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from the editor

Sawdust

No doubt you've heard the term "bucket list" before. I think a lot of woodworkers also tend to have woodworking bucket lists — projects or techniques that we'd like to try at least once, so that we can say we've done them. Well, this issue of *Woodsmith* contains not just one, but two projects that have techniques that happen to be on my woodworking bucket list.

The first is a chisel case that features a sliding tambour lid. My fascination with tambours goes all the way back to my childhood. Growing up, we had a roll-top desk in our house. I used to love playing with that desk, opening and closing the top (until my mother would tell me to stop). As a result, I've always been intrigued with tambour doors and lids and how they work, and I've always had it in the back of my mind that someday I would build a project with a tambour.

Another woodworking element that has interested me for a long time is wood hinges. So on page 18, we have a small wall cabinet with doors that feature full-length wood hinges. The technique we came up with to make the hinges is different than what you might expect. I think you'll find it fun to try, whether you decide to build this project or one of a different design.

Both of these projects have something in common — they're relatively small and uncomplicated. The benefit here is that you get the opportunity to try your hand at a couple of techniques that may be new to you without having to invest a lot in the way of time or materials. In other words, you can tick a couple of items off of your woodworking bucket list in short order.

FAREWELL. Speaking of bucket lists, Dana Myers, our Shop Craftsman for the past four years, has decided to retire in order to travel and spend more time with his family. Dana built many of the projects you've seen in *Woodsmith* in recent years and has been a great source of woodworking information and advice for our design and editorial staff. We're sorry to see him go, but we all wish him the best in his retirement.

Vince

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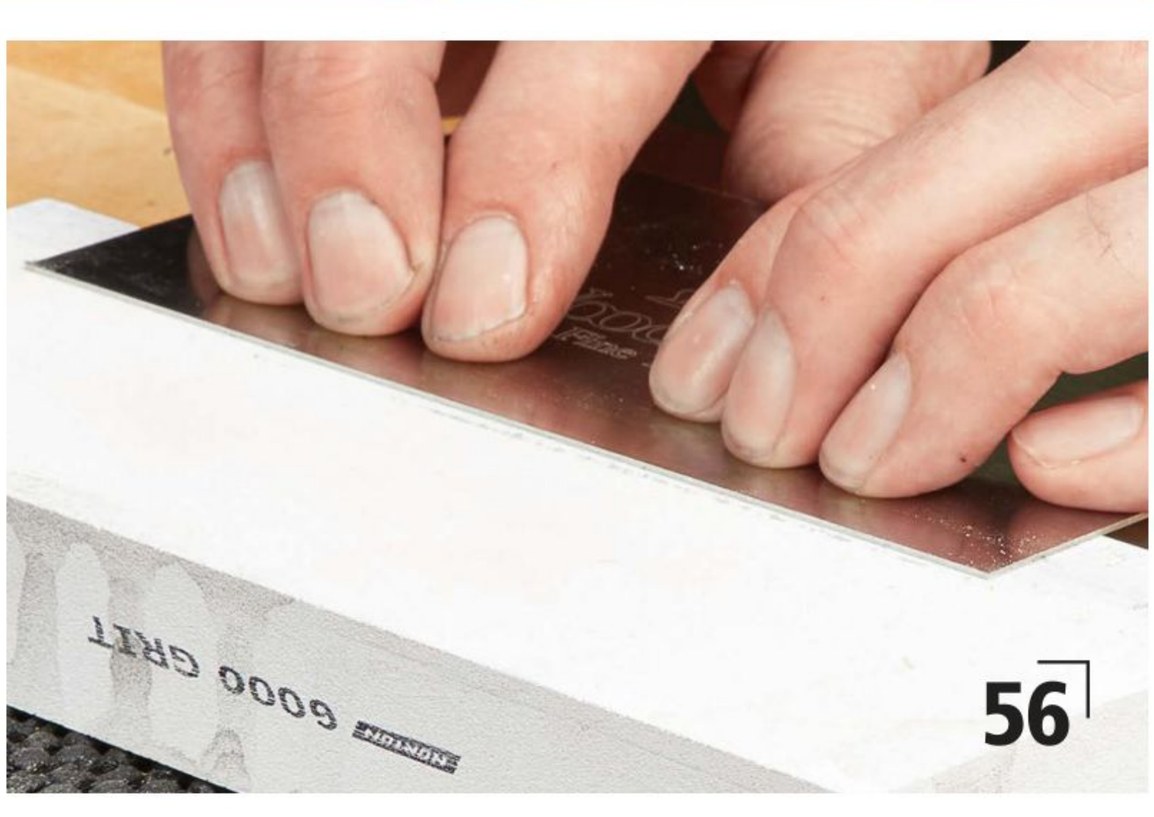
Projects



Departments

from our readers

Tips & Techniques

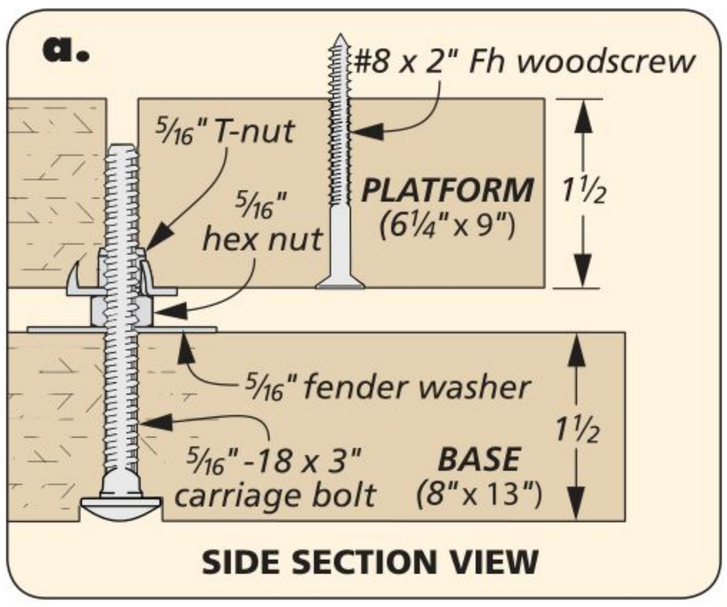
Spray Turntable

Recently, after building a bunch of gifts from a *Woodsmith* plan, I was looking for a way to quickly and efficiently finish them. That's when I came up with the idea for the simple finishing turntable you see here.

ROUND AND ROUND. The turntable is made up of a base and a platform, both made from two layers of plywood. A carriage bolt passes through a counterbored hole in the base and is held in place with a hex nut and a washer. The smaller platform rotates on a T-nut installed in the bottom face. I drove long screws through the platform to act as painter's points to raise the workpiece. The platform can then be threaded onto the bolt.

COUNTERCLOCKWISE AND BACK. To use the turntable, I place my workpiece on the screws and apply my finish. Rotate the platform counterclockwise on the bolt to finish all sides. For the second coat, I spin the platform clockwise to re-thread the bolt so the platform doesn't back off the threads.

Dave Brooks
Pleasant View, Utah



▲ The platform threads onto the bolt installed in the base. Changing rotation each coat prevents it from backing off.

Win This Forrest Blade

Simply send us your favorite shop tips. If your tip or technique is selected as the featured reader's tip, you'll win a *Forrest Woodworker II* blade. To submit your tip or technique, go to *SubmitWoodsmithTips.com*. There you can upload your tips and photos for consideration.

The Winner!

Congratulations to Dave Brooks, the winner of this *Forrest Woodworker II*. To find out how you can win this blade, check out the information at left.

Illustrator: Becky Kralicek

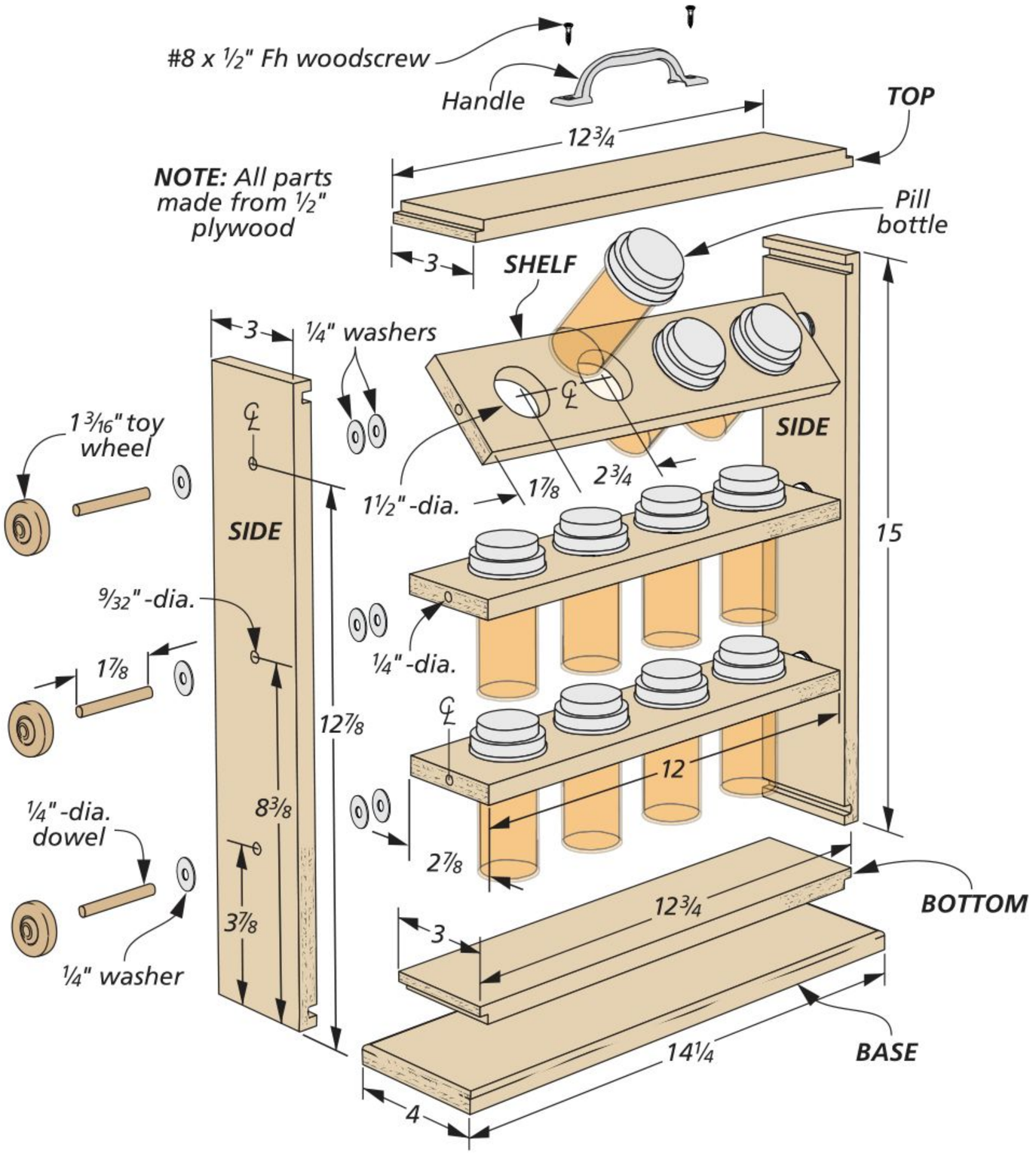
Tilt-Out Hardware Holder

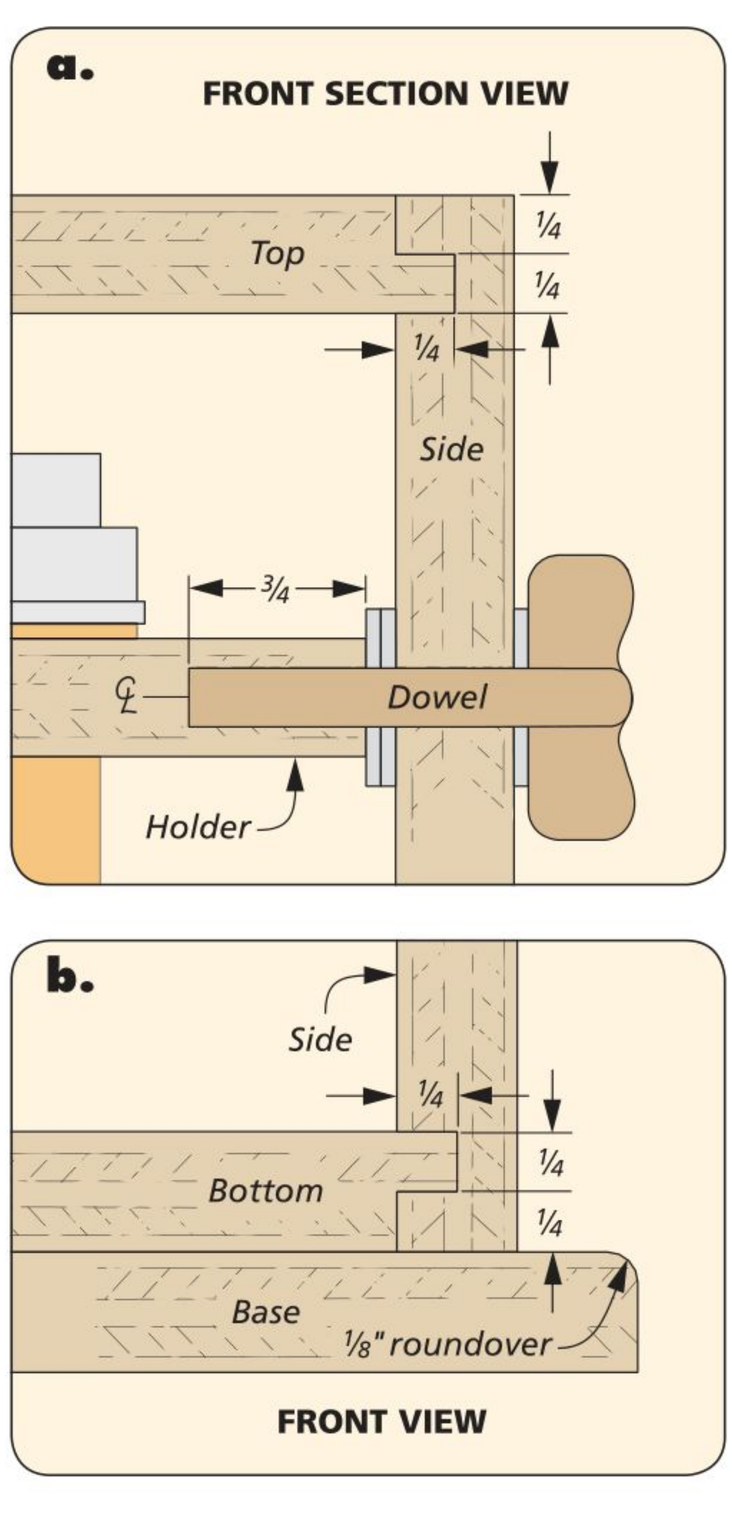
When I buy a box of hardware, I tend to have a lot of leftover pieces. One day, while taking some prescription medication, a thought struck me about how to store all the extra hardware. That's when I came up with the simple setup that you see here.

PILL HOLDER. The small parts holder consists of a plywood frame and three pivoting shelves. Each shelf has four holes to accept standard size pill bottles. The shelves pivot with the use of dowel pins and toy wheels on the outside of the frame. The dowel is glued into the shelf but not into the frame. The plywood frame is attached to a wider base for stability and has a handle on top to easily move the holder around my shop.

When I'm done with a prescription medicine, I save the bottle and dump my hardware in. I can pivot a shelf to insert the bottle, as seen in the photo. When not in use, I can store the holder in an out-of-the-way location.

Mark Cahill
Auburn, New York





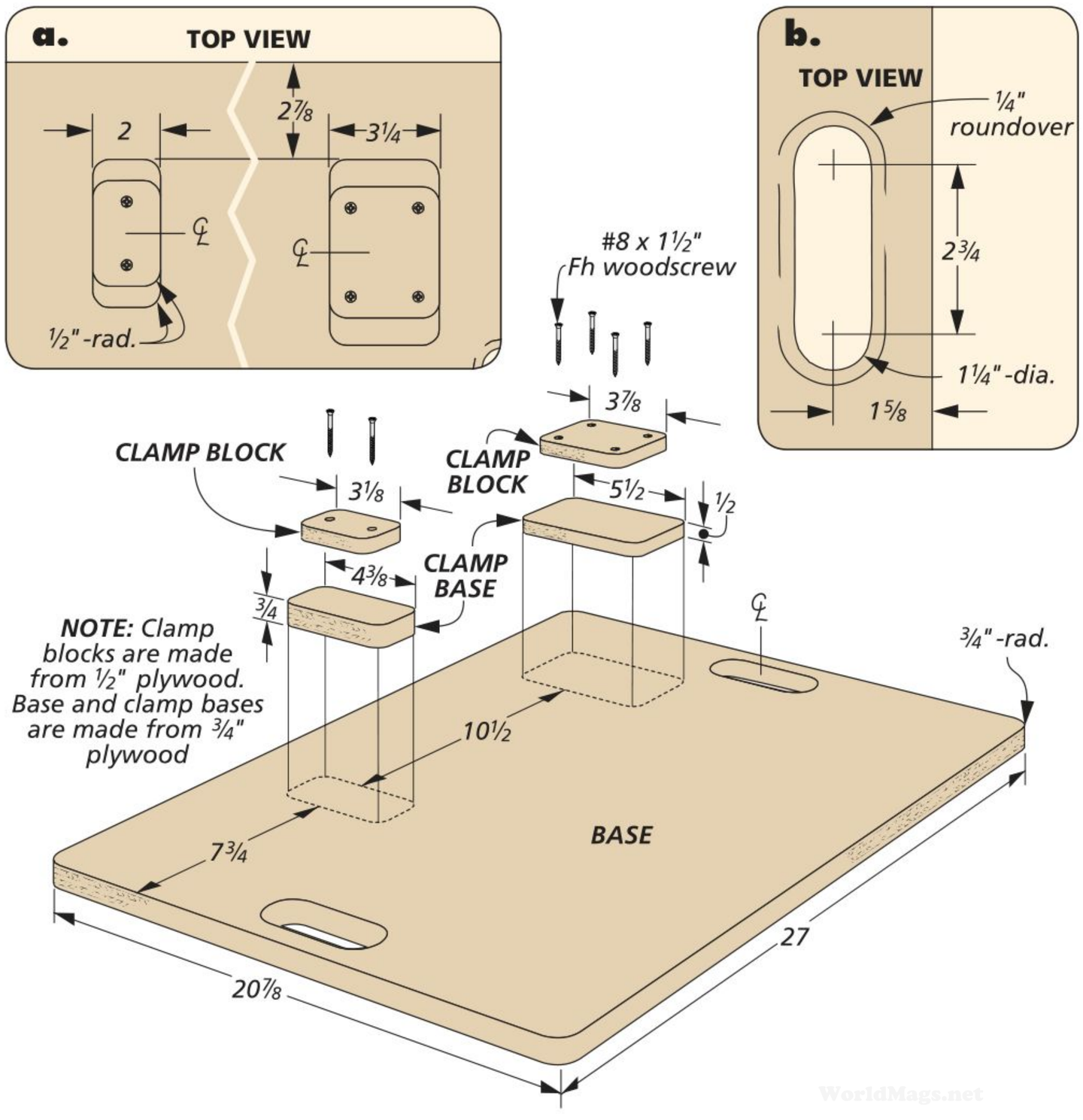
▲ The plywood base is wide enough that it can be used without clamping it to the workbench, or can be set on sawhorses.

Kreg Jig & Clamp Base

I recently built the Table Saw Storage Cart from *Woodsmith* No. 233. I decided to replace one of the pegboard frames with a plywood base for my *Kreg Jig*.

By cutting a couple of hand holes in a piece of plywood, the workstation slides in and out easily. I even had room on the panel to add some blocks to hold my assembly clamps. Because I have a *K5* system, the *Kreg* base stores the drill bit and accessories. This means that when I need to transport my jig, I can simply carry the jig base wherever I need to use it.

