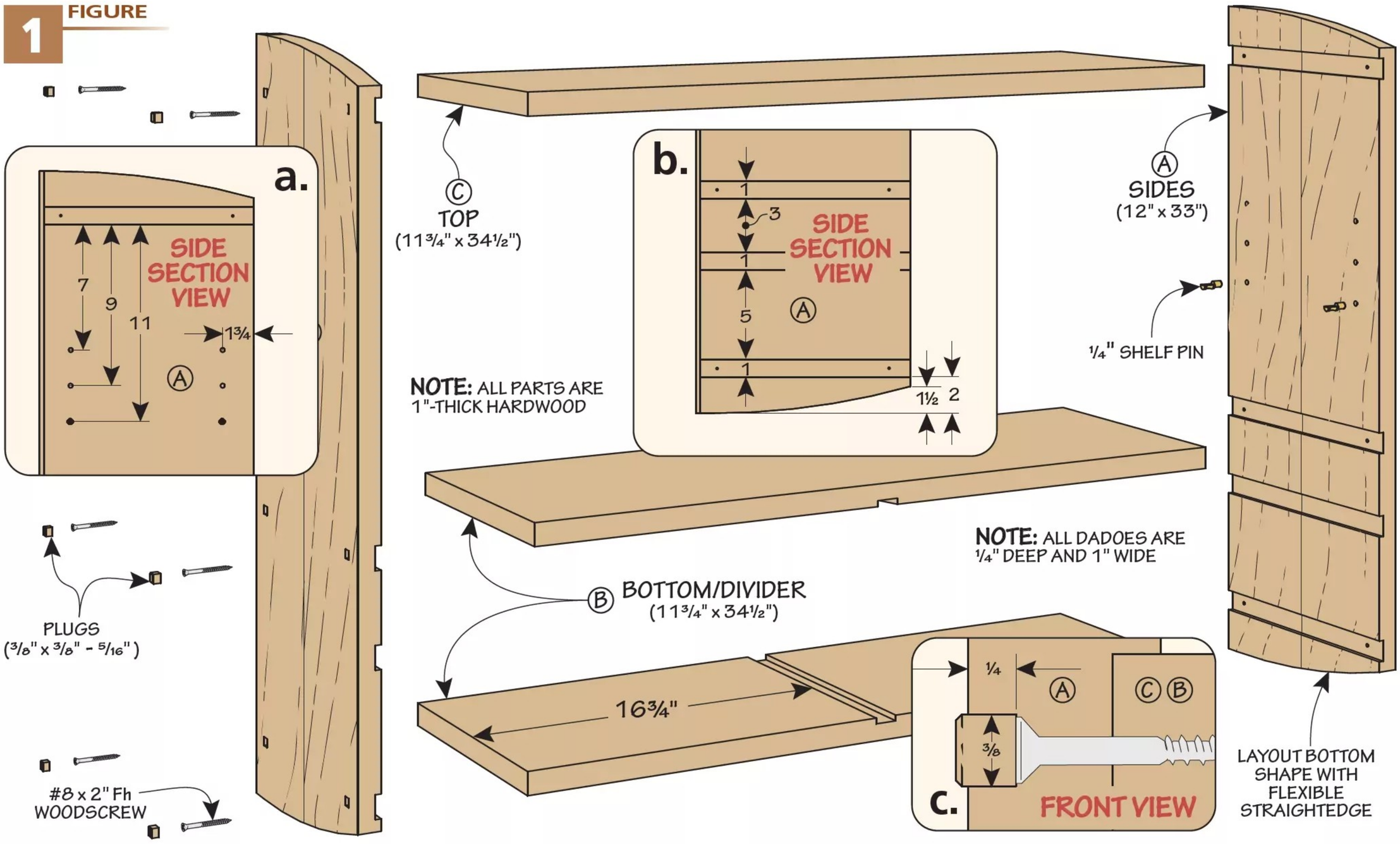
J	Stiles (4)	¾ x 2 - 16⅞
K	Rails (4)	¾ x 2 - 15 21/32
L	Muntins (4)	¾ x ¾ - 13⅞
M	Glass Retainer (32)	¼ x ⅜ - 244 rgh.
N	Door Stop (1)	¼ x ¼ - 2

DRAWERS

O	Small Drawer Sides (4)	½ x 2⅞ - 11½
P	Small Drawer Fronts (2)	½ x 2⅞ - 16⅜
Q	Small Drawer Backs (2)	½ x 2⅞ - 15⅞
R	Drawer Bottoms (4)	8⅜ x 15⅞ - ¼ Ply.
S	Large Drawer Sides (4)	½ x 4⅞ - 11½
T	Large Drawer Fronts (2)	½ x 4⅞ - 16⅜
U	Large Drawer Backs (2)	½ x 4⅞ - 15⅞

- (12) #8 x 2" Fh Woodscrews
- (20) ⅜" x ⅜" - 5/16" Hardwood Plugs
- (4) ¼" Shelf Pins
- (8) 6½" x 6½" Glass (⅛"-thick)
- (4) 2" Ball-Tip Hinges
- (8) Nylon Drawer Slides
- (4) 3¾" Drawer Pulls

Illustrations: Becky Kralicek



Build a Hardwood CASE

This tool cabinet project starts by building a sturdy case. As you can see in Figure 1, the main case consists of five parts. A pair of shaped sides have a series of dadoes cut in them.

▲ ***Craftsman Details.*** *The square plugs do double-duty, hiding screws and adding an appealing detail.*

The dadoes capture a top, a bottom, and a horizontal divider. Later, we'll add a drawer divider as well.

MATERIAL SELECTION. Before we start, let's touch on material. As mentioned, we built this cabinet out of quartersawn white oak. The case parts are all a full 1"-thick. This means that you'll need to start with at least 5/4 stock, maybe even 8/4 if you can't find 5/4 material. For quartersawn stock, you may be hard pressed to find material wide enough to make the case pieces out of one piece. In that situation, glue up your material beforehand.

The sides of the tool cabinet feature a gentle curve at the top and the bottom. We'll deal with that in a bit — let's start with the joinery. Looking at Figure 1 above, you can see that each side contains four dadoes. These dadoes will capture other case parts that we'll make later.

DADOES, YOUR WAY. My preference for cutting dadoes is almost always a dado blade at the table saw. I like the fact that I can take the workpiece to the tool, and I feel like I get consistent results between the matching parts. However, most dado blades stop just short of being able to cut 1" in one pass. Therefore, you will either need to shim out your dado stack, or make each dado in two passes. Whichever method you choose, set the rip fence as a stop to position your part. Then, guide your workpiece through the dado blade using the miter gauge. An auxiliary fence on the miter gauge will help support the long side panels.

After a pair of dadoes are finished, reposition the rip fence to cut the next set. The middle dadoes are laid out in Figure 1b. The dado for the top and the bottom of the cabinet can be cut with the same setup. Simply flip the workpiece end-for-end. Go ahead and cut the dadoes in the bottom and divider at the same time as you're cutting the sides. Finally, bury the dado blade in an auxiliary fence and cut the shallow rabbet along the back edge of the sides. You can see this in Figure 1a.

OTHER DETAILS. With the dadoes all cut, let's knock out some other details on the sides. Head over to the drill press and drill a series of shelf pin holes in each side for the shelf that's added later. To create the square holes for the plugs that hide the screws, you have a few options. While at the drill press, you can pre-drill an undersized hole to remove most of the waste, then chisel the hole square.

Another option is to use a mortiser to form the holes. Whichever you choose, you'll want to create some plug stock — simply plane stock down and cross cut it to length with a handsaw. The slight chamfers around the top can be done with a sanding block.

BY GLUE & SCREW. At this point, you can shape the ends of the sides. The band saw makes quick work of this, and a block plane or rasp will help smooth out the curves. Now, it's time to do some assembly. Apply glue to the dadoes and install the top, divider, and bottom. After tightening clamps, drill a pilot hole through the square plug holes and drive screws home.

DRAWER DIVIDERS

With the case drying, it's time to turn our attention to filling out the inside of the case. Starting at the bottom, we need to add a few more dividers that create drawer openings. The horizontal divider has a dado on the top and bottom. You can create this dado the same way you made the dadoes for the sides. The upper vertical divider is simply cut to size. However, the lower divider is notched at the back. This is to fit over hanging cleats (more on those in a minute). You can cut this notch with a dado blade at the table saw or simply free-hand it at the band saw.

HANGING CLEATS & BACK. This cabinet, by nature of the meaty white oak, is heavy. So, we need to make sure we have a way to properly attach it to the wall when it's all finished. This comes in the form of two hanging cleats. The cleats, as you see in Figure 2 below, are also made from white oak. They have a groove down the center of the front face to capture the top (or bottom). On the ends, they have a rabbet that engages the sides of the case. Finally, the back of each cleat is rabbeted. These rabbets will hold the plywood back.

The order of operations when cutting the joinery on the cleats isn't terribly important. For what it's worth, I would cut the groove first, then rabbet the ends before finishing with the back rabbet. Why that order? I couldn't tell you, but that's how I'd approach it.

With the cleats cut, install all of these parts into the case. Start with the horizontal divider, followed by the vertical ones. When slipping these in place, you may need the help of a mallet and a scrap block to convince them. The upper and lower cleats are glued in place, and several screws are driven from the back side into the top, bottom, and sides. Finally, cut the plywood back panel and install it with a bead of glue in the rabbets.

FIGURE 2

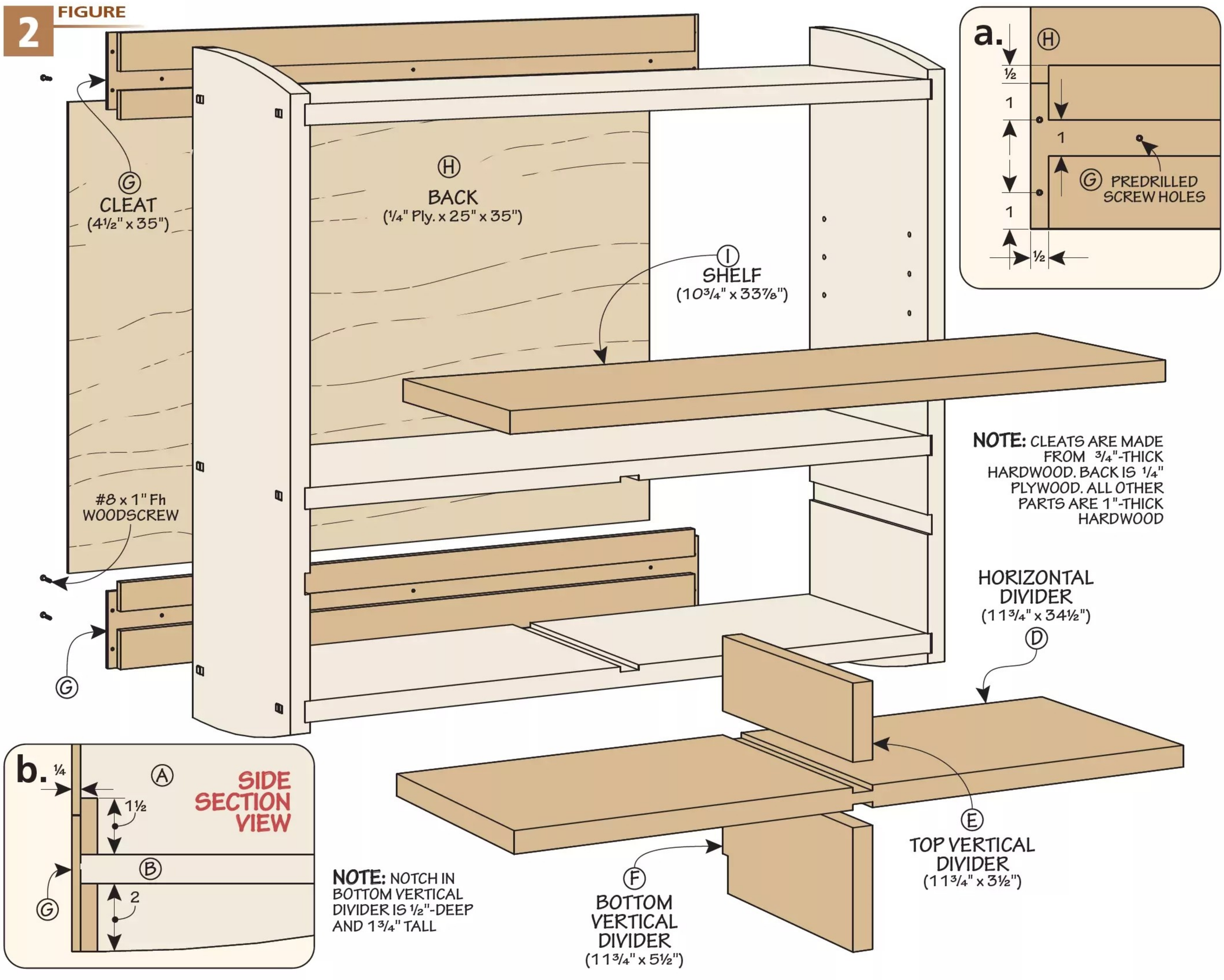
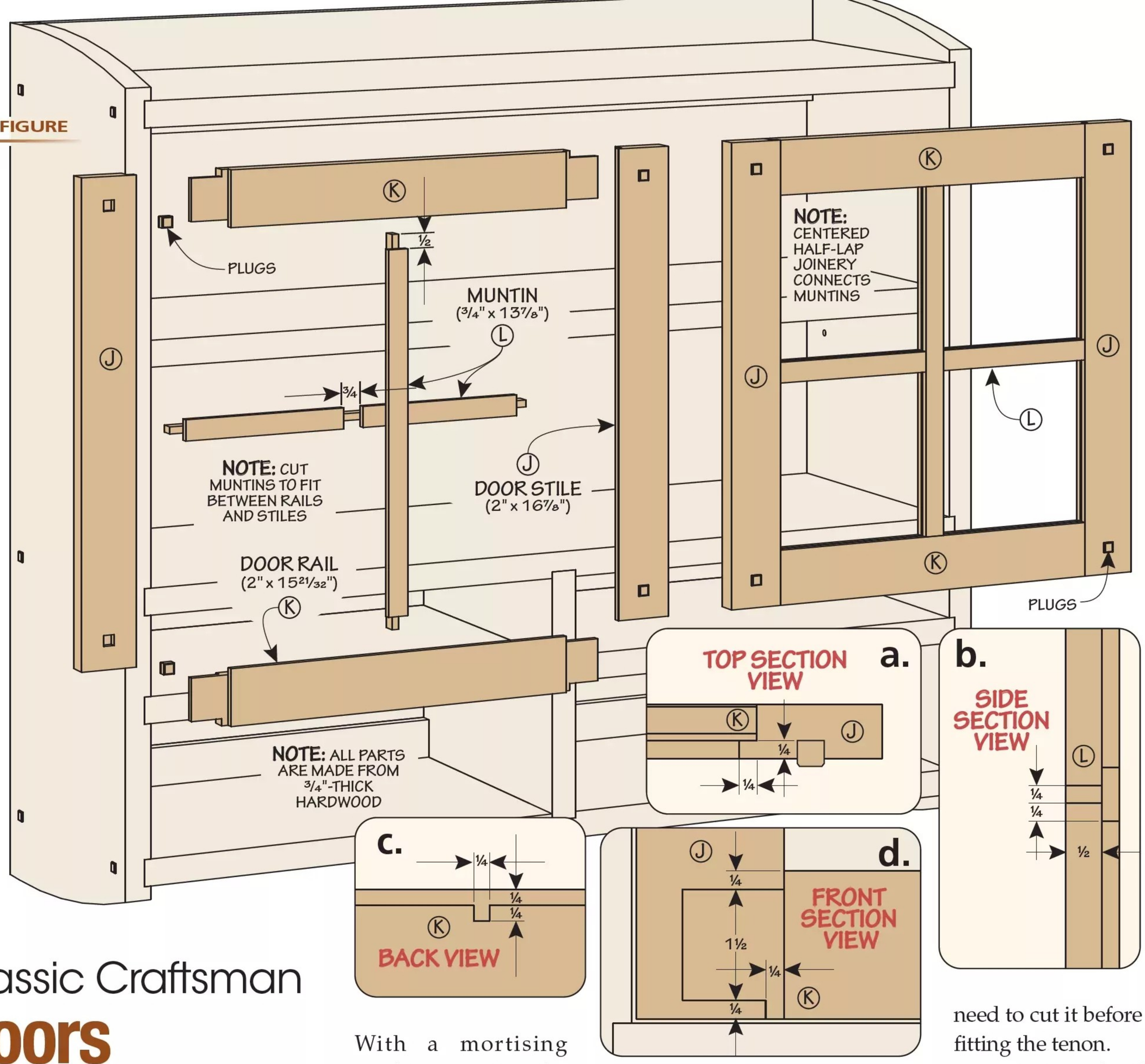


FIGURE 3



Classic Craftsman Doors

It may sound odd, but at this point I'd call these doors optional. As the cabinet sits, it would make a beautiful shelf without the doors. However, if you want to build a pair of doors to match the cabinet, you've come to the right place. As you can see in Figure 3 above, these doors have muntins dividing up four pieces of glass. The decorative plugs on the doors match those on the case.

HAUNCHED MORTISE & TENON. As simple as the construction of the cabinet case is, these doors throw a curve ball. Well, a little-league curve ball at least. The doors are constructed using haunched mortise and tenons. Looking at the drawing above, you'll see that the tenons on the rails have a small stair-step in them. This "stair-step" matches up to a similarly stepped mortise in the stiles. As per the usual, let's create the mortise first, and then we'll size the tenon to fit.

With a mortising machine, creating the haunched mortise is straightforward. Simply create a "step" at the end of a standard mortise. However, let's assume you don't have a mortising machine. If that's the case, I would create the mortises using a router table.

We'll make this mortise in two steps. The first will create a shallow mortise the same depth as the step running the entire width. The second setup will be to create the deeper mortise, but slightly shorter. While doing this, a stop block is key here. It will limit the length of the mortise you're making, allowing you to create the steps. See detail 'b' for the mortise info.

With the haunched mortise complete on each end of the stiles, now we're going to cut a rabbet along the back edge. This will house the glass that we'll add later. Usually, I'd wait to cut this rabbet until all door parts are done, however you'll need to cut it before fitting the tenon.

OFFSET TENON. As if the haunched tenon wasn't enough, the shoulders of the haunched tenon are offset. You can see what I mean in Figure 3a. The front face of the tenon is longer than the back face. This offset shoulder seats into the rabbet you just cut in the stiles. See, everything's falling into place now. Before ever thinking about the tenon however, form the inside edge rabbet for the glass using the same setup you just used on the stiles.

Now you can think about the tenon. Here's my suggested order of operations: using a dado blade, form the outside face of (all) the tenon first. Then, nibble away the lower edge of the tenon to form the haunch. Use your rip fence as a stop to set the position of the haunch. Now, cut the remaining face of the tenon. Remember, the shoulders are offset, so you'll end up removing less material from this inside face. When you've snuck up on the proper

fit, lock in the rip fence as a stop and cut the remaining tenons. Just test the fit often, and you'll end up with a great-looking, strong joint.

MUNTINS

With the joinery done on the doors, the next item is to fit the muntins. These divide the door into four quadrants. The muntins fit into a notch on the inside face of the rails and stiles. Here again, a mortising machine will make quick work of this small detail. This notch is pretty easy to make at the router table however. Use a straight bit combined with the fence (to position), the miter gauge (to guide), and a stop block (to stop your cut) to form it. This will leave a rounded cut that's easy to square up with a chisel. Glue the doors together and fit decorative plugs into plug holes on the face of the doors.

Forming the muntins is fairly straightforward. With a dado blade, cut a rabbet on one edge of extra-long stock. Then, flip the stock over and form the rabbet on the other side. Don't finish your cut however — leave a square end and shut the saw off. This will prevent the piece from tipping into the blade. Then, after cutting the muntins to length, cut the rabbets on the front face of the workpiece to form the tongue that fits in the small notch in the rails and stiles. After applying finish, the glass can be installed with small retainer strips that are mitered to fit, as you see in Figure 4.

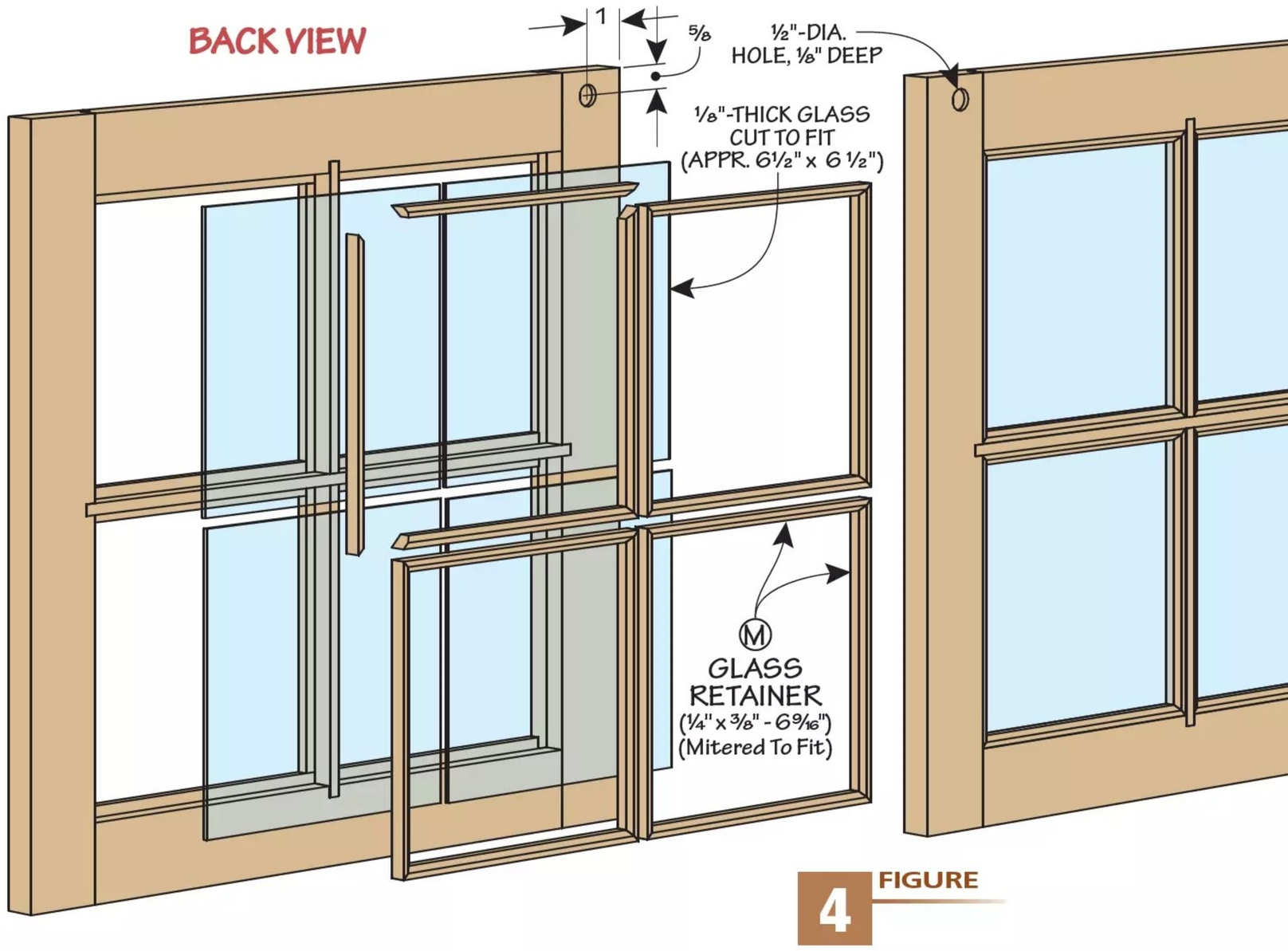


FIGURE 4

Finally, install the doors with hinges. Simple knobs and a magnetic catch will allow you to open and close the door. A glued in door stop helps keep the doors flush with the case.

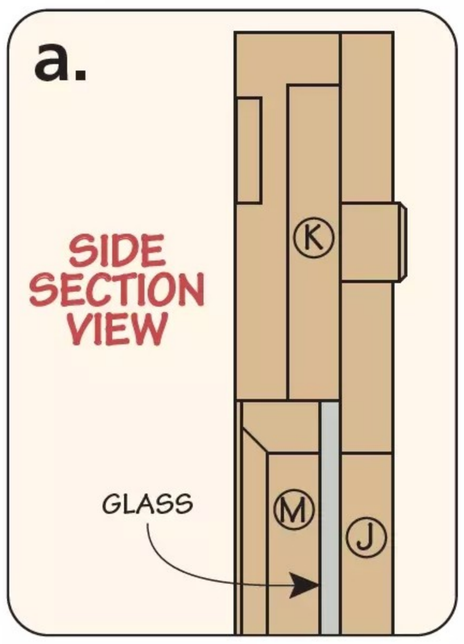


FIGURE 5

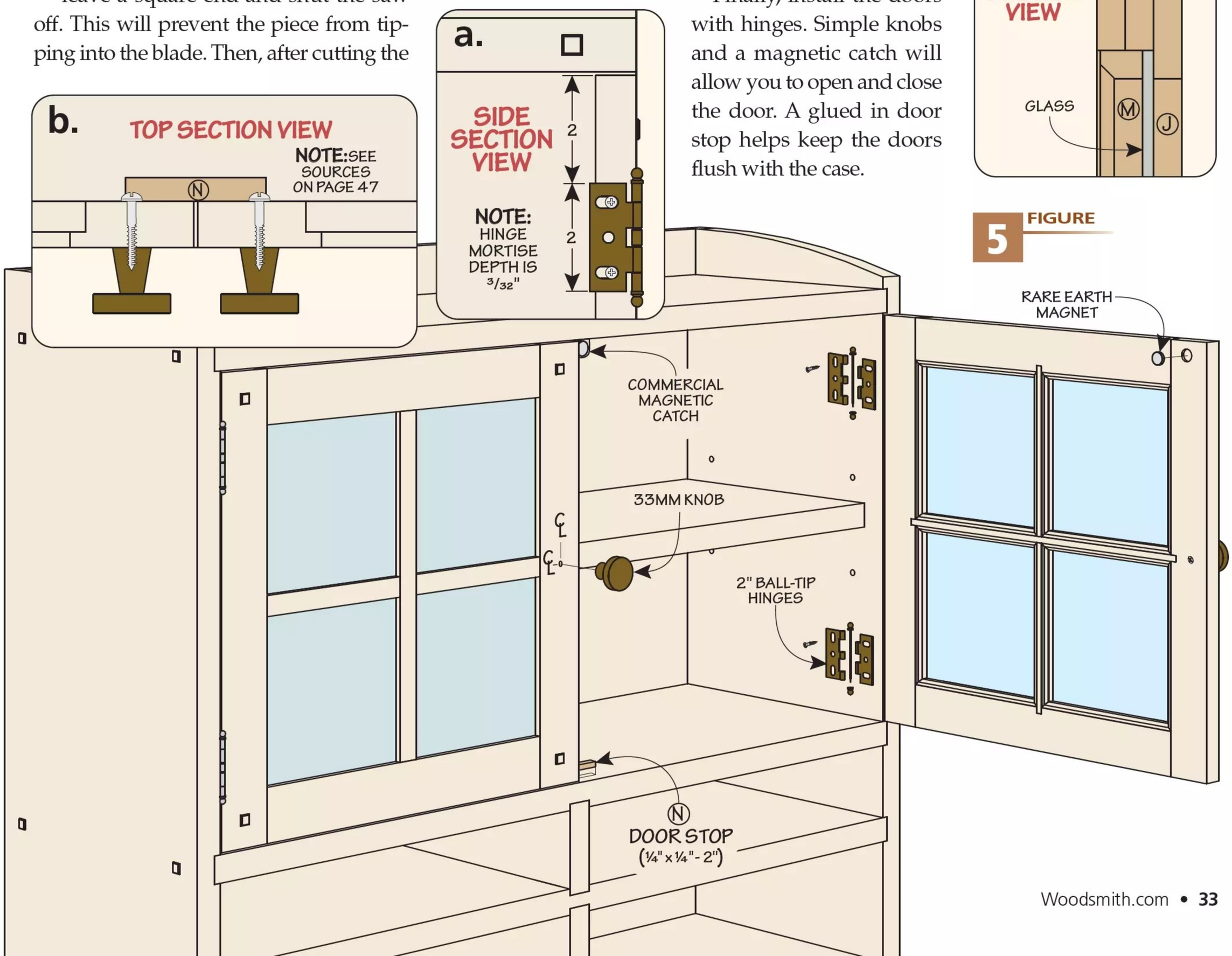
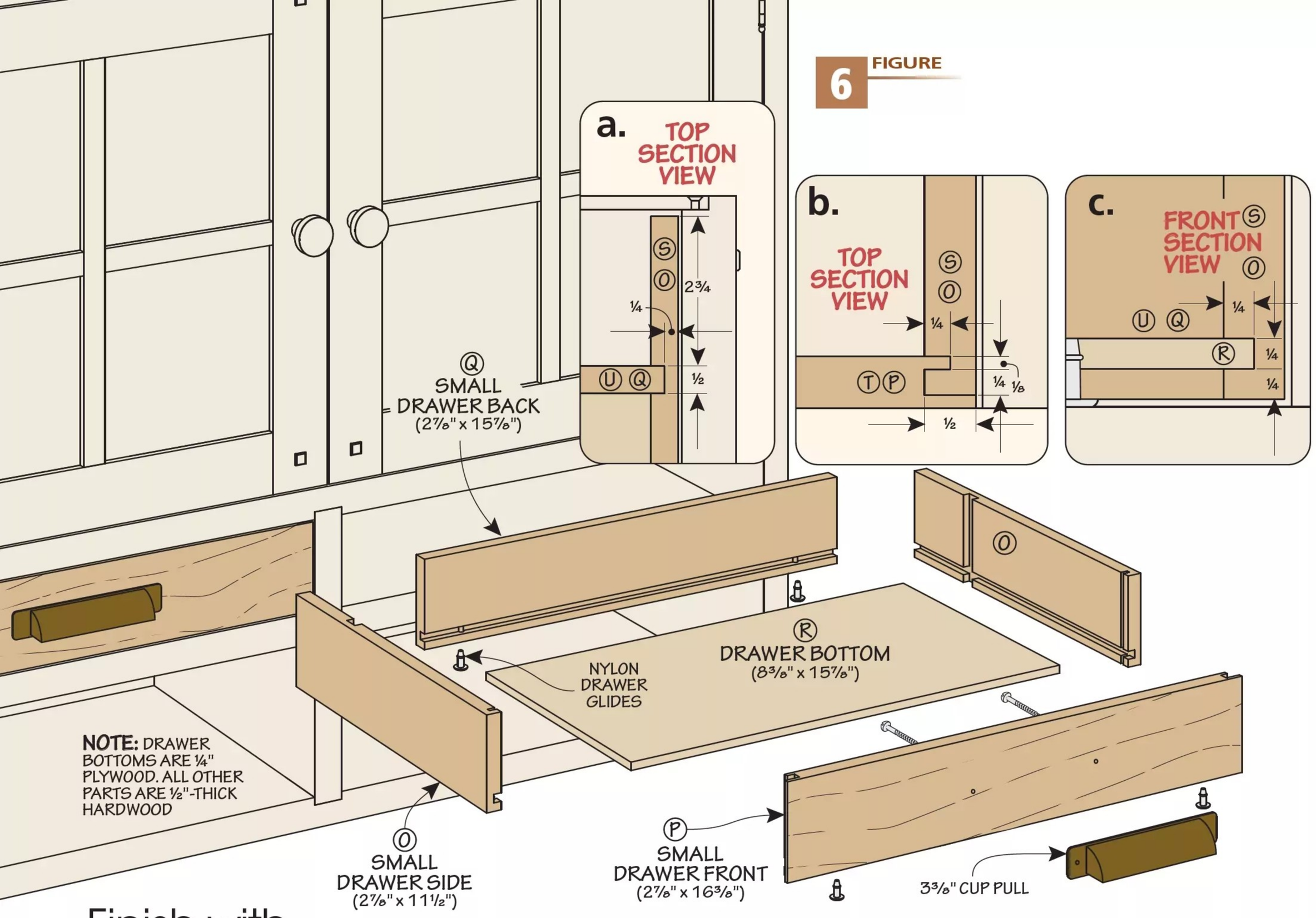


FIGURE 6



Finish with Drawers

We're in the home stretch now. With the doors made, the final thing to knock out are a set of four drawers. As you can see in Figure 6 above and the photo below, there are two different sized drawers. The upper drawers are shallower than the bottom ones.

STURDY LOCKING RABBET. These drawers are built to take a beating. The back is held to the sides with a dado joint, as you can see in Figure 6a. Simple and strong. The front, however, is attached to the sides with a locking rabbet joint (Figure 6b). The locking rabbet gives a clean look on the front of the drawer, while providing a solid mechanical joint.