Ron Diermeier
Neenah, Wisconsin



DIGITAL WOODSMITH

SUBMIT TIPS ONLINE

If you have an original shop tip, we would like to hear from you and consider publishing your tip in one or more of our publications. Jump online and go to:

SubmitWoodsmithTips.com

You'll be able to tell us all about your tip and upload your photos and drawings. You can also mail your tips to "Woodsmith Tips" at the editorial address shown on page 2. We will pay up to $200 if we publish your tip.

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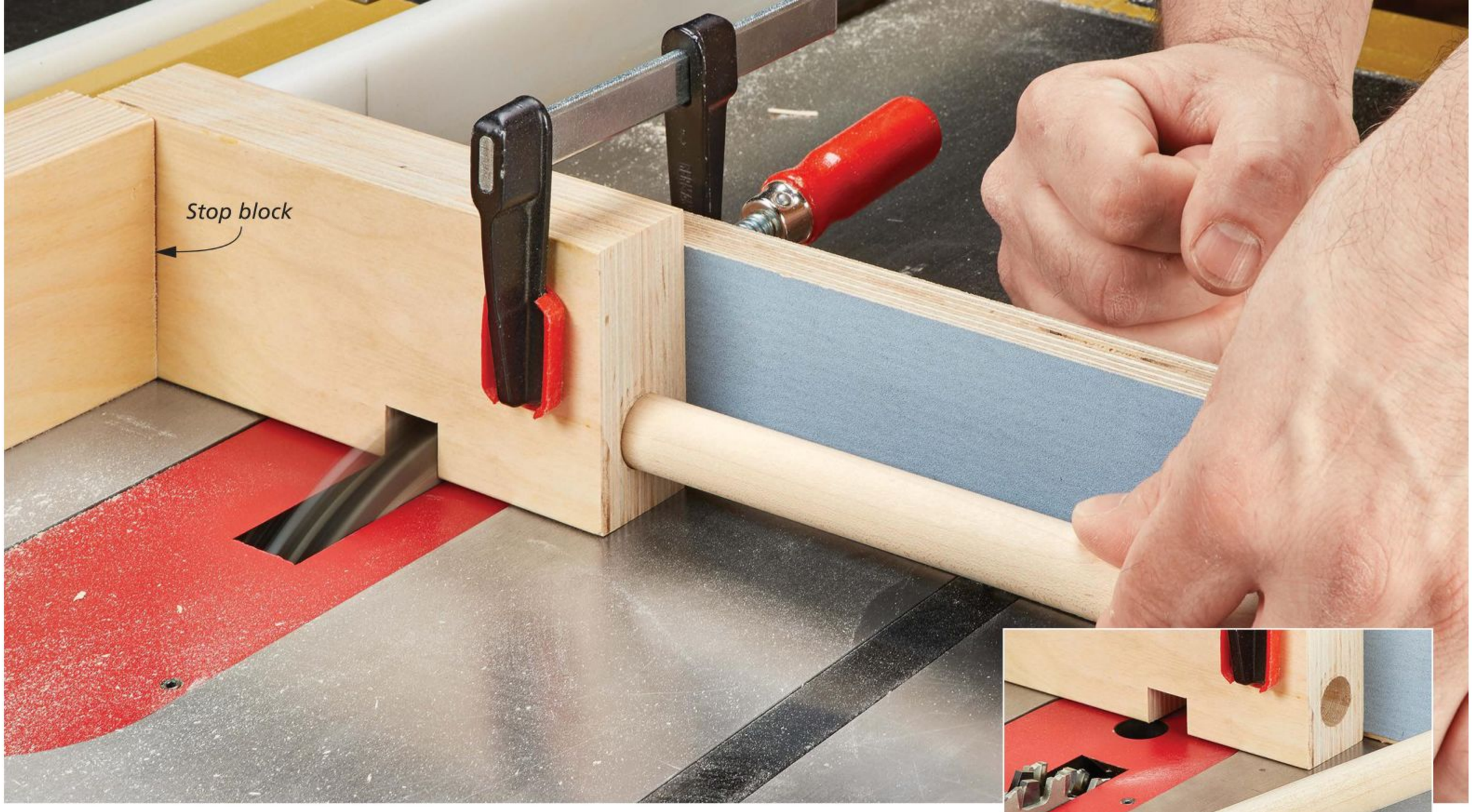


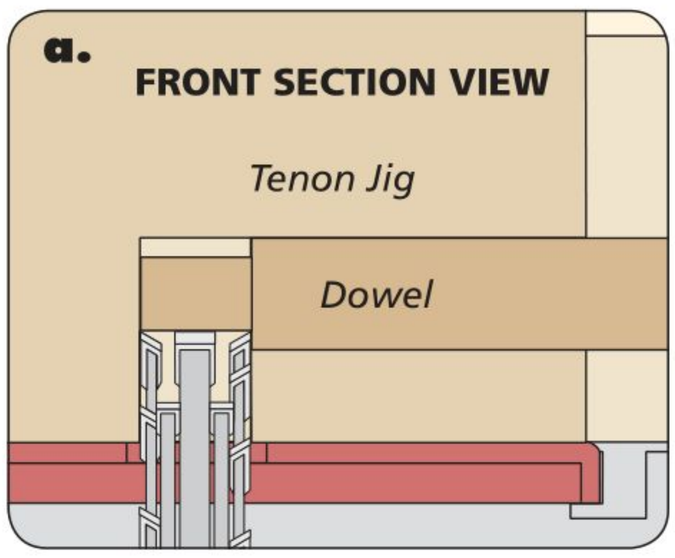
Dowel Tenon & Groover

When making toy parts, I often have the need to cut a groove or create a tenon on the end of a dowel. With the small size of most dowels, I had to come up with a safe solution. My answer is the simple device shown here.

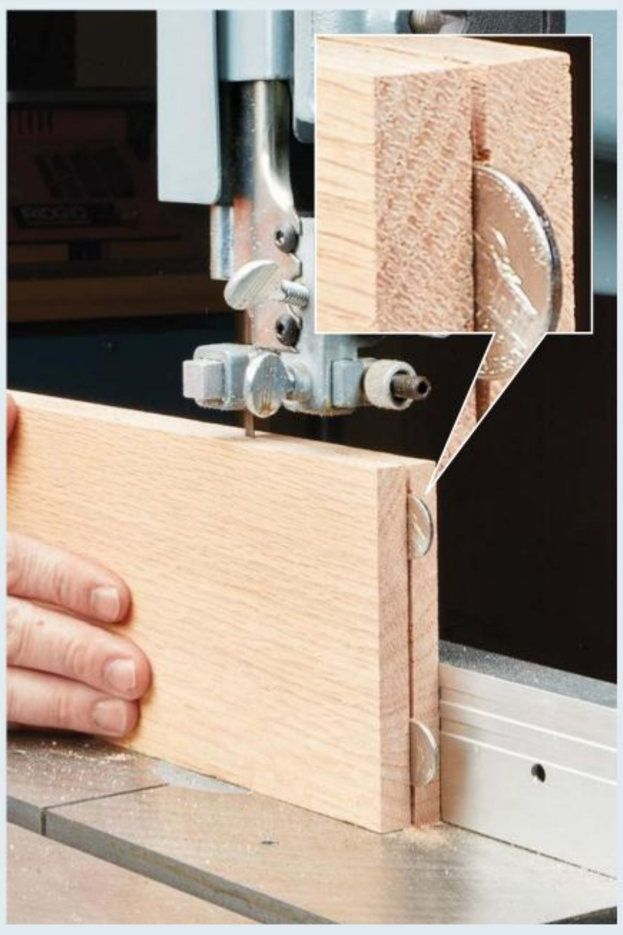
A CLEVER "JIG". The jig is just a block made from two layers of plywood. It has a hole that is sized to fit the dowel, but still allows the dowel to be turned. A stop block is clamped onto the rip fence to position the jig over the blade.

Using the jig is simple. After transferring the hole depth to the face of the block, I can set my blade to cut the correct width of tenon. With the block clamped to my miter gauge, I insert the dowel into the hole and push it into the blade until the jig and dowel contact the stop. Then rotate the dowel to create the tenon. The size of the tenon can be changed by adjusting the blade height.

Dan Martin
Galena, Ohio



QUICK TIPS



Spare Change Spacers. *Roger Page* of *Columbia, MO,* was resawing stock on his band saw and noticed the kerf was starting to pinch close on the blade. Since he didn't have a thin scrap, he reached in his pocket and found that a nickel was the perfect size for his band saw blade kerf. By inserting a couple coins into the kerf, it keeps his blade free to keep cutting.

Edge Clamps. *Dennis Volz* of *Denver, CO* recently needed some edge clamps for the edging he was applying on a shelf. Instead of buying specialized clamps, Dennis cut strips from a bicycle inner tube and slipped them over spring clamps. The tube holds the edging tight when the clamps are in place.

▲ Pumping up the jack raises the foot off the floor. Lowering the jack drops the bench back onto the foot.

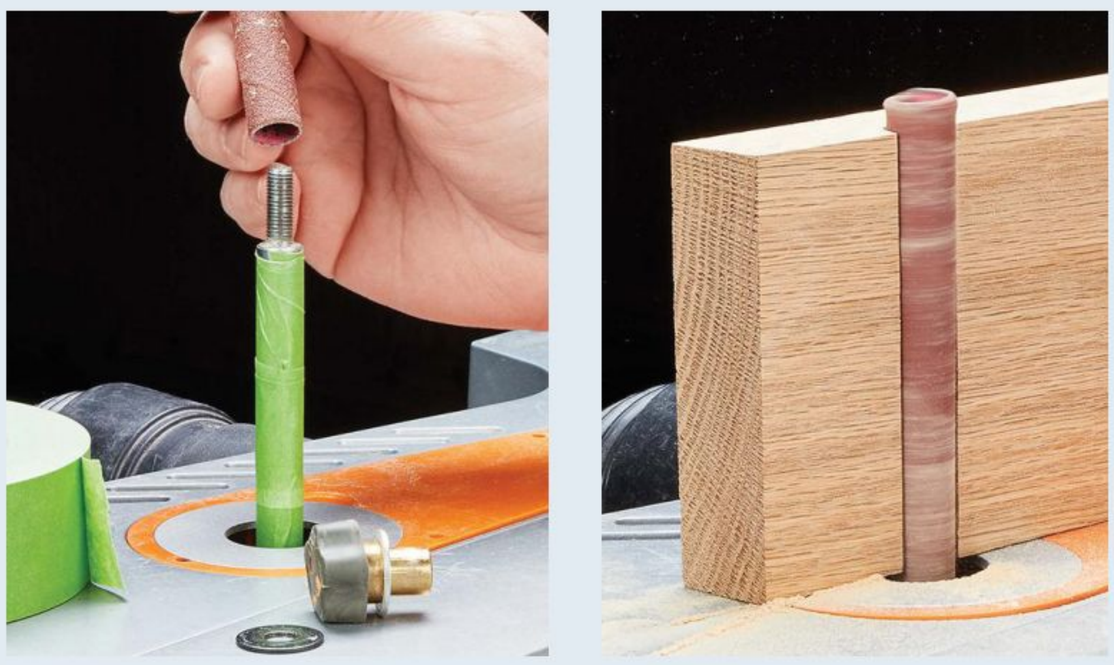
Bottle Jack Bench Mover

Having a mobile bench is necessary in my small shop. But after moving my bench, I want it to rest solidly on its feet when working. While changing a car tire, I came up with the idea for the workbench lift seen here.

HYDRAULIC POWER. The lift uses two small inexpensive bottle jacks that are usually reserved for lifting a car. Using butt hinges, I attached a plywood piece to the bench foot and installed a pair of cleats. The cleats serve a couple of purposes. First, they register and cradle the base of the jack. Second, the cleats provide an anchor point that the bottle jack base can lever against when it's getting pumped up to lift the bench.

The jack presses against the lower shelf support and lowers the wheels while raising the workbench. Then, it's a simple matter of moving the bench into its new place and using the pressure relief valve to lower the jack and the bench to the floor.

William Collett
Bettendorf, Iowa



Knobless Sander. *Riley Onofrio* of *Saint Paul, MN,* needed to sand a tall workpiece on his spindle sander but the retaining knob at the top hit the workpiece as it oscillated. To fix the problem, Riley used a few layers of painter's tape on the shaft. The friction holds the sleeve in place without the knob.

▲ The jack rests on a hinged plate with cleats to hold the jack in place. When pumping up the jack, it presses against the lower shelf support and lowers the plate and wheels, raising the bench.

all about

Choosing & using Waxes

Wax isn't a new concept in the shop, in fact, it's one of the oldest wood finishes known. But that doesn't mean that it's out of date. With the number of waxes available, it can be daunting choosing the right one. Not to worry, however. In this article, I'll guide you through the most common waxes, and the uses of raw (photo, below) and blended waxes in your shop.

PARAFFIN. One of the most common types of raw wax is paraffin wax. Paraffin is derived from petroleum. This means that it's oil based and most finishes can be applied over it. Paraffin wax is also an ideal choice for lubrication in your shop. It's excellent for lubricating hand saws, planes, drawer runners, vise screws, and other shop lubrication tasks (upper left photo, next page).

One of the best attributes of paraffin wax is its availability and price. Paraffin is sold at most grocery stores as "canning wax" and only costs a few bucks.

I mentioned that paraffin is compatible with most finishes. That doesn't mean it's a good choice to use in a finish, however. It just doesn't dissolve easily enough.

BEESWAX. The oldest of the waxes, beeswax is a favorite for home-brewed finishes. Beeswax, as the name implies, is wax that is produced by honeybees for building honeycomb. While it's water resistant, much like paraffin, beeswax easily dissolves into various solvents making it a perfect choice for mixing into finishes. See the How-To box on next page for a finish recipe. Beeswax adds a warm glow when applied to raw wood. And when mixed with mineral spirits, is a food-safe finish for cutting boards (upper right photo, next page). Beeswax is more expensive than paraffin, however, but can be purchased from various retailers and local beekeepers.

CARNAUBA WAX. Carnauba wax is well known to woodturners. This hard wax polishes to a spectacular shine and is best applied with a buffing wheel or on a lathe where heat is generated (lower left photo, next page). Carnauba wax is refined from palm tree leaves and is the base for most popular paste waxes.

◀ Paraffin is a soft and oily wax. Beeswax is harder and can be tacky. Carnauba is the hardest of all and is brittle.

WAX BLENDS

More wax blends have become available in recent years (right photo, next page). They offer many benefits over raw waxes.

PASTE WAXES. *Johnson Paste Wax* has been a favorite in my shop for maintaining work surfaces, such as the cast iron top on a table saw (photo above). Paste wax dries to form a hard, protective surface thanks to carnauba wax. It not only lubricates but also protects surfaces

Written by: Logan Wittmer

▲ The low cost of paraffin wax makes it a great choice for lubricating tools. When rubbed on hand tools, it greatly reduces the effort needed to push a tool, and it works great for lubricating fasteners.

▲ A favorite food-grade finish, a mixture of mineral spirits and beeswax, makes a finish that not only looks great but is extremely water resistant and can be easily reapplied over time.

that are prone to rust. Application is as simple as applying the wax and buffing when it's dry. Paste wax also makes a great final furniture polish and even comes in tinted colors that add a subtle hint of color to a finished project.

RENAISSANCE WAX. Another wax known to woodworkers is *Renaissance* wax.

▲ Carnauba wax is a favorite of turners. The hard, polished surface it leaves after buffing is not only glossy and protective, but tactile.

In addition to the paste wax duties mentioned previously, it's preferred by conservators that are preserving antiques. The neutral pH will not harm antiques. Also, it can be used in the shop on surfaces to keep glue from sticking.

ALFIE SHINE. One of my favorite wax blends is a product called *Alfie Shine*. It was developed by tool collector Jim Hendricks and is based on a 17th-century recipe. The mixture of ingredients (resins found in frankincense, carried by beeswax and blended with essential oils) makes *Alfie Shine* a jack-of-all-trades. It excels at cleaning and rejuvenating wood, or it can be used as a finish on its own. The waxes and added resins allow it to be polished to a beautiful sheen.

▲ Wax blends offer the advantages of raw wax, but with added benefit. Most are easier to apply than their raw counterparts.

The waxes and resins make the wood really glow and offer a hard finish. And the frankincense leaves an aroma that smells wonderful.

The next time you have a lubrication task in the shop or your project needs that final little polish to make it shine, take a second look at waxes. You'll be glad that you did. W

How-To: A BEE-UTIFUL WAX FINISH

Beeswax really excels when used as a finish. Now, don't get me wrong. It's not going to be as hard as a varnish or a poly, but it gives a look that appears hand-rubbed. Not to mention, it's easy to renew without stripping and you can make your own beeswax finish at home.

I like to start my blend with shredded wax (far right photo), and melt it into an oil. Here, I'm using tung oil, but linseed oil works also. Heat the oil in a jar in boiling water and add the beeswax, stirring until melted. I use a 4:1 ratio of oil to wax, but you can add more or less wax to change the hardness of the finish.

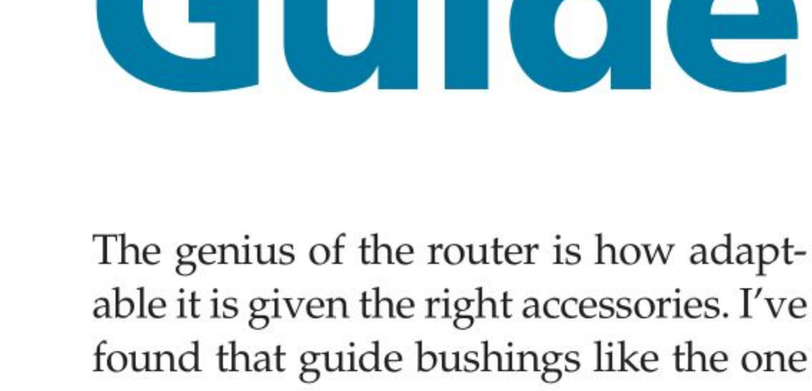
▲ Use a cheese grater or a knife to shred beeswax into the heated oil in a double boiler. Add the wax slowly, allowing it to melt completely before adding more.

▲ An oil and wax blend makes a great final coat over varnish for a hand-rubbed look.

Template routing with Guide Bushings

The genius of the router is how adaptable it is given the right accessories. I've found that guide bushings like the one shown below increases the accuracy and capabilities of my router.

Rather than try to explain why guide bushings are so handy to have in your shop, let me show you a project-specific example — the chisel case on page 24. You can use what you learn here as a launching point to find other uses for guide bushings in your projects.



▲ The bushing gets installed in the base of the router. The pin helps center the bushing on the bit for consistency.

The case features a roll-up tambour door that runs in a track cut into the sides of the case. It's not something you can form using an edge guide or even at the router table.

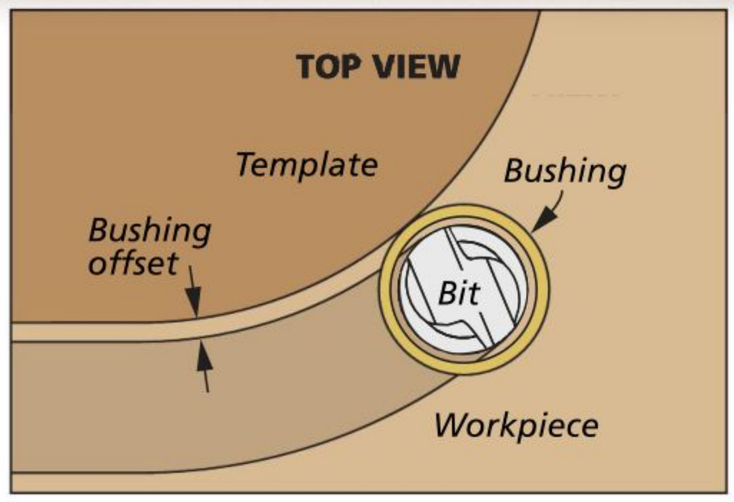
START WITH A TEMPLATE. The answer is to form the track with a template. That's nothing earth-shattering. I often use a template to shape complex parts. However, the width of the track meant that I couldn't use a bearing-guided bit, like a pattern bit.

This is where the guide bushing enters the scene. It effectively allows any bit to follow a template. Of course, for this to work best, the template needs to be shaped and sized correctly. And as the photo above shows, the edges need to be smooth and even.

▲ Take the time to create smooth edges and even, flowing curves on the template since any lumps and bumps will get transferred to the workpiece.

Written by: Phil Huber

▲ For the chisel case, the template is slightly smaller than the profile of the track you'll make. This is especially noticeable on curves. For the outside curves of the track, the radius of the template is smaller than actual curve by the amount of the offset (right drawing).



OFFSET. Sizing the template is a little different when working with a guide bushing. In order for the bit to pass through the bushing, the bushing needs to be larger than the bit. So you need to account for the difference between the outside of the guide bushing and the edge of the bit (the offset) when sizing the template. The photo above and drawing at right shows what I mean.

▲ Keep one hand on the work to balance the router and act as a fulcrum to keep the bushing in contact with the template.

PUT THE SYSTEM TO USE. With the template in hand, install the bushing. A centering pin (shown on previous page) can help get it accurately positioned.

It's time to get set up and routing. Double-sided tape works far better than clamps for securing the template without anything getting in the way. Take care to position the template accurately — especially if you need to have mating or aligning pieces.

Don't forget to take the thickness of the template into account when setting the bit depth. Speaking of bits, the box below talks about a few options for this kind of guide bushing operation.

The critical part of getting top-notch results is maintaining solid contact between the bushing and the template. Start with the bit away from the edge. Turn on the router and ease the bushing against the template and start the work.

Keeping the router moving avoids scorch marks especially when navigating around corners. (A clean, sharp bit is a big plus, too.)

For me, the grip on the router matters. I rest the heel of one hand on the template while moving the router along (left photo). It improves balance and acts as a pivot point while following curves.

In short, you'll quickly master the process. And set the gears turning for finding other ways to use these helpers. W

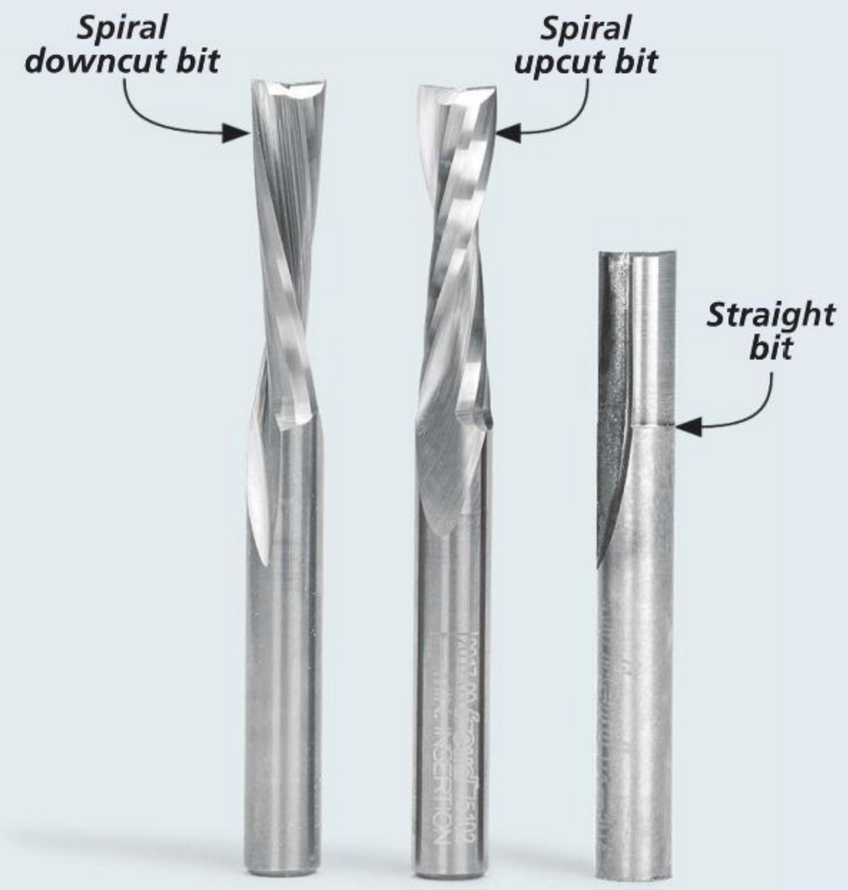
Groovy: BEST BITS FOR ROUTING

Whether routing dadoes, grooves, or rabbets, standard, inexpensive straight bits get the job done. But when the operation or the material gets tricky, I call in some specialized help.

SPIRAL DOWNCUT BIT. Most of the time, the appearance of the upper surface of the workpiece is what matters, and the bottom isn't seen. So with materials that are stringy or prone to chipping, I'll use a spiral downcut bit. The cutting action forces the wood fibers down, ensuring a clean surface. That also means the chips get packed into the groove. So this one is best for shallow (¼" deep or less) cuts.

SPIRAL UPCUT BIT. The other type of specialized bit I keep on hand is an upcut bit. It acts like a drill bit to quickly pull chips out. This reduces heat buildup, but can lead to a ragged-looking edge.

Reach for these bits when you're creating deep cuts (mortises, for example) and when you need to minimize burning in mild-mannered materials.



Illustrations: Bob Zimmerman

great gear

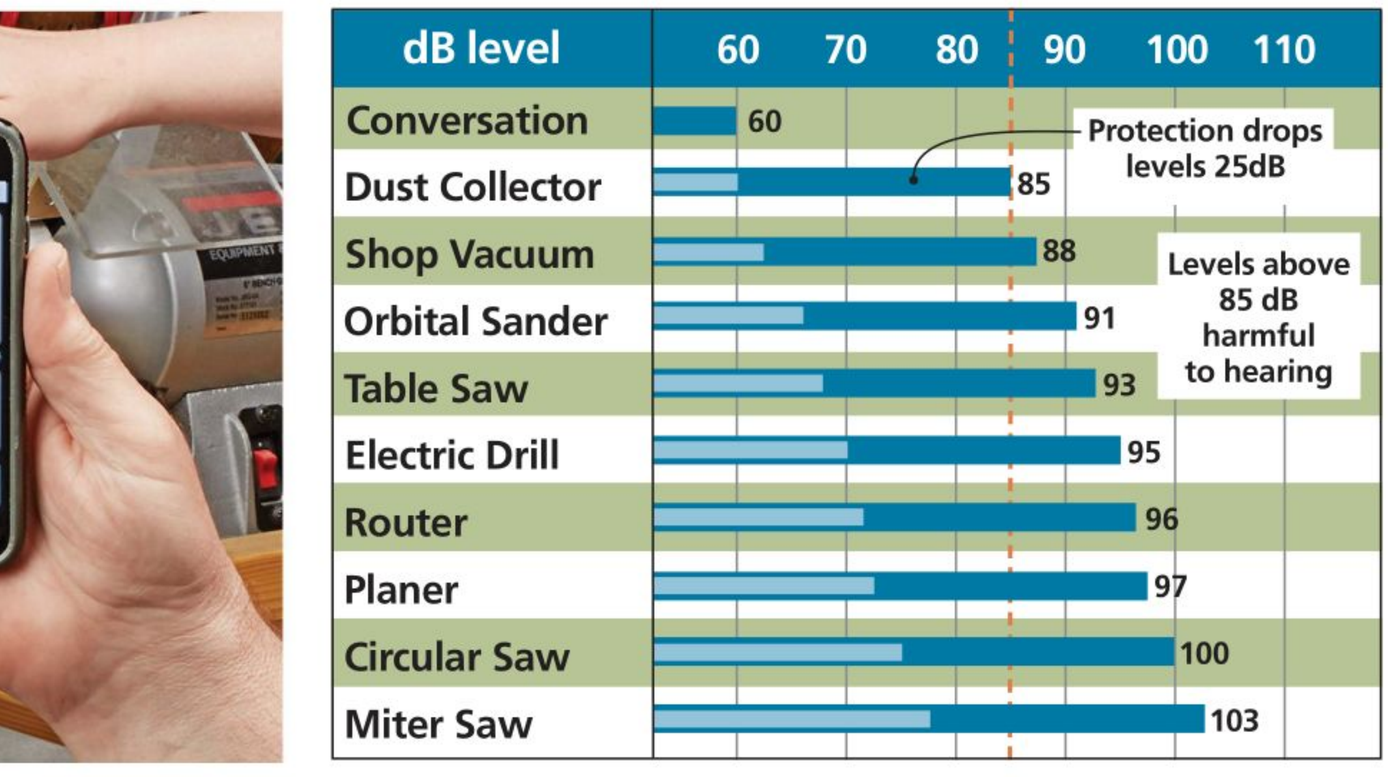
Sound advice for

Hearing Protection

Of the five senses that we have, hearing is the most passive when it comes to defending itself. A splinter in your finger, dust in the eye, and toxic odors all demand attention at the moment they happen. But with hearing, the warning signs are often no more than an annoying ringing in the ears. And when the ringing goes away, we think the problem is over. But it's not. Noise-induced hearing loss not only doesn't go away, it accumulates over time. Plus the damage it does is irreversible.

As you know, working in the shop can be a noisy affair. There are two ways to combat this problem. First, how you set up your work environment and dampen your machinery will help a lot. That isn't enough, though. You still need to protect your hearing from prolonged exposure to loud noise. But how much protection

▲ The smartphone app from *Decibel X Pro* lets you take instant readings and record the noise levels in your shop. The app comes with directions for use (inset photo).



▲ The bar to the right of each tool shows its noise output level. Dark blue is the reading without protection. Light blue is the noise level with hearing protection.

Written by: Erich Lage

varies from task to task. The chart you see at the bottom of the previous page covers the tools frequently used in most shops and the decibel levels they create.

MEASURING NOISE. The chart is general in nature. What you need are some specific measurements. There's only one way to measure the noise level that you're experiencing, and that's to use a sound meter which reads decibel (dB) levels.

You can spend a lot of money on sound meters that provide you with way more information than you need. On a hunch, I picked up my smartphone to see if there was a sound meter app available. Sure enough, there was quite a variety to choose from. I landed on the one you see at the bottom of the previous page. The *Decibel X PRO* meets all the needs I have for measuring the noise levels in my shop.

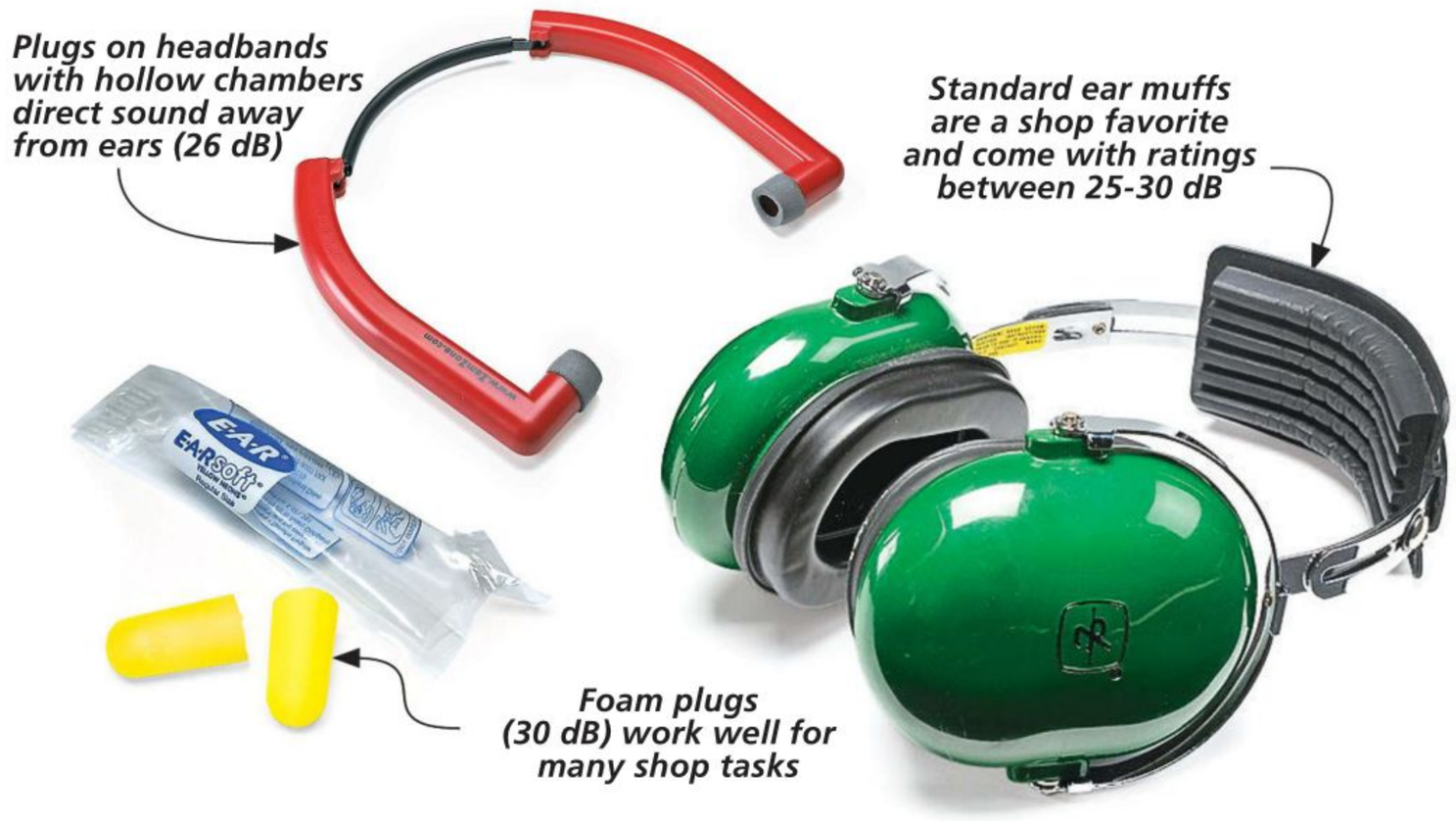
When using the app, I found it best to take the reading when standing in the position from where I operate the tool. Also, to dial in the reading even better, I hold the phone at the approximate level of my ear. When reading decibel levels, you'll want to round up your readings — that's to err on the side of caution. Many times a noise in an open room will intensify as it travels into your ear and down the ear canal.

ENTERTAINING OPTIONS. Once you have an accurate assessment of your shop noise, you can pick out the type of hearing protection that works for you. As you can tell by the chart on the previous page, to be effective, you need to choose protection that has a noise reduction rating of at least 25-30 dB.

There are two categories to choose from: plugs that fit in your ears or muffs that cover your ears. The photo above offers basic versions and their levels of protection that are inexpensive and pretty straightforward.

BLUETOOTH TO BOOT. Considering plugs first, it's nice when you can combine hearing protection with entertainment, like listening to music or sports. The *ISOtunes Pro* (main photo and photo below right), does just that through a *Bluetooth* connection. It lets you take phone calls as well.

When it comes to ear muffs, you also have plenty of choices. But ear muffs intersect with another important safety consideration — eye protection.



AN ALLY FOR EAR MUFFS. Here I want to look at an ongoing challenge that comes up when wearing ear muffs. That's how they interact with your safety glasses. In most cases, the arms of your safety glasses will prevent ear muffs from fully surrounding your ear. The *Soundvision* glasses (photo below) hook to the outside of your ear muffs and don't break the noise protection seal. The cloth arms on the glasses bond tightly with hook and loop pads that are provided with the product.

For places to buy the *ISOtunes Pro* earbuds and the *SoundVision* kit, turn to Sources on page 64. It's important to wear hearing protection at all times in the shop. So if by adding music with earplugs, or getting a more comfortable seal and noise reduction with your earmuffs does the trick — it's worth the effort and investment. W

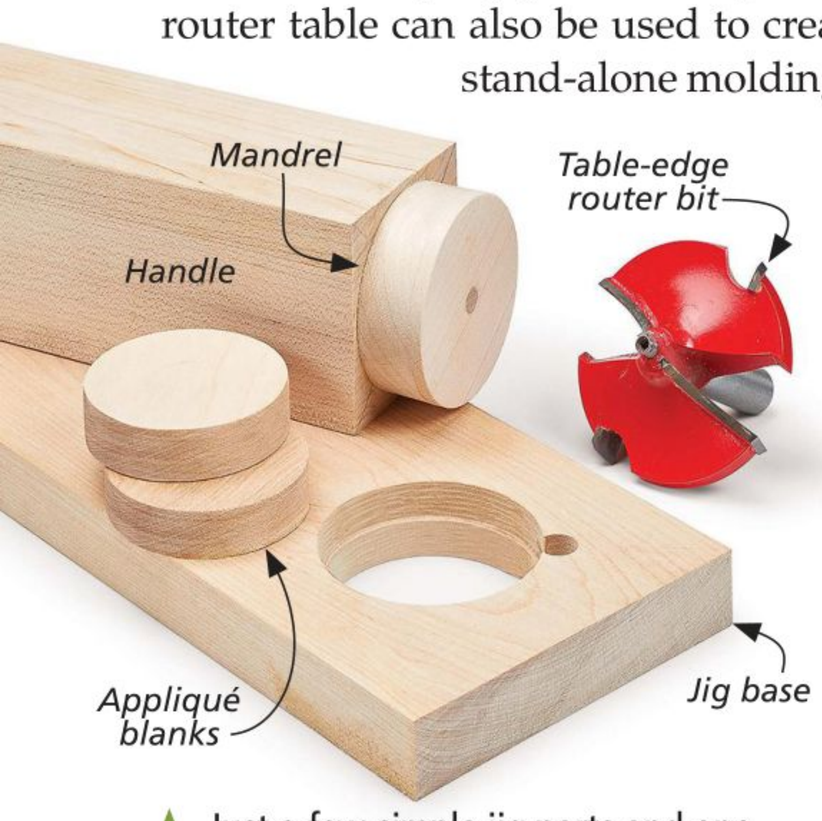
▲ Special eye protection for use with ear muffs is cleverly done by the folks at *FullPro*. *Soundvision* are safety glasses that connect to the exterior of your ear muffs with hook and loop fasteners.

◀ *ISOtunes Pro* are *Bluetooth* earbuds that protect your hearing while keeping you connected to the outside world.

Illustrations: Becky Kralicek

Making domed Appliqués

The router table is typically a one-stop shop for making unique profiles and routing intricate joinery on a project. But with simple jigs and setups, the router table can also be used to create stand-alone moldings.



▲ Just a few simple jig parts and one router bit are all it takes to create the appliqués for the dressing table.

Such is the case with the dressing table on page 30. Here, I adorned the three mirror frames with domed appliqués to enhance its mid-century look.

The nice thing about the appliqués is that they're made using the same table-edge router bit that was used to make the profiles on the drawer fronts and mirrors on the dressing table. This "double-duty" use of the bit provides for visual continuity on the project.

Because of the small size of the appliqué blanks (and the fact that they're round), routing the profile on the edge with a handheld router wasn't an option. So I turned to the router table and a simple jig setup to make the appliqués in a safe and efficient manner.

HOW DOES IT WORK? In a nutshell, a hardwood base is clamped to the router table, over the profile bit. An appliqué blank is attached to a mandrel on the end of a handle with hot-melt glue. It's then lowered into a "stepped" hole in the base. Once inserted, the base traps the appliqué blank so the handle can be rotated to form the profile on the blank.

▲ Use a circle cutter with the pilot bit removed to cut the appliqué blanks. Replace the pilot bit to cut the mandrel.

Written by: Robert Kemp

The main photo on the previous page shows it in action.