First thing's first — with this style of construction, the only parts that have the same lengths (within each drawer) are the sides. Mark your parts to keep the sides separate from the front and the back. Let's start by cutting a groove on the bottom of all the drawer parts. This will house the plywood bottom. Do this by setting up a narrow dado blade in the table saw and making the cut with the

▲ ***Craftsman Hardware.*** *The simple iron hardware on the cabinet won't break the bank and adds to the Craftsman feel. However, you can easily add hardware of your choice to customize the look.*

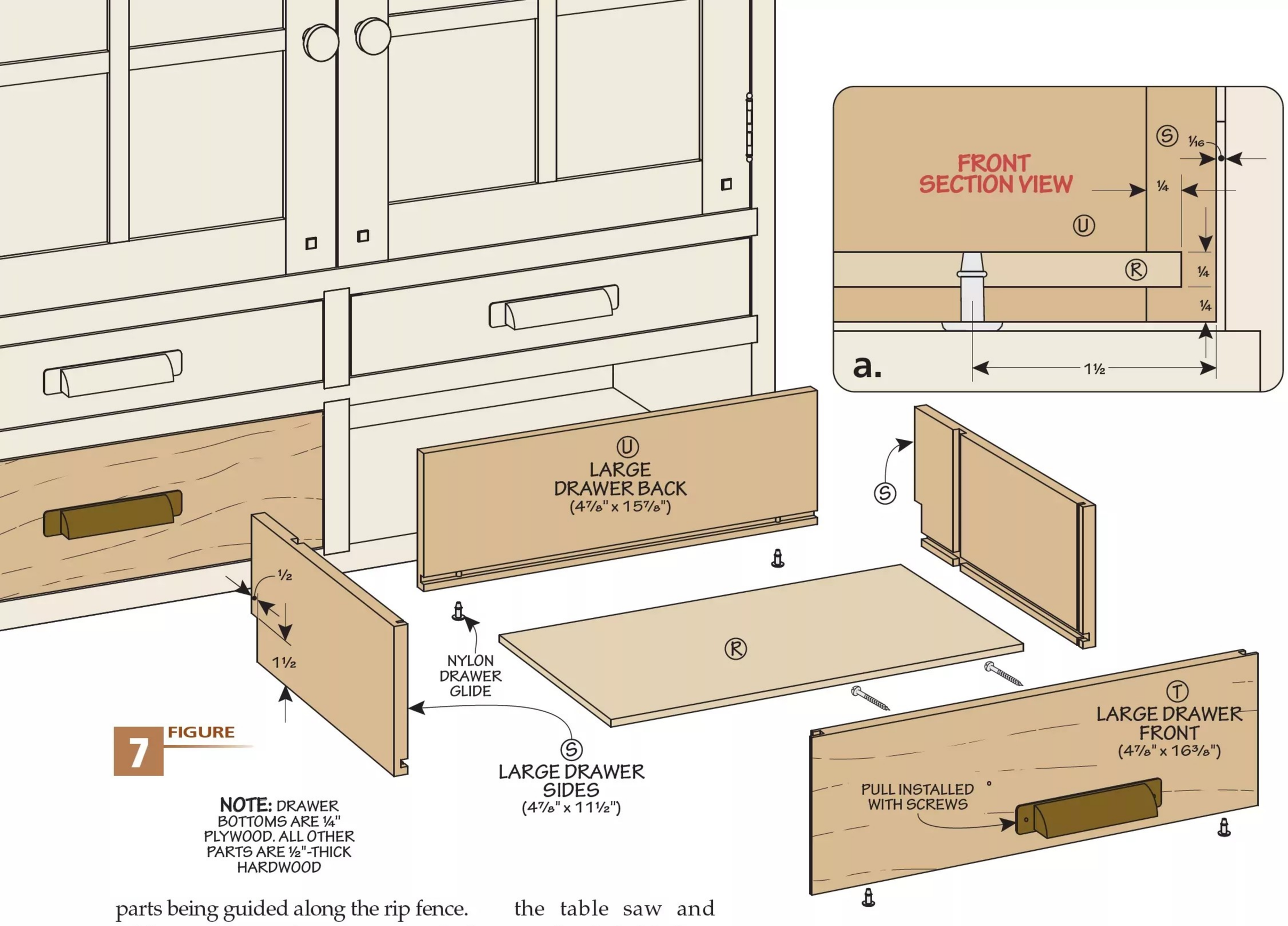


FIGURE 7

NOTE: DRAWER BOTTOMS ARE ¼" PLYWOOD. ALL OTHER PARTS ARE ½"-THICK HARDWOOD

parts being guided along the rip fence.

Now, without changing your dado size, we're going to make two additional cuts. The first will be the dadoes for the drawer back. If you pay attention to Figure 6a, you'll notice that these dadoes are not at the back of the sides. Instead, the back of the drawer is a couple of inches from the back edge of the sides. This allows you to access all of the drawer contents without the drawer spilling onto the floor. The dadoes in the sides need to be made in two passes to be the proper width with this narrower dado blade, but it will go quickly.

The next cut to make will be on the drawer front. Forming the locking rabbet is a three-step cut. The first is to create a deep groove in the end of the front. This groove needs to be as deep as the sides are thick. To make this cut, stand the drawer front on end, and guide it along the rip fence with a backer block to help support it. Cutting the groove correctly will result in a thin tongue remaining on each face.

Next, lay the drawer front down on the table saw and use the dado blade to nibble the inside tongue away. You can see the shape of this joint in Figure 6b on the previous page. Finally, swap back to a standard kerf blade and cut a dado in the drawer sides. This dado accepts the remainder of the tongue you just nibbled away. If you were diligent with your machine setup, this joint will go together smoothly, with few gaps, and will be self-squaring when you apply clamps. Just a word to the wise — be careful putting this joint together before you get everything glued up. The tongues, before they're glued up, can be fragile.

The larger drawers, as seen in Figure 7, have an identical construction. The only difference with these (besides depth) is that the sides receive a notch to fit around the lower cleat.

ASSEMBLY & HARDWARE. With the joinery done, glue up the drawers. My favorite thing about this style of construction is that one or two clamps from side-to-side are usually enough to hold the drawers tight while the glue cures. Once the drawers are dry, it's time to take care of some hardware. The first is a set of small drawer glides. These little nylon nubs fit into holes in the bottom edge of the drawers and help them slide while leaving an even gap.

The pulls for the drawers and doors can be installed — when drilling the holes for the installation screws, I suggest using a sacrificial block on the inside as you're drilling. Newton's Law states that drilling through a finished drawer or door to install hardware will result in vampire-slaying sized splinters if you don't back up the hole.

Finally, it's time to apply a finish. With white oak, especially quartersawn white oak like this, I'm a sucker for an ammonia-fumed finish, which is traditional of Craftsman furniture. However, it's a fairly caustic finish to apply, so exercise caution if you go that route. A gel stain works well to help pop any medullary ray flecks that the stock has and is available in countless shades. Top that with a good coat of spray lacquer, and your tool cabinet is ready for years of service. W

HEIRLOOM Project

Written by: Phil Huber; Project Design: Dillon Baker

▲ The large compartment is ready for customizing. Add hooks, racks, or other handy hardware.

3-Drawer Wardrobe

Add a versatile storage solution to your home. Plywood makes the construction quick and strong.

◀ Three deep drawers add dresser-like function to the wardrobe and give you more storage options.

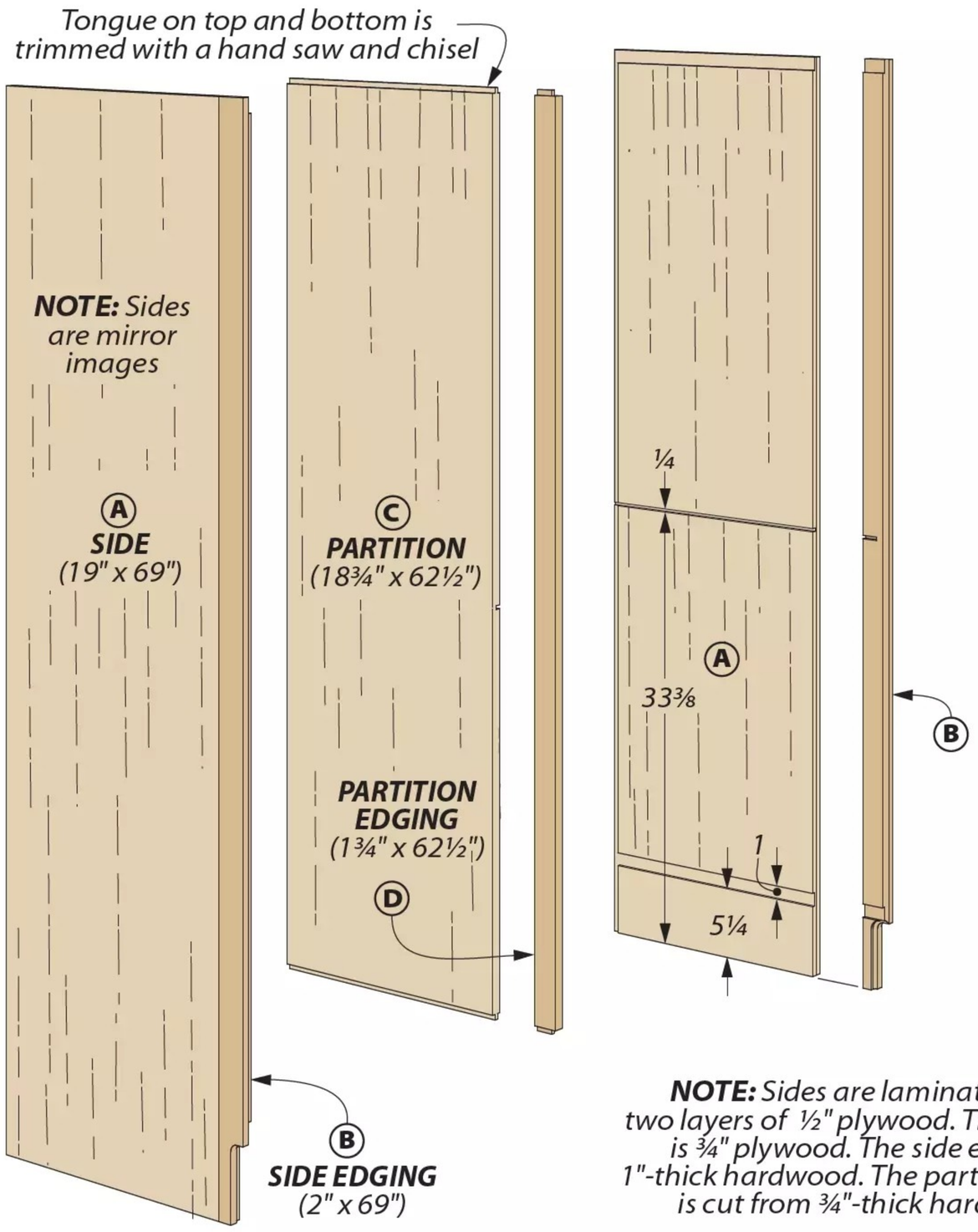
Illustrations: Harlan Clark

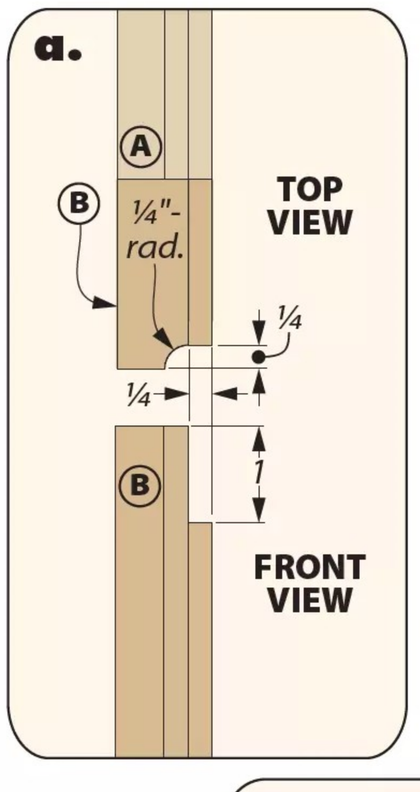
There are some furniture forms that never run out of usefulness. I'd put the wardrobe high on that list. At its core, a wardrobe is a large storage box. That makes it ripe for imagination and iteration. The flexibility that the form offers is the secret ingredient to its utility. A wardrobe can house clothes like a closet, work as a pantry, or a craft center. Heck, way back in the 1900s, we even put TVs inside them.

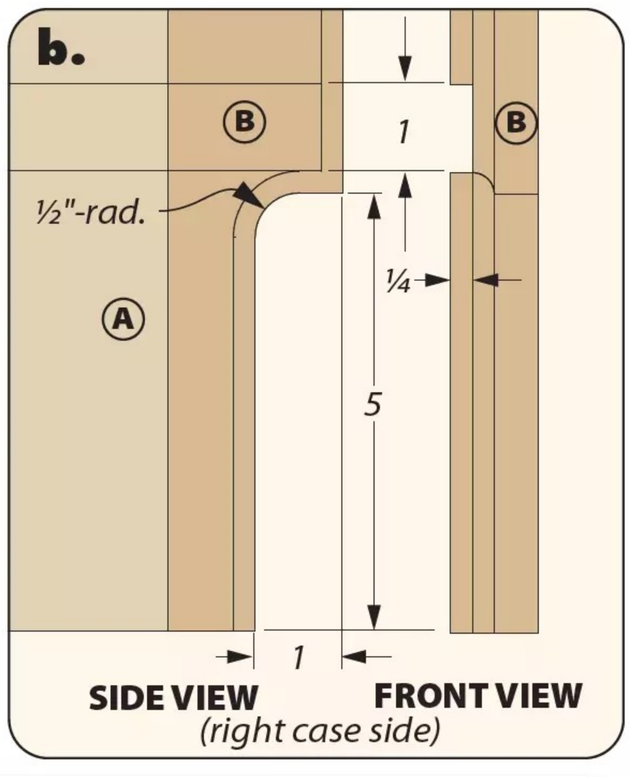
JUST RIGHT FEATURES. One of the keys to a project like this is to balance the features and keep the versatility intact. Design editor Dillon Baker did this by dividing the case into three compartments. Too organized can be just as bad as not organized enough.

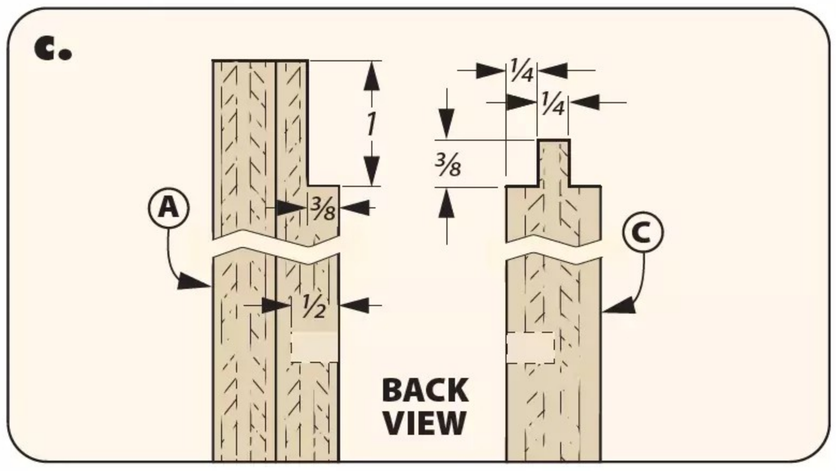
The largest works as a space for hanging clothes and bulky items. Two smaller spaces feature adjustable shelves and a set of drawers, as shown at left.

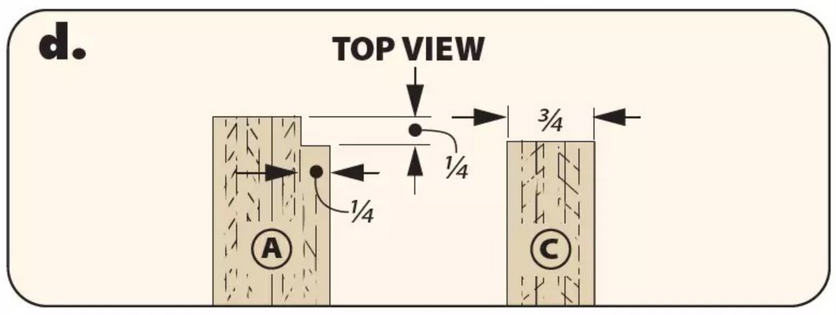
PLYWOOD DONE RIGHT. This wardrobe centers on plywood construction. Dillon selected alder for its "cherry-lite" grain and color. Matching hardwood accents add style and move it beyond a basic box. The joinery is all rabbets and dadoes. The design of the large door and the painted drawer fronts also helps avoid a box-like appearance.











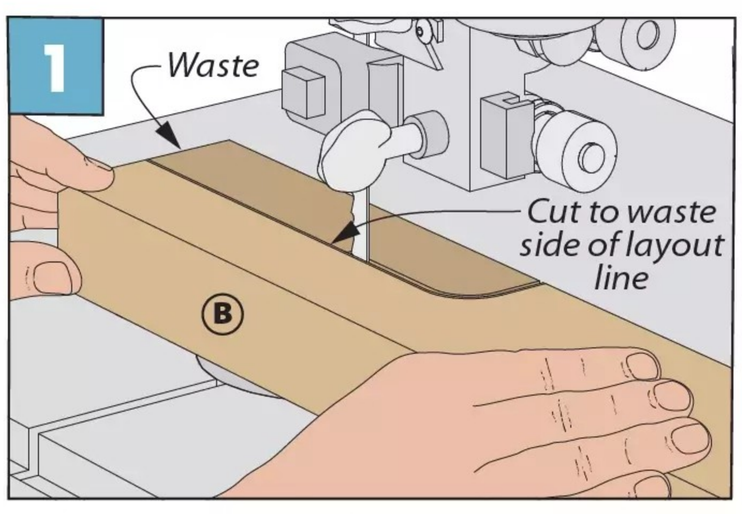
NOTE: *Sides are laminated from two layers of ½" plywood. The partition is ¾" plywood. The side edging is 1"-thick hardwood. The partition edging is cut from ¾"-thick hardwood*

Small details, **BIG PARTS**

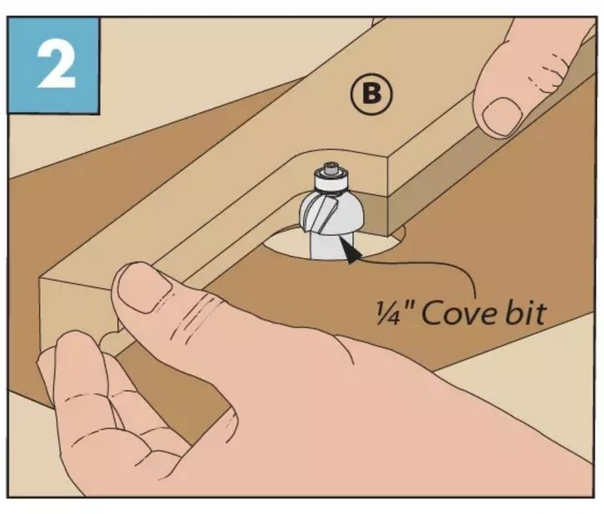
As big as this piece is, standard ¾" plywood didn't seem right. Instead, the main case parts are laminated from ½" panels. To do this, you need a flat worksurface and a way to clamp the parts. A thick piece of foam insulation provides the first. I gathered up weights, heavy tools, scrap wood, and even a few pavers to act as clamps. A wide, notched spreader distributes an even coat of glue on the parts.

SIDES & PARTITION. The largest parts come first, as shown in the drawing above. The two sides are mirror images, more or less. A wide hardwood strip glued to the front edge conceals the exposed core of the plywood. I sized these to be a hair thicker than the plywood pieces. This allows me to sand them flush once they're attached.

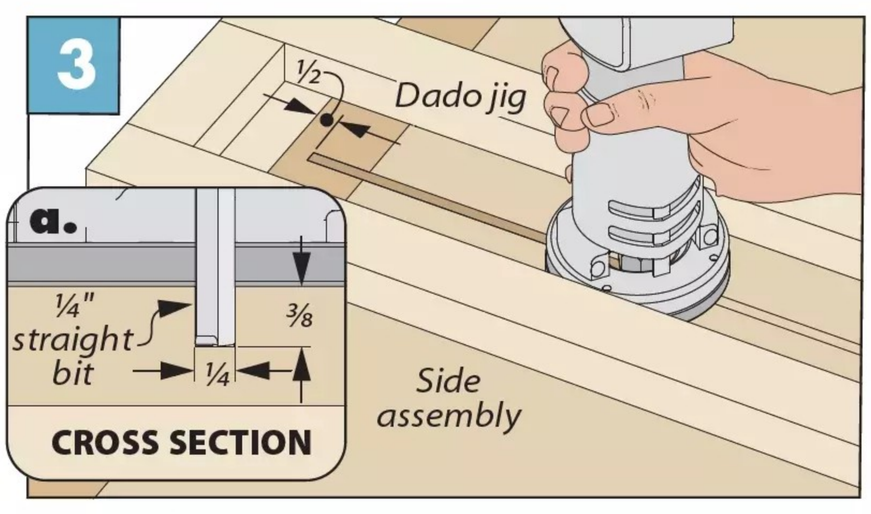
EDGING & JOINERY DETAILS



Relief Cut. At the band saw, cut away most of the toe kick relief. Clean up the blade marks with a rasp and file.



Cove Profile. A bearing-guided cove bit follows the edge to form a hollow on the edging.



Routed Dadoes. I made a frame that matches the base of the router to guide the tool for routing dadoes and grooves.

The box on the bottom of the previous page and detail 'b' show the decorative details the strips require. After the glue dries, glue the strips to the sides and sand them flush.

A similar treatment applies to the partition. In addition to its smaller size, it's also just a single piece of plywood (¾") so the edge strip needs to match.

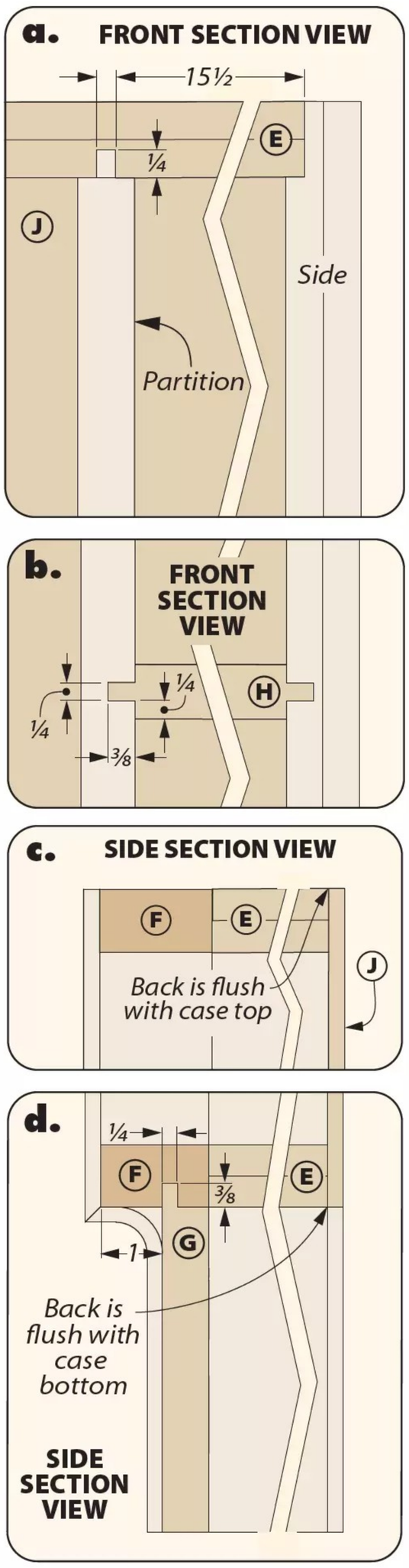
JOINERY & DETAILS. Rabbets and dadoes join the various parts. Figure 3 on the previous page shows a router jig to cut the stopped dadoes. Simply change the bit to create a dado of a different size (shown in details 'd' and 'e'). In order to cut the rabbets along the top edge of the sides and partition and the one to house the back, I attached an edge guide to the router.

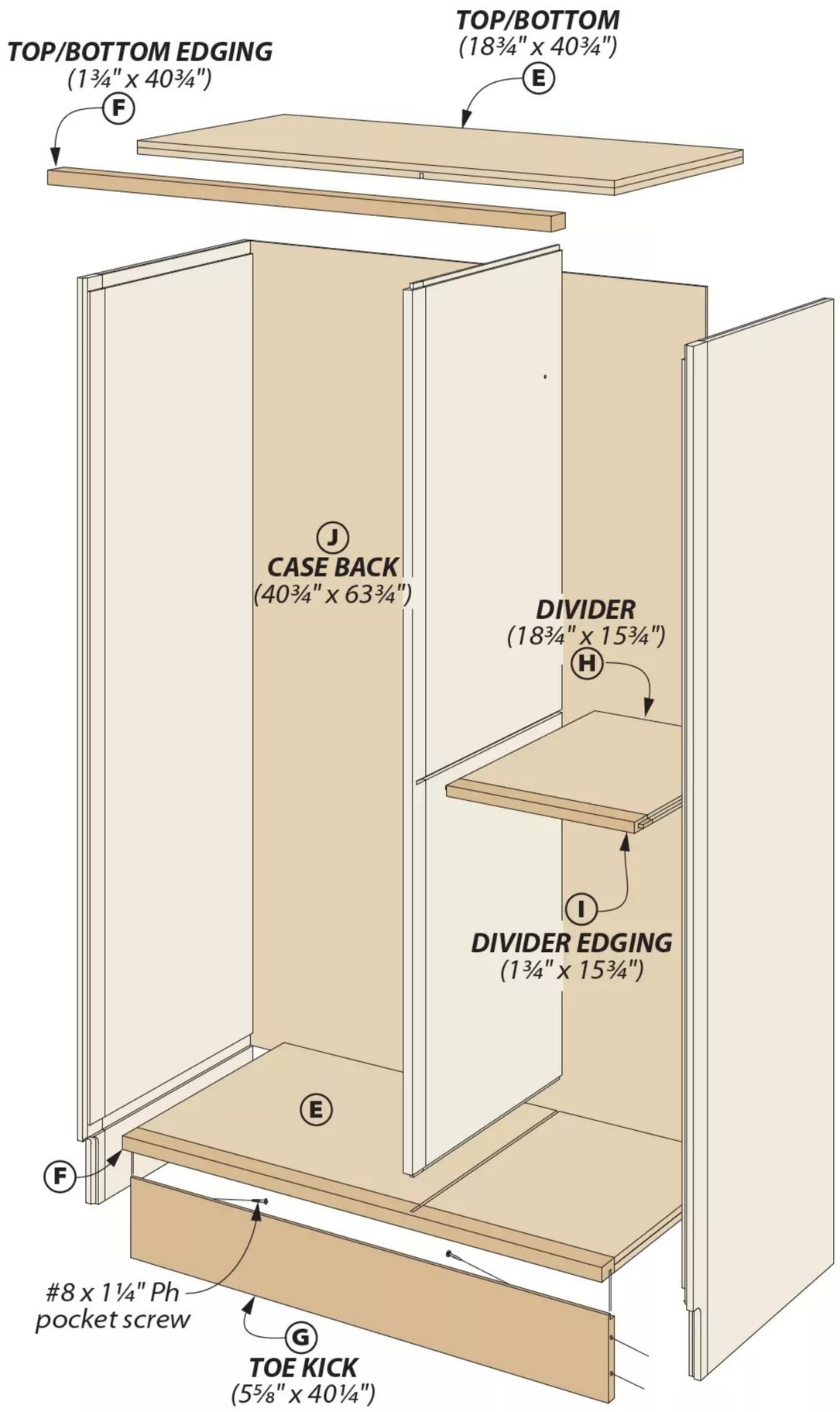
CONNECTIONS

It's time now to consider the horizontal connection pieces. These are shown in the drawing at right. The top and bottom follow the pattern: plywood with wide hardwood edging. A stopped dado houses the partition (detail 'a'). Once the dadoes are cut, I went back and formed a tongue at each end of the partition to fit (detail 'd' on the previous page). The bottom features a groove on the lower face to accept the toe kick, as in detail 'd' at right and Figure 2 on this page.

A divider separates the right side into two compartments. In detail 'b' you can see a tongue on each end fits into dadoes in the partition and case side. Take a look at Figure 1 to see how to trim the corners of the divider.

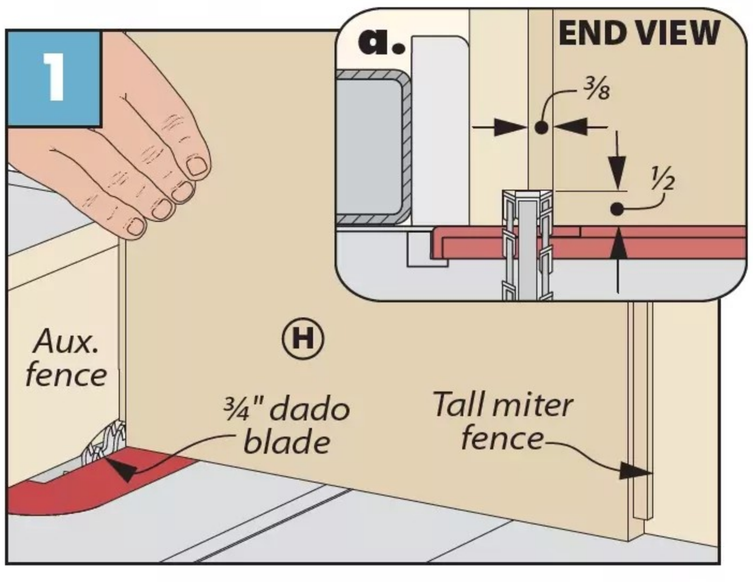
ASSEMBLY. Begin the assembly by gluing the top and bottom to the partition. The second stage involves adding the divider and right case side. The left side follows after. The final steps are to glue and screw the toe kick in place. Then it's time to make and glue in the back.



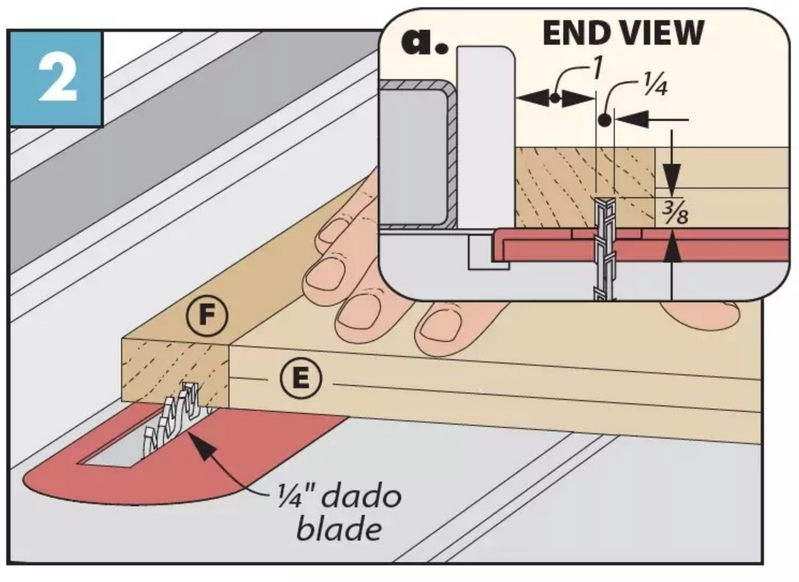


NOTE: *Top and bottom are laminated from two layers of ½" plywood. The divider is ¾" plywood. The top and bottom edging is made from 1"-thick hardwood. Divider edging and toe kick are ¾"-thick hardwood*

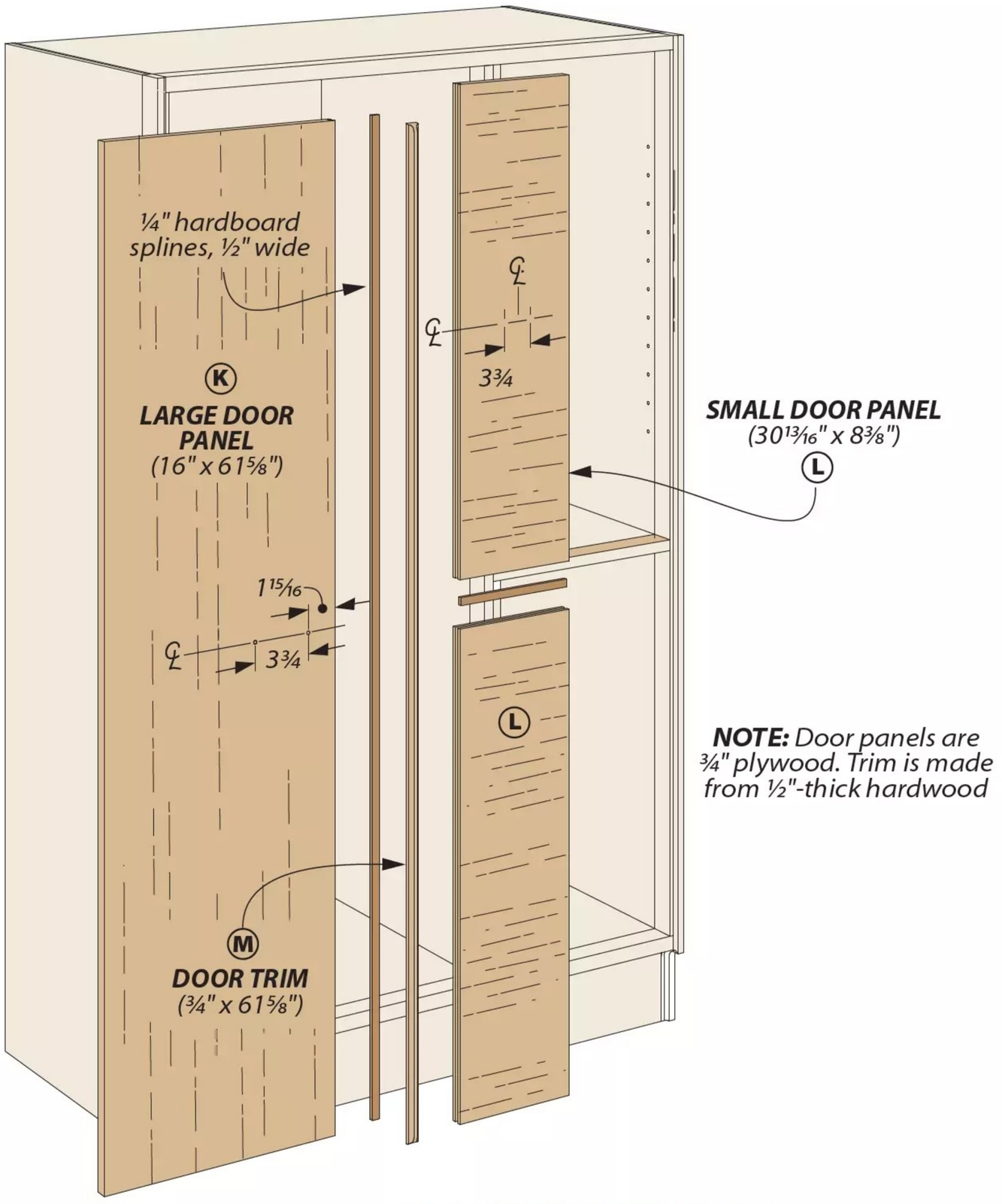
GETTING CENTERED & STRAIGHT



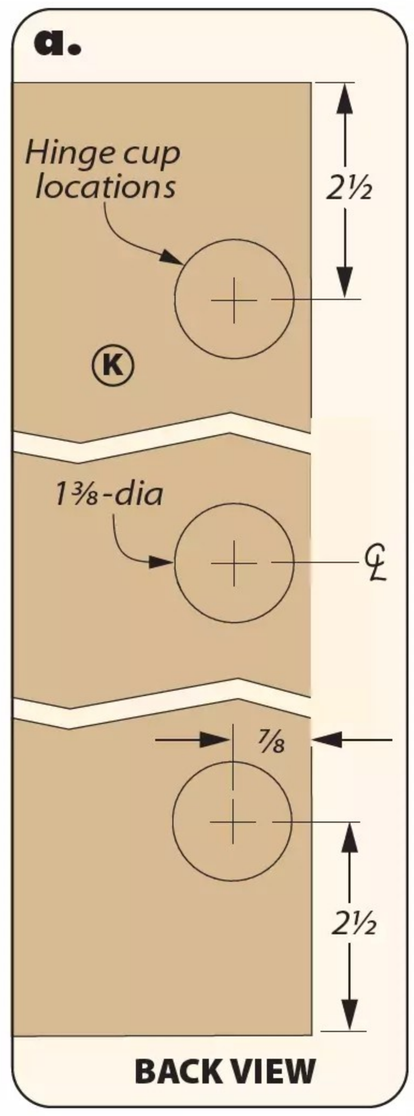
Trim the Corners. This setup allows you to trim the divider's corners.