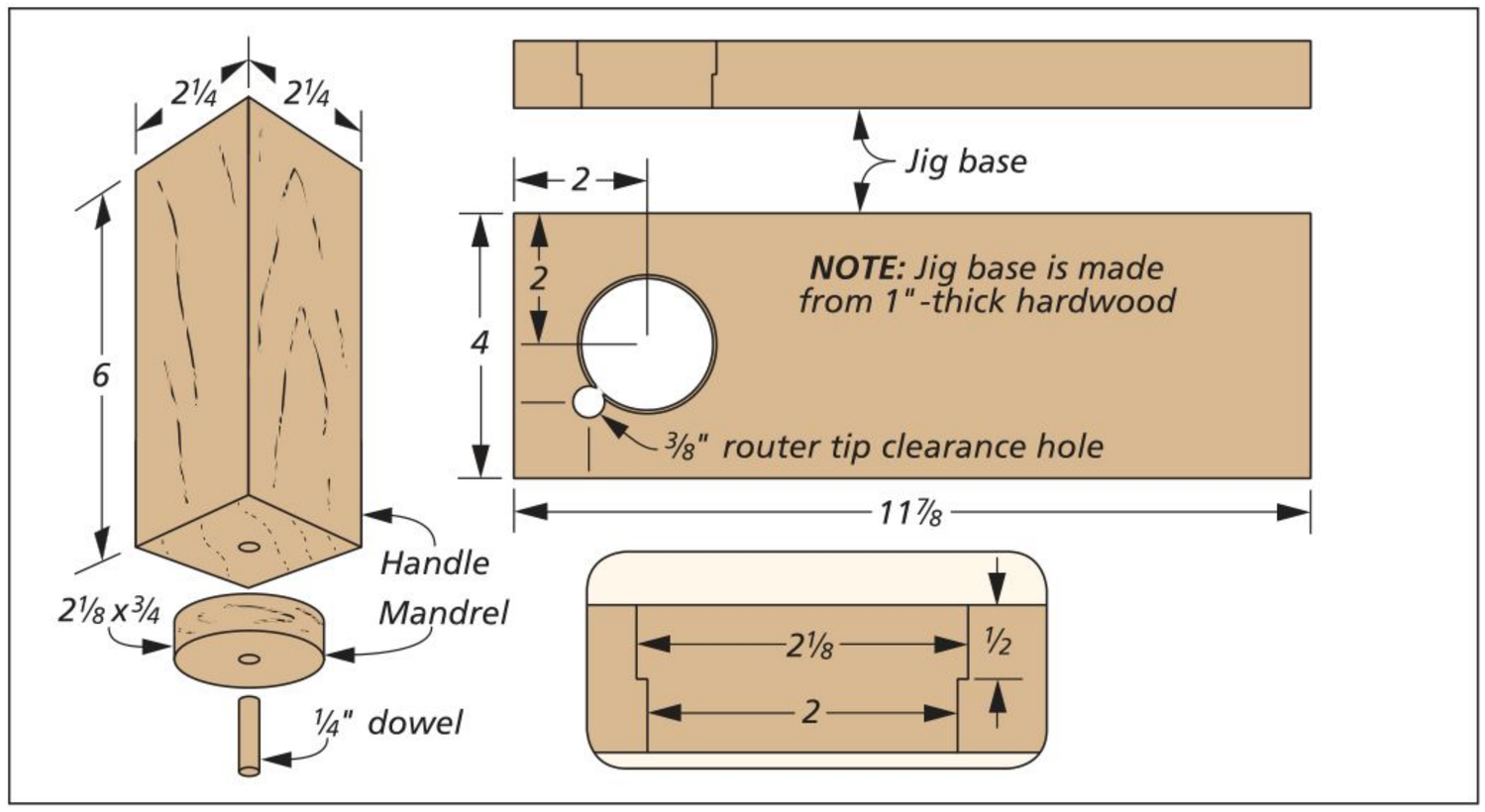
APPLIQUÉ BLANKS. Before making the jig, you'll want to make enough appliqué blanks for all three mirrors (12), plus a few extras for setting up the jig. I turned to a circle cutter in the drill press to get this done (lower right photo, previous page). You'll want to run the drill press at it's slowest setting for best results.

MAKING THE JIG PARTS. The jig setup that I used consists of just a few parts, shown in the lower left photo on the previous page. The illustration at right provides all the information you'll need to make the jig parts.

JIG BASE. As I said before, the base is sized so that it can be clamped to the front edge of the router table. You may have to modify the length of the base to fit your table. The large, "stepped" hole can be made using a couple of Forstner bits, or two hole saws.

The smaller hole drilled tangent to the 2"-dia. hole provides clearance for the tip of the router bit (with the bearing removed). The 2"-dia. hole is the size of the appliqué disc, while the 2⅛"-dia. hole is the same size as the mandrel on the end of the handle. The cut-away diagram below shows how all of these parts work together to make the profile.

HANDLE & MANDREL. The handle is simply a square blank and is pretty straightforward to make. I made the mandrel the same way as the appliqué discs — using a circle cutter on the drill press. I put the pilot bit back in the wing cutter when making the mandrel. This center hole can be used to glue in a dowel to attach it to the handle.



USING THE JIG. With the table-edge bit installed in the router and positioned below the surface of the table, place the jig base so that the small hole is centered over the tip of the router bit. I then slid the router fence against the end of the base and locked it in place before clamping the base to the front edge of the table. Refer to the main photo to help get a better understanding of the setup.

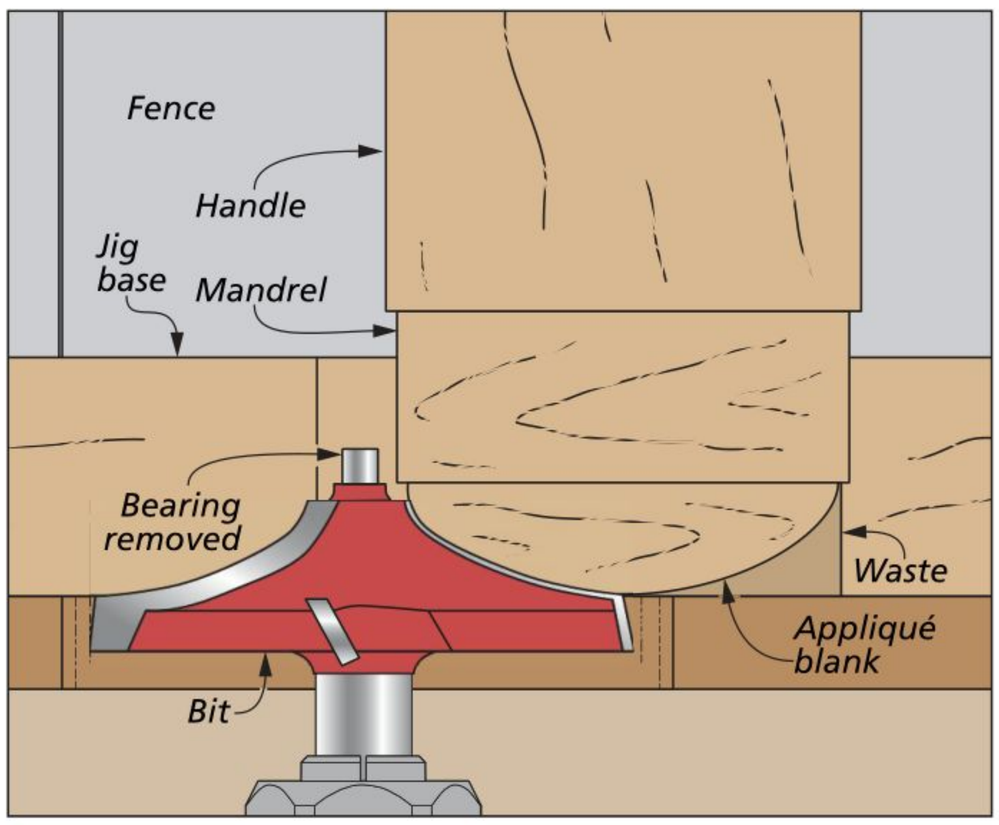
SET BIT HEIGHT. Setting the height of the router bit will depend on the type of router and table you have. As the illustration below shows, the bit actually cuts into the bottom of the jig base just slightly. My router table has above-the-table adjustability, so I simply turned on my router and raised it into the jig base, erring on the side of leaving it a little low for now.

AFFIX APPLIQUÉ BLANK. Next, I attached a test appliqué blank centered on the round mandrel. I found that three dabs of hot-melt glue was the perfect amount to securely hold the blank in place (photo above). The fast-setting nature of hot-melt glue means that it's ready to go in a very short time.

I used three small dabs of a quick-setting hot-melt glue to attach the appliqué blanks to the mandrel.

Now, turn on the router and lower the handle assembly and blank into the hole in the jig base. When the mandrel is seated, turn the handle counterclockwise one full turn. Check the blank to see if the bit needs to be raised.

When done, a flap sander in the drill press can be used to clean up any burn marks on the appliqué without distorting the dome shape. I left them on the handle assembly for this (left photo). Finally, peel the appliqué from the mandrel. A little denatured alcohol loosens the glue without damaging the wood. W



After routing to shape, leave the appliqué attached to the mandrel and use a flap sander to clean it up.

Illustrations: Bob Zimmerman

Weekend Project

Wood-Hinge Cabinet

The wooden hinge and curved doors make this wall cabinet a true attention grabber. Believe it or not, building it's a straightforward process.

Storage. It's one of those things that you can never have too much of. Often, storage is required in a place that's inconvenient for traditional options. This wood-hinge cabinet takes that inconvenience and turns it into a stunning piece of wall furniture.

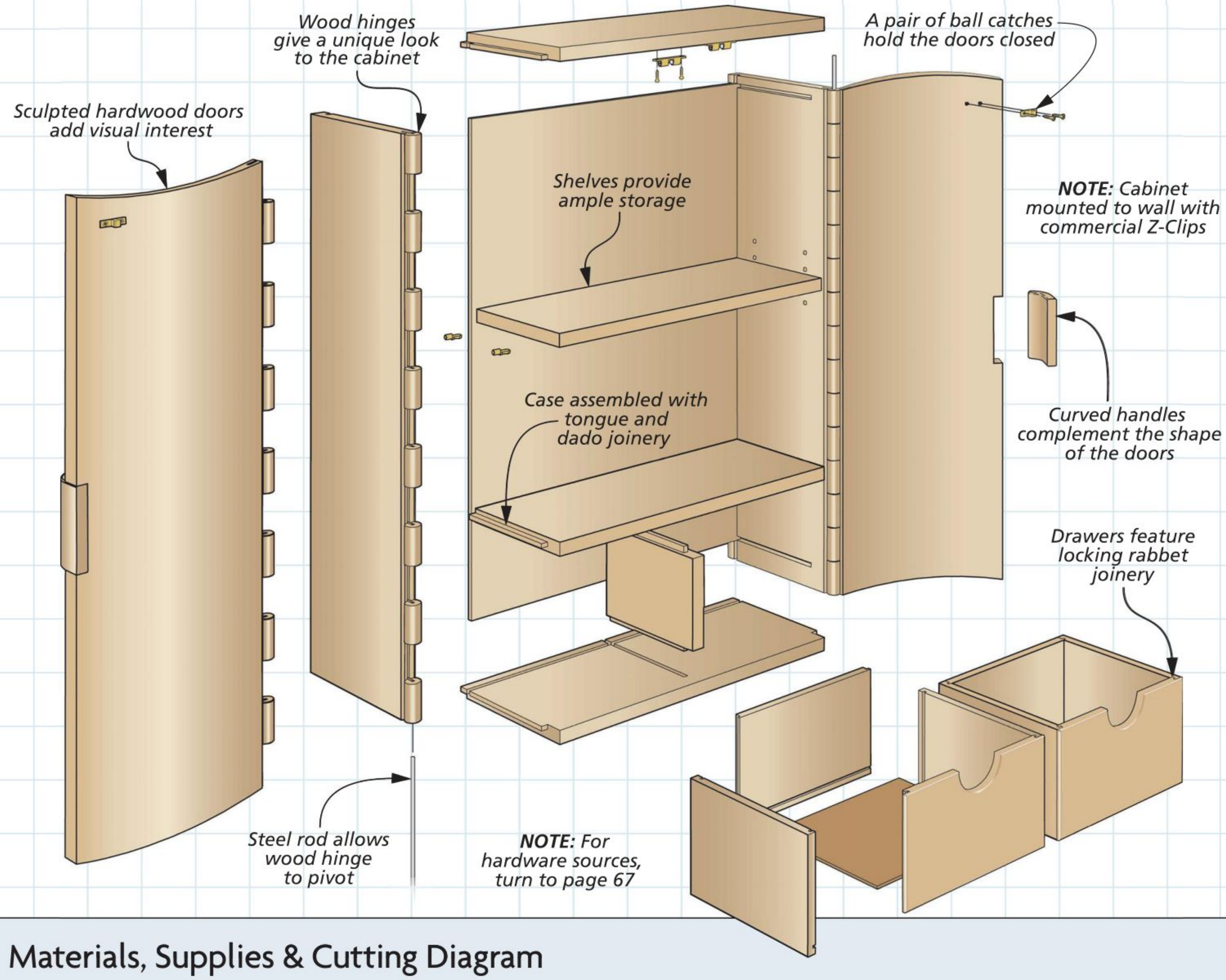
SMOOTH OPERATOR. When I first saw the design for this wall-mounted cabinet, there were two things that really stood out. The first is the wooden hinge. Looking at it, you would expect the hinges to be quite difficult to make. That isn't the case, however. A few simple steps at the router table and table saw will have this hinge operating smoothly in short order.

THE RIGHT CURVES. The second thing that I really took a liking to is the curves on the doors. Not only do the top and bottom of the doors end in a nice, smooth curve, but the doors themselves are also concave and convex to add a little depth to the closed cabinet. The curves take a little hand work, but are easy to accomplish.

It all begins with a simple hardwood case. So turn the page to get started building this wood-hinge cabinet.

Written by: Logan Wittmer; Project Design: Chris Fitch

Construction Overview / *OVERALL DIMENSIONS: 19¼"W x 30¾"H x 9½"D*



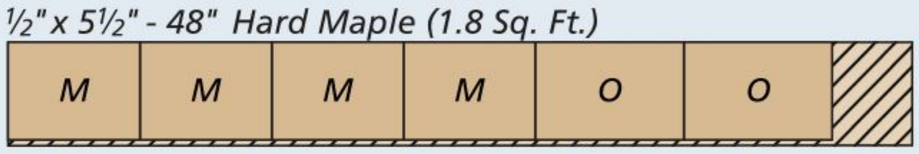
Materials, Supplies & Cutting Diagram

A	Sides (2)	¾ x 8 - 30	**G**	Shelf (1)	¾ x 7 - 17⅝
B	Top (1)	¾ x 7⅞ - 18½	**H**	Barrels (30)	¾ x ¾ - 2
C	Bottom (1)	¾ x 7⅞ - 18½	**I**	Splines (30)	⅛ hdbd. - 13/16 x 2
D	Horz. Divider (1)	¾ x 7⅛ - 18½	**J**	Left Door (1)	15/16 x 8 15/16 - 30¾
E	Vert. Divider (1)	¾ x 6 - 7⅛	**K**	Right Door (1)	1 5/16 x 8 15/16 - 30¾
F	Back (1)	½ ply. - 18¼ x 28¼	**L**	Handles (2)	1 1/16 x 2⅛ - 4

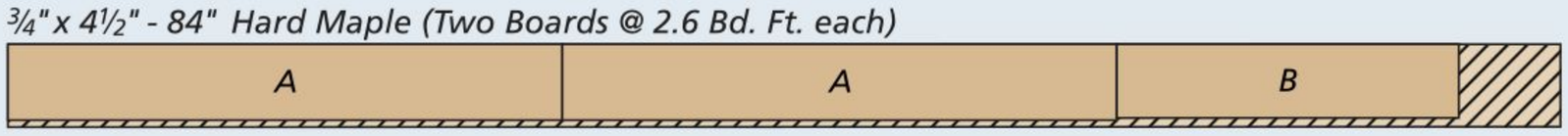
M	Drawer Sides (4)	⅜ x 5 3/16 - 7
N	Drawer Fronts (2)	⅜ x 5 3/16 - 8⅜
O	Drawer Backs (2)	⅜ x 5 3/16 - 7⅞
P	Drawer Bottoms (2)	⅛ hdbd. - 6⅝ x 7⅞

- (2) ⅛" x 30" Steel Rods
- (2) Ball Catches
- (2) Z-Clips
- (4) ¼" Shelf Pins

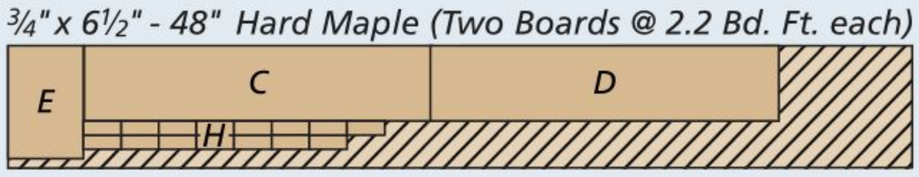
½" x 5½" - 48" Hard Maple (1.8 Sq. Ft.)



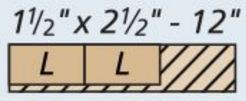
¾" x 4½" - 84" Hard Maple (Two Boards @ 2.6 Bd. Ft. each)



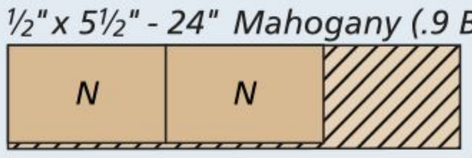
¾" x 6½" - 48" Hard Maple (Two Boards @ 2.2 Bd. Ft. each)



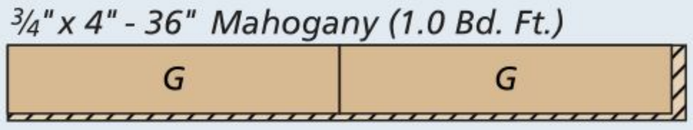
1½" x 2½" - 12" Hard Maple (.4 Bd. Ft.)



½" x 5½" - 24" Mahogany (.9 Bd. Ft.)



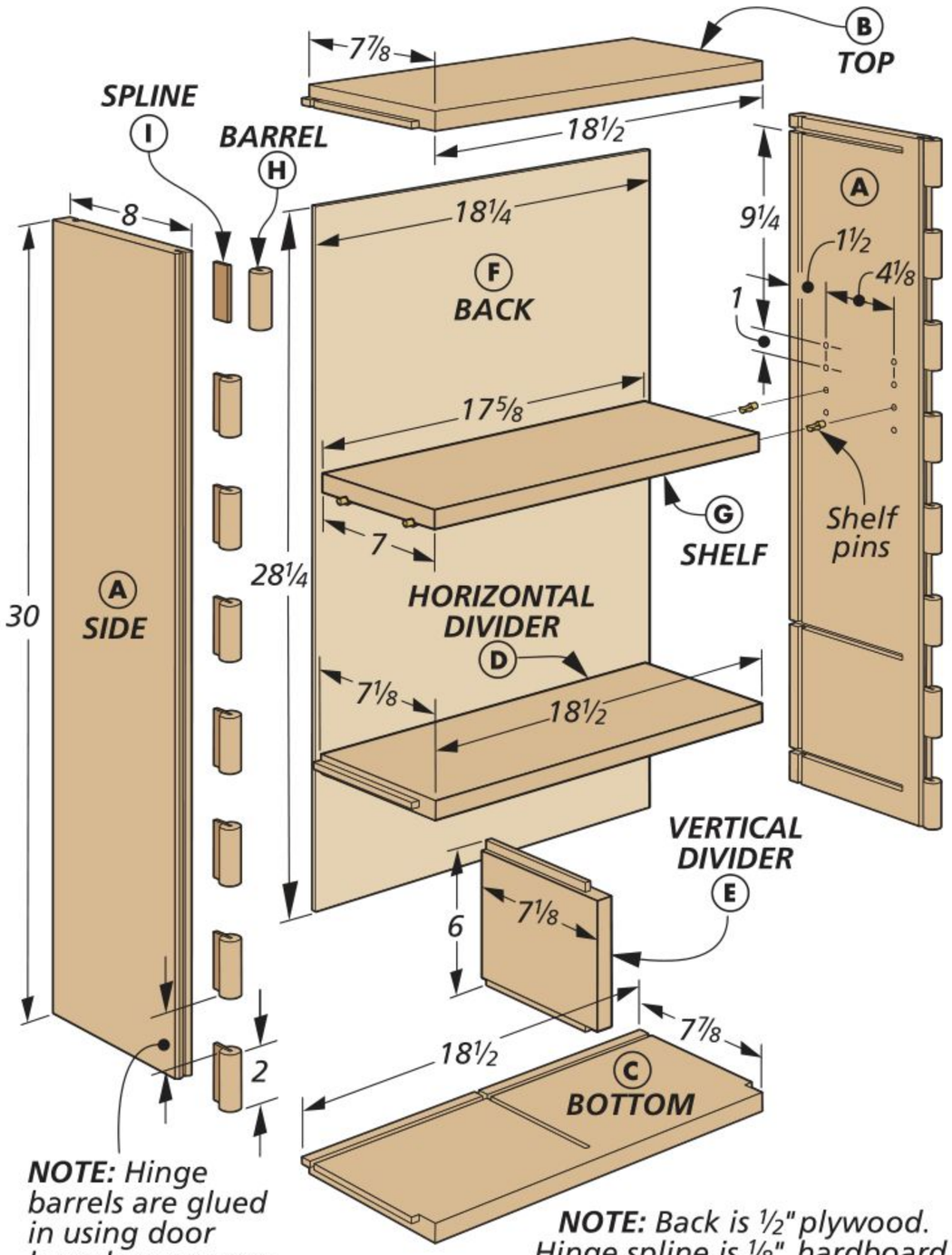
¾" x 4" - 36" Mahogany (1.0 Bd. Ft.)

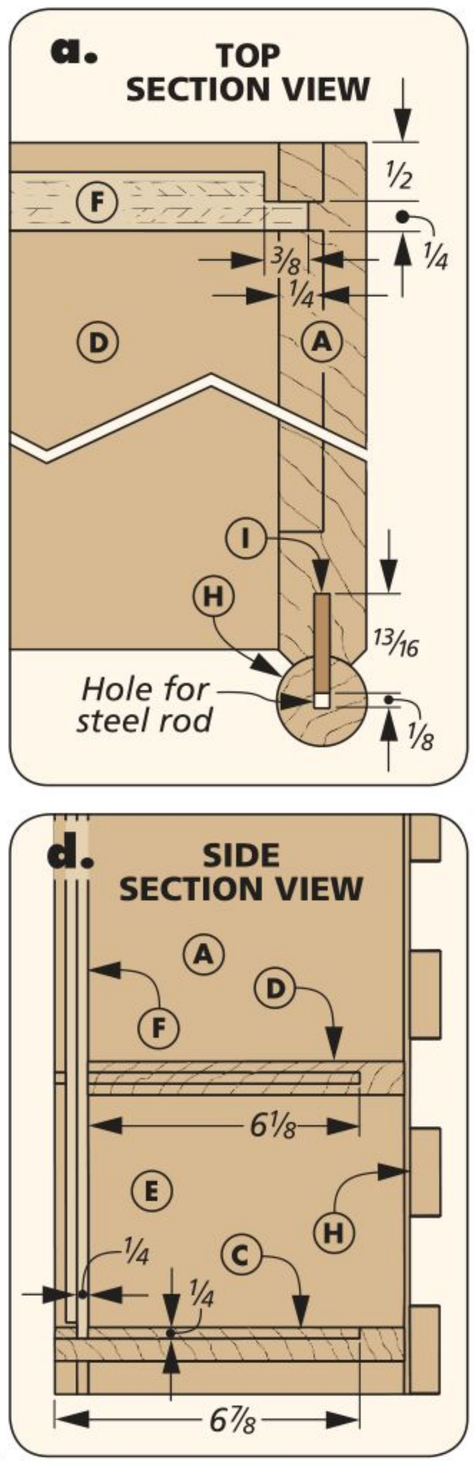


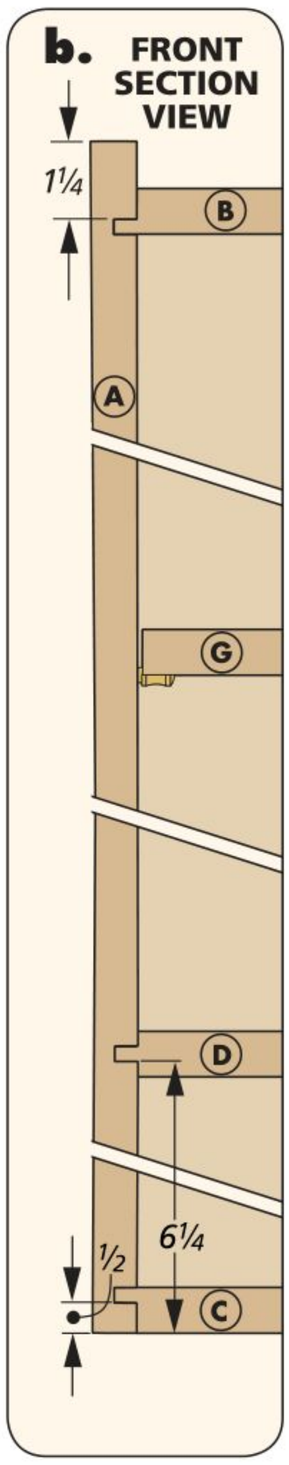
1½" x 5" - 72" Mahogany (Two Boards @ 5.0 Bd. Ft. each)

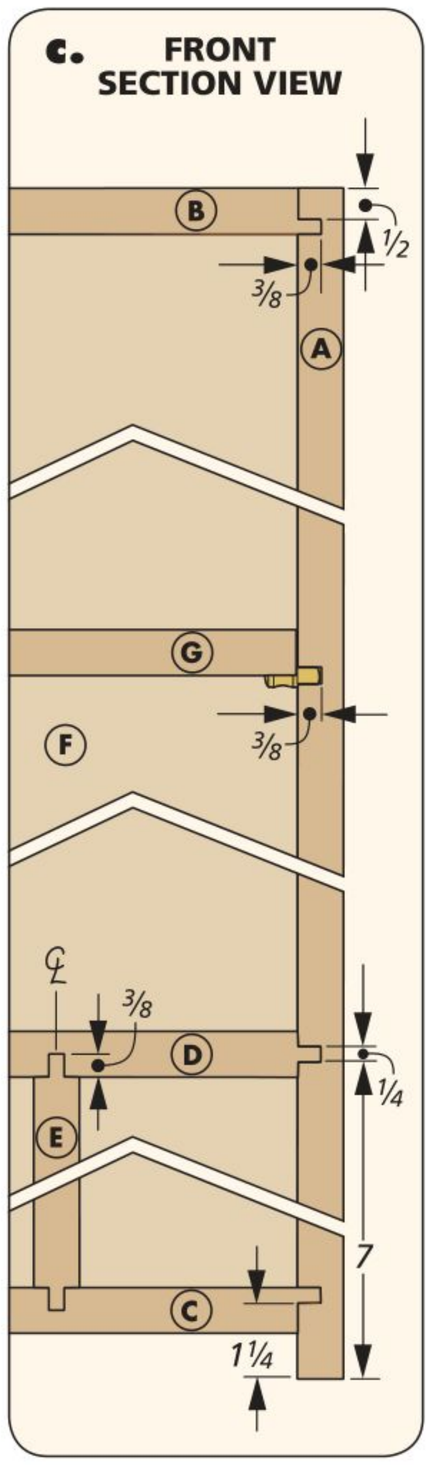
ALSO NEEDED:
One 24" x 24" sheet of ⅛" hardboard
One 24" x 48" sheet of ½" maple plywood

Illustrations: Peter J. Larson









Making the CASE & WOOD HINGES

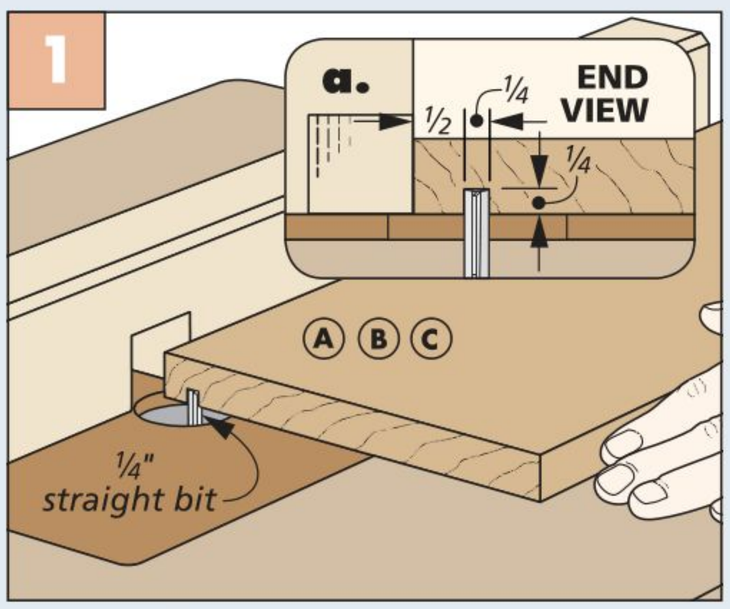
The heart of the cabinet is a hardwood case that uses basic, but strong, tongue and dado joinery. We chose to use maple for the case of the cabinet. The doors, shelf, and drawer fronts, which you'll make later, are made of mahogany.

GROOVES. Start by cutting the case parts to size at the table saw. Over at the router table, rout a groove along the back edge of the sides, top, and bottom for the back. Figure 1 shows the location of these grooves.

OFFSET DADOES. With the grooves cut, the stopped dadoes can be cut using a handheld router. But there's something I want to point out here. The sides of the case are offset from each other. So when laying out the dadoes, note the dado

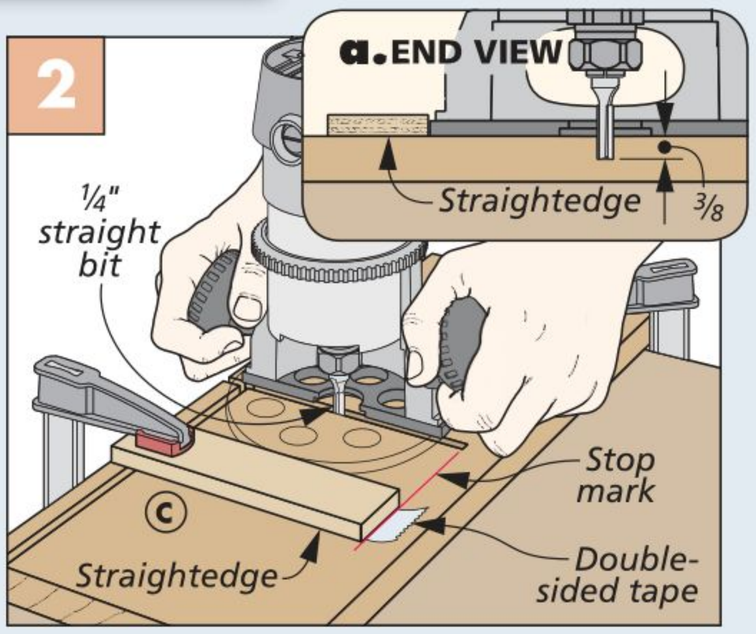
How-To: CUT THE CASE JOINERY

1



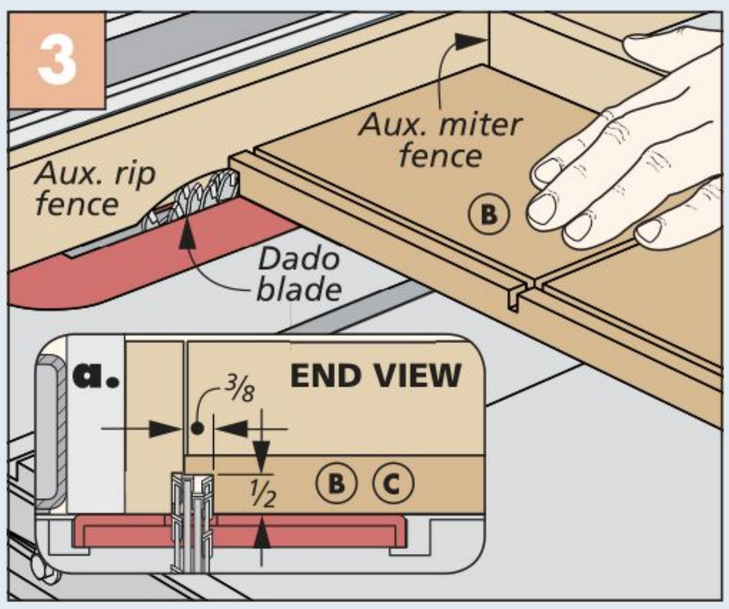
Groove for Case Back. Rout a groove in the sides, top, and bottom with a straight bit at the router table.

2



Stopped Dadoes. Rout stopped dadoes in the sides, bottom, and horizontal divider with a router and straightedge.

3



Rabbets. Cut rabbets on the ends of the top, bottom, and dividers at the table saw with a dado blade.

locations are different in the two sides. Details 'b' and 'c' on the previous page show what I mean. This offset between the two sides will make more sense when the doors are installed later. You'll need dadoes in the sides for the top, bottom and horizontal divider. Also, the horizontal divider and bottom each receive a dado for a vertical divider.

Tongues are cut on the ends of the top, both dividers, and the bottom of the case to fit in the stopped dadoes (Figure 3 on previous page). After the tongues are cut, the front edge of each tongue can be trimmed.

With that done, you can cut the back to size and rabbet the edges (detail 'a'). Finally, after cutting the shelf to size and drilling holes in the sides for the shelf pins, you can set everything aside except the sides. Those require a little more work before assembling the case.

WOOD HINGE

The wood hinge on the case is made up of a few parts fitting and working in a way so they appear seamless. The doors receive the same steps later on.

COVED SIDES. To start making the wood hinge, you first need to rout a shallow cove in the front edge of the sides, as shown in Figure 1. This allows the hinge barrels to seat fully in the side. Next, a kerf is cut down the center of the cove (Figure 2). Finally, the edges next to the cove are chamfered at the table saw, as shown in Figure 3. The case can now be assembled before you move on to the hinge barrel.

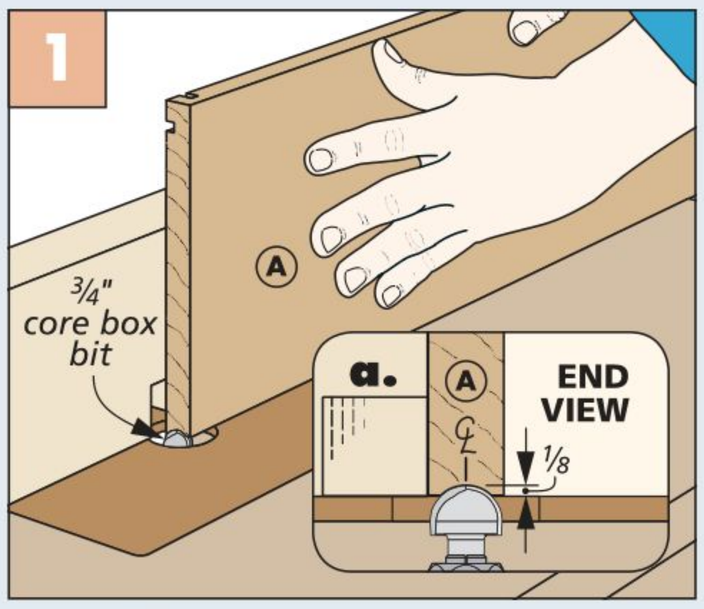
HINGE BARRELS. To create the round hinge barrels that allow the door to open and close, I started off with several long, square blanks. At the table saw, cut a kerf centered on one edge (Figure 4)

To turn the square blank into a round cylinder, grab a roundover bit and head over to the router table. You'll want to rout each edge, creating a cylinder (Figure 5). Make sure to leave the ends of your blank square. This keeps your workpiece fully supported when routing.

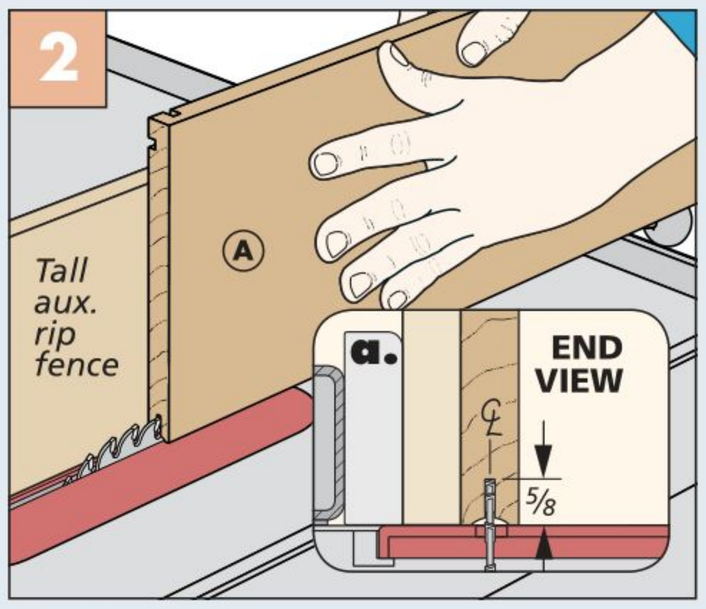
To attach the hinge to the case, a strip of hardboard is glued into the kerf in the barrel blank. Don't insert the hardboard all the way into the kerf, however (detail 'a' previous page). The small gap needs to be big enough for a rod to be inserted later, so size it according to your rod. With the hardboard in place, you can cut the hinge pieces to length, as shown in Figure 6.

ATTACH HINGE. Attaching the hinge barrels to the case is a simple process. When gluing them into the kerf in the sides of the case, use another hinge barrel as a spacer. The goal here is to glue every other barrel in place. The opposite barrels will be glued into the doors later. See the main drawing on the previous page.

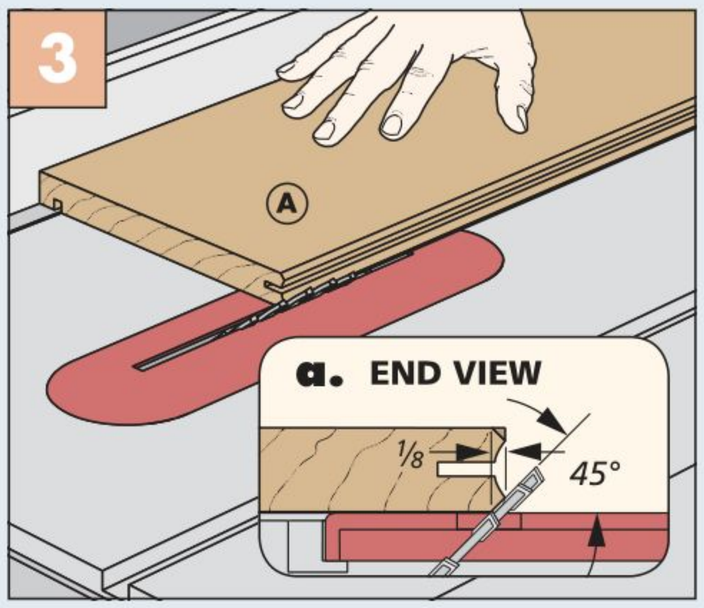
How-To: CREATE THE WOOD HINGES



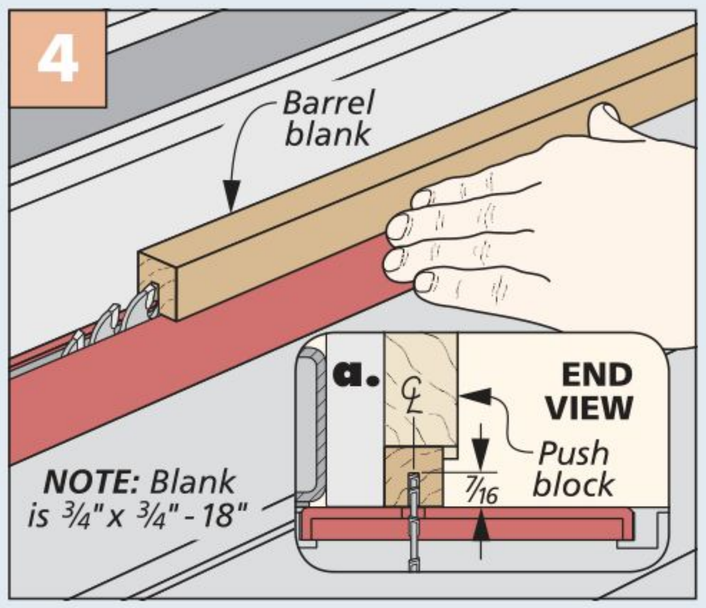
Cove Edges. At the router table, rout a shallow cove in the front edge of the sides using a core box bit.