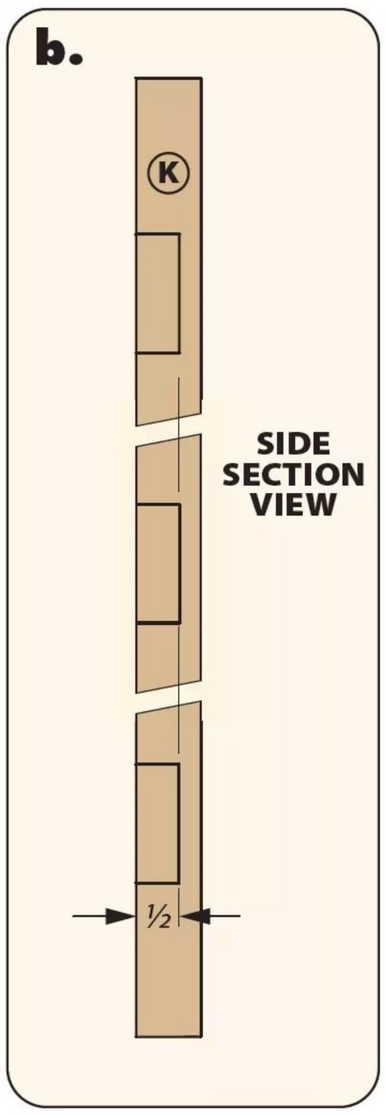


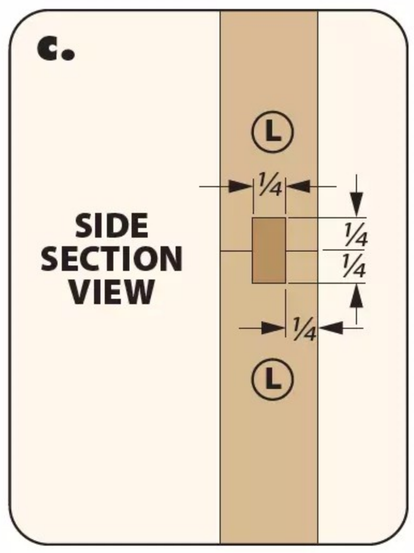
Toe Kick Groove. Cut a groove on the underside of the case bottom.

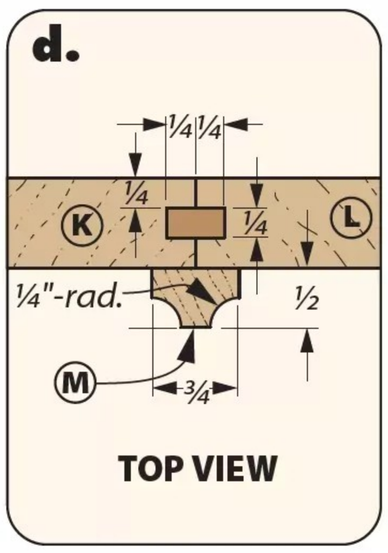


NOTE: *Door panels are ¾" plywood. Trim is made from ½"-thick hardwood*









Doors of DISTINCTION

Time to close in the case. Two of the compartments are concealed by doors. The remaining compartment is filled with drawers that we'll come to later on. As part of the face of the wardrobe, the construction and layout of the doors give it personality.

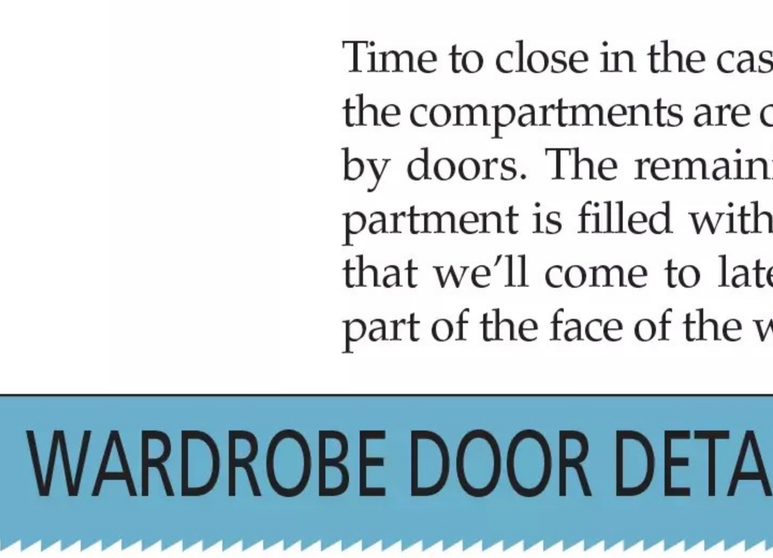
In keeping with the contemporary style of the project, the doors use slab construction. This means a single flat panel is used for the door: no hardwood frame, no battens holding a series of planks together. Using plywood makes a flat panel door easier to achieve.

THREE-PART DOOR. Let's tackle the big door first. With such a large area, the effect could be dull. Instead, Dillon created an eye-catcher. The drawing above shows that the door is made up of three panels.

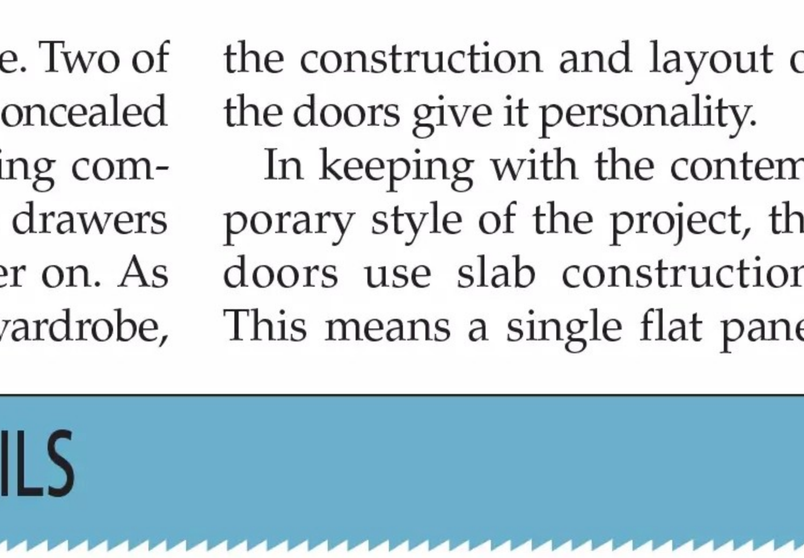
The outer panel runs the full length of the opening and about two-thirds of the width. The grain on this piece runs vertically. After you cut it to size, rout a slot along the edge to attach the next parts of the door.

Before the door gets too large, it's a good idea to drill the hinge cup holes, as in Figure 1 at left. The locations for the holes are shown in details 'a' and 'b.'

WARDROBE DOOR DETAILS



Hinge Mortises. Set up a fence at the drill press in order to form the mortises for the Euro-style hinges in the doors.



Make Molding. An extra-wide blank increases safety and stability while routing the cove profile on the door trim.

The grain on the other part of the door runs horizontally. This is something you wouldn't do with solid wood. Due to the size of the opening, it isn't possible to cut this from a sheet as a single piece. A hardboard spline aligns the two smaller pieces together, as shown in detail 'c.'

Rout a matching slot across the mating end of this glueup to the large door panel. Then glue this up with a spline (detail 'd').

TRIM PACKAGE. A piece of trim covers this long glue joint. Figure 2 on the previous page shows how this is molding is made.

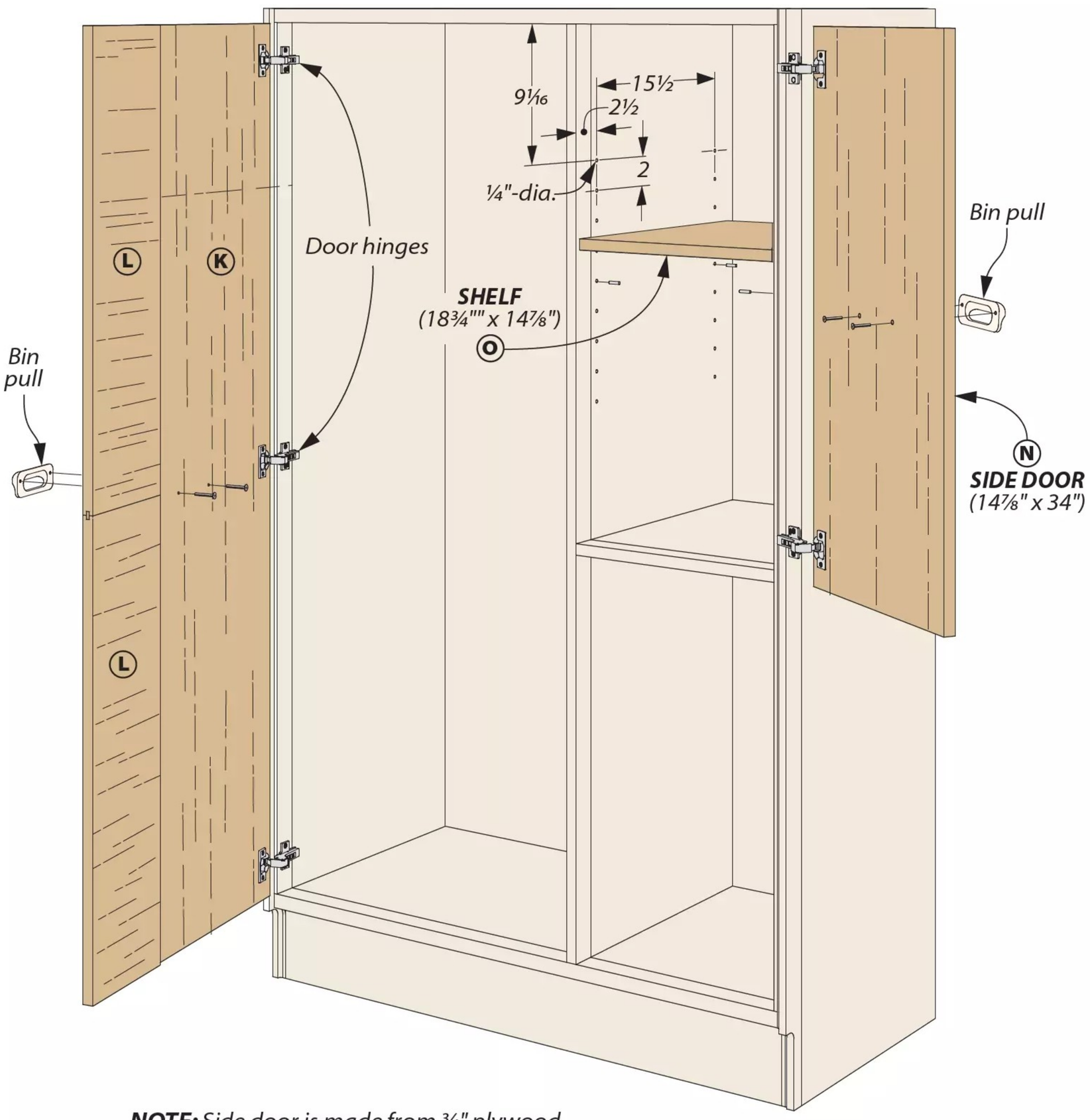
DOOR HIDES A SHELF

The door on the upper right compartment takes a low-key approach. It's simply a piece of plywood cut to fit the opening with an even reveal around all four sides. This is shown in detail 'c' below. Two hinges are all that are necessary to attach this door to the case. Use the same locations as you did for the hinges on the large door.

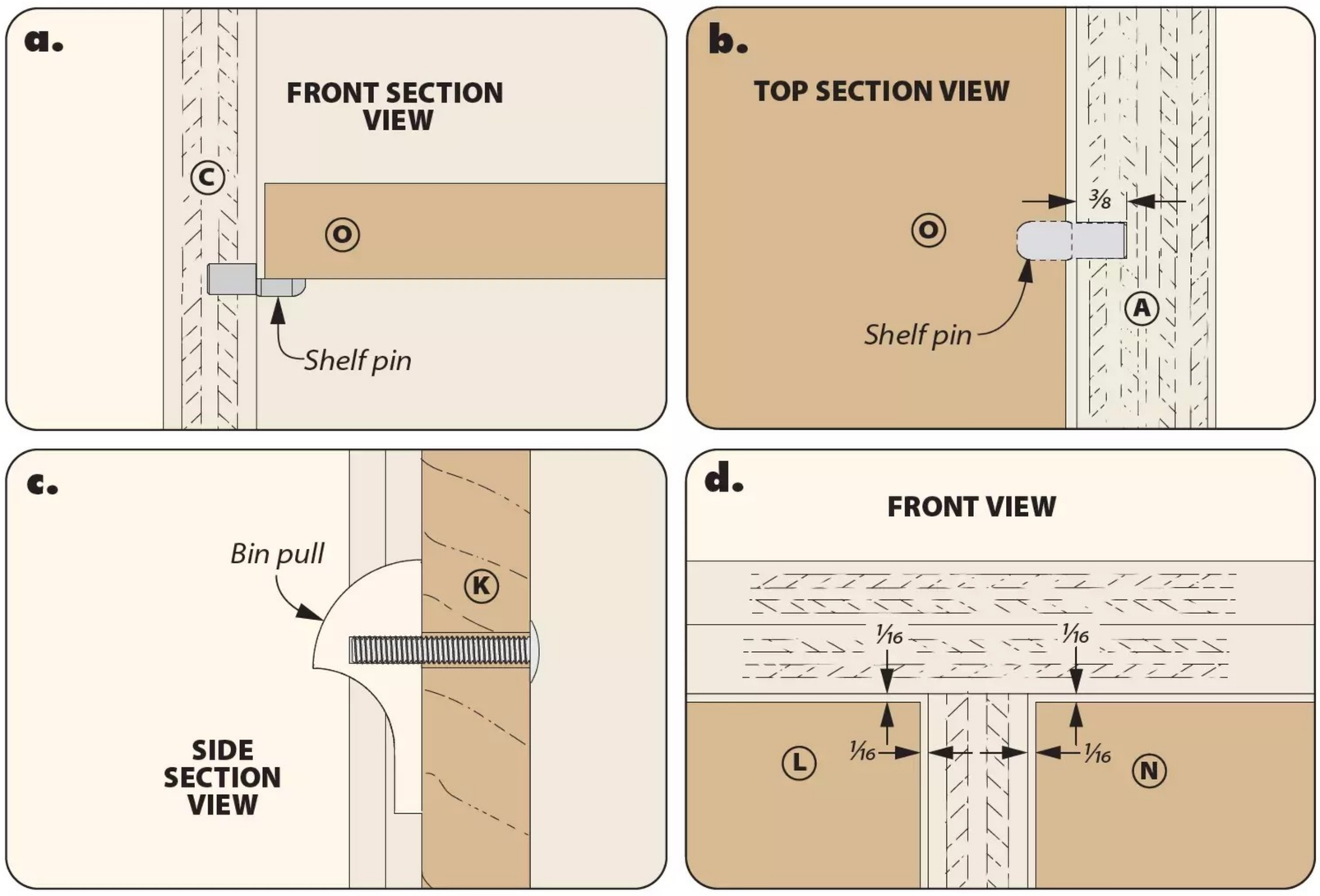
EDGING & HARDWARE. The doors forego edging and instead paint covers the core and offers a glimpse of color. Solid-wood bin pulls are used to operate the doors, as in the main drawing and detail 'b.' Inside the large compartment, I installed a pull-down garment rack.

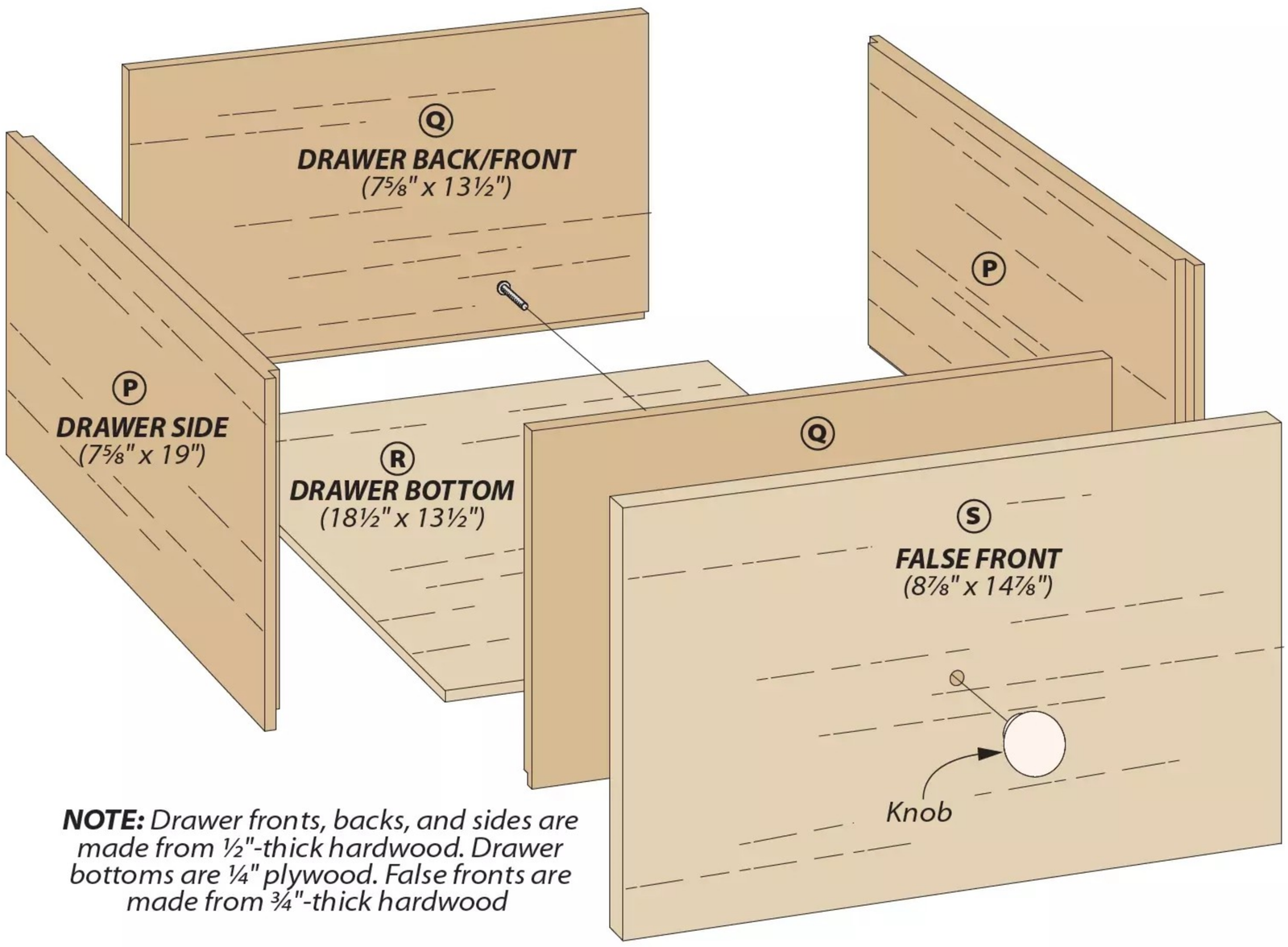
The back of the door features a tie rack that is easily adapted to organize more than just ties. Turn to sources on page 66 for these details.

ADJUSTABLE SHELF. An adjustable shelf (or two) organizes the space behind the door. I used a drilling jig to drill shelf pin holes on the partition and the case side. This is shown in the drawing and details 'a' and 'b.' For the shelf (or two), I glued up a solid-wood panel. Using solid wood here means I didn't have to worry about what to do with the edges.

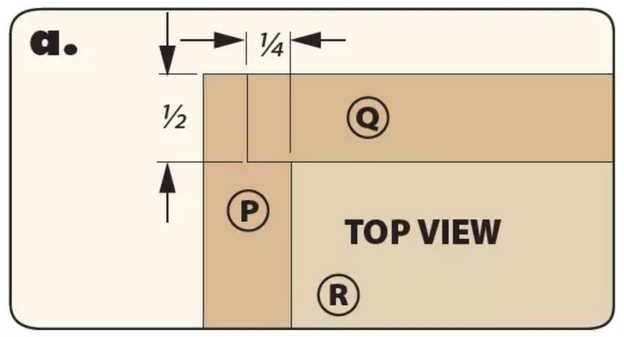


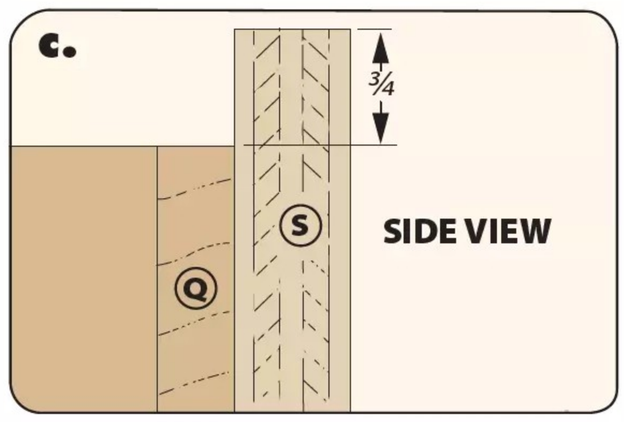
NOTE: *Side door is made from ¾" plywood. The shelf is glued up from ¾"-thick hardwood*

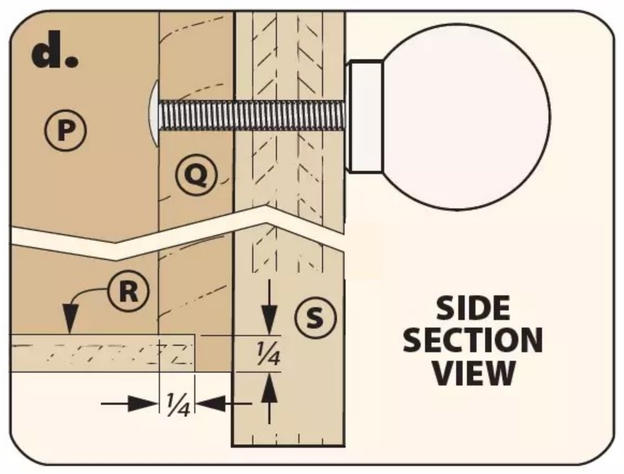




NOTE: *Drawer fronts, backs, and sides are made from ½"-thick hardwood. Drawer bottoms are ¼" plywood. False fronts are made from ¾"-thick hardwood*







Drawers **MADE EASY**

Three drawers complete the storage features for the wardrobe. These fill the lower right compartment in the case. The drawers are identically sized. The drawing above highlights the parts and construction. As has been the pattern throughout this project, the drawers incorporate both plywood and solid wood. The sides, fronts, and backs are made from hardwood. The false fronts and drawer bottoms are all plywood, though different thicknesses.

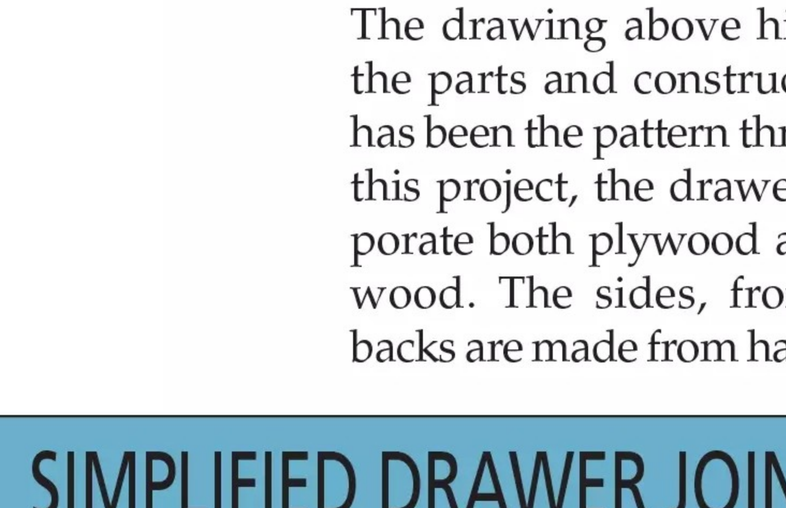
DRAWER SIZING. Since the drawers run on full-extension slides, you don't need to make the boxes fill the whole space. In fact, when you build the boxes a little smaller, it gives you better leeway when it's time to install them in the case. The separate false fronts take care of creating a uniform look and consistent gaps all around.

RABBET JOINERY. Low-friction slides carry the load of the drawer, which allows us to use straightforward rabbets to connect the sides, front, and back, as shown in details 'a' and 'b.'

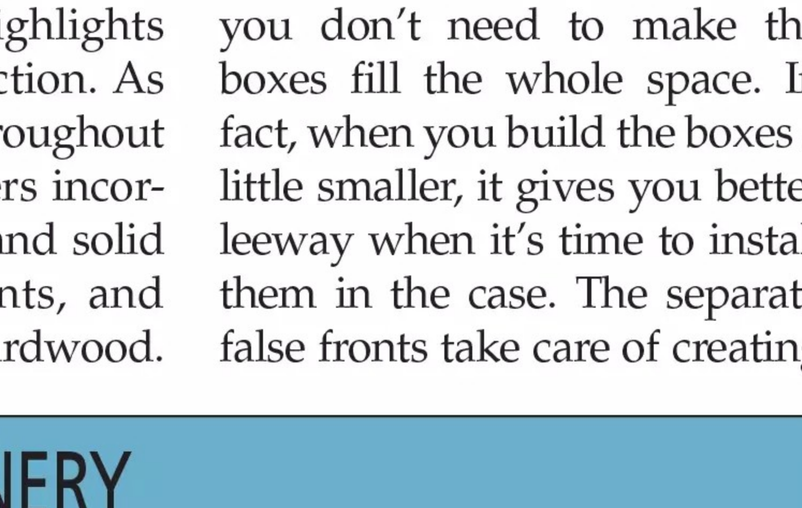
The box at left illustrates the setup to make these joints at the table saw. In Figure 1, the key is to set up a wide dado stack. Then use an auxiliary rip fence that allows you to partially recess the dado blade. You set the rip fence so that the amount of the blade that's exposed matches the thickness of the drawer fronts and back. Use a test piece to dial in this setup. Numbers are ideals, but the parts you have on hand are what you need to work to.

Keep firm pressure on the workpiece as it passes across

SIMPLIFIED DRAWER JOINERY



Rabbet Front & Back. Cut a rabbet on each end of the sides to match the thickness of the fronts and backs.



Rabbet for The Bottom. Reposition the rip fence for a narrow rabbet to accept the drawer bottom panel.

the blade. Doing this helps to keep the depth of cut consistent.

DRAWER BOTTOM. The drawer bottom sits in a rabbet as well. Take a look at detail 'd' and Figure 2 on the previous page. The setup only requires a slight repositioning of the rip fence. Here you're looking to match the thickness of the plywood used for the drawer bottom. The blade height stays the same.

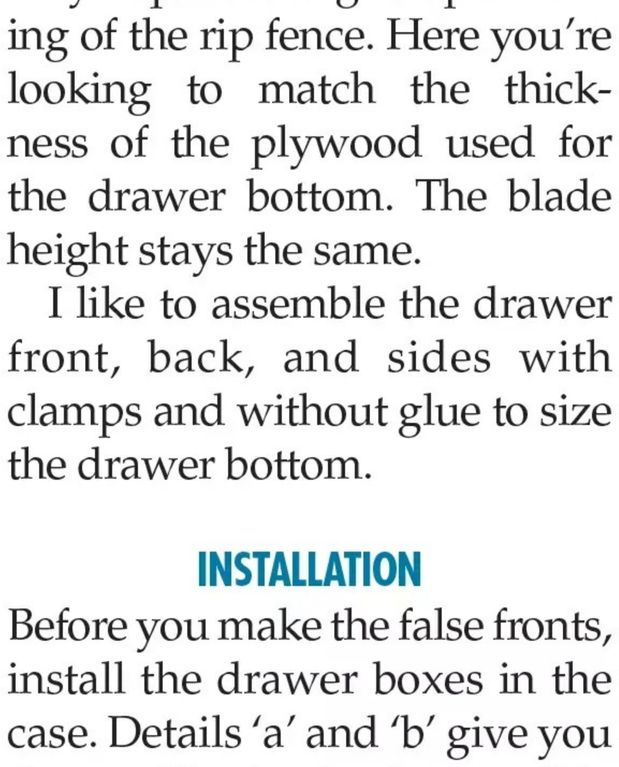
I like to assemble the drawer front, back, and sides with clamps and without glue to size the drawer bottom.

INSTALLATION

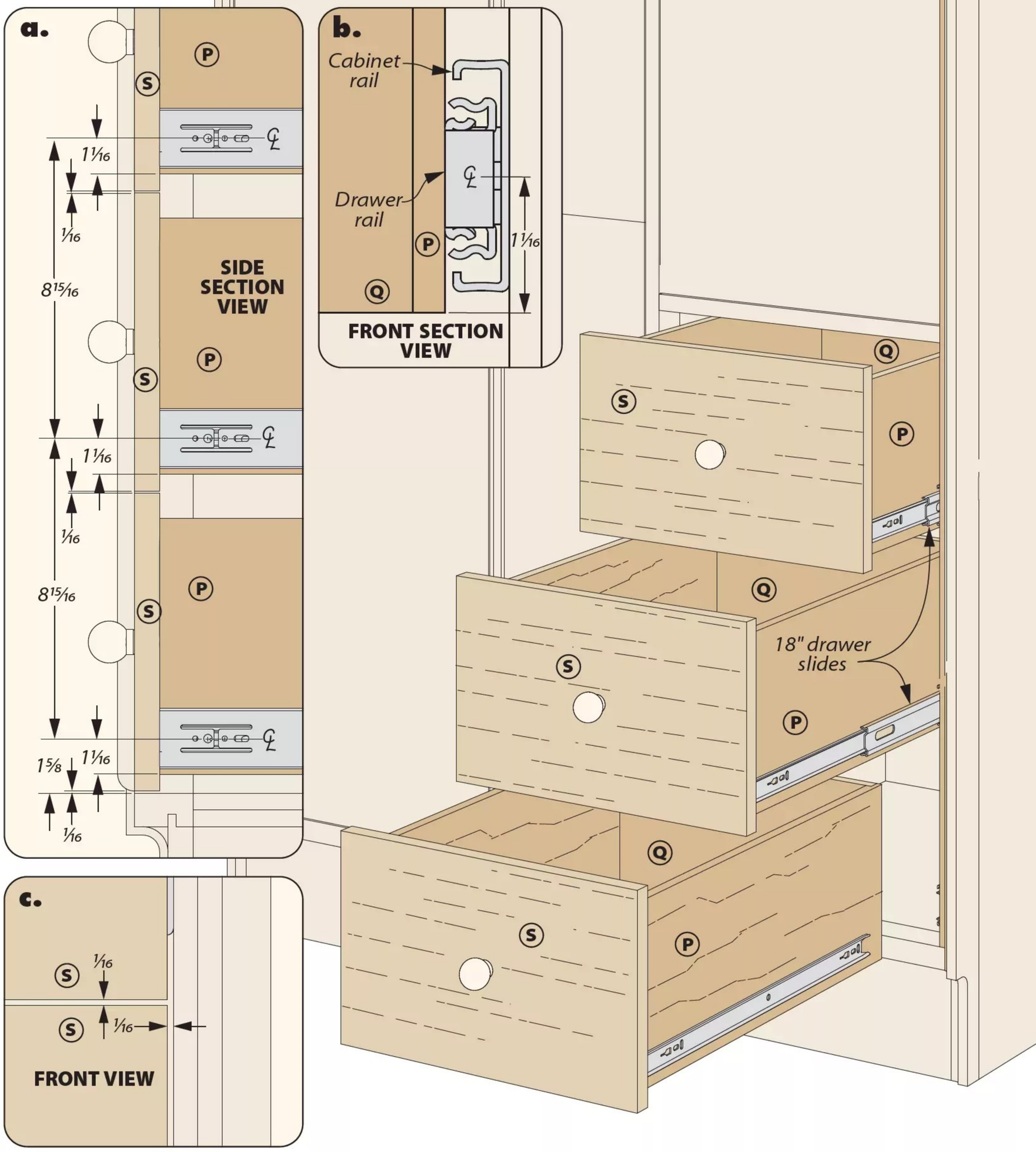
Before you make the false fronts, install the drawer boxes in the case. Details 'a' and 'b' give you the specifics for the drawer slide location and spacing. The idea is for the false fronts to be identical. Trim them so that the gap is even around the edges, as in detail 'c.'

The false fronts are painted with the same color used on the door edges. I found some marble knobs that complement the paint and look great.

Get some help to move the wardrobe to its new home. Open the doors. A new world of storage waits for you. W



▲ This garment rack is one of my favorite hardware finds for this project. It slides in and out to give easy access to the clothes inside.



Materials & Supplies

A	Sides (2)	1 ply. - 19 x 69	
B	Side Edging (2)	1 x 2 - 69	
C	Partition (1)	3/4 ply. - 18 3/4 x 62 1/2	
D	Partition Edging (1)	3/4 x 1 3/4 - 62 1/2	
E	Top/Bottom (2)	1 ply. - 18 3/4 x 40 3/4	
F	Top/Bottom Edging (2)	1 x 1 3/4 - 40 3/4	
G	Toe Kick (1)	3/4 x 5 5/8 - 40 1/4	
H	Divider (1)	3/4 ply. - 18 3/4 x 15 3/4	
I	Divider Edging (1)	3/4 x 1 3/4 - 15 3/4	
J	Case Back (1)	1/4 ply. - 40 3/4 x 63 3/4	
K	Large Door Panel (1)	3/4 ply. - 16 x 61 5/8	
L	Sm. Door Panels (2)	3/4 ply. - 30 13/16 x 8 3/8	
M	Door Trim (1)	3/4 x 1/2 - 61 5/8	
N	Side Door (1)	3/4 ply. - 14 7/8 x 34	
O	Shelf (1)	3/4 x 18 3/4 - 14 7/8	
P	Drawer Sides (6)	1/2 x 7 5/8 - 19	
Q	Drawer Fronts/Backs (6)	1/2 x 7 5/8 - 13 1/2	
R	Drawer Bottoms (3)	1/4 ply. - 18 1/2 x 13 1/2	
S	False Fronts (3)	3/4 ply. - 8 7/8 x 14 7/8	

- (4) #8 x 1 1/4" Ph Pocket Screws
- (1) 1/4" hdbd. - 1/2" x 8 3/4" Spline
- (1) 1/4" hdbd. - 1/2" x 61 5/8" Spline
- (5) 110° Hinges w/Screws
- (2) 3 3/4" Bin Pulls w/Screws
- (4) 5/8"-dia. Magnetic Door Stops
- (4) 5/8"-dia. Magnets and Cups
- (4) 1/4" Shelf Pins
- (1) Pull-Out Closet Rod w/Screws
- (1) Tie Rack w/Screws
- (3 pr.) 18" Full-Extension Slides w/Screws
- (3) 35.5mm-dia. Marble Knobs w/Screws

KITCHEN
Project

Spice Cabinet

Simple shapes unite to form a striking ensemble in this small sliding-door cabinet, perfect for herbs, spices, and other kitchen curios.

Cabinets really do come in all manner of shapes, sizes, and styles. The intent of one dictates not just what it ought to fit, but how it organizes the space within, how it opens and closes, and even how the air should (or shouldn't) move through it. The spice cabinet up for discussion here is a unique example. The case is small, with a shelf to hold two stories of spices and finger joints to add a little flair on the corners. It's the sliding doors that really steal the show, however. Their design was inspired by another aromatic cabinet: one meant to hold pipes and tobacco, built by James Krenov.

A classic pipe cabinet has a few requirements. It must be tall. Actively used tobacco pipes need to be stored stem-up. Airflow is also important; open, vertical slots in the doors allow moisture to evaporate, preventing mold from forming in the tobacco or the pipe resin. This results in a cabinet with a strong vertical design, which hints at its contents through the doors.

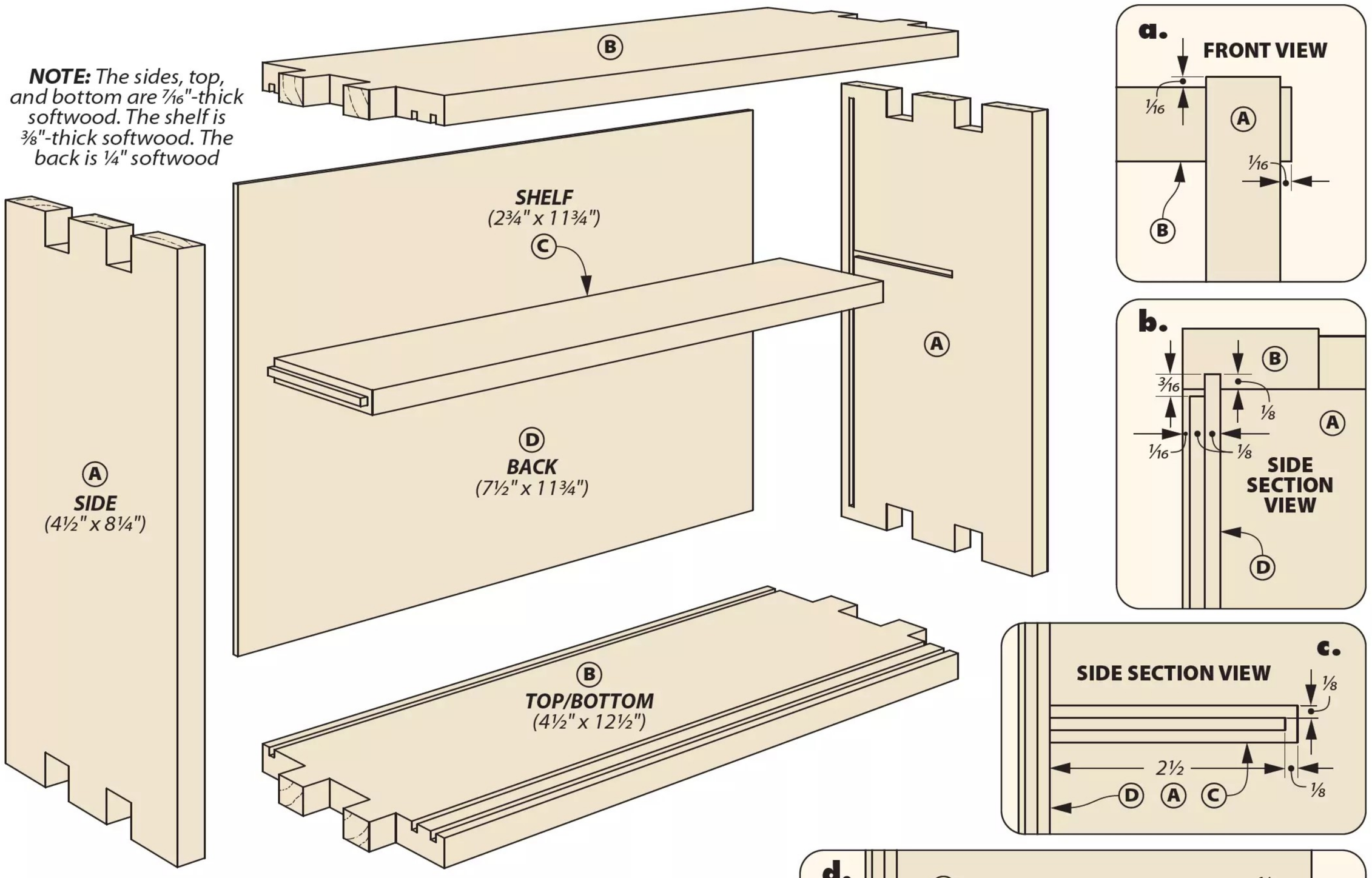
Of course, spices in the modern day don't have such needs. As such, this cabinet is shorter and wider to better fit on a kitchen counter. Sliding doors offer quick and easy access. While airflow isn't a necessity, the open frames of the doors still offer a peek at the cabinet's contents, with the mid-stiles and handles granting a fascinating verticality. All in all, this cabinet will yield you a fun few days in the shop along with a neat new way to store your spices.

▲ Finger joints at the corners of the case add a unique visual interest. The shop-made jig that creates these makes adding finger joints a breeze.

▲ Curved handles and coved stiles decorate these framed doors. The doors themselves slide back and forth along the case via a set of runners.

Written by: Rob Petrie; Project Design: John Doyle

Illustrations: Becky Kralicek



Kick off with the CASE

The case on this little cabinet is pretty simple, but it contains a couple interesting aspects. First are the finger joints on the case's corners — they're a subtle element of the overall project, yet they add nice visual interest to the corners of the case. Second are the series of grooves which join the cabinet parts, but we'll dive deeper into those shortly.

FINGER JOINTS. This project begins as all do, by planing down your lumber and cutting parts to size. For all the parts of this project, I chose to use Southern yellow pine. This is merely an aesthetic choice; however, any softwood or hardwood that suits your fancy will do fine.

The first pieces to size were the sides, top, and bottom of the case. These join together with the finger joints I mentioned earlier, and you can see how I made them in Figures 1 and 2 on the next page. This jig (which you can read more about on page 64) keeps the pins and the notches perfectly aligned between mating parts. I cut the pins on the top and bottom first, then flipped the jig around to cut out the notches in the sides. Keep in mind as you cut these that the fingers should sit slightly proud of their mating parts (detail 'a').

CASE GROOVES. Grooves do the heavy lifting in this project. A stopped groove in each side will house the rabbeted edges of the back panel (detail 'b'). Figures 3 and 4 below show how I cut these grooves at the router table.

The stopped grooves align with through grooves in the top and bottom. I cut these on the router table as well. While I was at it, I also cut the set of grooves at the front edges of these pieces (detail 'd'). These will house the runners of the sliding doors.

SHELF DADOES. Along with all these grooves, there are a pair of

Materials & Supplies

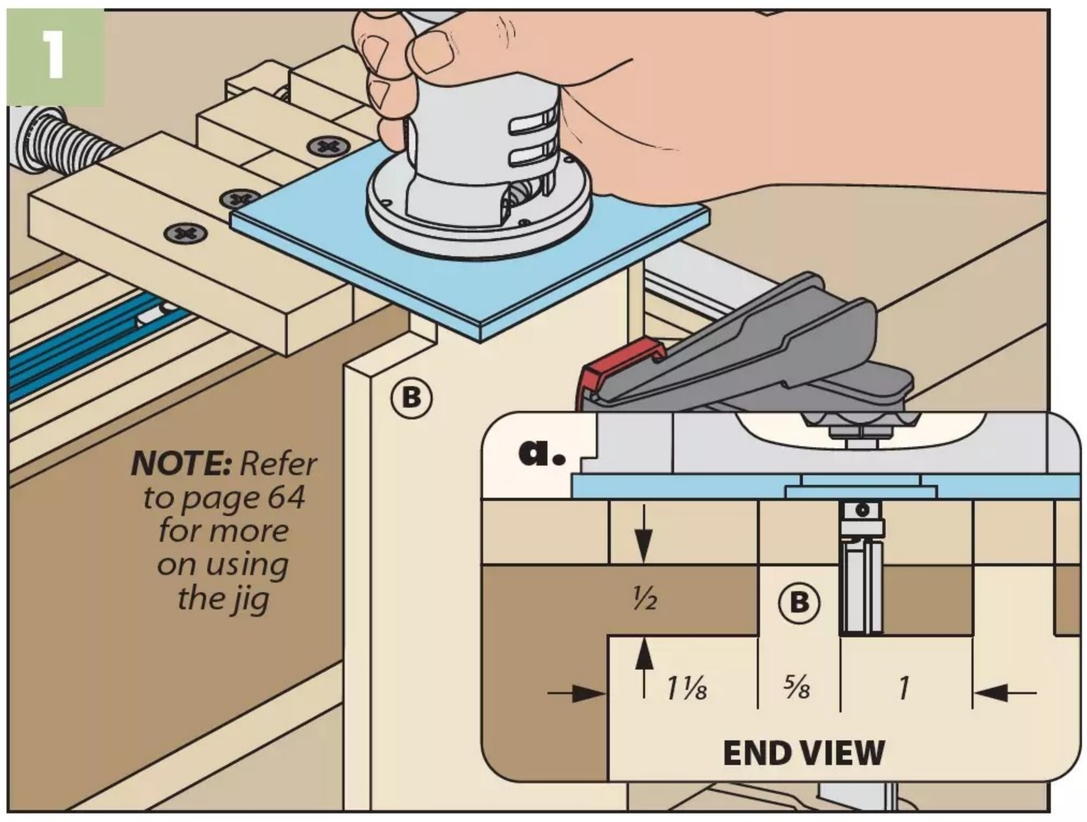
A	Sides (2)	7/16 x 4 1/2 - 8 1/4	**F**	Stiles (4)	3/8 - 1 1/8 x 7 1/8
B	Top/Bottom (2)	7/16 x 4 1/2 - 12 1/2	**G**	Runners (4)	1/8 x 5/16 - 5 13/16
C	Shelf (1)	3/8 x 2 3/4 - 11 3/4	**H**	Handles (4)	1/4 x 1/4 - 4
D	Back (1)	1/4 ply. x 7 1/2 - 11 3/4	**I**	Mid-Stiles (4)	3/8 - 1 1/8 x 7 1/8
E	Rails (4)	3/8 - 1 1/8 x 5 13/16	•	(8) 1/8"-dia. x 5/16" Dowels	

stopped dadoes in the sides to accept the tenoned ends of the shelf (detail 'c,' previous page). I cut these on the router table as well, but this time using a miter gauge. As with the stopped grooves, a pair of stop blocks determines the beginning and end of the cuts. To make the cuts, align your miter gauge with the initial stop block, turn on the router, pivot the workpiece onto the bit, then push through to the second stop block.

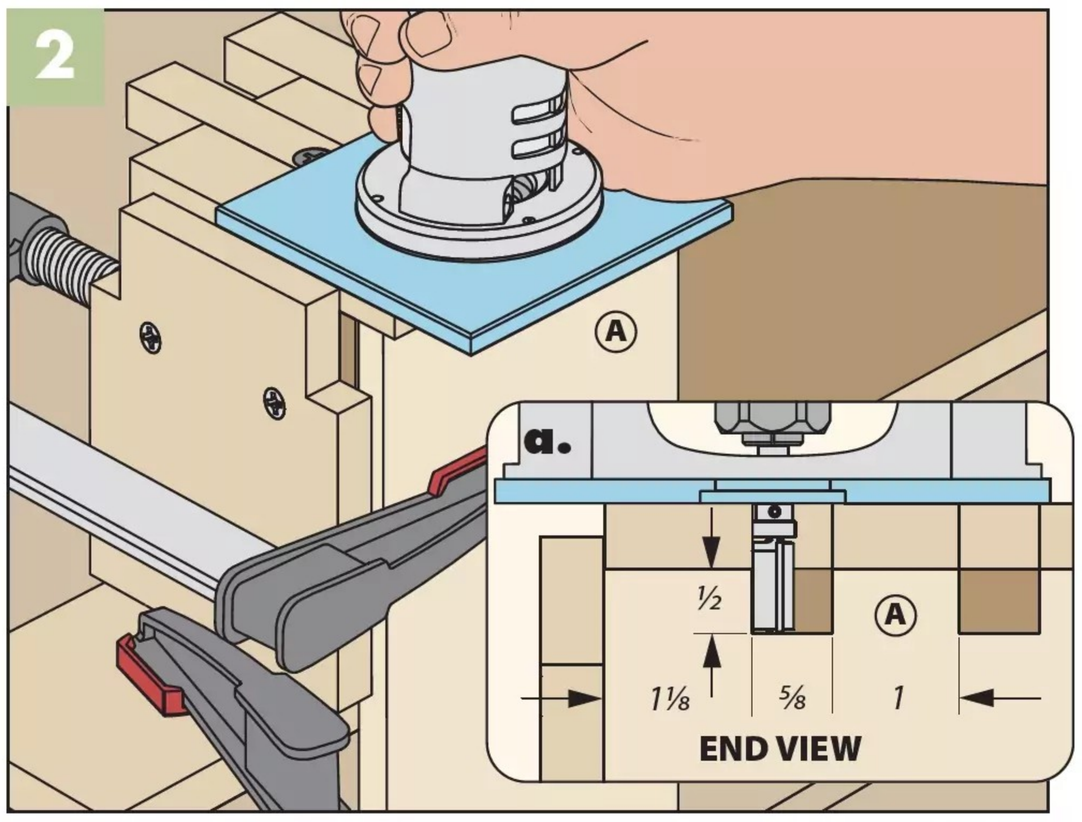
RABBET CUTS. This portion of the build will be closed up by the shelf and back panel. After sizing them, both of them require a few rabbet cuts. To make these, I used a dado blade buried in an auxiliary rip fence.

I began by tenoning the ends of the shelf. To avoid chipout on these crosscuts, use an auxiliary fence on your miter gauge. Once that's done and the tenons fit neatly in the dadoes, rabbet the perimeter of the back panel. This creates the tongues to fit in the case grooves. Once you've finished, dry fit the case together to see if any adjustments need to be made. Once you're happy with how the case has come together, it's time to turn our attention to the other half of this project.

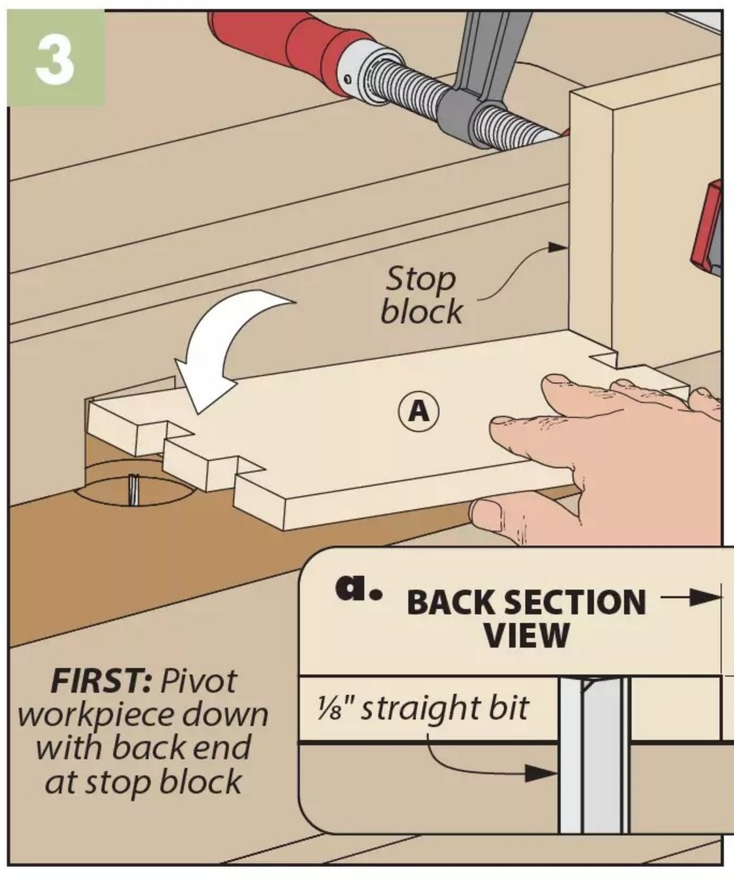
FINGER JOINTS & STOPPED GROOVES



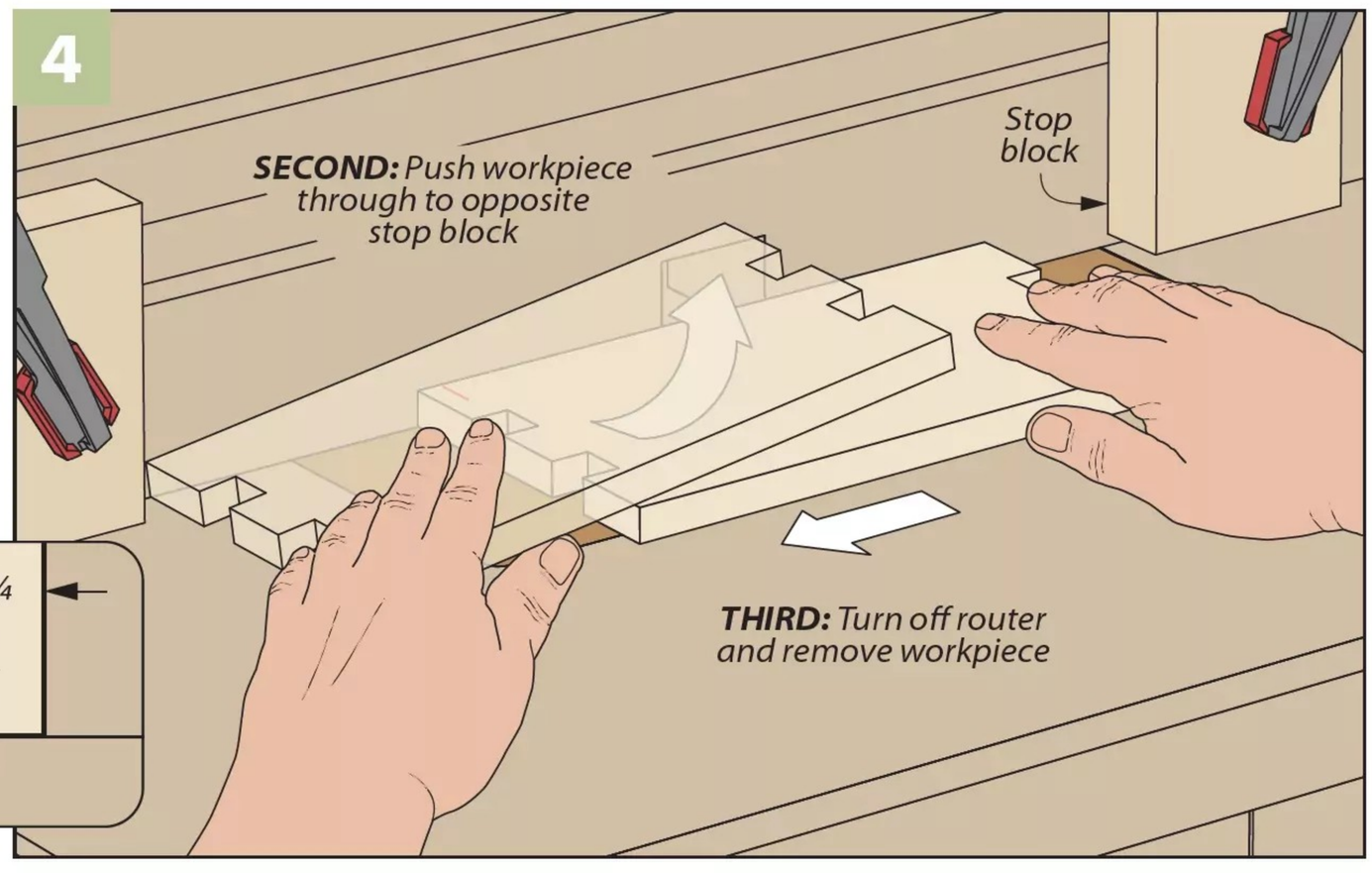
Pins First. Set the guides on the jig to match the locations of the pins of the joints. I used a pattern bit in my palm router to make the cuts, registering the bearing on the jig.



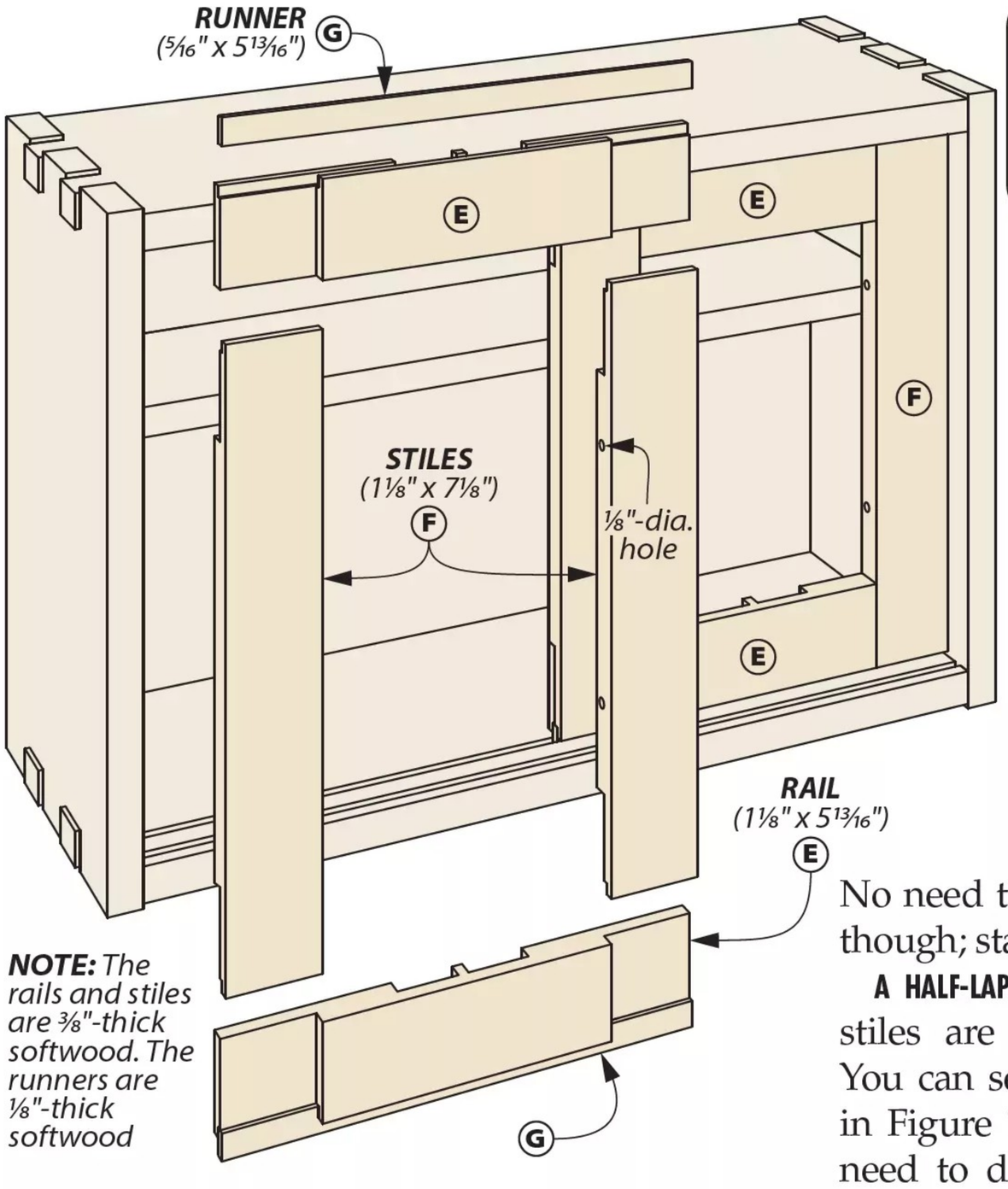
Then the Notches. By flipping the jig around, you're left with an exact match for the pins you just cut. Use a palm router and pattern bit once more to rout these out.

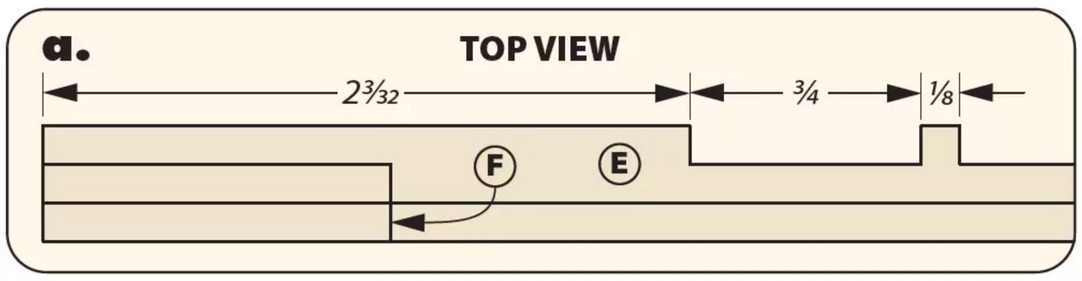


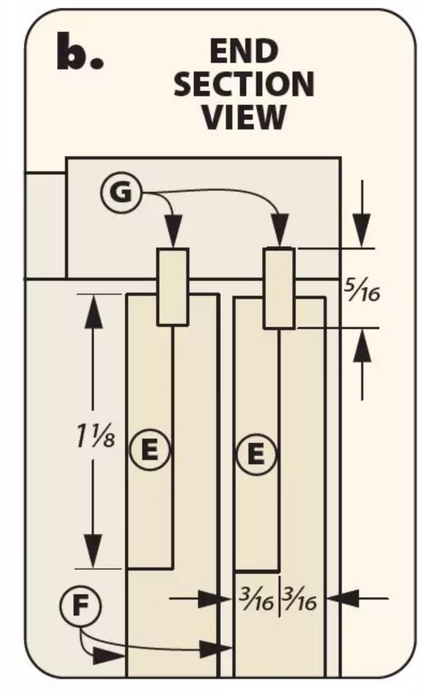
Stopped Grooves. Place stop blocks at the beginning and end of the cut. Pivot the workpiece onto the spinning bit.



Finishing the Cut. Complete the double-stopped groove by pushing the workpiece through to the second stop block. Once there, turn off the router and lift the workpiece off of the bit.







A Duo of DOORS

After the case come the doors. As you can see above and on the next page, five pairs of parts go into each door: rails, stiles, runners, handles, and mid-stiles.

No need to tackle it all at once though; start with the frame.

A HALF-LAP FRAME. The rails and stiles are joined by half-laps. You can see how I made these in Figure 1 below. Next, you'll need to drill the holes for the dowels that attach the handles.

Now you can glue the frames up. The rails need a pair of dadoes to accept the mid-stiles, but these are best to cut after the frame is assembled (Figure 2).

RUNNERS. The doors ride on a pair of runners. Cut these to size now and set them aside; we'll attach them later.

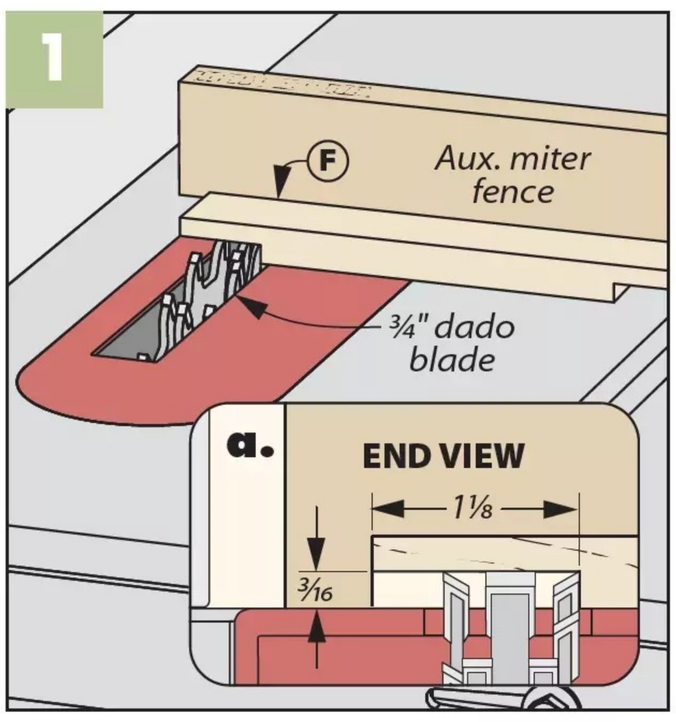
HANDLES & MID-STILES

Now, it's time to add the last accenting details. A pair of handles and mid-stiles fill out the opening of each door. Between these, I began with the handles.