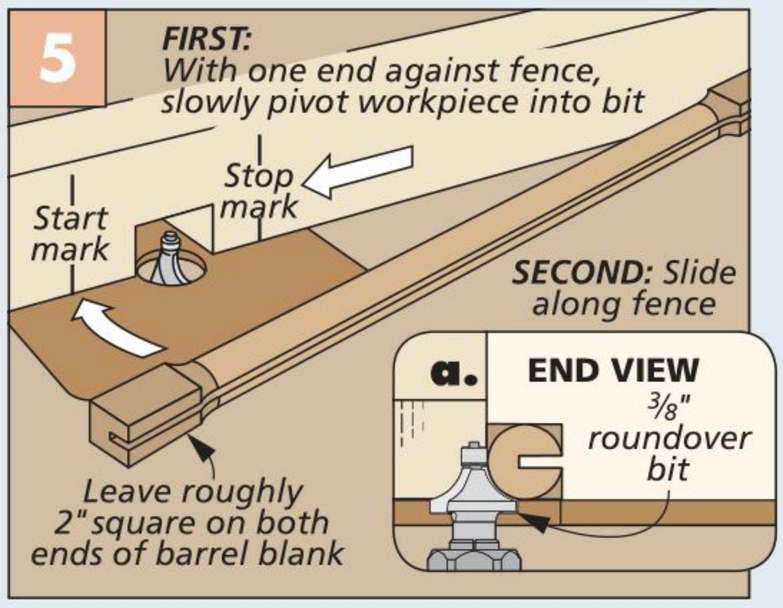
Kerf for Splines. At the table saw, cut a kerf in the front edge of the sides, guided by a tall auxiliary rip fence.



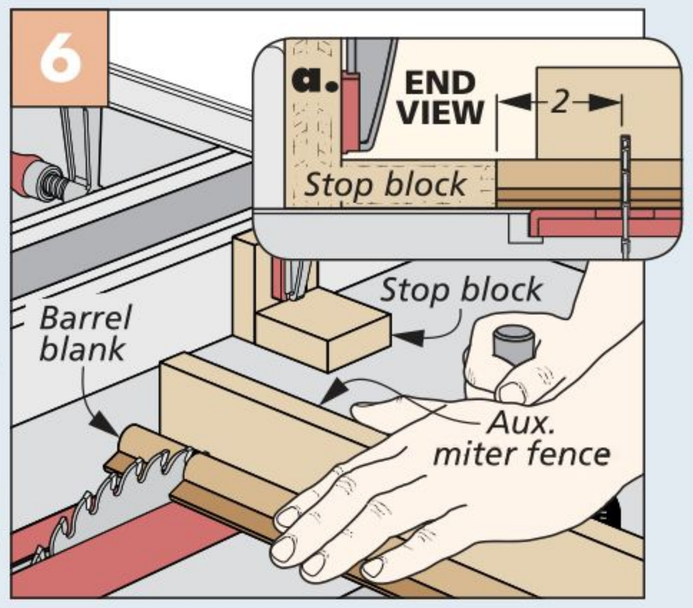
Chamfers. With the blade tilted, chamfer the front edges of the sides. Be careful not to cut into the cove.



Kerf Barrel Blank. At the table saw, cut a kerf in a square blank for what will become the hinge barrels.



Create Dowel. Round over all four edges of the barrel blank to create a dowel, then glue in a hardboard spline.



Hinge Assembly. Use a stop block and miter gauge to cut the hinge barrels to length.

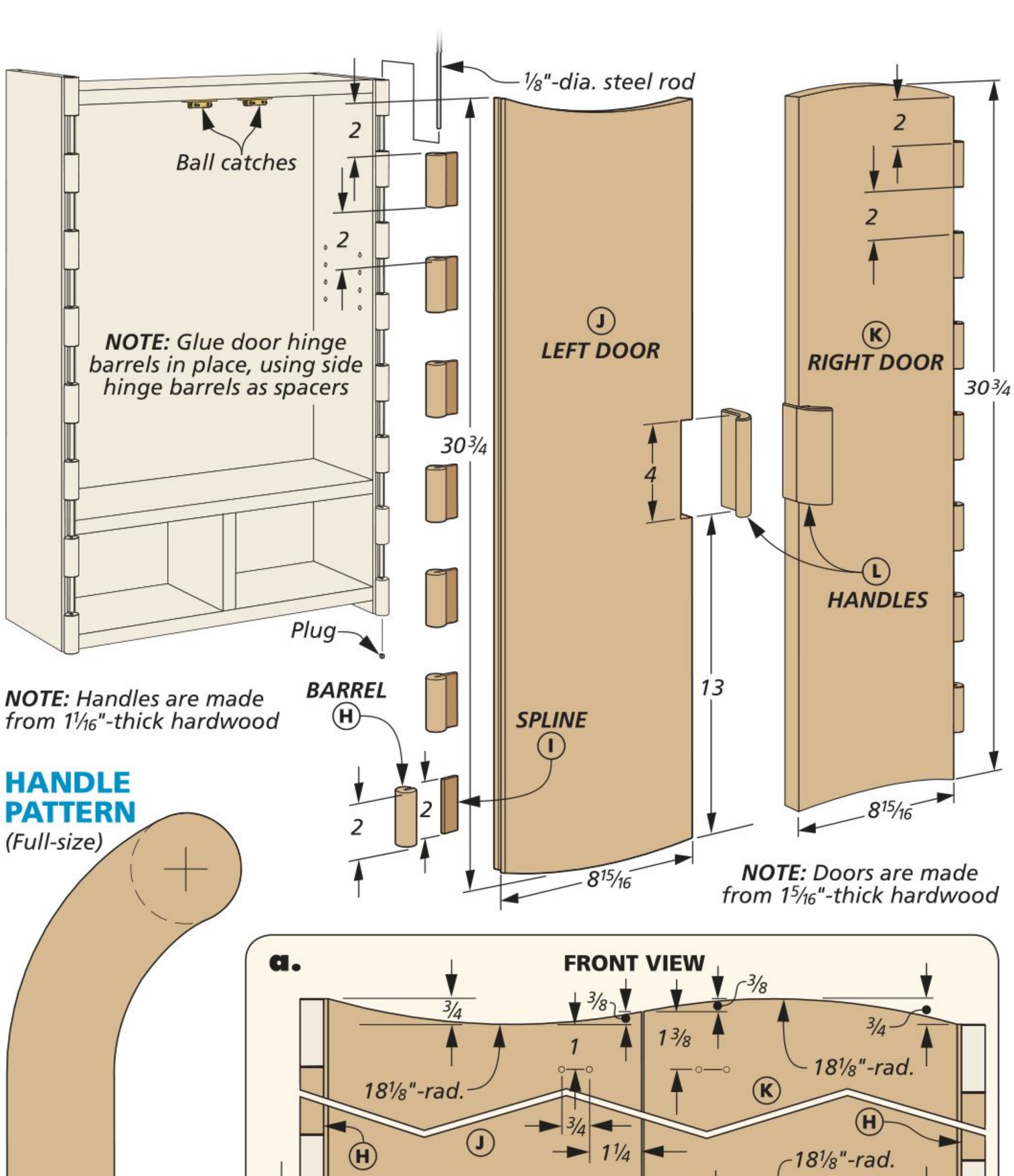
Curved DOORS & DRAWERS

After the construction of the case and the hinges, you're well on your way to having a great looking wall cabinet. Up next is tackling the doors.

NOT YOUR STANDARD DOOR. Like I mentioned before, the doors are made out of solid mahogany. Start them by cutting the stock to rough width. You'll want to leave them a little wide so that you can fine-tune the fit later. The outer edge of each door is milled using the same process that was used on the sides. But because of the curvature of the doors, the edge treatment is not centered (detail 'b'). Once the hinge edge is cut, you can test fit the doors to the cabinet and sneak up on the final width of the door.

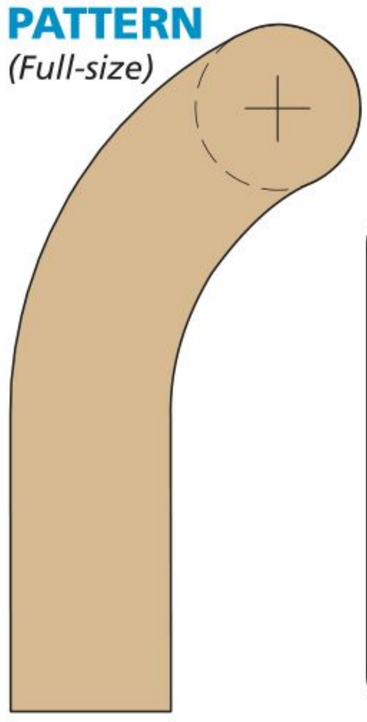
SHAPE DOORS. As you can see in detail 'a' the ends of the doors are curved. In addition the left door face is concave, while the right door is convex (Figure 1 and detail 'b'). You can read more about shaping these profiles in Shop Notes on page 64. After shaping the doors, the inner edge can be notched for the handles as shown in Figure 2.

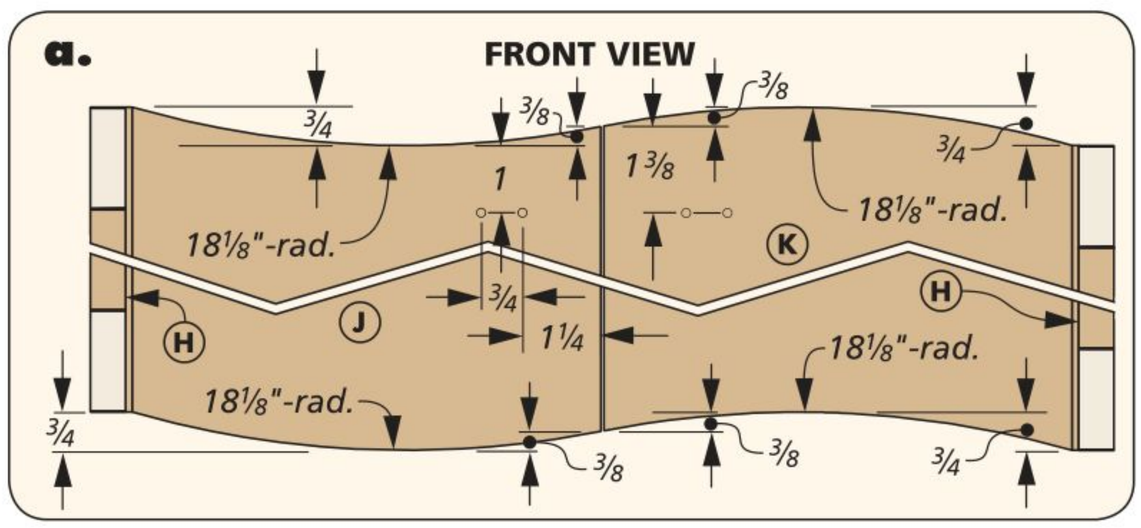
CURVED HANDLES. To make the handles for the doors, start with a thick blank and use the pattern at right. Remove the waste at the band saw as shown in Figure 3. Then, it's just a little work

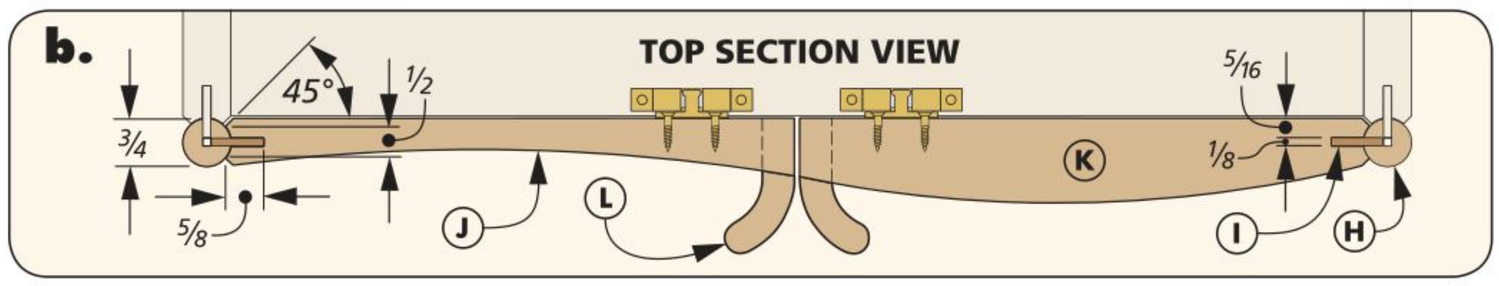


HANDLE PATTERN

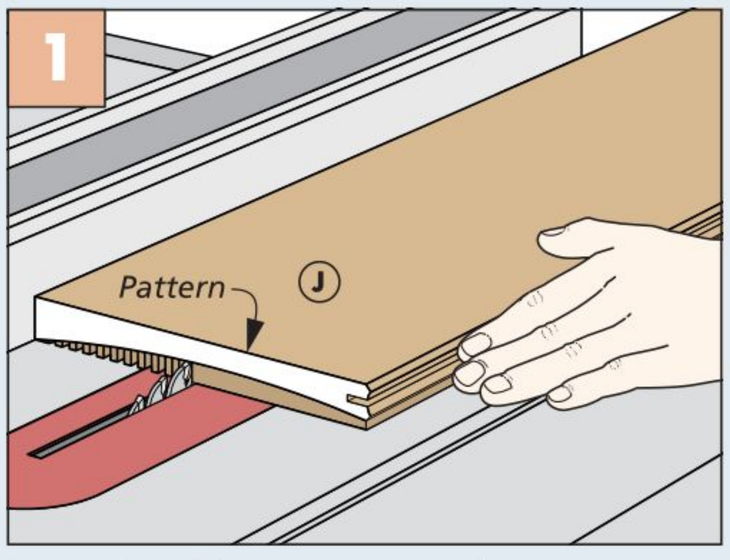
(Full-size)



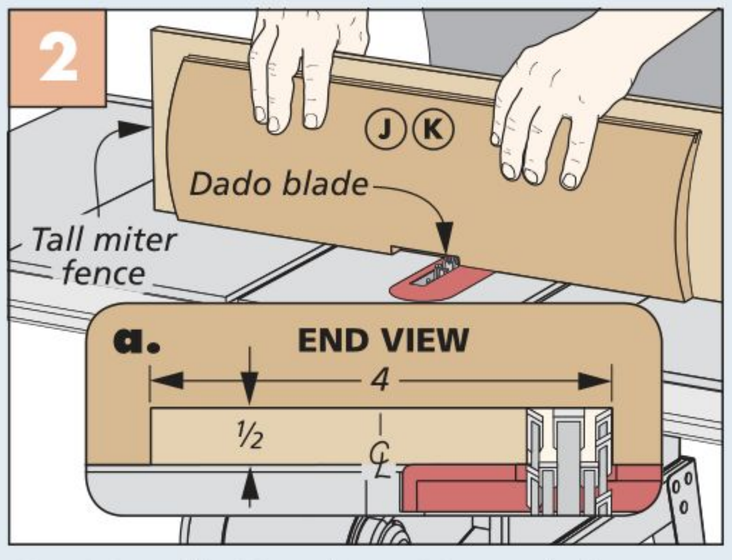




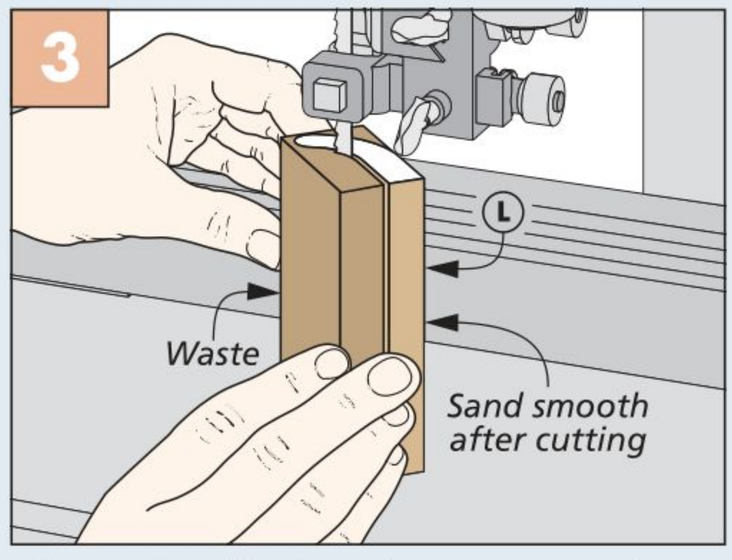
How-To: SHAPE THE DOORS & HANDLES



Door Profiles. For a step-by-step guide on creating the door shape, see Shop Notes on page 64.



Cut Handle Notches. Use a dado blade and a tall miter fence for support to cut the notches in each door.



Shape Handle. Use the pattern and a band saw to remove the waste from the blank. Then sand the handle smooth.

with some sandpaper to smooth out the shape. After that, the handles can be set aside until after finish is applied.

A ROD TO BIND THEM. Now is a good time to glue the hinge pieces into each door. Use the hinge barrels that are already glued to the case as spacers for installing the door barrels. Finally, it's a simple matter of interlocking the doors and case hinge barrels and sliding the rod partially into place. Before starting on the drawers, install the door catches and a small plug in the bottom barrel to prevent the rod from falling through (main drawing, previous page).

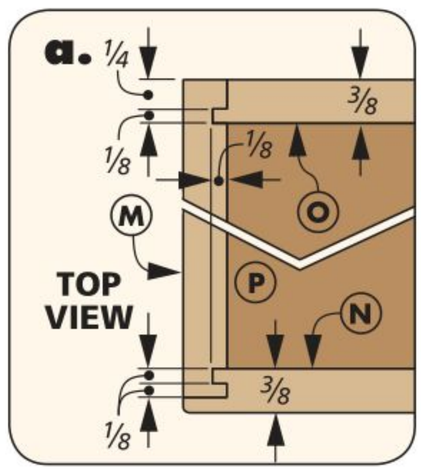
DRAWERS

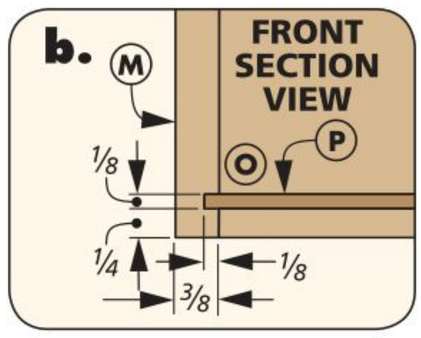
At this point, you have a beautiful, serviceable cabinet. But I took it a step further and added a pair of drawers. The drawers aren't difficult to build and use some common joinery techniques.