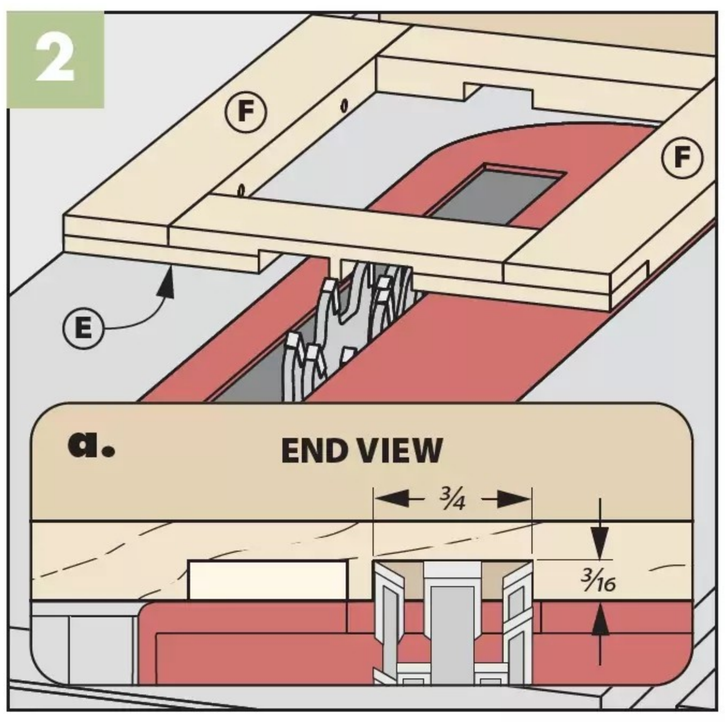
MINI HANDLES. The little handles that adorn the doors begin life as one long, thin blank. It's in this form that I drilled out the holes for the dowels that will attach them (Figure 1, next page).

Once those are in, cut them apart. The following two steps involve shaping, and to ensure that they'd be identical — and that I wouldn't be shaping my fingertips as well — I stacked them up and attached them to a scrap block that I could hold, securing everything with thin strips of double-sided tape. You can see this in Figures 2 and 3. Lastly, I glued them into the doors with dowels (detail 'a').

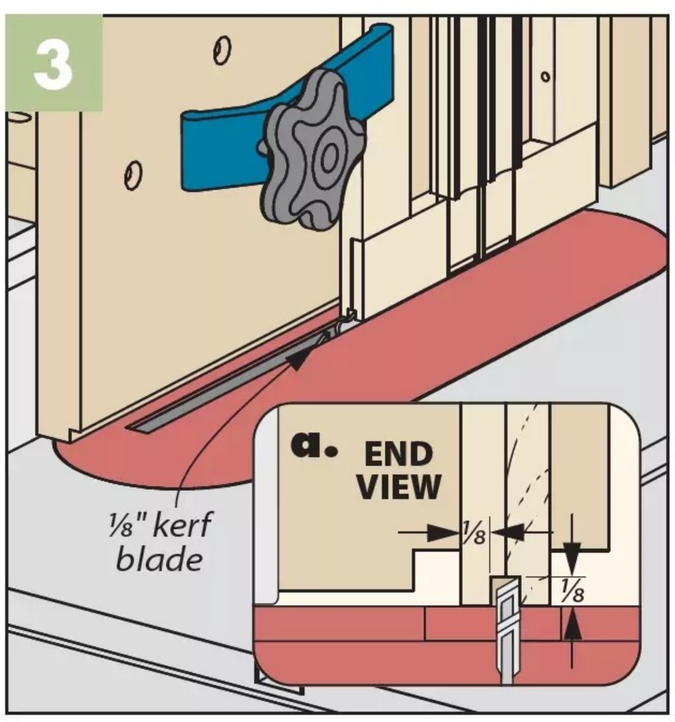
SHAPING THE DOOR FRAMES



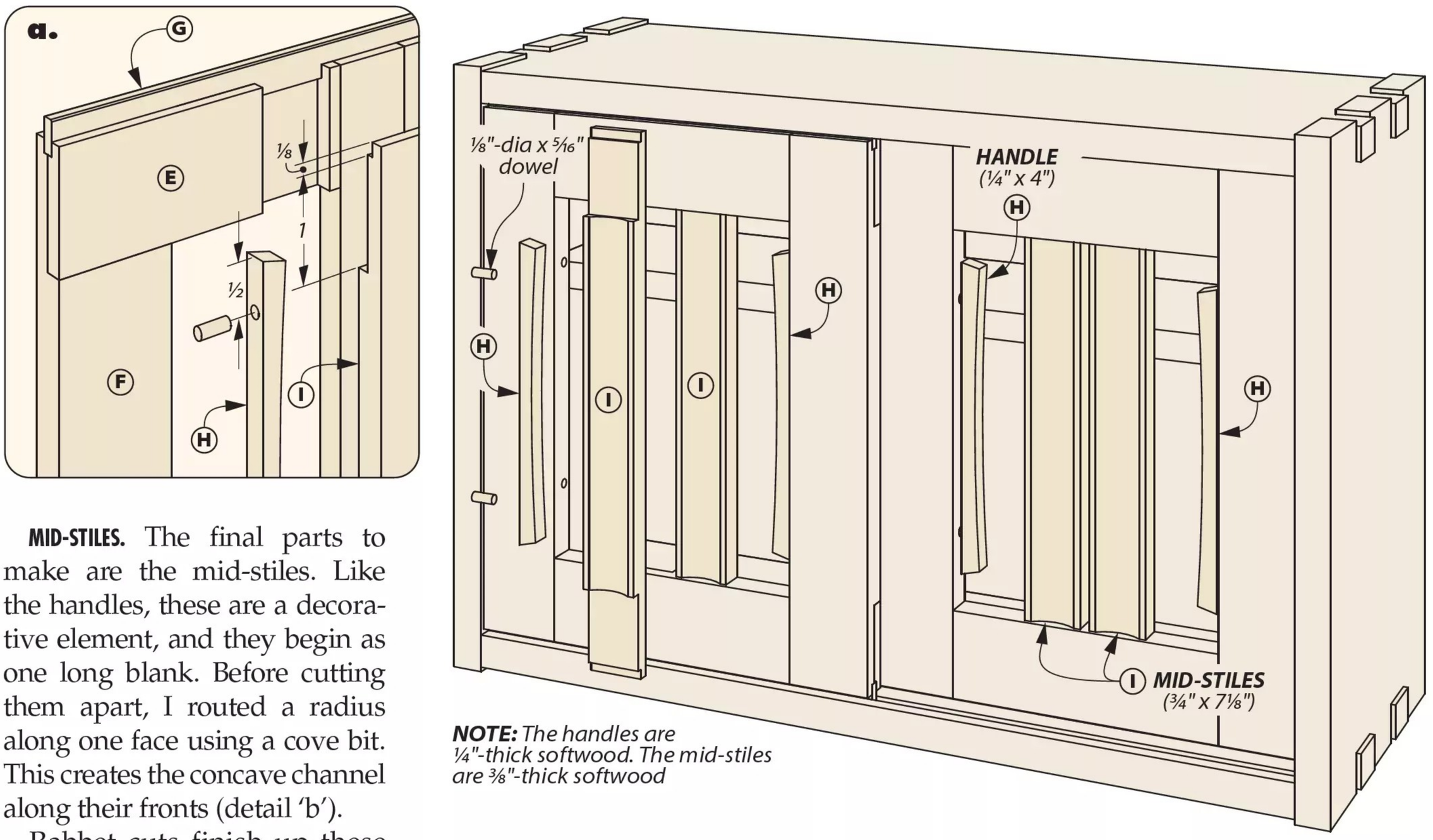
Half-Laps. To cut the half-lap joints, set the height of a dado blade to half the thickness of the workpieces.



Mid-Stile Dadoes. After assembling the rails and stiles, cut the dadoes into the frame for the mid-stiles.



Runner Grooves. To cut the grooves for the runners, I used a tenoning jig to secure the door assemblies.



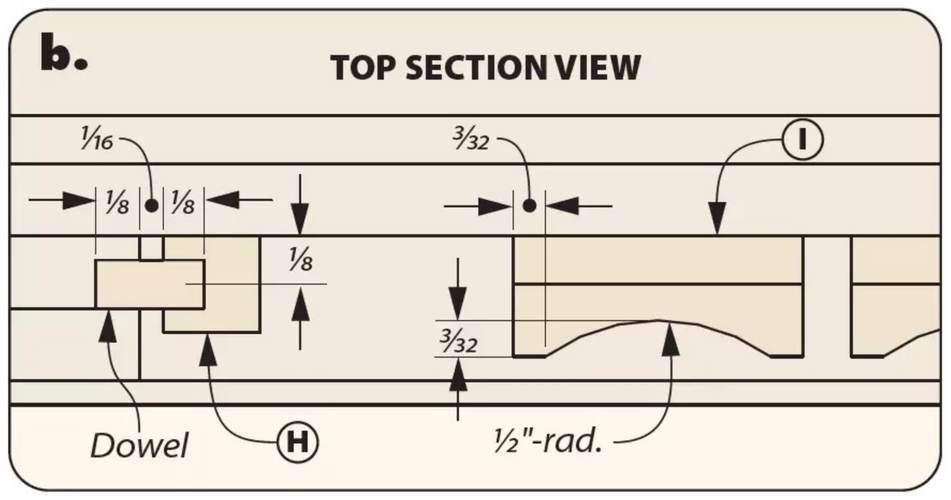
NOTE: *The handles are 1/4"-thick softwood. The mid-stiles are 3/8"-thick softwood*

MID-STILES. The final parts to make are the mid-stiles. Like the handles, these are a decorative element, and they begin as one long blank. Before cutting them apart, I routed a radius along one face using a cove bit. This creates the concave channel along their fronts (detail 'b').

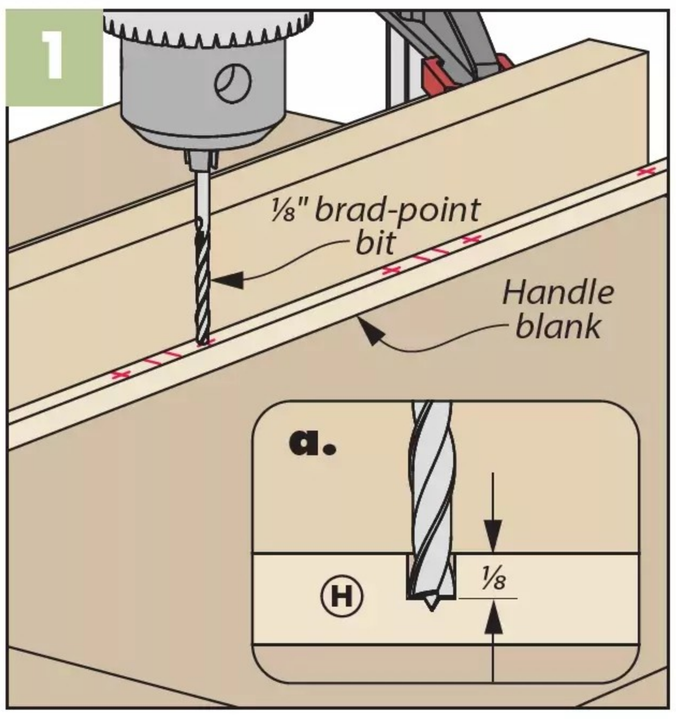
Rabbet cuts finish up these workpieces. Again, a few half-laps are needed. Then, glue the mid-stiles ino the rails.

With the doors assembled, it's time to return to the runners. These slot into grooves in the ends of the door frames (detail 'b,' previous page). I cut these using a tenoning jig at the table saw (Figure 3, previous page). Once the grooves are in place, glue the runners into them.

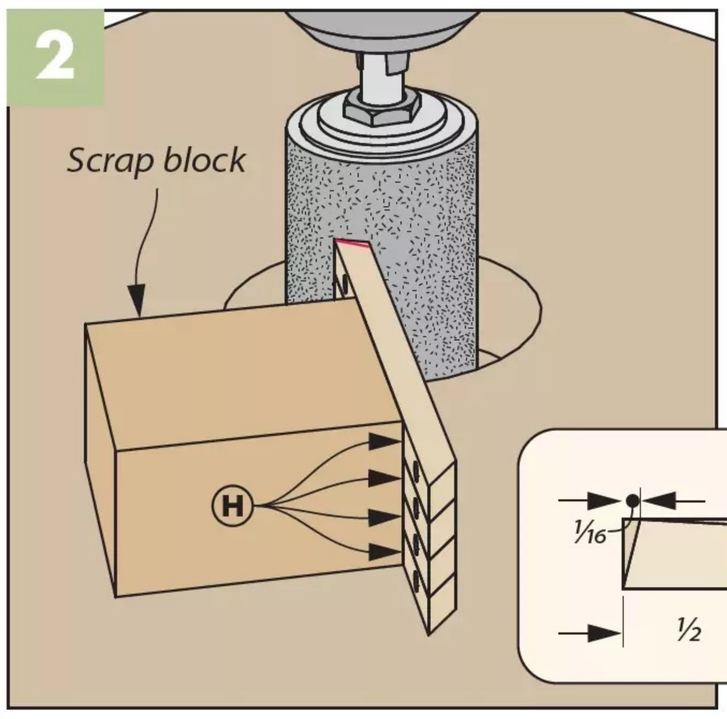
BRING IT TOGETHER. Once the runners are in, the case can finally be assembled. After the clamps come off, you just need to add some finish to call this spice cabinet complete. W



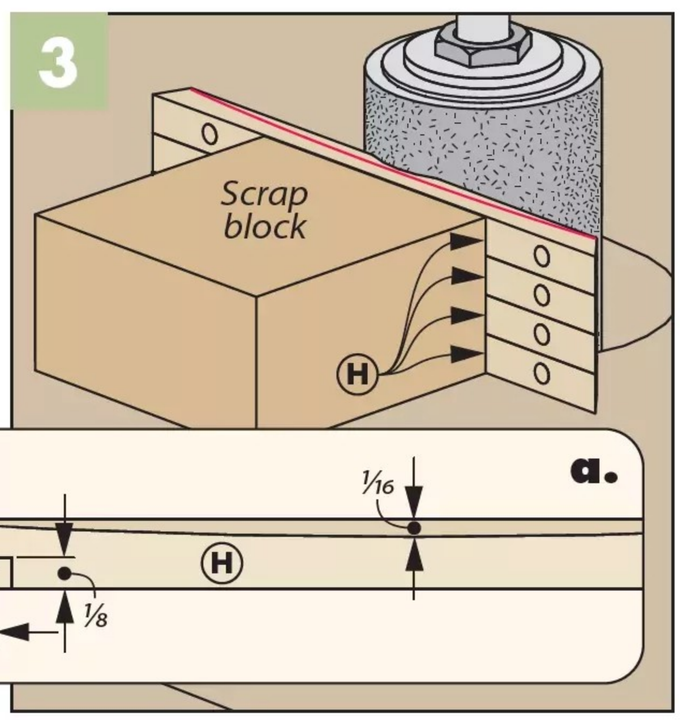
MAKING MINI HANDLES



Handle Holes. While the handles are still in one long blank, drill out the holes for the dowels.



Angled Ends. I sanded the ends of the handles with them all taped together, using a scrap block as a handhold.



Sand the Arc. Use the spindle sander to shape the curve along the fronts of the handles.

DESIGNER Project

Written by: Phil Huber; Project Design: Dillon Baker

▲ The small scale of the cabinet combined with the wall-hung design gives a small powder room a greater sense of open space.

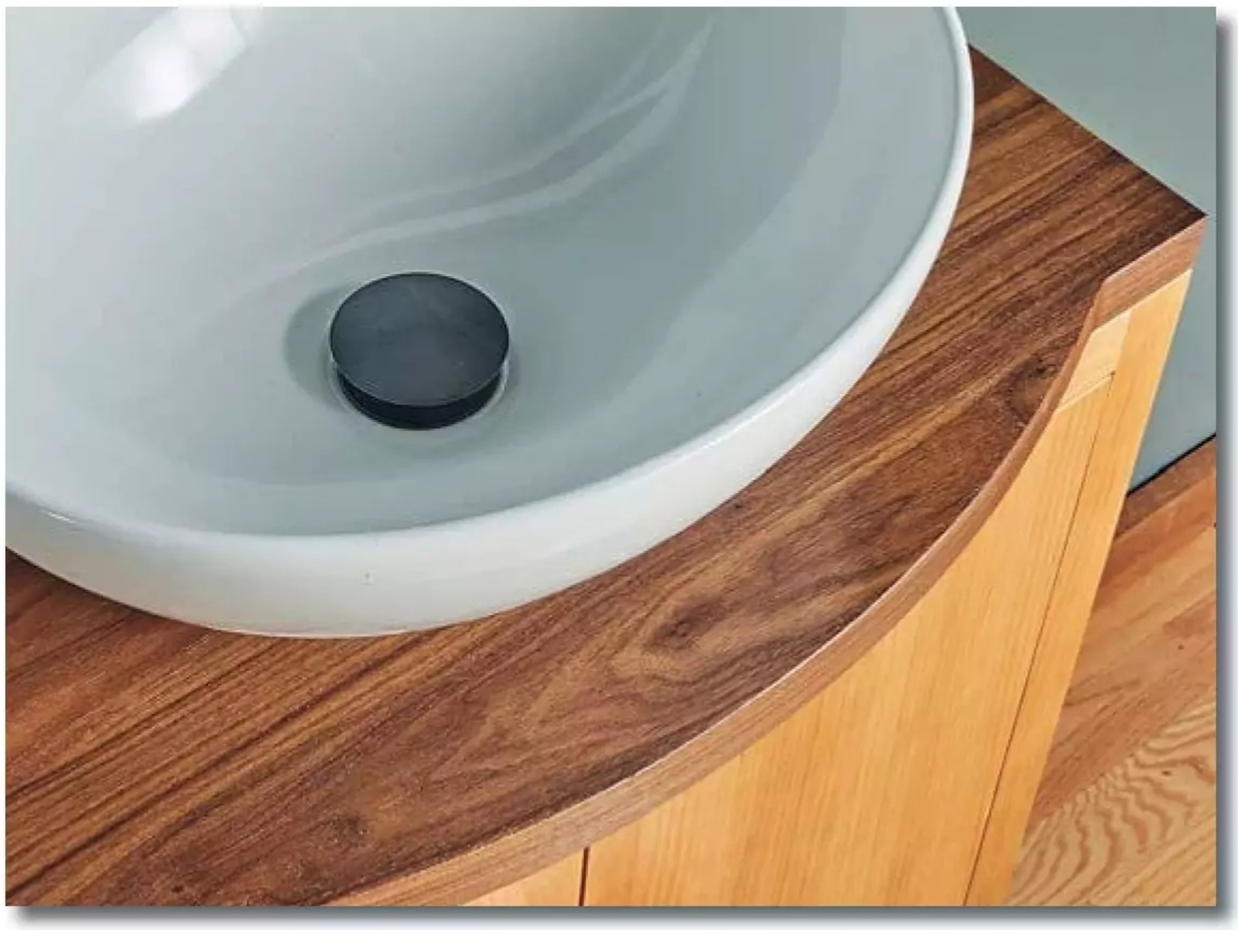
Floating Vanity

Inspired by a home-improvement project, this compact cabinet is easy to build and easy on the eyes.

Behind the scenes here at *Woodsmith*, you're likely to see not only magazine projects in process, but a few personal projects, too. I have a couple going myself. These lunch-hour diversions are built to serve practical needs at home. Which makes them candidates for a magazine project.

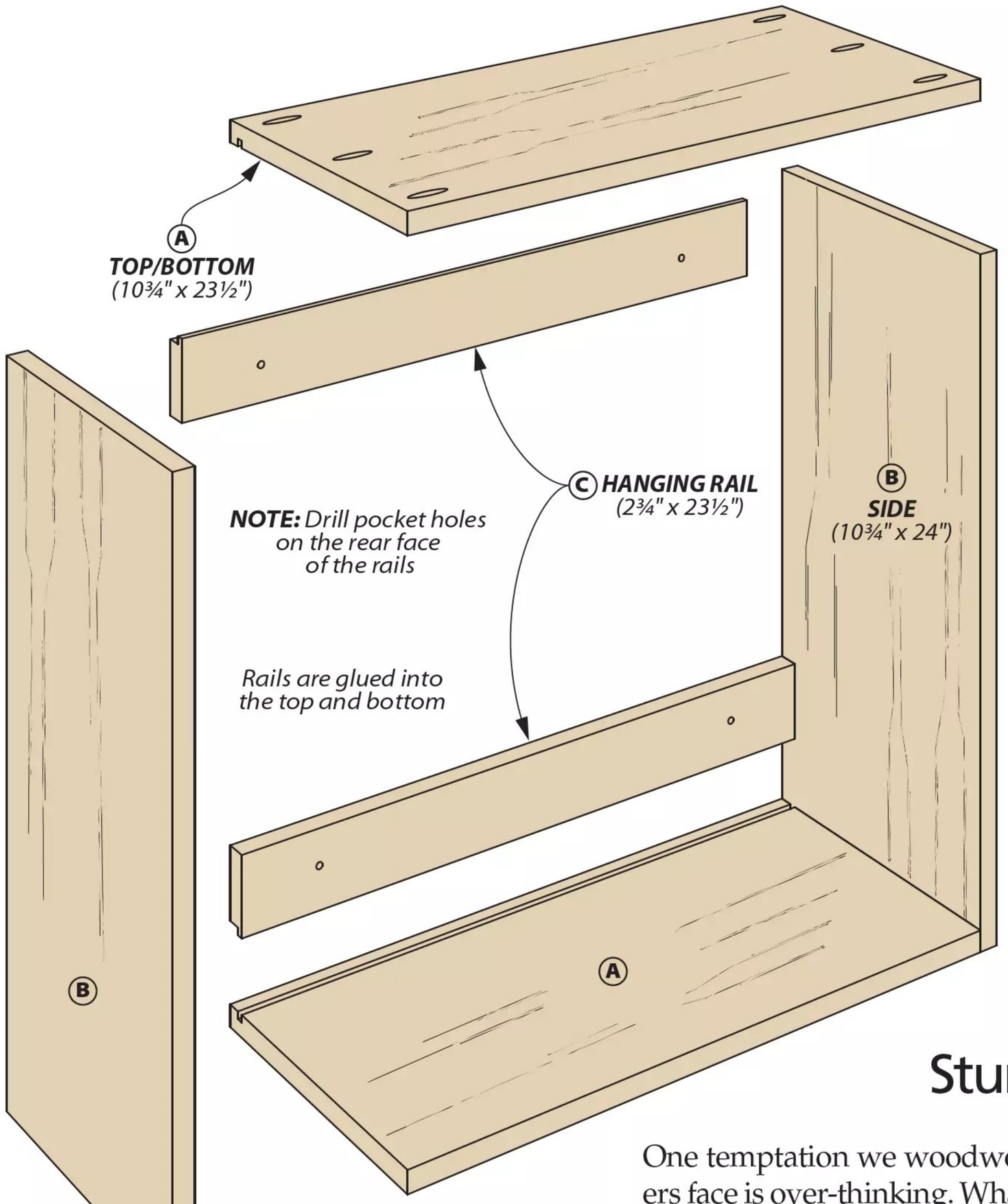
Dillon Baker recently remodeled a bathroom in his older house. He wasn't satisfied with the scale (or the build quality, frankly) of the options at the home center. So he did what comes naturally to many of us — he made something himself. The space-saving, wall-mounted design is ideal for smaller rooms. At its core, his vanity represents what furniture should be like. The easy-to-assemble case is made from plywood with a solid-wood face frame. The straight grain and color were chosen to work together. The thick walnut top sets the stage for a vessel-style sink and spout faucet.

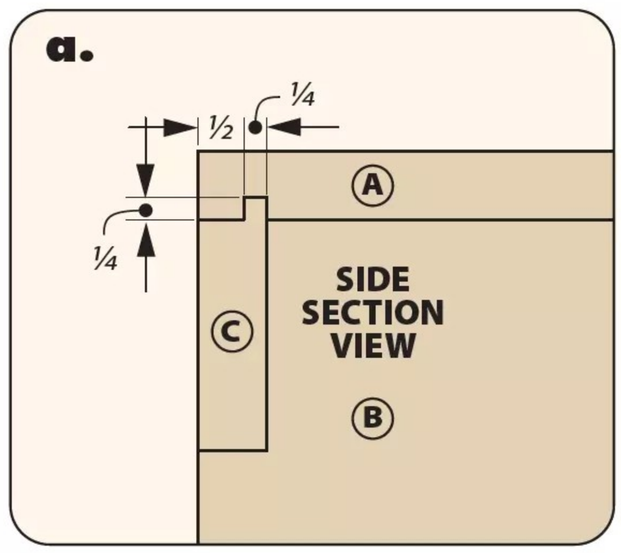
▲ Simple hardwood door stops are all that you'll need when self-closing Euro hinges are used.

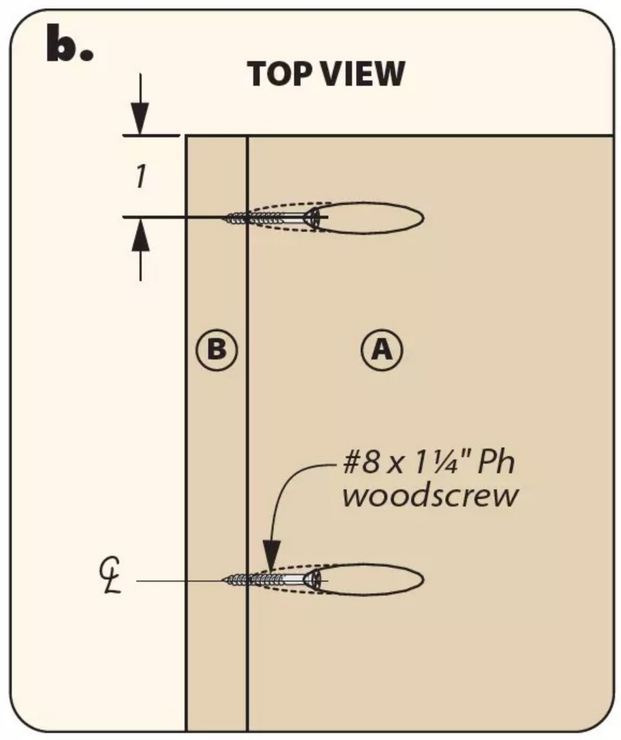


▲ The top swells out to echo the curves of the sink basin. The top is made from thick black walnut, while the case is cherry plywood.

Illustrations: Becky Kralicek







Sturdy PLYWOOD CASE

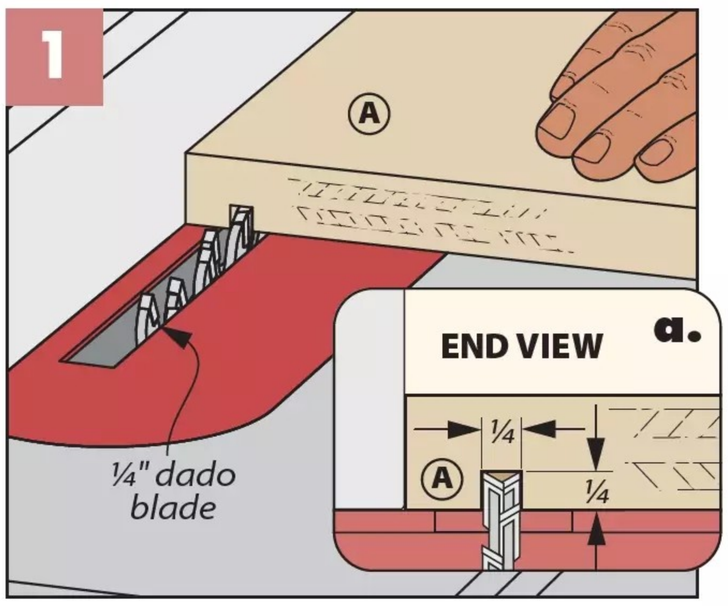
One temptation we woodworkers face is over-thinking. What-if scenarios and possibilities swirl like a carnival merry-go-round. The construction of this project shows how to rein those impulses in (drawing above). The case is made from cherry plywood. Matching hardwood elements dress up and reinforce the structure.

MAKE THE CASE. The starting point, then, is the case. Cut the four parts to the sizes shown. Beyond numbers, what's important is that the top and bottom are the same size, as are the two sides.

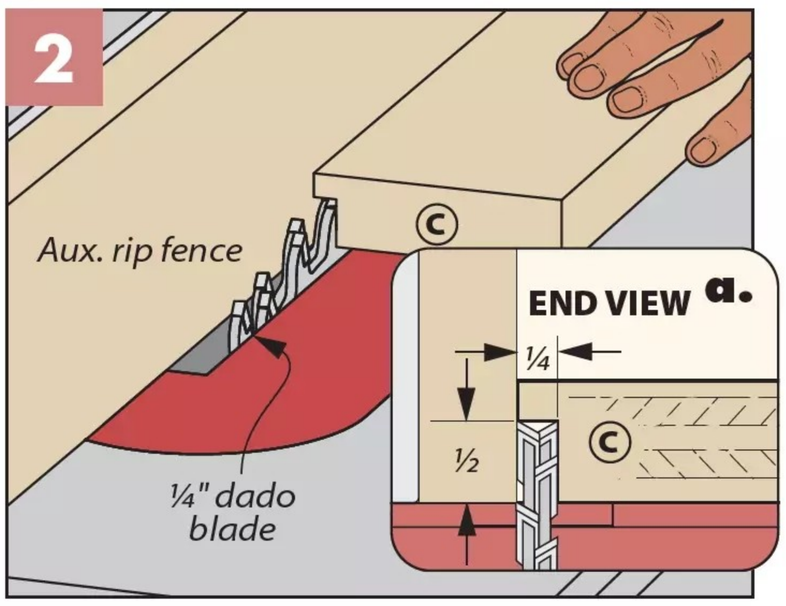
The top and bottom have a groove cut on their inner faces. These accept hanging rails that come later. The dimensions for the grooves are in detail 'a.' Figure 1 at left shows the table saw setup for this. A dado blade is used to make the cut.

POCKET HOLES. The case parts are joined with pocket screws. Drill the holes for these on the outer faces of the top and bottom, as shown in the main drawing and

TONGUE & GROOVE JOINERY



Get Groovy. The case top and bottom sport grooves to interlock with the hanging rails for a secure connection.



Form a Tongue. Sneak up on the size of the tongue. You're aiming for a snug fit you have to press together.

in detail 'b.' This is all you need to do regarding joinery prior to assembling the case.

Before going further, I sanded the inside surfaces of the case. This is much easier to do as separate panels. Keep in mind that the face veneer is thin. I glued the case parts using clamps and assembly squares to hold the pieces in alignment in order to drive the screws into place.

RAILS. A pair of hanging rails come next. Their primary purpose is to offer a surface to attach the vanity to the wall. They also strengthen the case. They're made from the same plywood as the case.

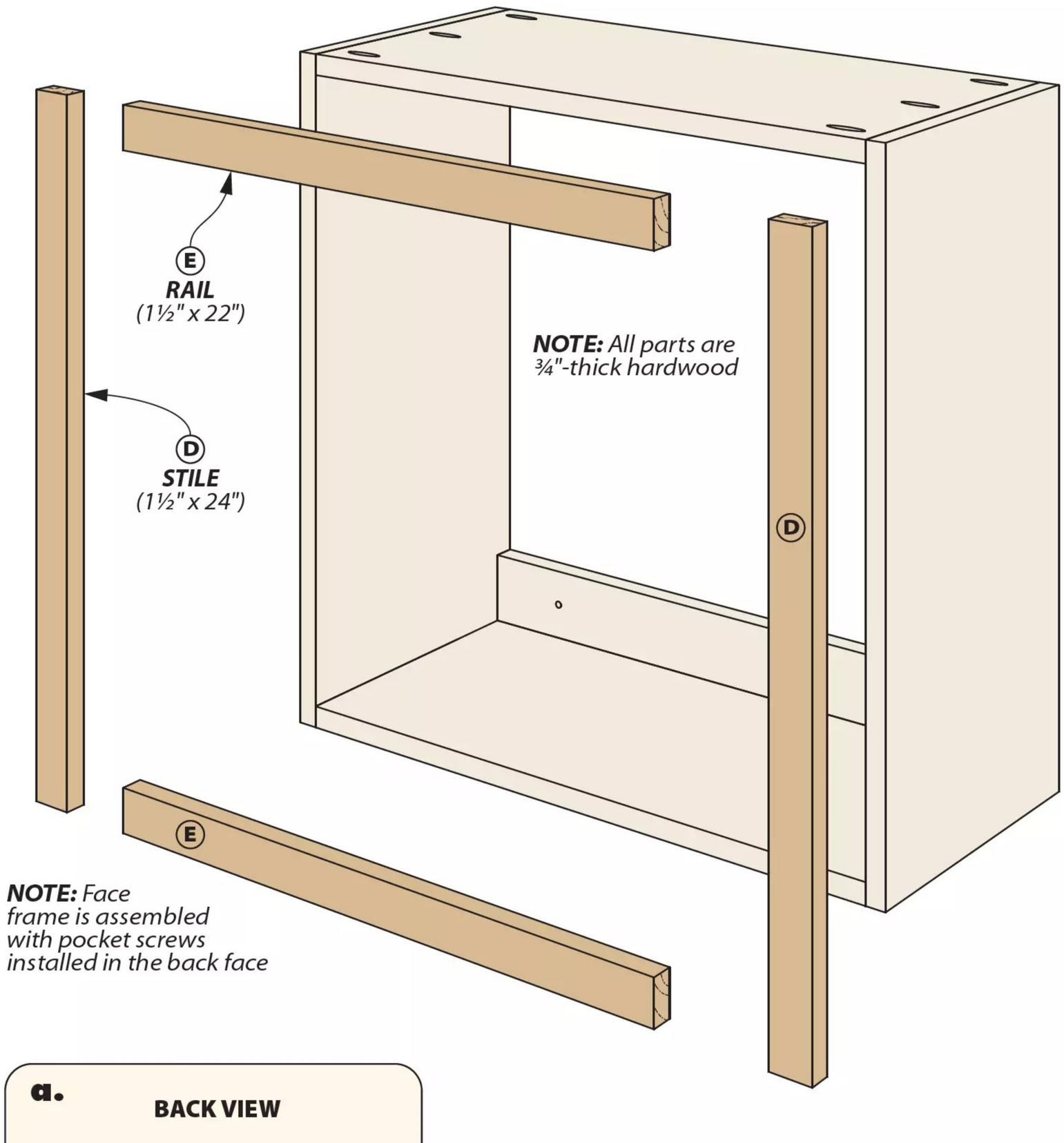
On one edge of each rail cut a rabbet, as in Figure 2 on the previous page. This forms a tongue to fit the grooves in the top and bottom. Then drill a pair of pocket holes on each end. When you combine the tongue and groove with the pocket screws, you end up with a case that won't get pulled off the wall.

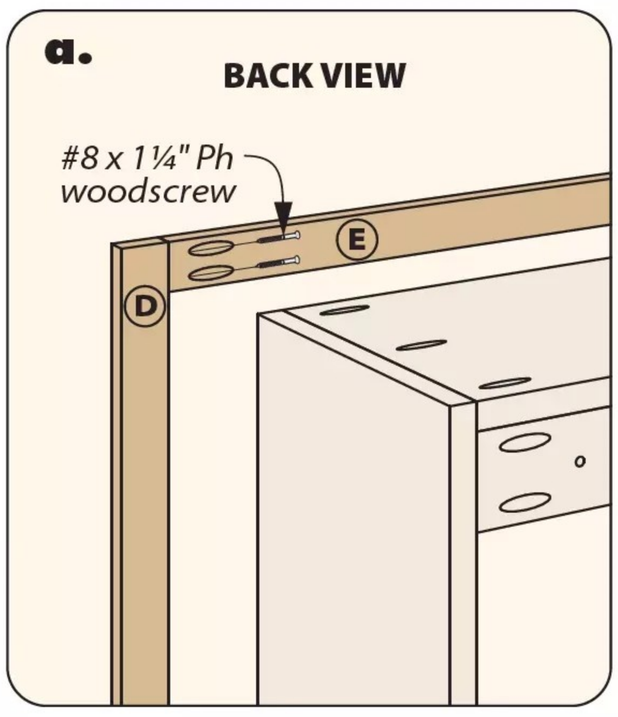
Since the rails are at the back of the case, I didn't apply edgebanding. But feel free to do so if you prefer to conceal the plywood edge. Apply glue to the tongue and groove joint and secure the rails with pocket screws driven into the sides.

FACE OFF

While I'm not concerned about the exposed edges on the rails, I do want to conceal the exposed edges on the front of the case. Additionally, since the case needs to support a sink, I want to increase the stiffness of the case at the front. The solution to both of these issues is a hardwood face frame, as shown in the drawing at right.

STILES & RAILS. The face frame is made up of a pair of stiles (vertical pieces) and rails (the horizontal ones). To match the modern look of the vanity, I kept these parts the same width.



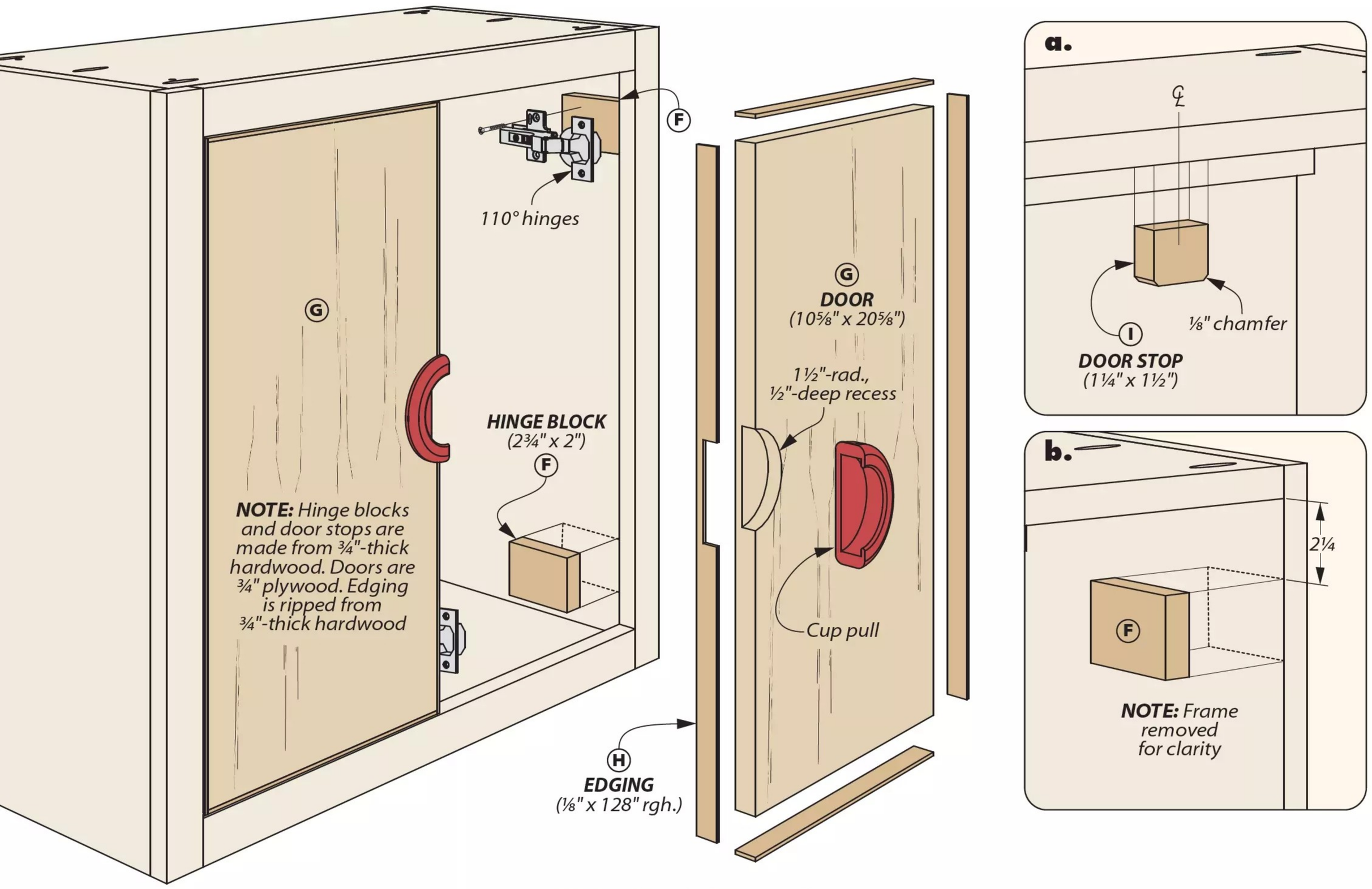


The width of the face frame parts also relates to the style. Relatively narrow pieces reflect the modern look.

I cut the stiles first. These will be attached flush to the sides. As a result, they determine the length of the rails that fit between them. To determine the length of the rails, I clamped the stiles to the case, without glue. The space between them is the length of the rails. Actually, I like to cut the rails a hair extra-long. This way the stiles extend beyond the case and I can sand them perfectly flush after assembly. After you cut the rails, drill pocket holes on the back face, as you can see in detail 'a' at left.

ASSEMBLE THE FACE FRAME. Here again, I used glue along with the screws. Then attach it to the case with glue and clamps.

Once the glue dries, remove the clamps and sand the face frame flush. Sand the outer faces of the case, as well. Since this will get a film finish, I just used 150-grit sandpaper. Check the surface with your hand for smoothness as you go. Sand the face frame and ease the inside edges of the face frame to eliminate sharp corners.



Enclosed with **TWO DOORS**

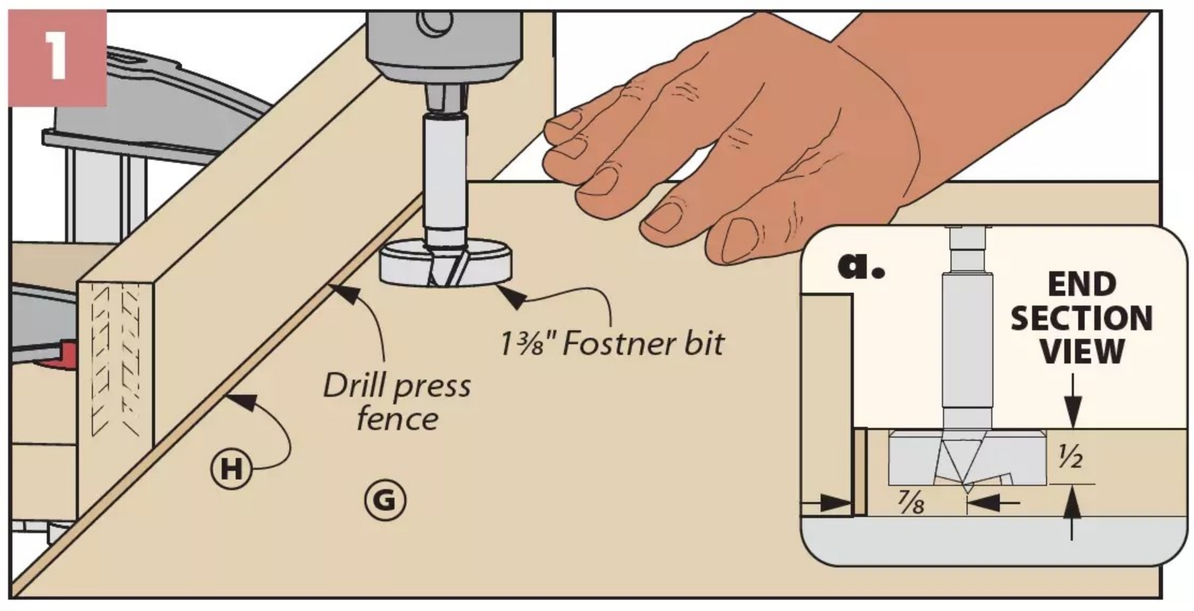
The doors of the vanity reinforce the quiet, uncluttered mood of the case. There's a little work that we need to take care of before it's time to build the doors.

MOUNTING BLOCKS. The doors swing on concealed, Euro-style hinges. I added a pair of blocks inside the case to serve as a platform for the hinges, as shown in the drawing above. The blocks tuck in right behind the face frame and are sized to be flush with the inside edge of the face frame. Detail 'b' shows the location for the blocks. The blocks are glued in place, though a few pins or brads keep the project moving along.

DOORS. The doors are made from the same plywood as the case. The edges of the panels are covered by thin strips of hardwood. Before attaching the edging, I used a few pieces as spacers to zero in on the final size of the doors. You don't have a lot of material for trimming once it's installed.

Euro hinges require a round mortise drilled on the back face of the door. This is shown in the box at left. Once installed, the doors help you locate the placement of a pair of stops, as you

HINGE CUP MORTISES

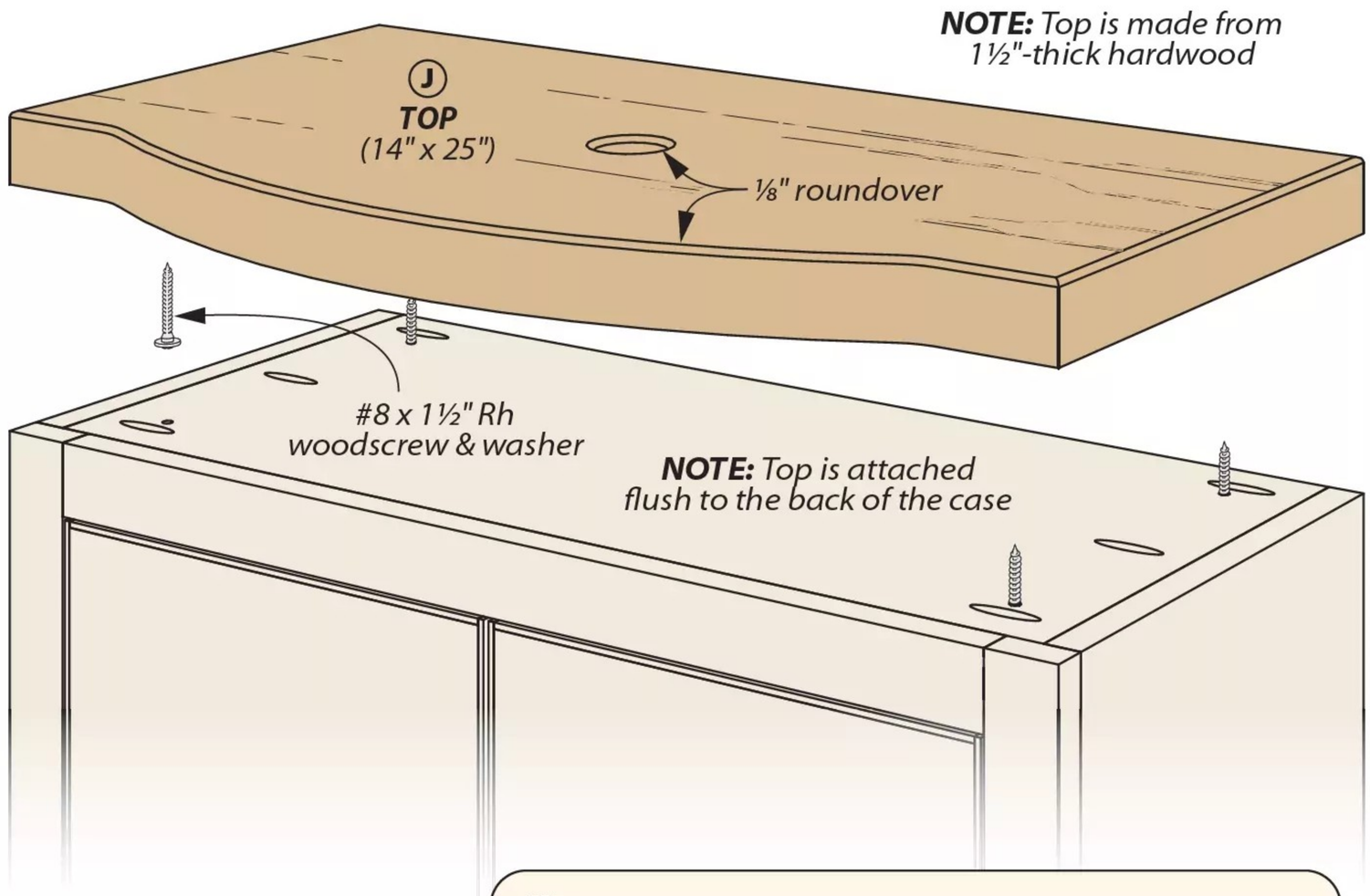


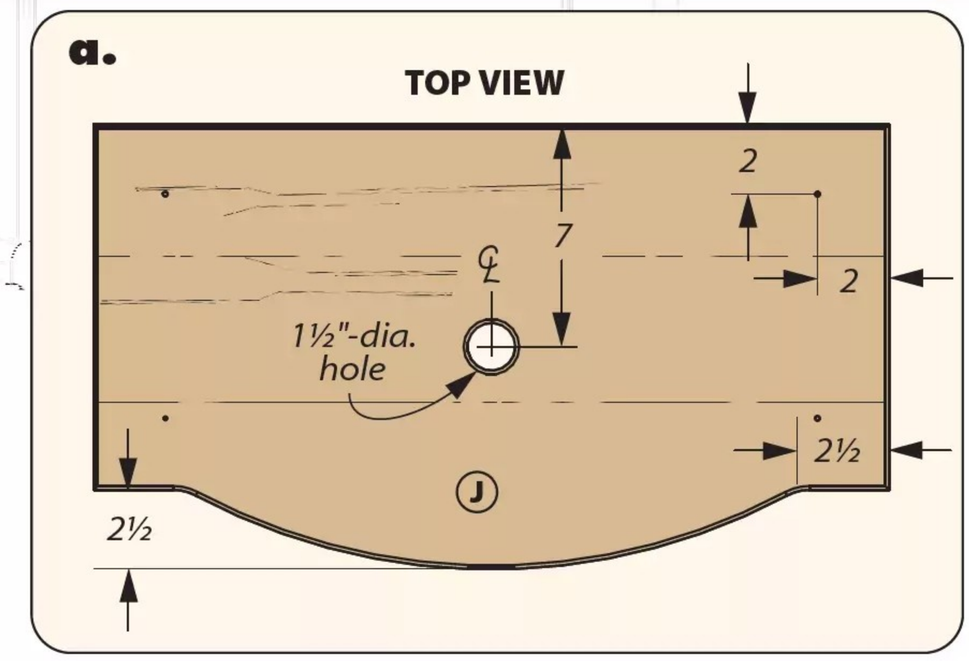
Set Up For Success. Clamp a fence to the drill press table to locate the hinge mortises consistently from the edge of the doors. Set the depth stop to match the cup on the hinge.

Materials & Supplies

A	Top/Bot. (2)	¾ ply. - 10¾ x 23½
B	Sides (2)	¾ ply. - 10¾ x 24
C	Cleats (2)	¾ ply. - 2¾ x 23½
D	Stiles (2)	¾ x 1½ - 24
E	Rails (2)	¾ x 1½ - 22
F	Hinge Blocks (4)	¾ x 2¾ - 2
G	Doors (2)	¾ ply. - 10⅝ x 20⅝
H	Edging (1)	¾ x ⅛ - 128 rgh.
I	Door Stops (2)	¾ x 1¼ - 1½
J	Top (1)	1½ x 14 - 25

- (20) #8 x 1¼" Ph Woodscrews
- (2 pr.) 110° Euro-Style Hinges
- (2) Cup Pulls w/Screws
- (4) #8 x 1½" Rh Woodscrews
- (1) Sink & Faucet





can see in detail 'a' on the previous page.

I found some cup pulls that sit in a matching recess along the inside edge of the doors. The bold red gives them a flair.

HARDWOOD TOP

A solid wood top caps the vanity. The top in our version is made from black walnut to provide a complementary look with the cherry plywood. Unless you're fortunate, you'll need to glue up the top from several boards.

Cut the length of the panel to match the width of the case. Then lay out the curve along the front. The flats on either side of the curve should line up with the front edge of the case.

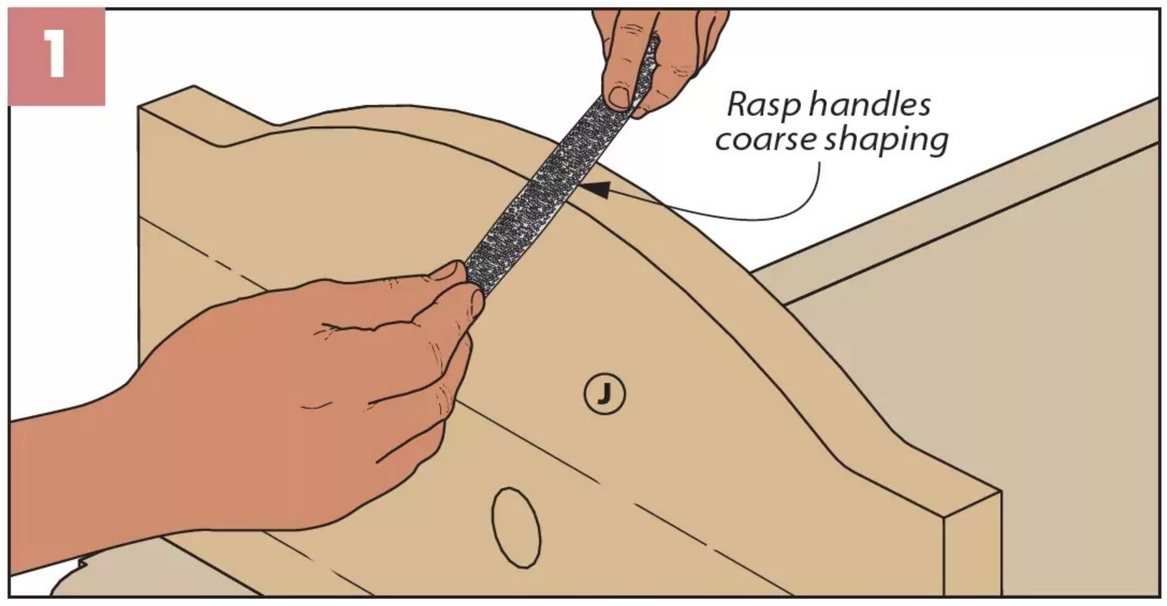
CUT & SHAPE. I cut the curve at the band saw. There's a delicate balance of cutting on the waste side of the line while getting as close to it as you're comfortable. The closer you can get, the less cleanup work there is. One more thing: cut the curve in a fluid motion to minimize lumps and bumps.

As for cleanup, I chose to use a few hand tools. A rasp starts off by blending the curve into a smooth shape. Get right up to the line. Then switch to a file. This tool removes the scratches left by the rasp. To smooth the knurled texture the file leaves behind, use a card scraper. I used a wide chisel to terminate the curve into the flat on either end.

SAND & FINISH. When you're satisfied with the look, sand the surface and ease the edges. A few coats of finish protect the top from daily wear and tear.

The top is attached to the case with roundhead screws in oversize holes to allow for wood movement. Detail 'a' shows the location of the hole for the sink's drain. I didn't call out the faucet hole(s). That depends on the faucet and location you choose. Ideally, you want to attach the vanity to the wall studs with long screws; at least on one side. Then it's time for plumbing. W

SMOOTHING THE CURVE



Rasp & File. A rasp and a file make a dynamic duo to refine and smooth the curve along the front edge of the top. Take strokes along and across the edge to get an even curve.

CARVING
Project

Chris chose to adorn the carved panels with reliefs of poppy flowers; for more on carving panels like these, check out his article on page 18.

Written by: Rob Petrie; Project Design: Chris Fitch

Carved Panel Chest

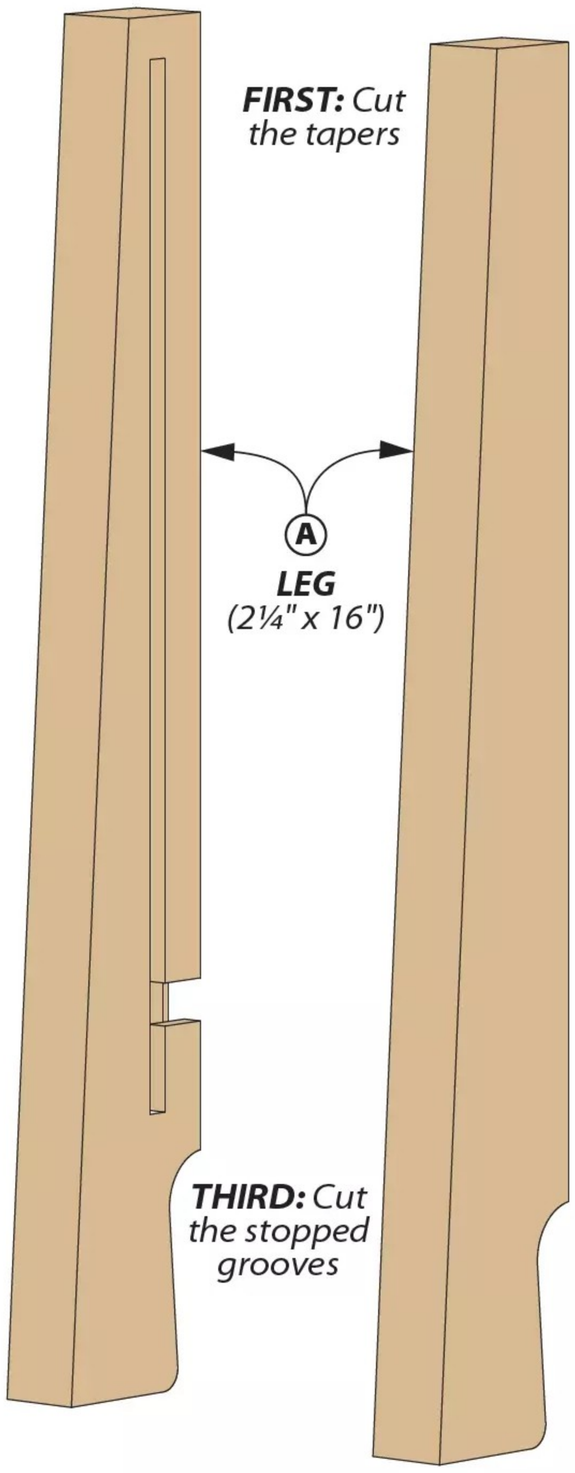
This gorgeous, paneled chest will show off not only your joinery abilities, but your carving skills too, with interchangable panels adorning the front.

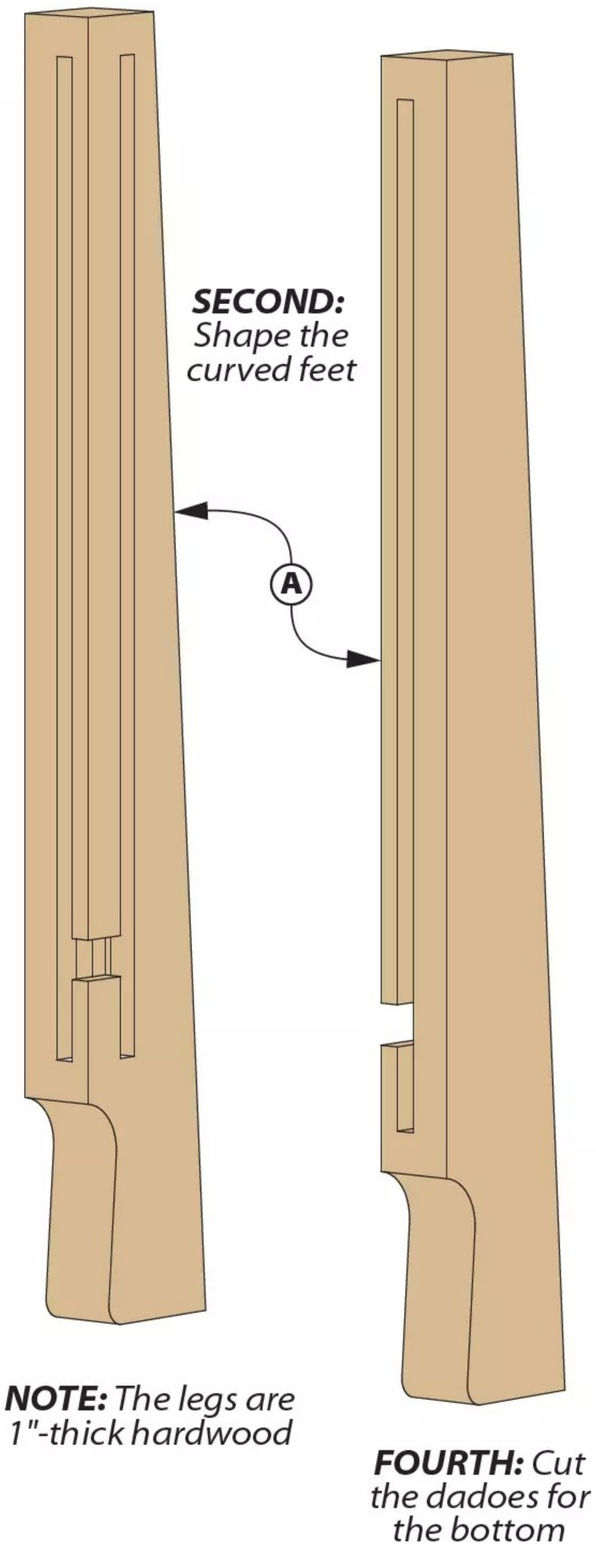
Small chests, cabinets, and boxes have become some of my favorite projects. In many cases, a smaller piece offers much of the same meaty woodworking as a larger one, but with a lower risk when something goes wrong. Was there a bit of chipout on the back end of that dado? No matter; cutting a new part is no big deal when it's only four inches long.

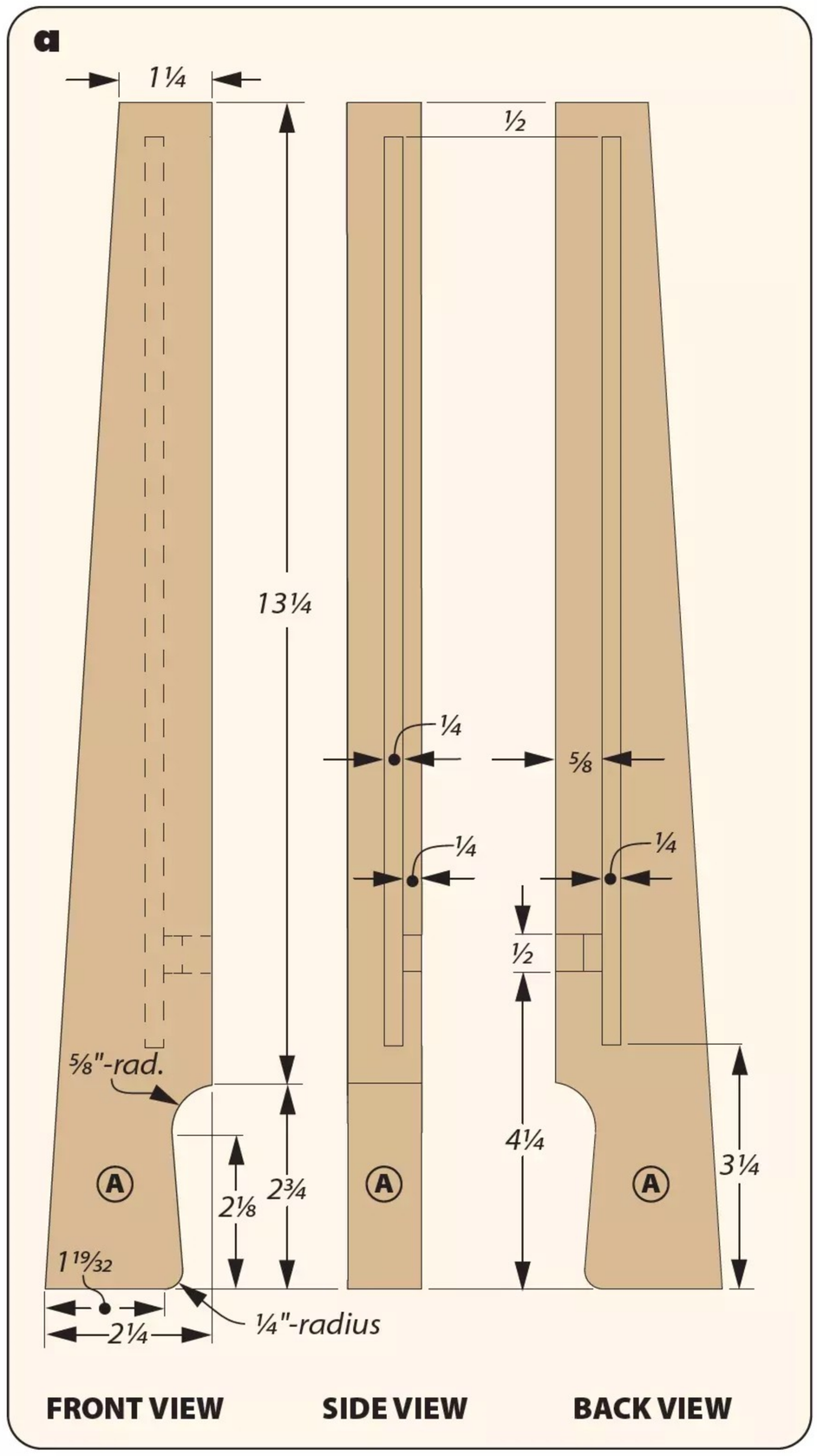
A less obvious benefit of small projects is that they concentrate the scope of focus, which leads me into the topic of this article. As the name suggests, panels are the main ingredient here, with each side of this chest constructed from frame-and-panel assemblies. Of course, the carved panels on the front are the stars of the show. Our creative director, Chris Fitch, carved and painted these designs. However, most of the work is not on the stars but on their stage, and on the joinery that forms this paneled chest.

◀ A sturdy stay supports the thick lid, which is attached by butt hinges to enclose the contents of the chest.