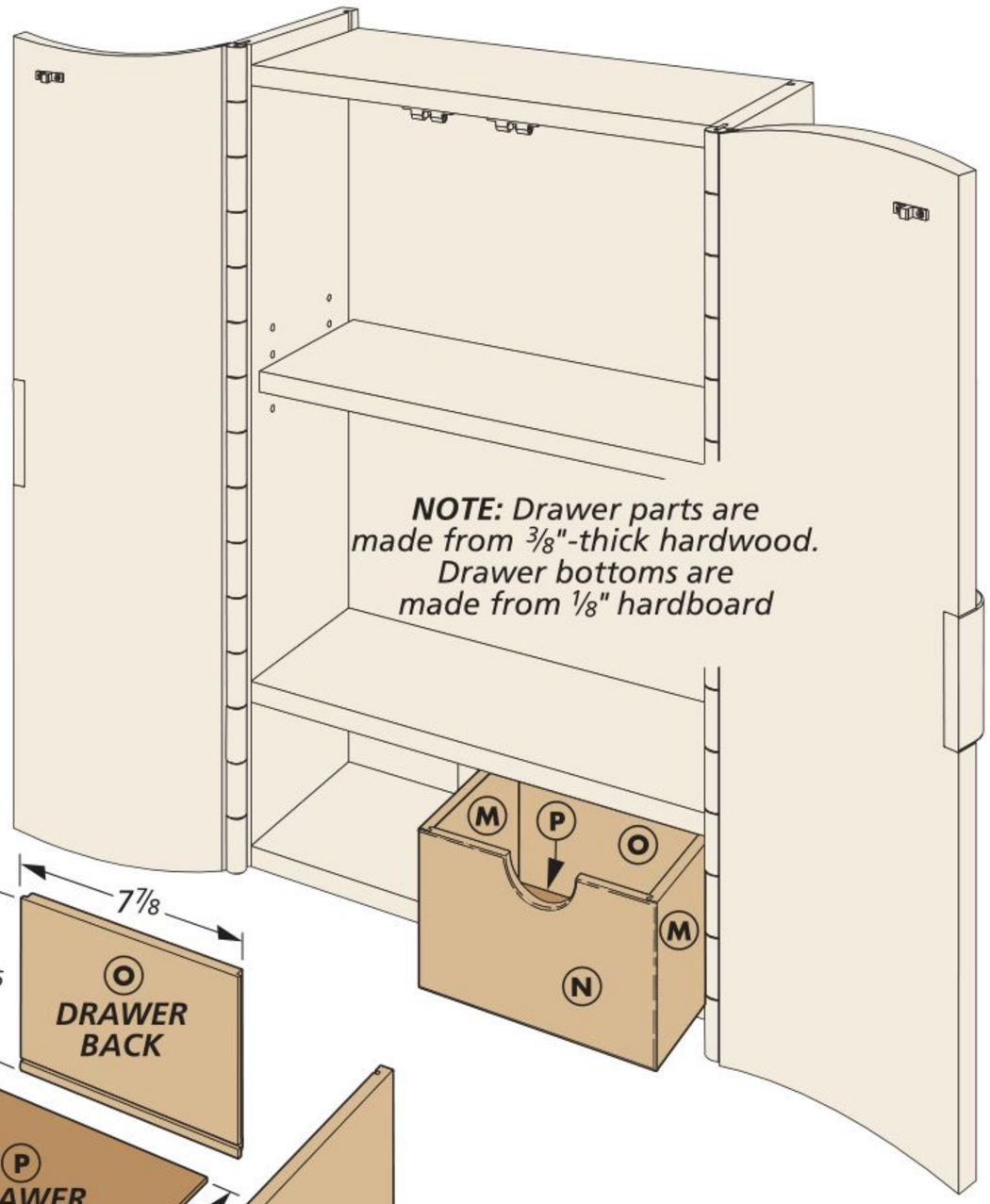
CLASSIC LOCKING RABBET. The drawer fronts are made out of mahogany for a contrast against the inside of the case. The sides and back, however, are maple. To start, a groove is cut along the bottom edge of the fronts, sides, and bottom, as shown in Figure 1. Figure 2 shows the process for cutting the locking rabbets in the fronts. The back is connected to the sides with a tongue and dado (Figure 3). Before assembling the drawer, drill a finger notch in each drawer front using a scrap block and a Forstner bit. Then, the drawers can be glued together.

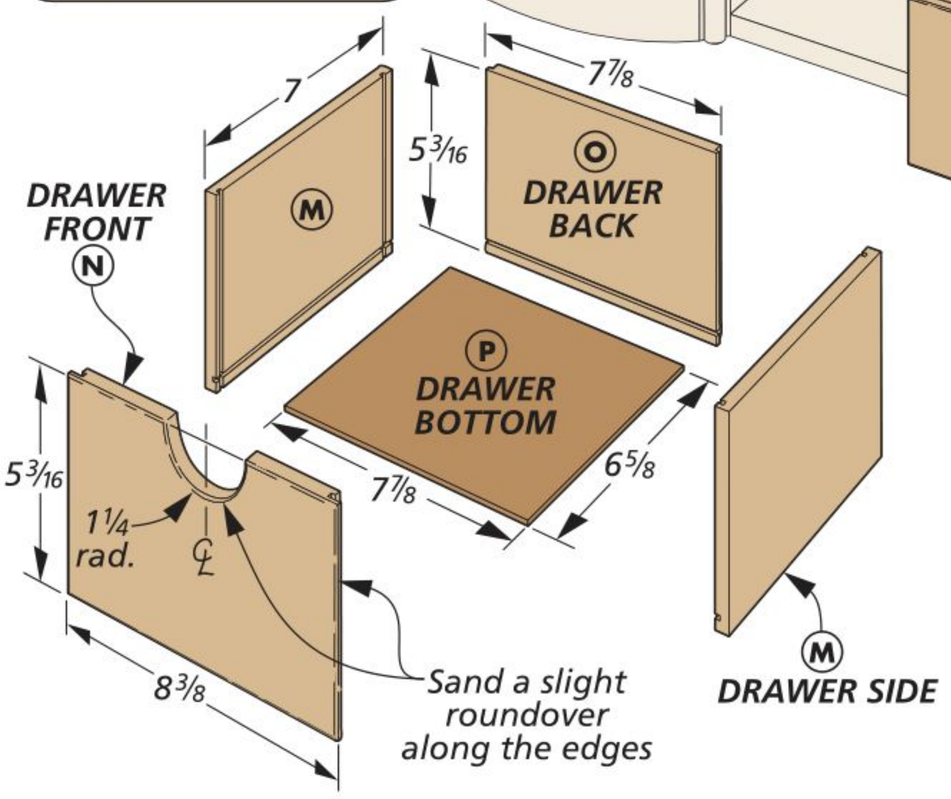
FINISH. After sanding the entire cabinet, remove the rod from the hinge so the doors can be finished separately. This keeps the hinge from sticking together. Before applying finish, mask off the notch in the doors so the handle can be glued in after the finish is dry. Then the entire cabinet, doors, and drawers are sprayed with multiple coats of lacquer. To finish the handles, paint them with a couple of coats of black milk paint, and then finish them with lacquer, again masking off glue areas. Then, glue them in place.

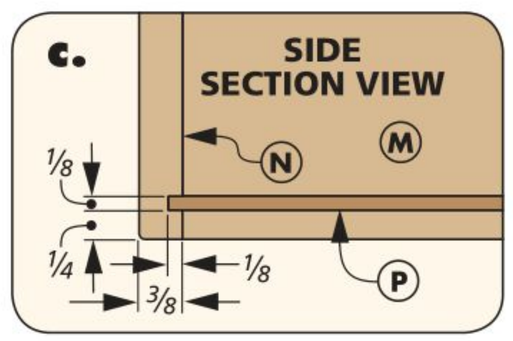
With the handles installed, the cabinet is ready to be mounted with a pair of Z-clips. Now, the cabinet is ready to offer stylish storage any place in the house. W



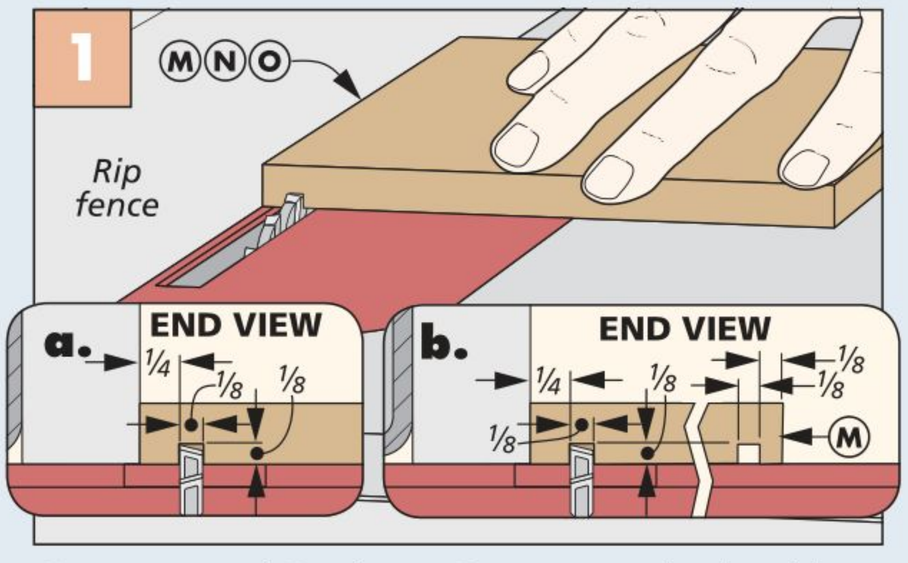




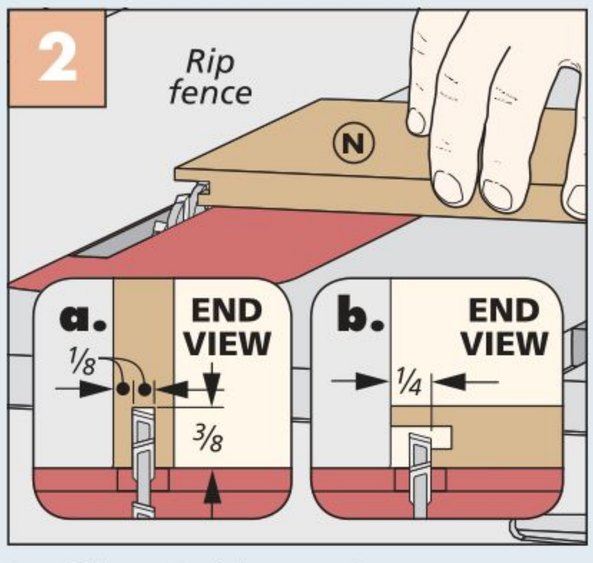




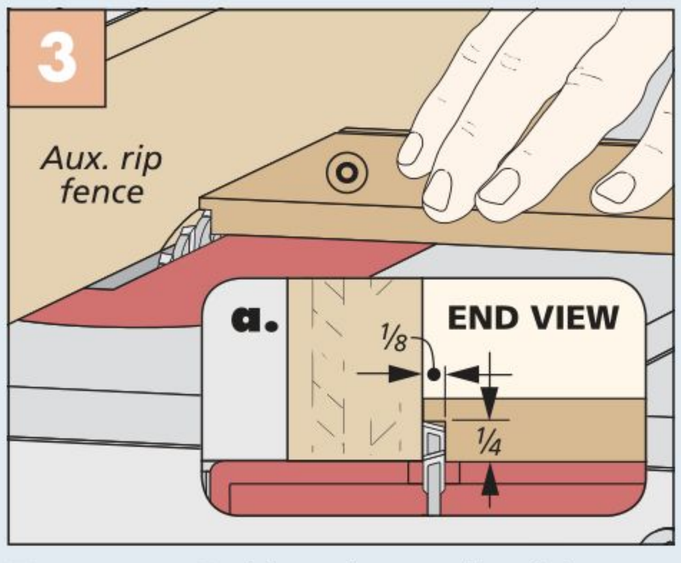
How-To: CUT THE DRAWER JOINERY



Grooves and Dadoes. Cut grooves in the sides, front, and back for the bottom. Cut dadoes in the drawer sides for the front and back.



Locking Rabbets. Cut a groove in the drawer front and trim the tongue for the locking rabbet.



Tongues. Rabbet the ends of the drawer back to create tongues that fit into the drawer sides.

Shop Project

Roll-top Chisel Case

The solid-wood construction of this chisel case not only protects and organizes your chisels, but is also a handsome addition to your shop.

When it comes to woodworking, most woodworkers put themselves in a category of either using hand or power tools. But no matter what type of woodworker you consider yourself, a good set of bench chisels is a necessity in any shop. Often though, chisels tend to get buried on a cluttered bench. Or worse yet, roll off the bench and onto the floor. Keeping your chisels safe and clean is where this chisel case shines.

TAMBOUR DOOR. The most distinguishing feature of this case is the tambour door. When closed, the door keeps dust and chips out and protects your chisels. The door slides in a track to reveal the storage area for the chisels. While the tambour door looks challenging to make, breaking it down into a few simple steps makes it much more approachable.

CUSTOM CRADLES. The chisels rest in a pair of cradles that hold the butt of the handle and the blades. While we designed these cradles to hold four sizes of chisels, this configuration is easily customized for your brand and size of chisels.

Written by: Logan Wittmer; Project design: Chris Fitch

Grooved SIDES

When broken down, the chisel case is built with only a few parts. While none of them are complicated, the sides of the case require the most work, so that's where I chose to begin.

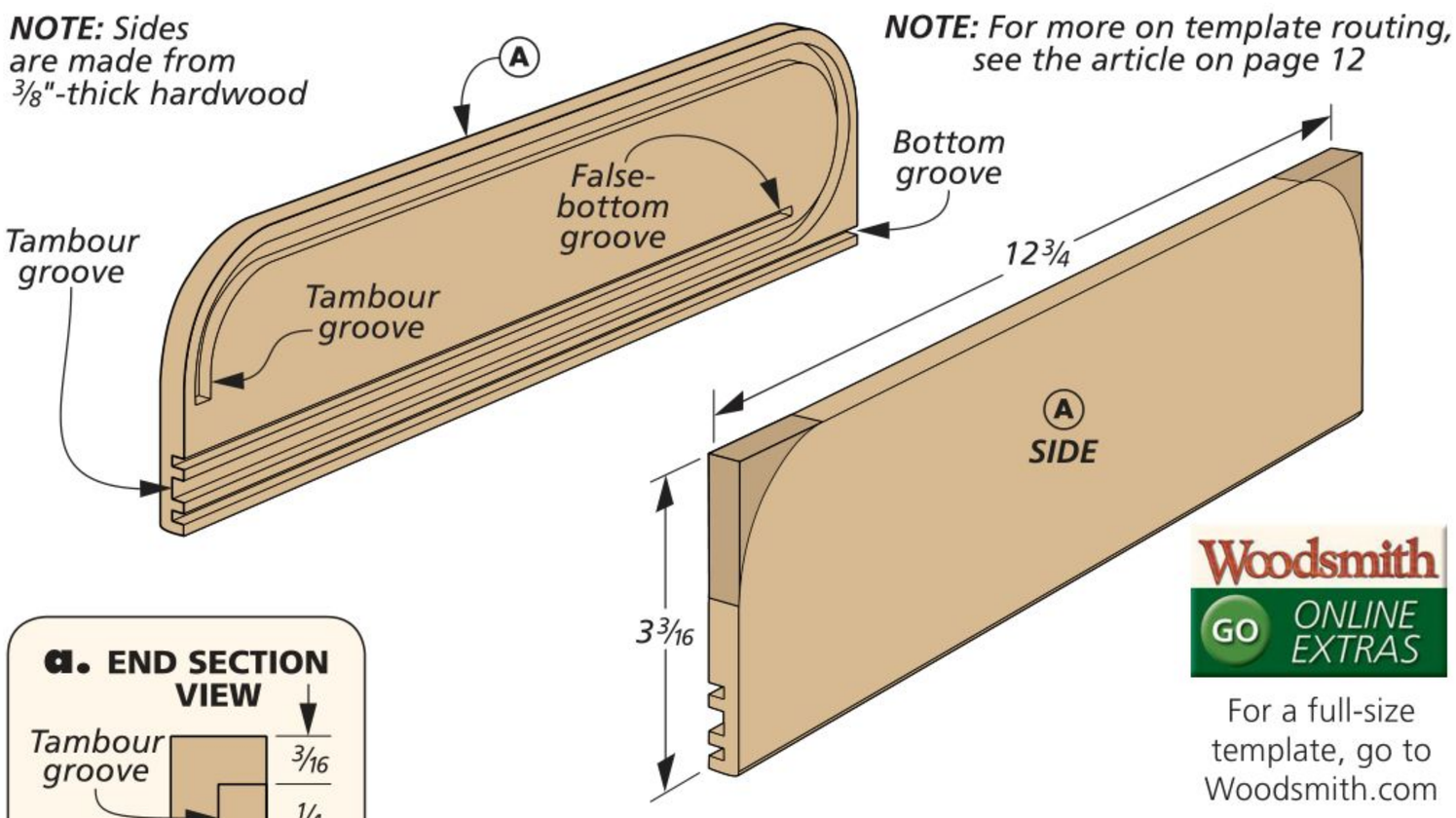
SIDE BLANKS. The sides start as hardwood blanks that are planed down to final thickness and cut to overall size. For this case, I chose a nice piece of straight-grained walnut. Because of the small amount of wood needed to build this project, it's the perfect opportunity to use that small piece of special wood that we all seem to hold on to.

GROOVES GALORE. The sides each receive three grooves. The first groove acts as a track for the tambour door. This is an oval-shaped groove that follows the profile of the sides. The groove straightens out on the lower half of the oval and exits through the front edge of the sides.

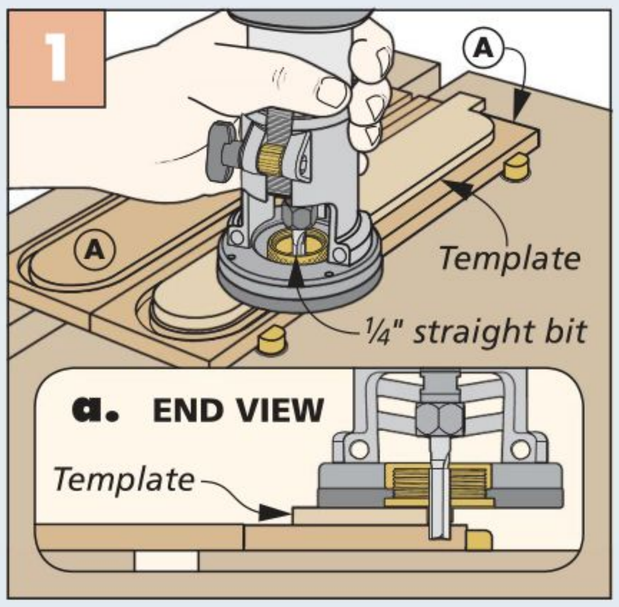
The other two grooves are straight and house a pair of bottom panels that help hide the door when it's open. We'll talk about the bottoms later, but you can see the layout of their grooves in the main illustration at right.

TAMBOUR GROOVE. After making the template at right, I routed the tambour groove using a router equipped with a guide bushing and a straight bit (Figure 1).To rout the opposite side of the case, simply flip the template over.

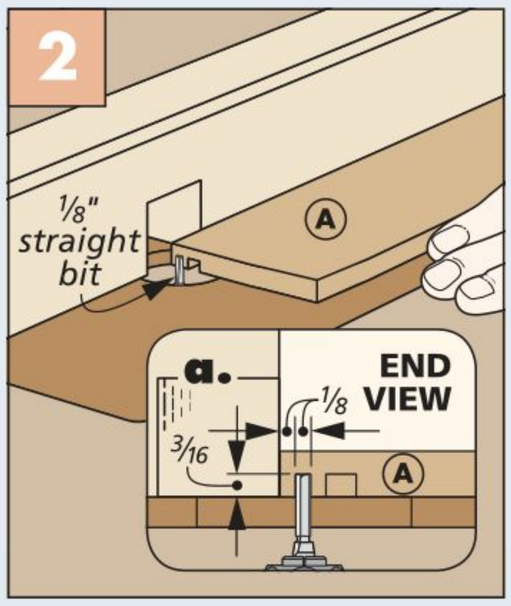
Figures 2 through 4 walk you through cutting the straight grooves in each side. The setup for the through bottom groove is the same on both sides, so go ahead and start with that one. Then, the stopped groove can be routed on both sides. Use stop marks on the fence and stop the workpiece when the end reaches the mark. Details 'a' and 'b' above show the groove locations. Finally, round the corners of the sides at the band saw and sand them smooth.