Illustrations: Harlan Clark





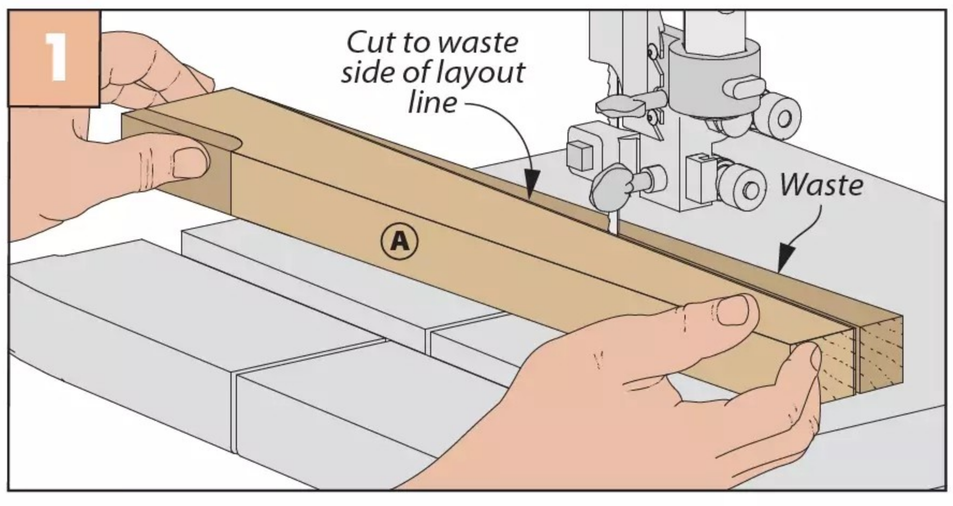


A Quartet of LEGS

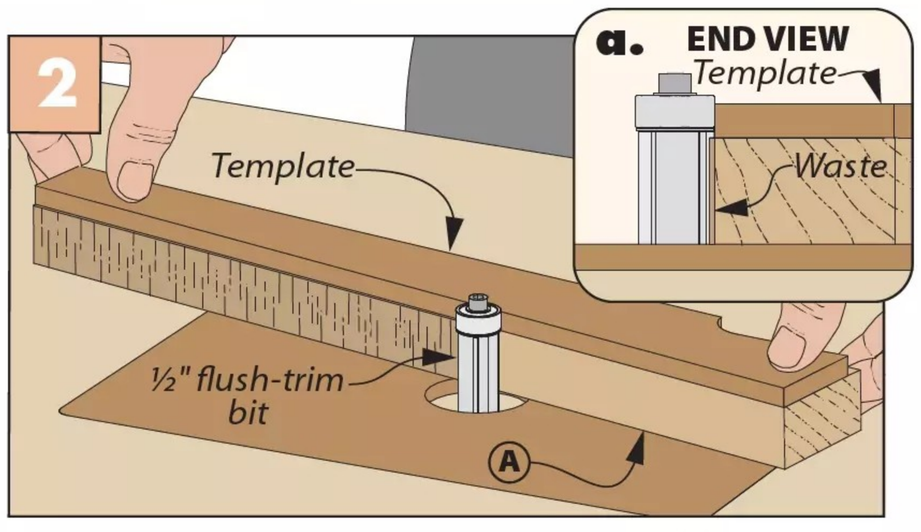
The four legs you see above stand as the foundational pillars of this chest — which makes them an excellent place to begin building. The work here can be divided into two categories: the profiles of the legs themselves, and the joinery that will hold the chest together. After planing down and sizing four hardwood blanks (I used white oak), I chose to start by creating the profiles.

SHAPING THE LEGS. Before diving in, I recommend labeling the legs; while it won't matter for the shaping right now, it will when it comes to the joinery. With that out of the way, I next shaped a

CUTTING LEG TAPERS



Rough Taper. After tracing out the profile of the legs on the blanks, begin by rough-cutting the angle of the taper on each blank at the band saw.



Template Trimming. To remove the blade marks and give the legs a finished edge, I routed along the template with a flush-trim bit.

hardboard template. You can see the dimensions I used in detail 'a' on the previous page. After mapping my layout on the hardboard, I roughed it out at the band saw, then finished the taper at the edge sander and the curve at the spindle sander.

Now, template in hand, I shaped the legs. These were cut roughly at the band saw after tracing on the shape of the template, as in Figure 1 on the previous page and at right. From there, I attached the template with double-sided tape and routed off the blade marks using a flush-trim bit (Figure 2).

GROOVES & DADOES

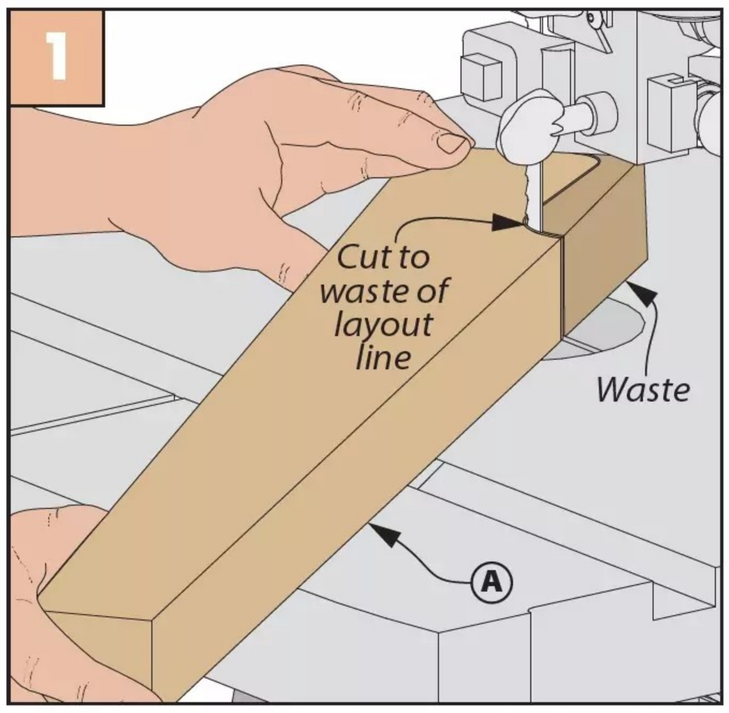
Next comes the joinery. There are two items to address on each leg: the long grooves that will accept the tongues of the frame assemblies and the short dadoes that will hold the bottom panel.

ROUTING STOPPED CUTS. These dadoes and grooves are each stopped. For the grooves, this goes doubly, as they're stopped on both ends. Luckily, this isn't difficult at the router table.

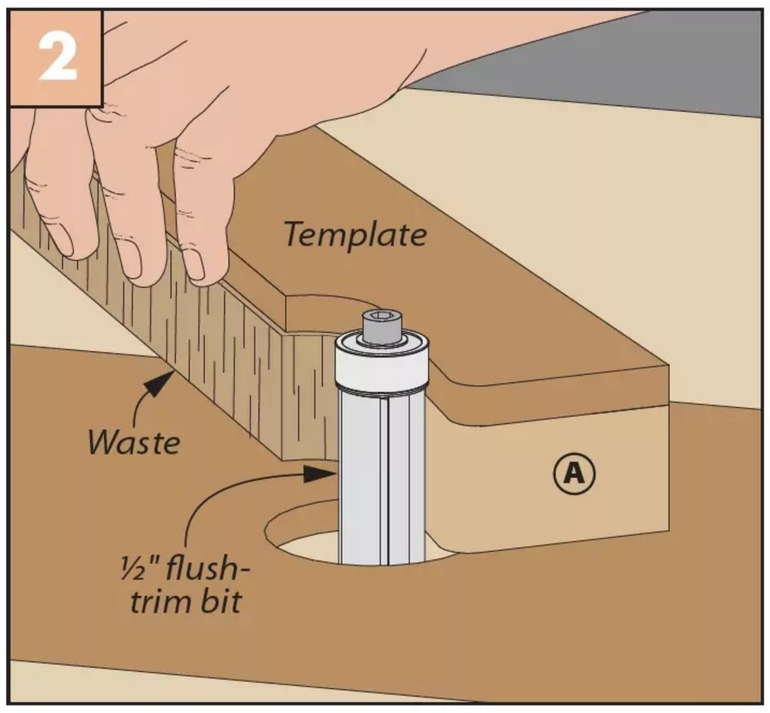
You can see how I tackled it in Figure 3. The key is to map out three points. First, you'll need the "start line," where the leading edge of the workpiece should be pivoted down. Second, you'll need a line on the router fence to indicate where the leading edge of the bit is. The third mark is your "finish line," and it shows the end of the groove. When the mark for the bit and the finish line meet, the cut is done. To square the corners, I used a chisel, as in Figure 4.

PANEL DADOES. The bottom panel is held by a pair of dadoes on each leg. I cut these using a straight bit at the router table. Keep in mind that you'll need to angle the miter gauge slightly to account for the taper (Figure 5). With those in place, the legs are finished; now for the panels.

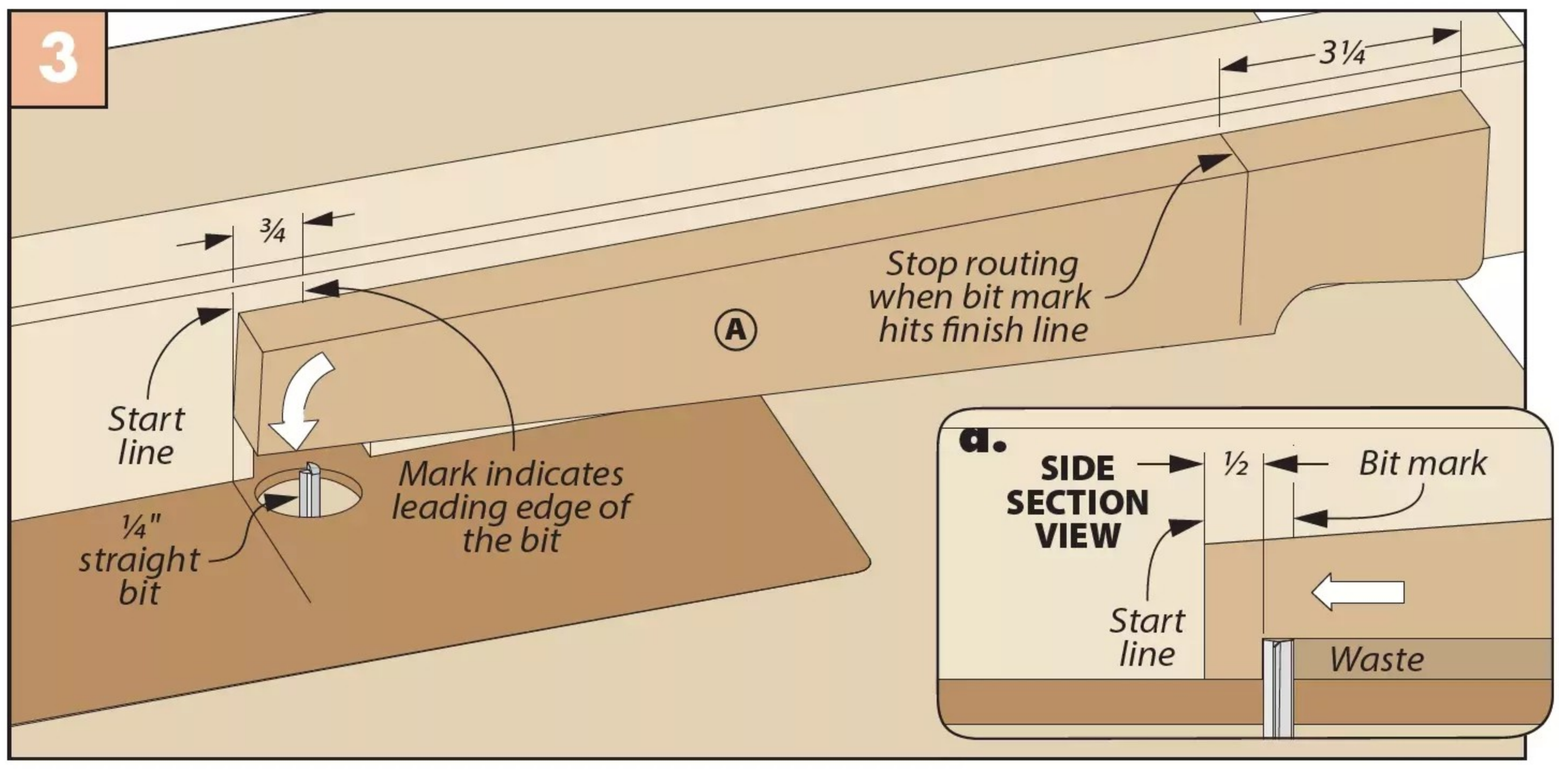
SHAPING FEET & CUTTING JOINTS



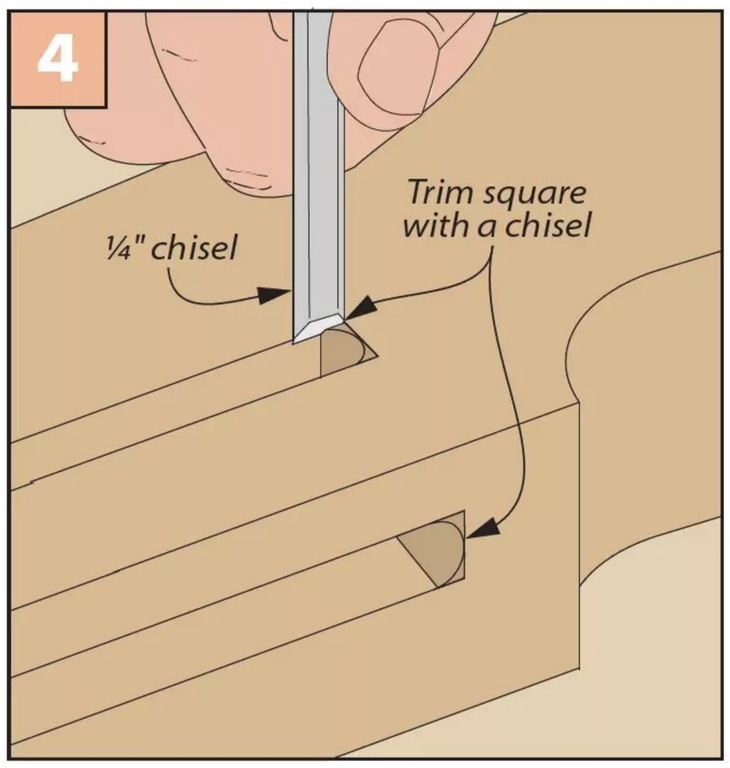
Curving Cuts. Return to the band saw to rough-cut the S-curve of the feet, staying outside the layout lines.



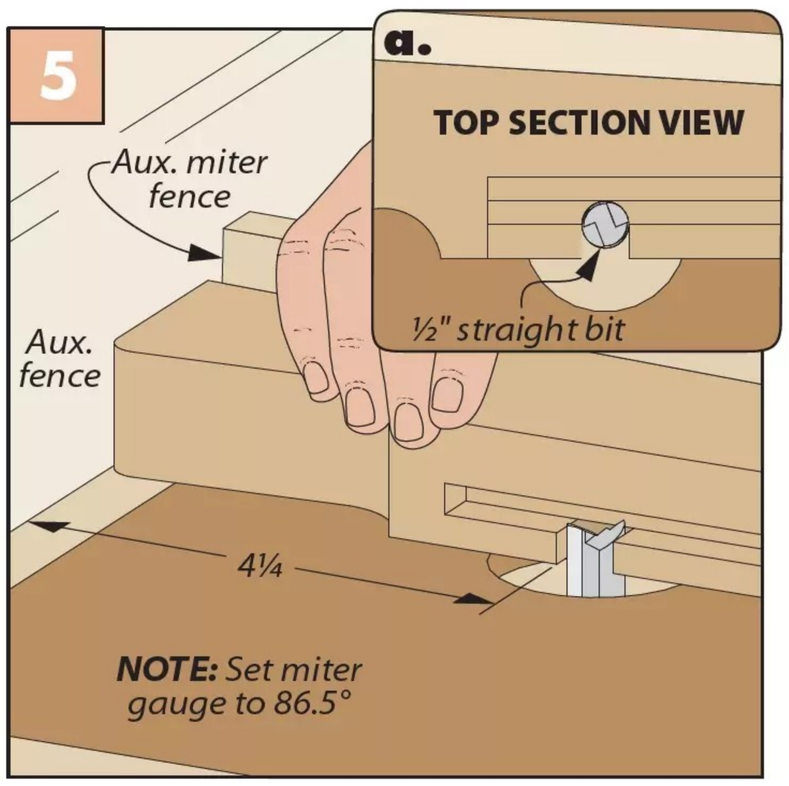
Clean the Feet. Back at the router table, use the flush-trim bit to clean up the rough edges of the S-curves.



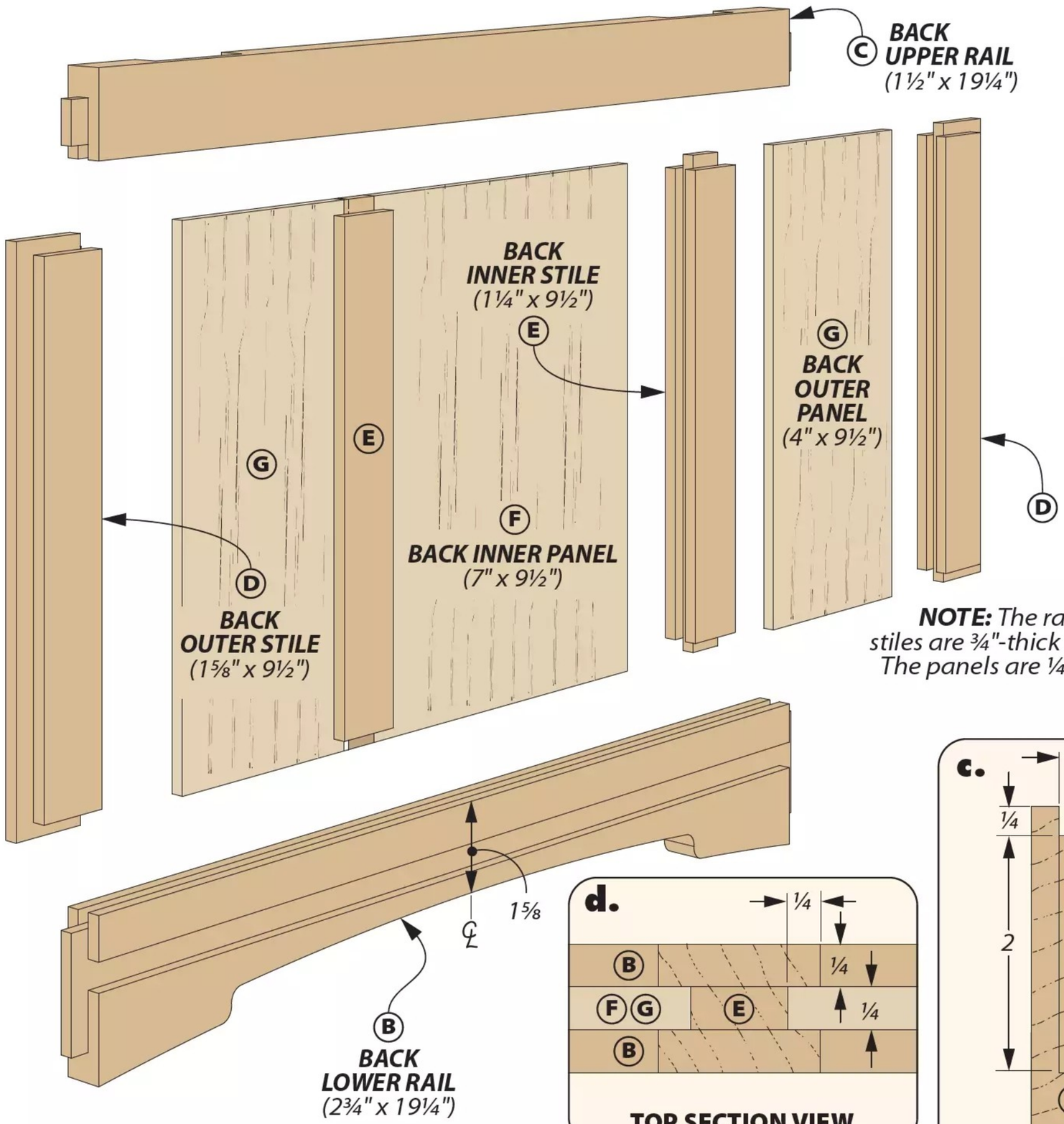
Double-Stopped Groove. Mark out the start line, the leading edge of the bit, and the finish line. Pivot the leg down at the start and push it through to the finish line.



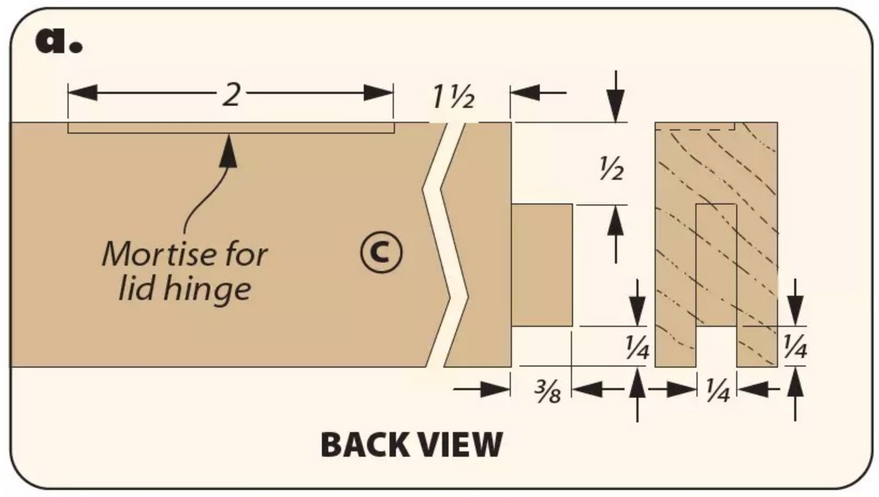
Squaring Corners. Pare the corners of the grooves with a chisel. Cut across the grain first to sever the wood fibers.

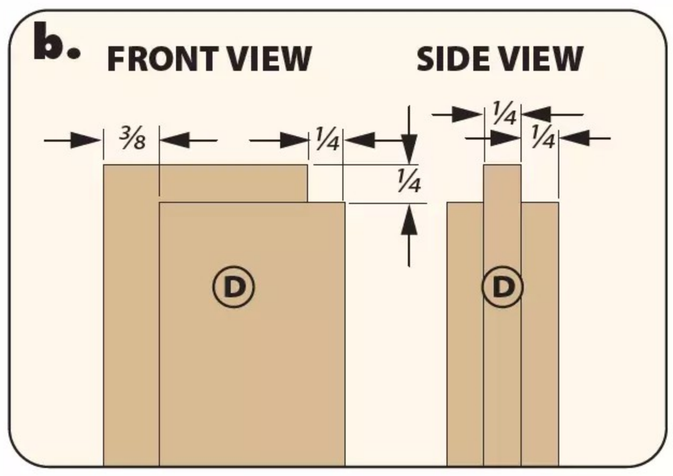


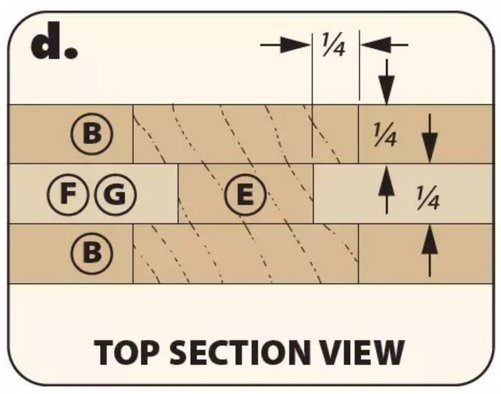
Dado Routing. With the miter gauge set to the taper, cut through the waste until you reach the side of the groove.

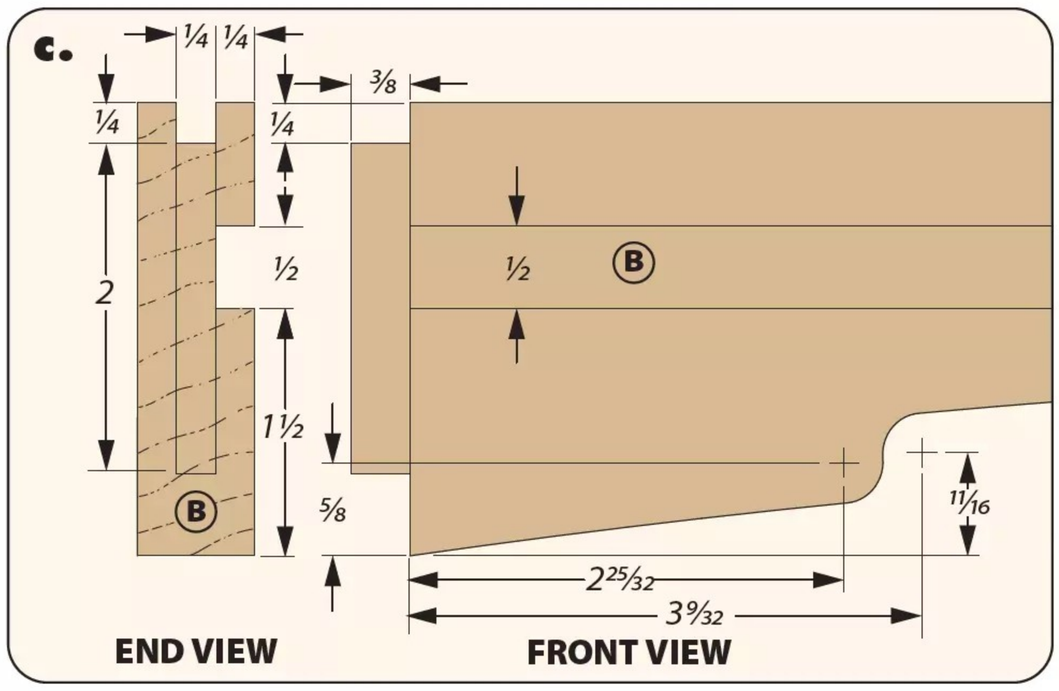


NOTE: *The rails and stiles are ¾"-thick hardwood. The panels are ¼" plywood*







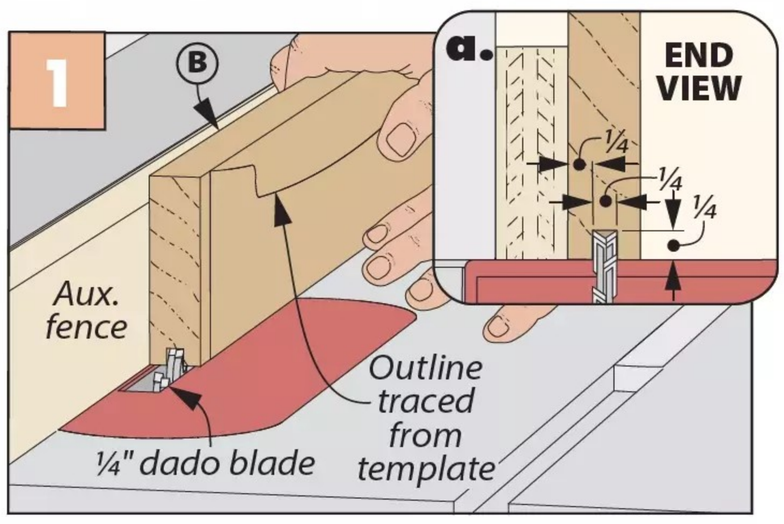


Paneled FRAMES

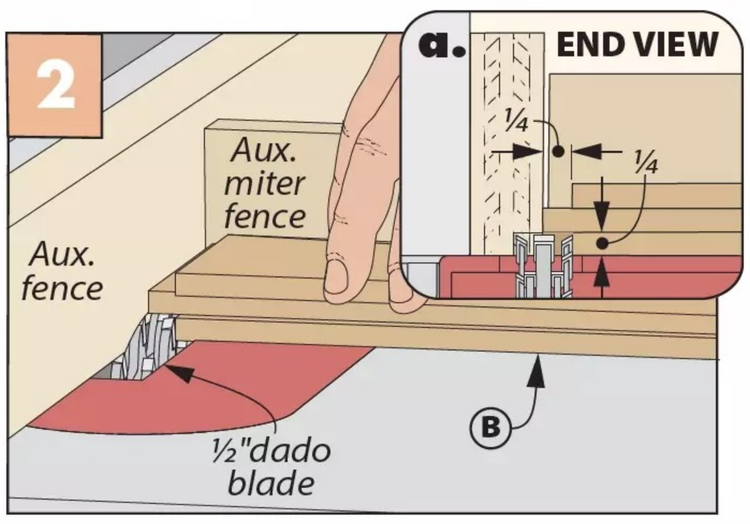
The back and front of this chest are multi-panel assemblies, with two narrower panels at the sides and a wider one in the middle. In addition to the typical rails and stiles of a framed assembly, this also necessitates a pair of inner stiles. I prefer to work outside-in, which meant the rails came first.

RAIL JOINERY. With one key exception (which we'll address later), the front and back panels are identical, so I created each set of parts at the same time. I started by sizing out the two pairs of rails, then moved on to the joinery. Each of these rails has a centered groove on its inner

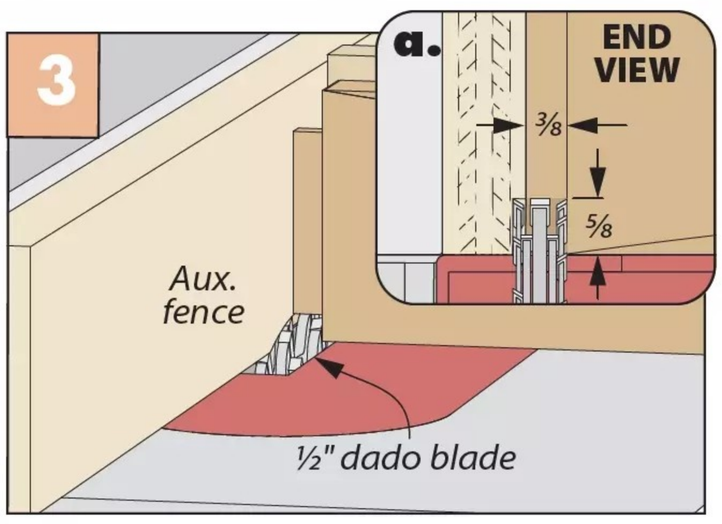
CREATING THE LOWER RAIL



Panel Groove. Cut grooves for the panels down the interior edges of the rails using a dado blade at the table saw.



Form the Tenons. To cut the tenons, bury a dado blade in an auxiliary fence and make rabbet cuts on either cheek.



Shoulders. Follow the same procedure to cut the shoulders of the tenons on the top and bottom.

edge to accept the panels and stile tenons. You can see how I cut these in Figure 1 on the previous page.

The rails also have tenoned ends, which contribute to the panel assemblies' tongues. Cut the cheeks first, as in Figure 2 on the previous page, followed by the shoulders (Figure 3).

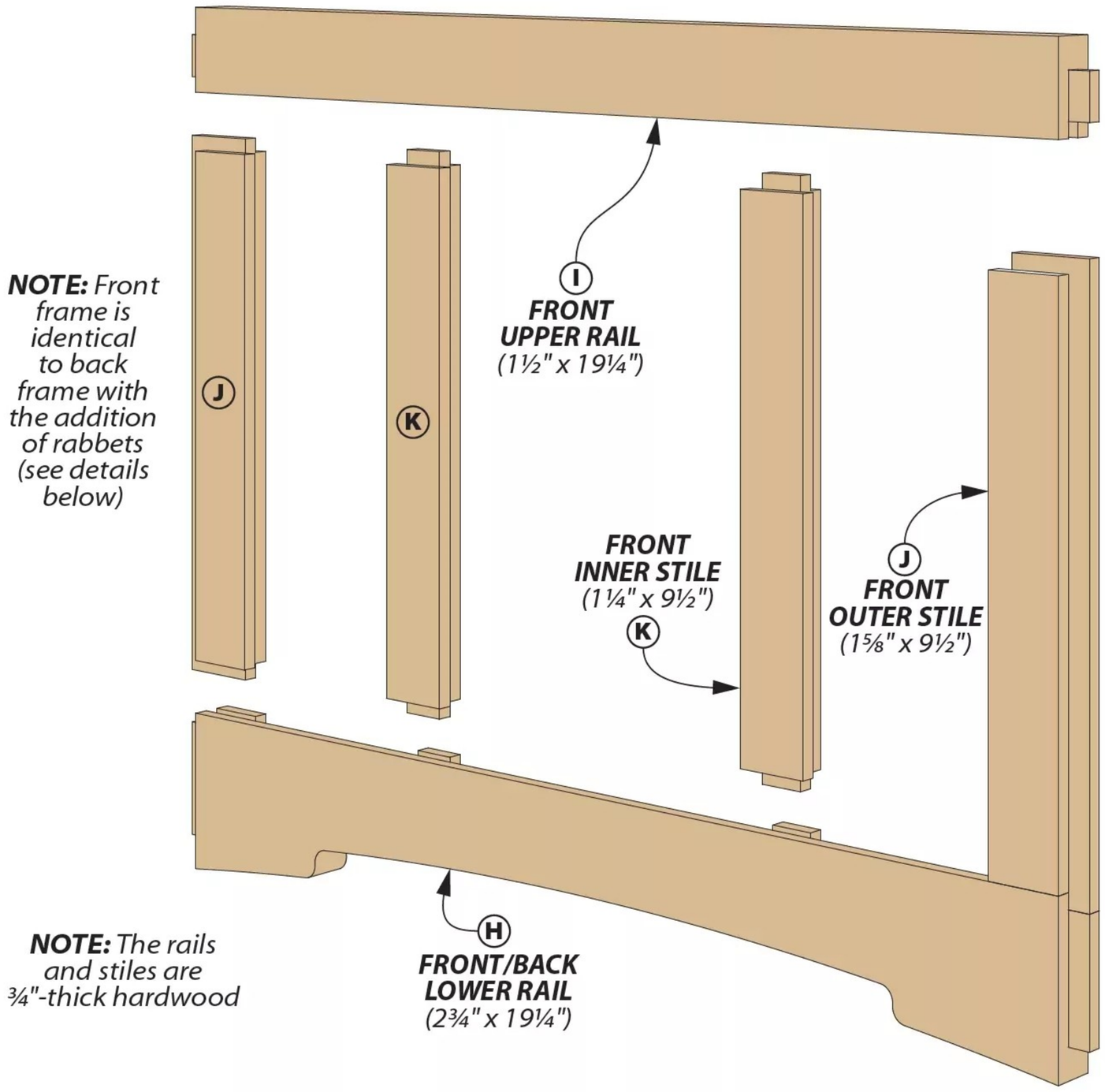
LOWER RAILS. As you can see in detail 'c' on the previous page and detail 'b' at right, the bottoms of each lower rail has a decorative cutout. As with the legs before, I first shaped a hardboard template. This guided the rough shaping at the band saw and registered the bearing as I finished the edges with a flush-trim bit. I finished these rails up by cutting the grooves for the bottom panel (Figure 1).

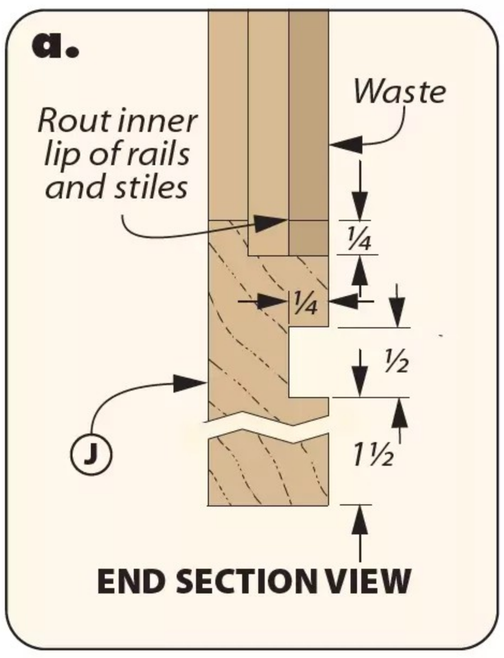
UPPER RAIL MORTISES. The upper rail on the back has two mortises for the butt hinges which attach the lid (detail 'a'). After laying these out, I routed the waste with a straight bit, then pared the corners with a chisel.

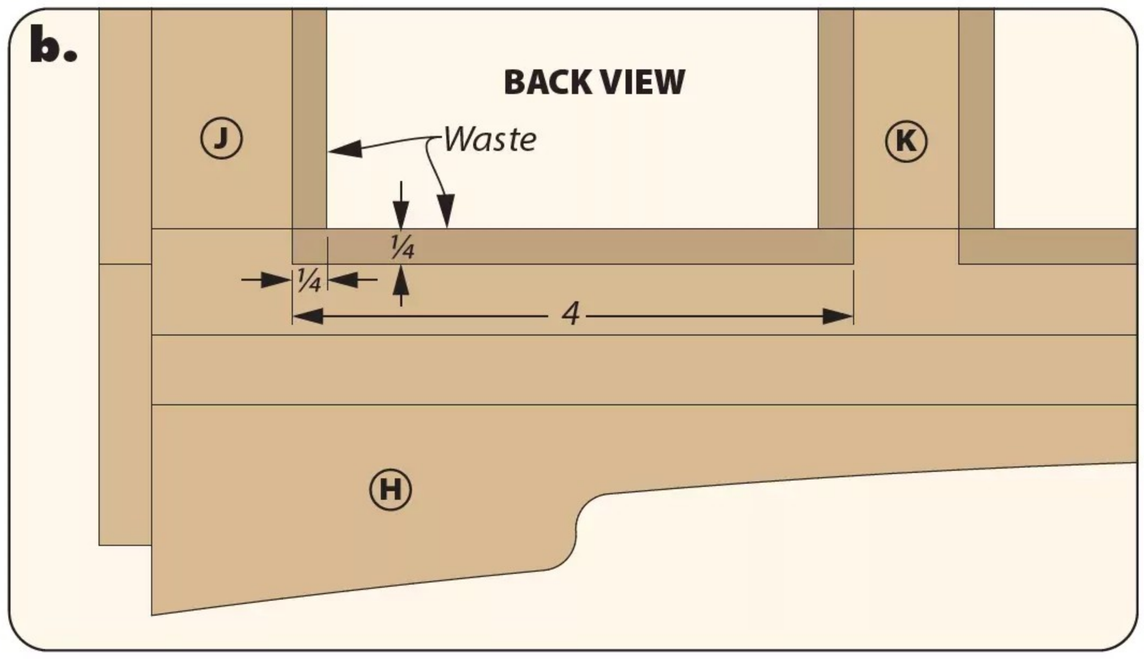
STILES. The stiles are largely a review of the work done on the rails. Grooves come first, with one on the interior edge of the outer stiles and both edges of the inner stiles. I followed this up by creating the tenoned ends. The outer stiles also require a rabbet on their outer edges, which form the tongues to join the assembly with the legs.

FRAME ASSEMBLY. The two frames can now be glued up. For the back, you'll need to cut out the plywood panels as shown on the previous page. The front will house the carved panels, which will be added in later.

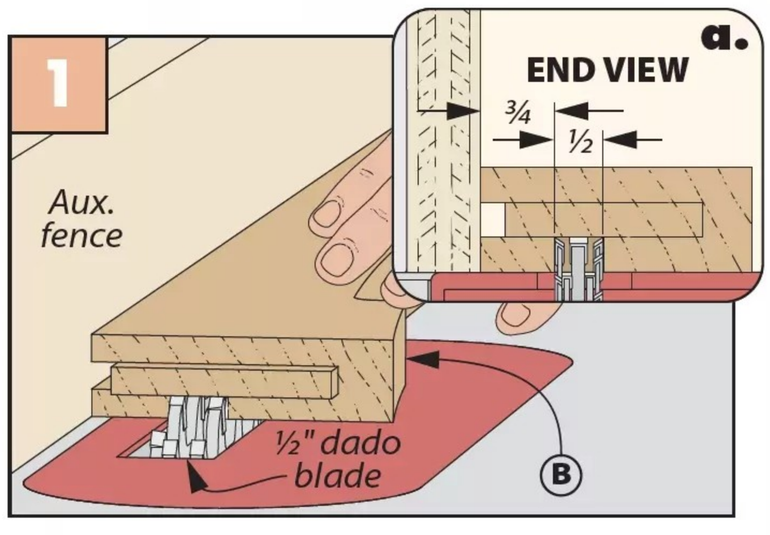
Once the clamps come off, you'll finish up the front panel by routing rabbets around the inside edges of the openings (Figure 2). This allows the carved panels to be inserted from behind. Once that's done, the front and back are complete.



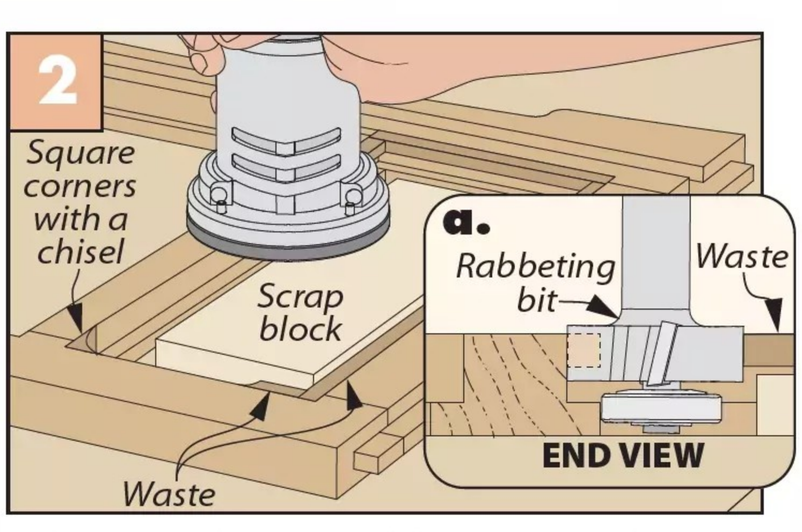




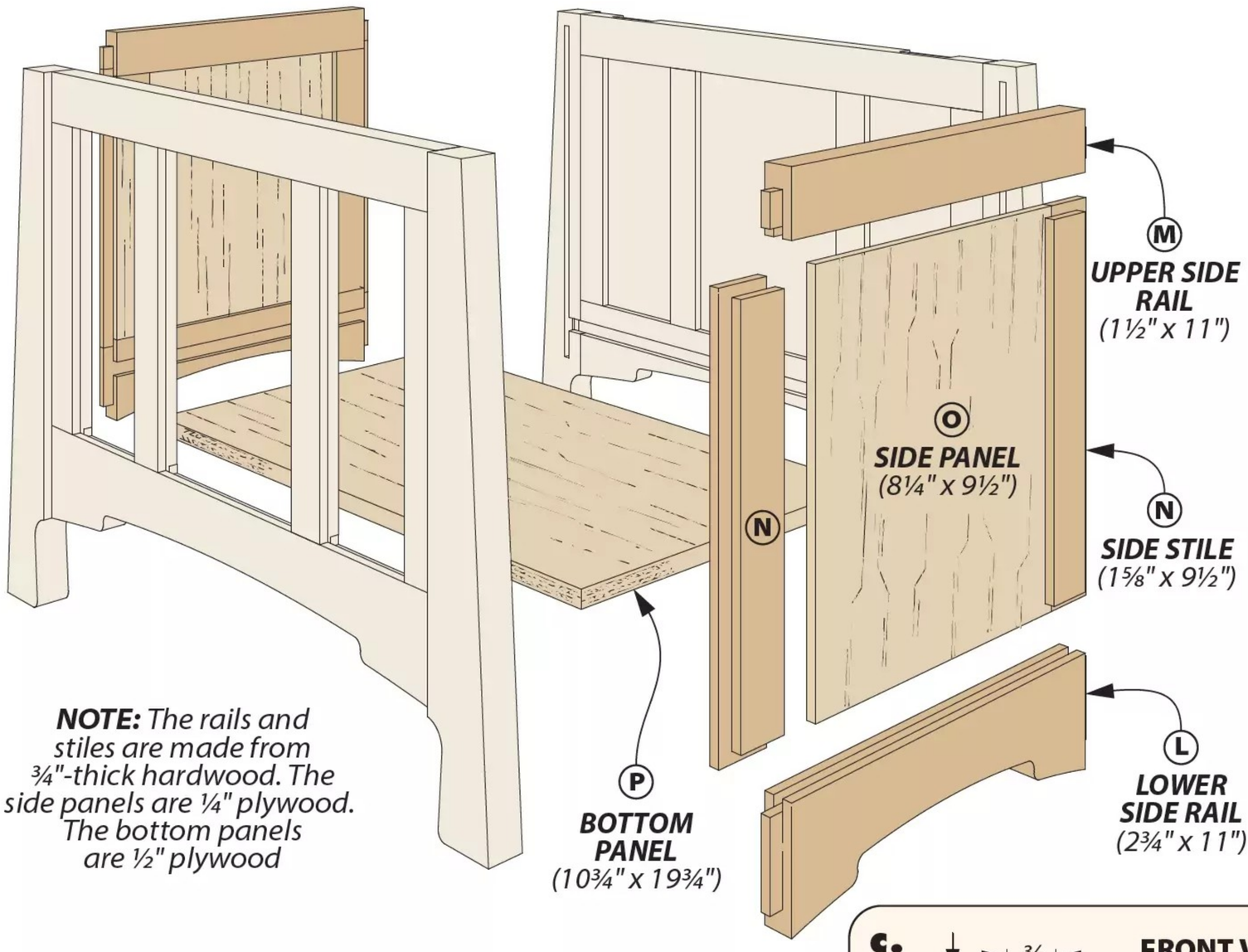
GROOVES & RABBETS



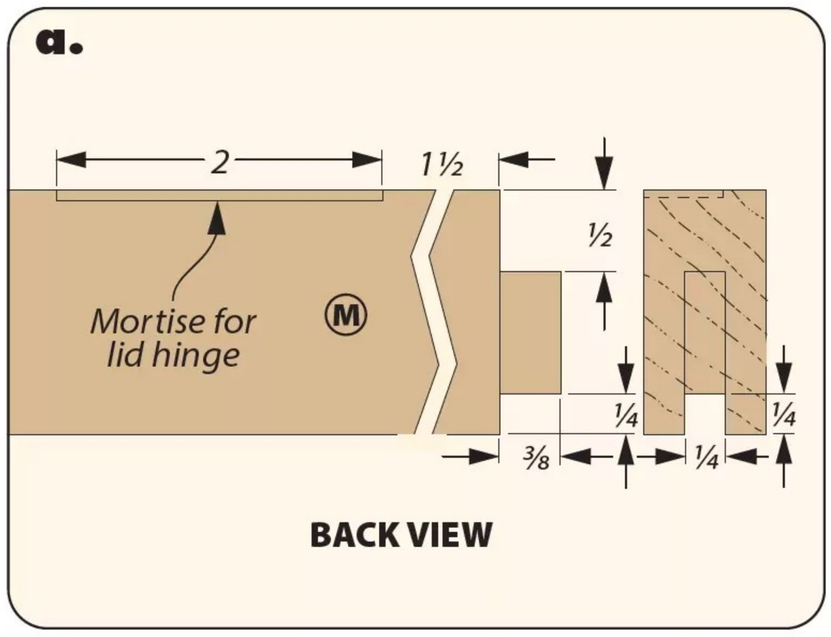
Bottom Panel Groove. To accept the bottom panel later on, cut grooves in the interior faces of the lower rails.

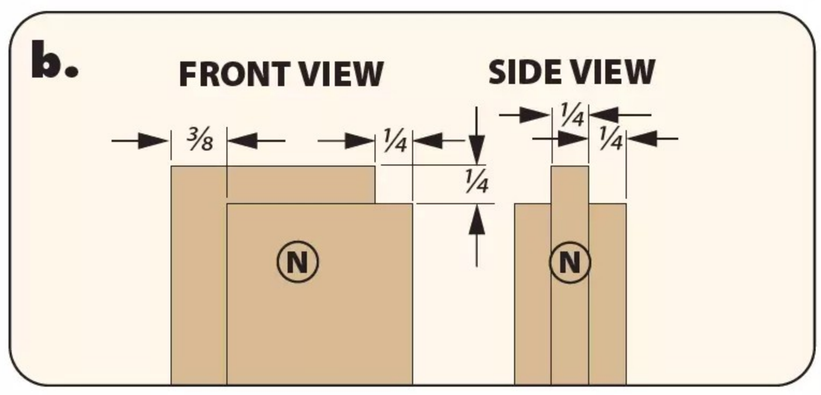


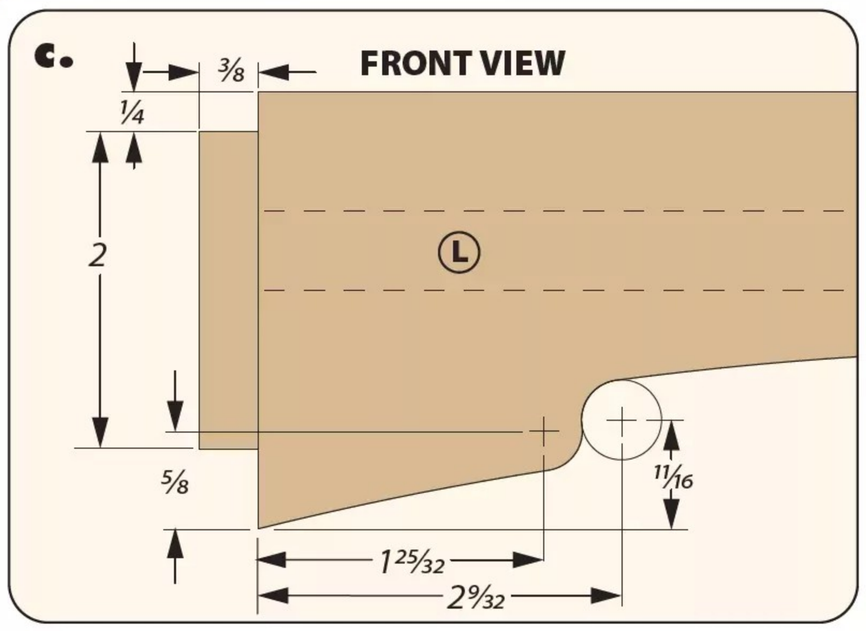
Rabbets Within. Finish the front frame by routing a rabbet along the inner edges of the openings for the carved panels.

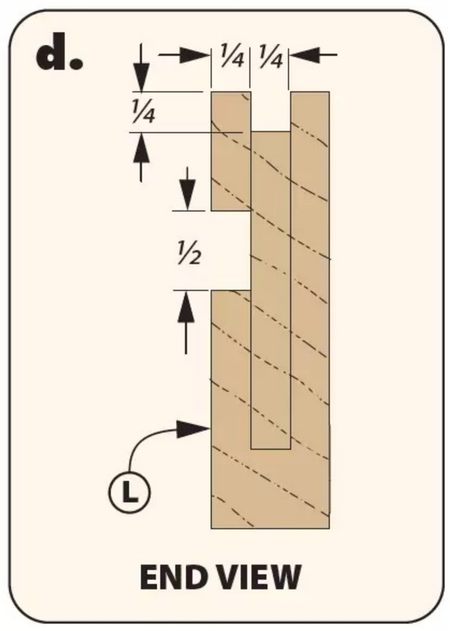


NOTE: *The rails and stiles are made from ¾"-thick hardwood. The side panels are ¼" plywood. The bottom panels are ½" plywood*









Connecting the CASE

The side frames you see above join with the legs to connect the parts we've made previously. These are simplified renditions of the front and back frames, eschewing the inner stiles.

When making the joinery on these parts, you can refer to the illustrations on the previous two pages. The rails here are quite similar to those on the front and back, just shorter, whereas the stiles are exact copies of the outer stiles you just created.

JOINERY. I began by sizing the rails and stiles, then attending to the grooves for the side panels. As before, I cut these using a dado blade at the table saw. The rabbets came afterward, forming the cheeks on the tenons, then cutting the shoulders on the edges of these workpieces. Finally, I finished up the stiles by adding the long rabbets to create the outer tongues.

LOWER RAILS. Now all that's left here is a little work on the lower rails. I made these as I did on the front and back (band saw, then spindle sander). However these are slightly compressed relative to the previous rails, so refer to detail 'c' above for the dimensions. Lastly, finish these rails by cutting the groove for the bottom panel (detail 'd').

TWO ASSEMBLIES. With these frame parts made, you're nearly ready to put this chest together.

Materials & Supplies

A	Legs (4)	1 x 2¼ - 16	**J**	Front Outer Stiles (2)	¾ x 1⅝ - 9½	**S**	Panel Retainer (1)	¼ ply. - 10½ x 17½
B	Back Lower Rail (1)	¾ x 2¾ - 19¼	**K**	Front Inner Stiles (2)	¾ x 1¼ - 9½	**T**	Lid (1)	1 - 13¾ x 24
C	Back Upper Rail (1)	¾ x 1½ - 19¼	**L**	Side Lower Rails (2)	¾ x 2¾ - 11			
D	Back Outer Stiles (2)	¾ x 1⅝ - 9½	**M**	Side Upper Rails (2)	¾ x 1½ - 11	•	(10) #6 x ¾" Fh Woodscrews	
E	Back Inner Stiles (2)	¾ x 1¼ - 9½	**N**	Side Stiles (4)	¾ x 1⅝ - 9½	•	(1 pair) 2" Brass Butt Hinges	
F	Back Inner Panel (1)	¼ ply. - 7 x 9½	**O**	Side Panels (2)	¼ ply. - 8¼ x 9½	•	(16) #4 x ½" Fh Woodscrews	
G	Back Outer Panels (2)	¼ ply. - 4 x 9½	**P**	Bottom Panel (1)	½ ply. - 10¾ x 19¾	•	(1) Standard Lid Stay	
H	Front Lower Rail (1)	¾ x 2¾ - 19¼	**Q**	Large Carved Panel (1)	½ x 7 - 9½			
I	Front Upper Rail (1)	¾ x 1½ - 19¼	**R**	Small Carved Panels (2)	½ x 4 - 9½			

After cutting the side panels to size, glue up the rails and stiles around them. Once they're cured, dry fit the four paneled assemblies together with the legs to determine the exact size of your bottom panel. Once it's cut, you can glue the tongues of the panel assemblies into their leg grooves, with the bottom panel held inside.

CARVED PANELS & LID

You can see the final elements of this chest in the illustrations at right. Of course, this includes our carved panels, but it also entails a retainer panel that will secure them from behind and the lid to enclose the chest.

CARVED PANELS. Here is where a great deal is left up to you as the builder. Chris carved these, and instead of white oak he chose to go with poplar. It's a tight, even-grained wood, making it clean to rout and predictable to carve. However, most classic hardwoods are also suitable choices. Avoid woods that are too hard though, like maple or hickory, as those can be difficult to carve, as well as woods that are on the softer side, like basswood. While it's a pleasant wood to carve with, Chris's method is to rout out most of the waste, and basswood will likely end up fuzzy or torn out.

Additionally, while Chris carved poppy flowers, feel free to follow another design if that's what calls to you — let your creativity be your guide. Whatever your choice, you can cut the retainer to size now and have it at the ready. This is a simple piece of plywood which screws into the rails and stiles, supporting the panels from behind.

LID & HARDWARE. Capping off this chest is the lid. After sizing it, I cut the bevels along the edges of the lid that give it a lifted look. I made these at the table saw, using a tenoning jig to support the workpiece and tilting the blade (as in detail 'c'). I then cut the hinge mortises to match those in the back upper rail.

Finally, attach the lid by the hinges. A lid stay keeps it from falling down or flopping back. With a bit of finish, and perhaps some paint on the carved panels, this chest is done. W

► These front panels feature a set of carved poppies. While any design you choose will work, you can find how Chris carved these on page 18.

Routing Finger Joints

▲ Pattern bits in several lengths and diameters increase the jig's versatility.

If there's one router jig that I hope you build, it's this one. This one is the easiest to use, simplest to set up, and consistent in its results. I've used this on all kinds of boxes and clocks. I've taught it for a class and everyone who's made one feels the same way.

It's genius in its simplicity. One part of the joint is routed on one side of the jig. The mating "negative" part of the joint is cut from the other side. No adjustments are necessary between each step.

JIG COMPONENTS. A thick plywood beam makes up the structure of the jig. The beam rests on a base that extends out the ends so that you can clamp it to a surface. A stop on one end provides registration of the workpiece.

A replaceable hardboard backer faces each side of the beam to prevent tearout. A T-track in the top of the jig accepts keys that are "key" for creating the finger joints. The keys can be made from plywood or hardwood. And their size doesn't matter. The keys are held with short screws and square nuts. Keep an Allen wrench close by.

JOINT GEOMETRY. The arrangement of the keys determines the look of the joints. The length of the keys is important. A pattern bit traces around the keys. The bearing stops against the butt end of the opposing key to avoid routing into the jig's beam.

Here's the genius. Each key is responsible for the shape of each side of the joint, this is why the width

▲ The plans suggest a few sizes for keys. But you feel free to make a set in any size a project requires. I keep a box full of extra keys, screws, and nuts.

Written by: Phil Huber

of the keys doesn't matter. You can make irregular and variable spaced fingers. If you can follow a template, you can make eye-catching finger joints.

SETUP

This leads right into the setup of the jig. Come up with the arrangement of keys you'd like for the project, then slide them onto the T-track. The first one tucks in snug against the stop. Tighten it down. Repeat, alternating the direction of the keys. Make sure the keys are snug (not jammed) before cinching them down, as shown in the photo at right. At the end, slide one last key on the jig. The size doesn't matter. Though I would choose a wide-ish key. Its role is to provide support for the router at the end of the joint.

WORKPIECES

Arrange the project parts how you want them to be. The width of the parts should match or be a hair wider than the arrangement of the keys. I use a triangle to mark the top/front edge of all my parts.

Draw or scribe a baseline for the finger joints around the ends of the pieces. You can aim for a flush fit or create fingers that protrude at the corners. I use the bottom/back edge of the parts as my reference edge. This means the parts will be aligned and flush when assembled. So when you clamp the parts into the jig, the triangles will be on the outside.

Narrow parts can be held with a single clamp. Wider parts with two. There you go. The jig is set up for the first cuts.

BITS

The pattern bit needs to be set for two conditions: first, the end of the bit is even with the baseline (matches the thickness of the parts — for a flush joint). The second condition is that the bearing on the bit engages with the keys and the cutting edge will cut all along the joint surfaces.

Depending on the thickness of the parts you work with, this may mean you need to get pattern bits with shorter cutting edges. I keep a few sizes of pattern bits to accommodate a variety of thicknesses, as shown on the previous page.

ROUTING

Let's fire up the router and make a corner. Work from left to right. Make a light skim cut across the face of the piece before you dive into the cut. This prevents tearout. Trace along each of the keys. Be sure that the bearing contacts the end of the key at the back.

After routing one end, flip the piece end for end. Remember to keep the same edge against the stop. Repeat the routing for all the similar parts.

OPPOSITE SIDE. Turn the jig around. Again, clamp the adjacent workpiece in the jig, with the reference edge against the stop. The routing is the same but the pattern is reversed. When you're done, you can test fit the parts. Yup, they fit.

EXTRA BACKERS. The hardboard gets cut up with each key pattern. Flip the backers around to find a clean edge. Then make a few extras to keep on hand.

I'm a tinkerer, so I'd understand anyone that wants to make changes to the jig. There isn't much that could be improved in my opinion. But here are a couple options:

First, the plans indicate a few key sizes. They're fine, but the nature of the jig means you can make new ones whenever you want and to suit the project at hand.

The second is you could make the jig wider to accommodate larger case pieces. This makes it more unwieldy, but if that's your jam, go for it. W

▲ Slide each key into place. The first one should be snug against the end stop. Tighten each one sequentially with an Allen wrench. There's no need to squeeze them tight.

▲ Scan this QR code with your phone's camera to get the plans for the jig.

▲ To rout the mating portion of the finger joints, all you need to do is turn the jig (and the beat) around. The orientation of the keys forms the pattern for the bit. Be sure to keep the reference edge against the end stop.

▲ The fingers fit snug right from the jig. No fussing required.

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:

Amazon
amazon.com

Grizzly
800-523-4777
grizzly.com

Horton Brasses
860-635-4400
horton-brasses.com

IndiePubs
indiepubs.com

Lee Valley
800-871-8158
leevalley.com

Lowes
lowes.com

Wayfair
844-626-3707
wayfair.com

Wood Carvers Supply
800-284-6229
woodcarverssupply.com

Woodcraft
800-535-4486
woodcraft.com

Woodpeckers
800-752-0725
woodpeck.com

TIPS & TECHNIQUES *(p.6)*

- **Amazon**
  Plastic Flasks B07TGKLKJX

BOOK REVIEW *(p.14)*

Whittling Wildlife by Peter Benson can be purchased from many book retailers, but *IndiePubs.com* is offering *Woodsmith* readers a discount until June 30th, 2026 using the code IPP4037 on their website.

CARVING *(p.18)*

Here are the *Flexcut* carving tools Chris used to make the panels for the chest.

- **Woodcraft**
  #3 x ½" Gouge 184616
  #9 x ½" Gouge 184610
  V-Tool 184603
  Carving Knife 166936
- **Wood Carvers Supply**
  Punch Set 434425

GREAT GEAR *(p.22)*

The sawblades and layout tools can be found on the companies' websites at the SKUs listed below. The three items from *Woodpeckers* are sets, but they can also be purchased individually.

- **Grizzly**
  10" Pro Rip Blade. T34537
  10" Pro Cross Cut Blade T34546
  10" Pro Combo Blade . . . T34545
  10" Extreme Rip Blade. . T34549
  10" Extreme Cross Cut . T34553
  10" Extreme Combo T34550
- **Woodpeckers**
  Groover Set USFTGSET-3PC
  Dado Set USDADO8-FT-2
  In-Dexable Tools . . . . . I-SDK-I

TOOL CABINET *(p.28)*

Quartersawn white oak and the Craftsman style go together like Batman and Robin. But it isn't your only material choice. The key is to select a material that doesn't have a strong or distracting grain pattern. Straight lines and muted variation are what you're looking for. Rift or quartersawn red oak, beech, and butternut are other options. A coat of tung oil brings out the warm color of the oak before applying a couple coats of spray satin lacquer.

- **Amazon**
  33mm Knob B002HTMS70
  96mm Cup Pulls . . B07F1HKP1H
  Ball-Tip Hinges . CH2015U3-UNL
  Magnetic Catch . B08X3G7DWH

WARDROBE *(p.36)*

The wardrobe was finished in our usual finish: several coats of satin precatalyzed lacquer. Any clear coat of your choice works. My only hesitation would be an oil finish on the inside as the fumes tend to linger for a long time. The drawer fronts and the edges of the doors were painted with *Inifinity's* "Swiss Coffee" in flat from Lowes.

- **Lee Valley**
  Magnet Cups 99K3275
  Magnets 99K3904
  Drawer Slides 02K4218
  Soft-Close Hinges 00B1803
  Marble Knobs 00W4014
  Recess Pulls 00W3003
- **Wayfair**
  Closet Rod W100221847
  Tie & Belt Rack CLOP1097

SPICE CABINET *(p.44)*

No hardware is needed to construct the spice box (unless you count the dowels). As for finish, we chose to go with something subtle. We used a tung oil varnish that lightly accentuated the figure of the pine while also giving it a film-finish for a little protection since it'll live in the kitchen.

VANITY *(p.50)*

Unfortunately, just prior to our press date, the pulls we used on this cabinet were discontinued. Clear satin precatalyzed lacquer is the finish used on the vanity. It's tough enough to stand up to daily use.

- **Lee Valley**
  Soft-Close Hinges 00B1803
- **Wayfair**
  Vessel Sink FINF1067
  Faucet UINE1149

CARVED PANEL CHEST *(p.56)*

The white oak of the carved panel chest looks gorgeous with just a bit of shine from a few coats of lacquer. The carved panels themselves were painted, but that's not strictly necessary — there's something to be said about the look of tooled wood on its own, perhaps with just a bit of oil or lacquer on it.

- **Horton Brasses**
  2" Brass Butt Hinge PB-407
- **Lee Valley**
  Standard Lid Stay 00T0710

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1/4" Shank / *3/4" boards*....~~MSRP $48.89~~ $39.99

V-Groove Profile Bits cut a V-shaped recess with a smooth radius at the apex.

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1/4" Shank / *1" boards*....~~MSRP $52.77~~ $46.99
1/4" Shank / *3/4" boards*....~~MSRP $45.62~~ $39.99

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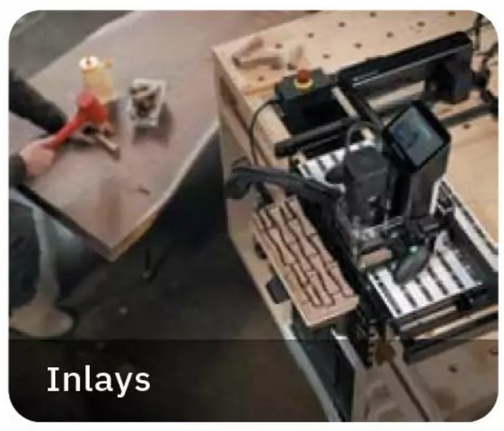
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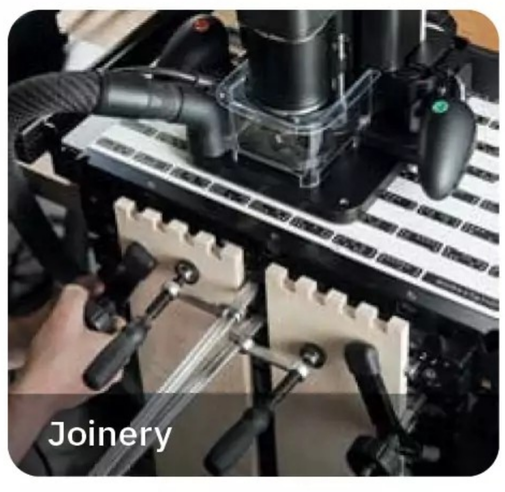
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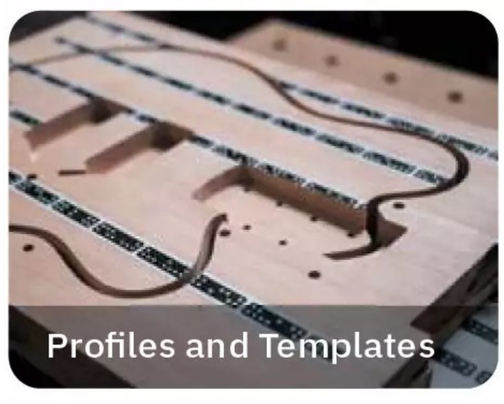
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