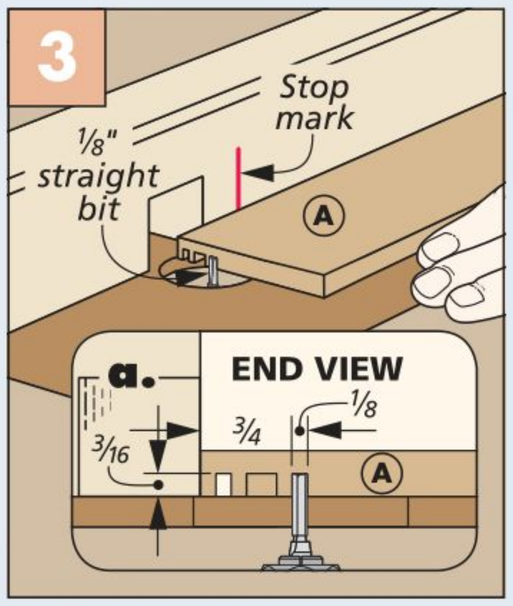
How-To: ROUT THE GROOVES IN THE SIDES



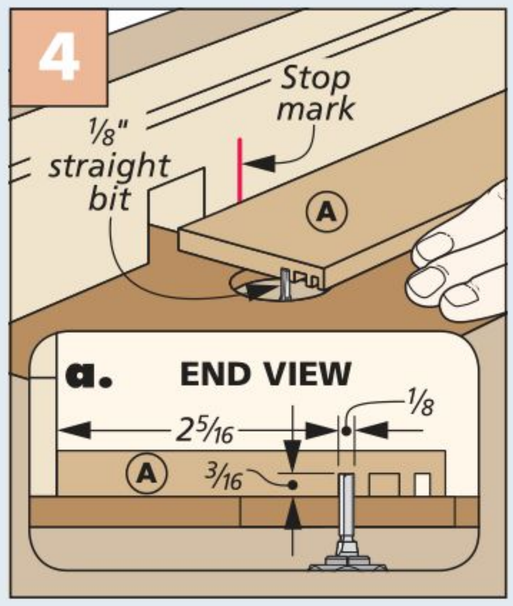
Tambour Groove. Use a router equipped with a bushing and straight bit to rout along template.



Rout Grooves. Rout the through grooves in both sides using a straight bit.

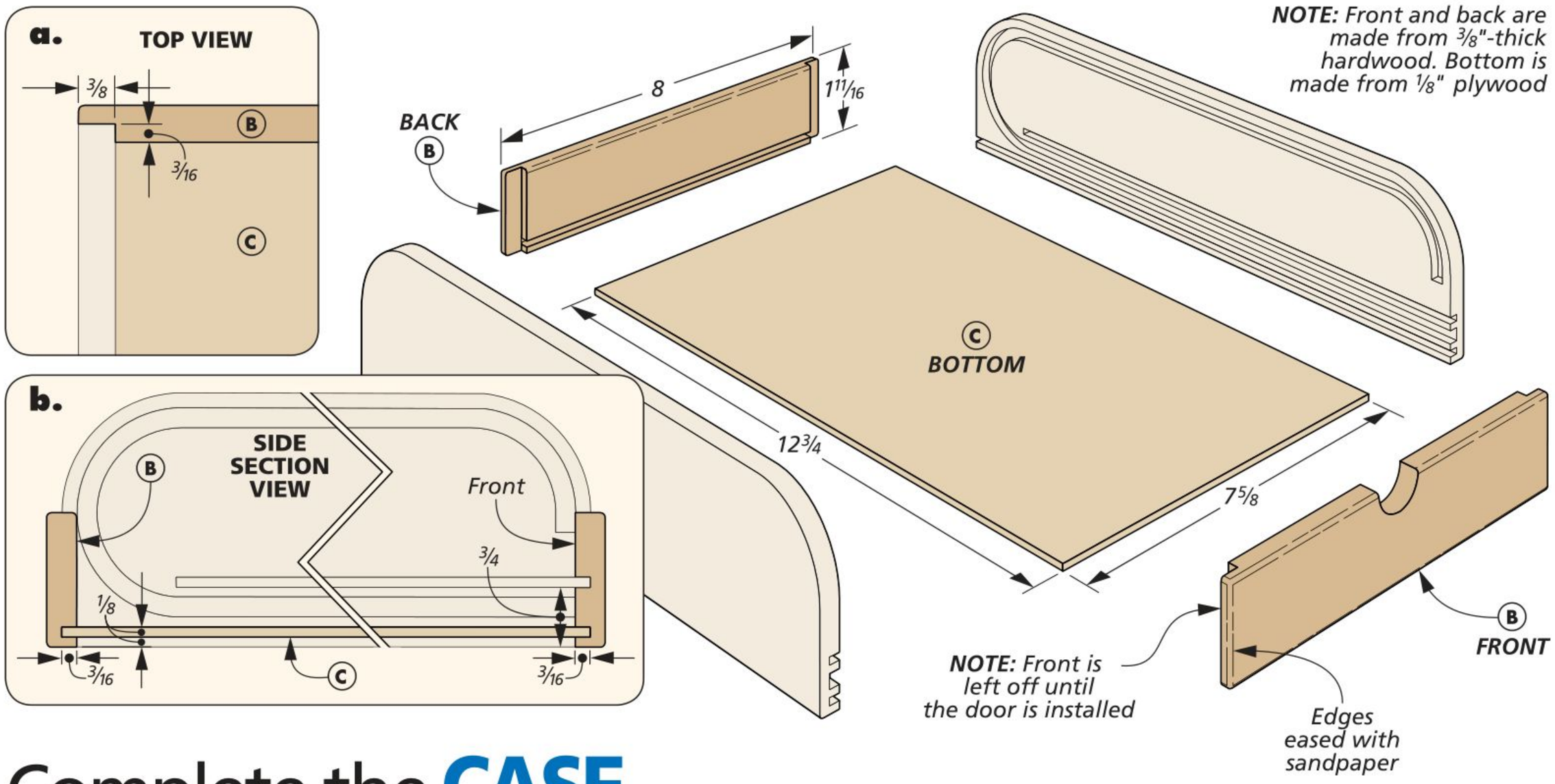


Left Groove. Rout the stopped groove in the left side at the router table.



Right Groove. Reset the fence to rout the stopped groove in the right side.

Illustrations: Peter J. Larson



Complete the CASE

The remaining parts of the chisel case are straightforward to make, but a certain assembly order needs to be followed to ensure the tambour door can be slid into place after a finish has been applied.

FRONT & BACK. The front and back of the case are the next items to take care of. A pair of rabbets wrap the sides, and grooves capture the bottom panels, as shown in details 'a' and 'b' above.

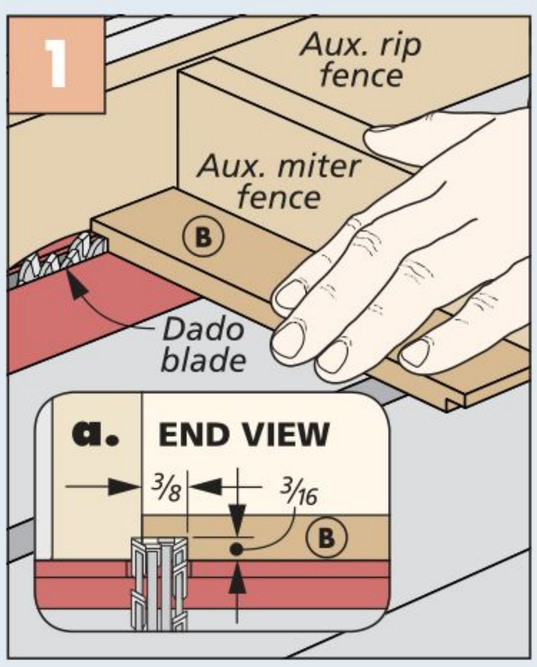
With the pieces cut to size, I cut the rabbets on each one first. Figure 1 below shows this process at the table saw. Both the front and back receive a groove for the bottom, as shown in Figure 2. That takes care of the back. The front needs a little more work before it's ready for assembly.

The front requires a second groove to house the false bottom. Figure 3 below shows the setup for cutting this groove on the table saw. The final step for the front is cutting a finger notch to open the tambour door. This is easily accomplished with a piece of scrap and a Forstner bit in the drill press (Figure 4).

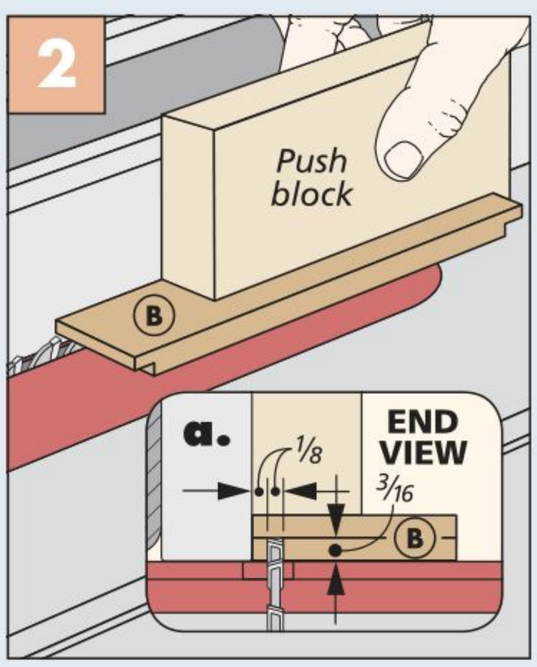
A PARTIAL ASSEMBLY. At this point, the bottom can be cut to size. Then you're ready to do some assembly. As mentioned, the trick is being able to slide the tambour door into the groove after finish has been applied. In this case, that requires leaving the front off until the tambour is completed later.

Glue the back to the sides and slide the bottom into place. It's helpful to clamp the front in place (without glue) to keep the case square. With that drying, you can start on the cradles.

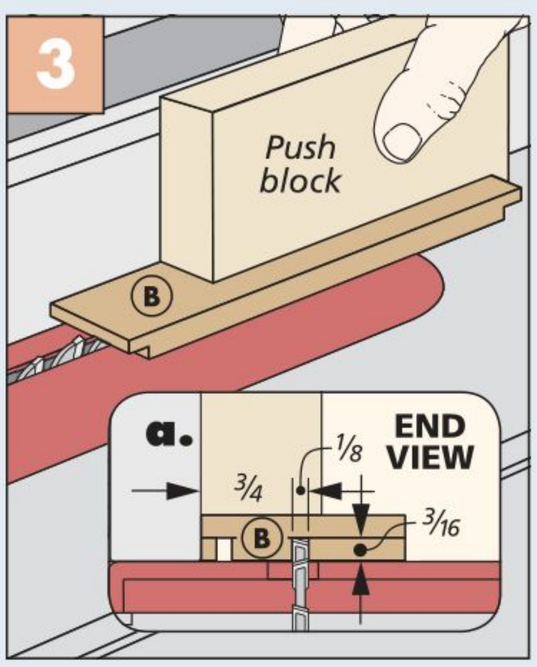
How-To: MAKE THE GROOVES & RABBETS



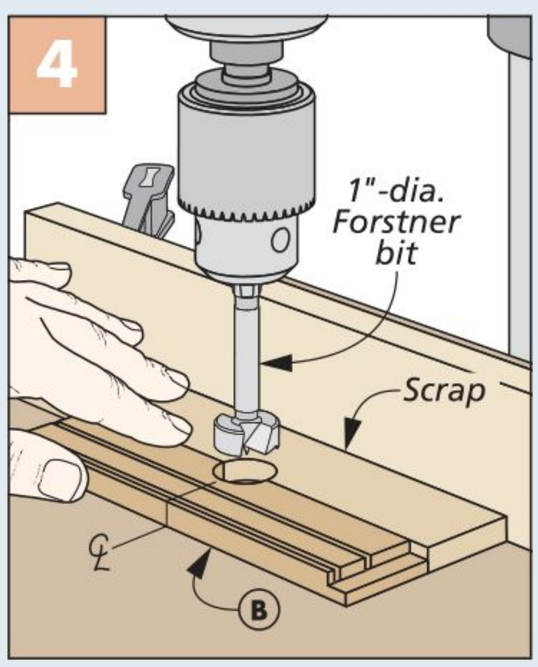
Rabbets. Rabbet the front and back using a dado blade and auxiliary fence.



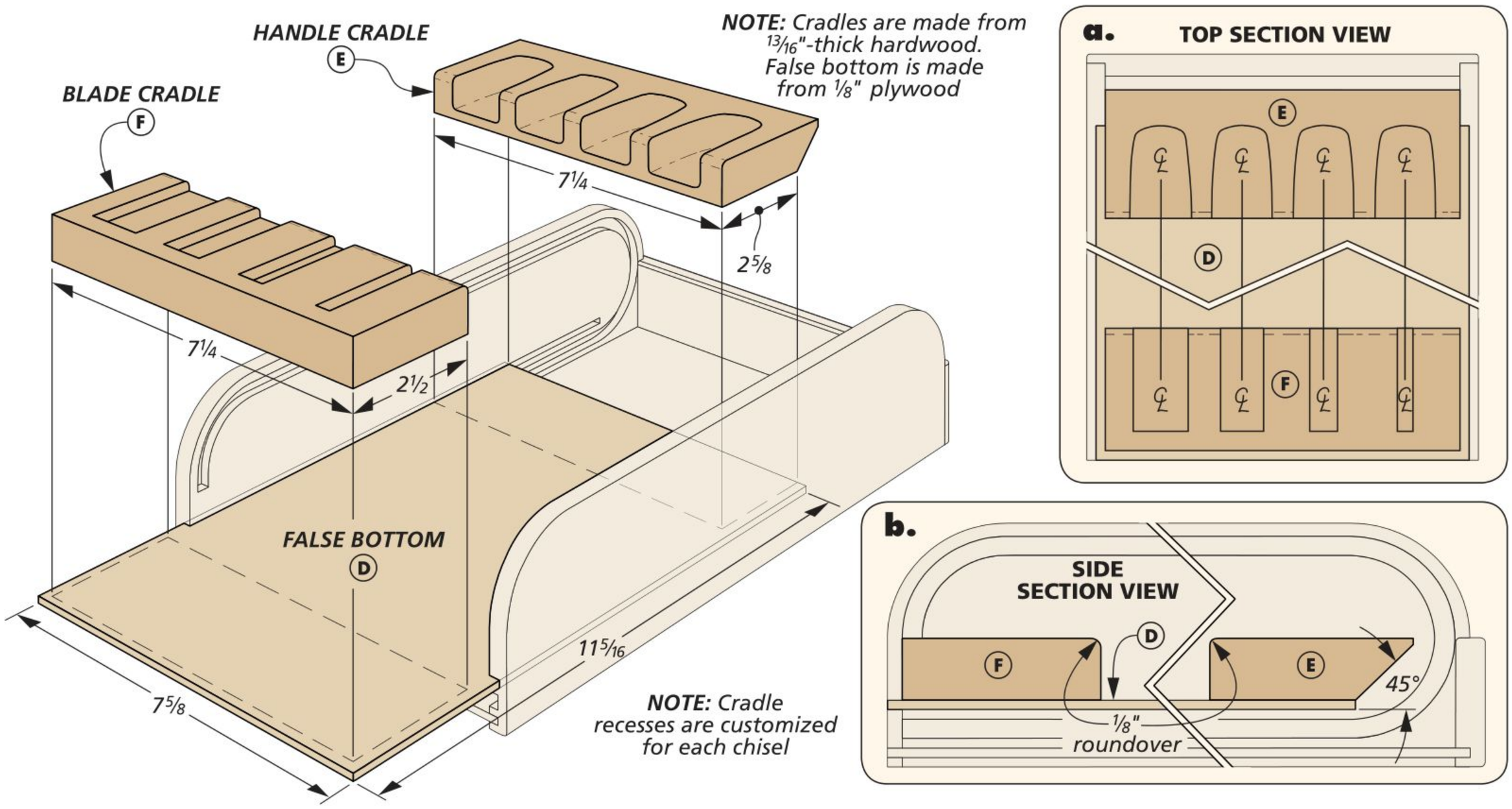
Bottom Grooves. Groove the bottom edge of both pieces for the bottom panel.



False Bottom Groove. Cut a second groove in the front for the false bottom.



Finger Notch. A scrap piece and a Forstner bit makes fast work of the finger notch.



CHISEL CRADLES

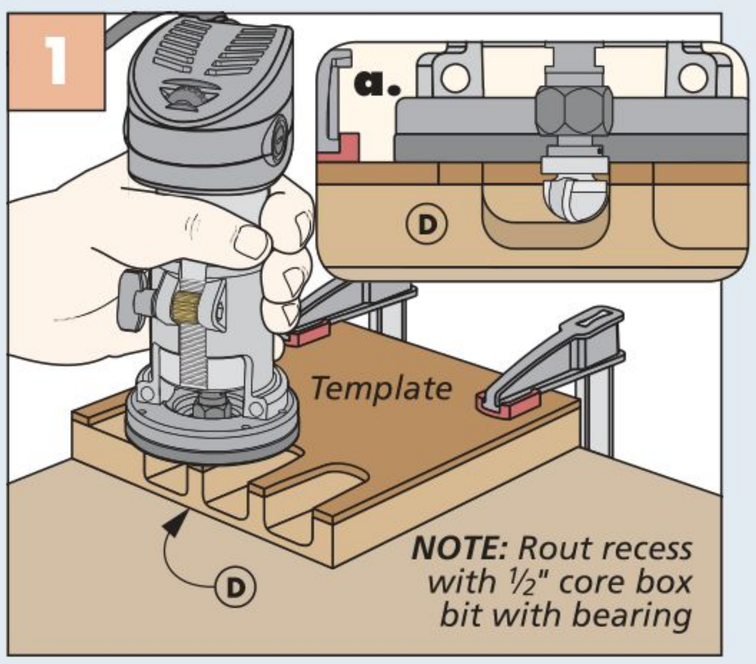
The chisels are held in place using two cradles — one to hold the blades and one for the handles. These are made from hard maple to closely match the bottoms.

HANDLE CRADLE. The cradles start as oversized blanks, and you'll want to mark centerlines where each chisel will sit (detail 'a'). To create the recess for the handles, first use a piece of hardboard to make a template. Draw the outline of a chisel handle on the hardboard and cut away the waste, sneaking up on the fit. Your handle should fit neatly into the template. Then, use double-sided tape to hold the template on the cradle blank.

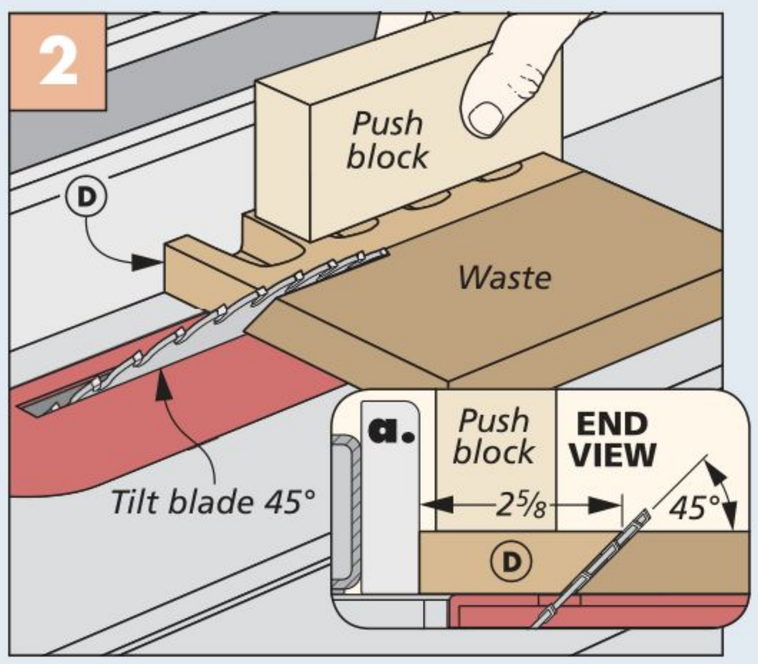
It's then a matter of following the template using a router equipped with a core box bit (Figure 1). The handle recesses should be about half the depth of your chisel handle thickness. Repeat the process for the remaining handle recesses. Finally, the back edge of the handle cradle can be cut at 45° to make room for the tambour door, as shown in Figure 2 and detail 'b'.

BLADE CRADLE. The blade cradle recesses are cut using a template much like the handles. This time however, use a guide bushing and a straight bit in your router and nibble away the waste (Figure 3). You're shooting for the chisels to rest level when held in both cradles, so test fit the chisels and adjust the depth accordingly. Afterwards, the ends of the slots can be squared up with a chisel and the cradles glued to the false bottom, as shown in the main drawing above. Details 'a' and 'b' show the position.

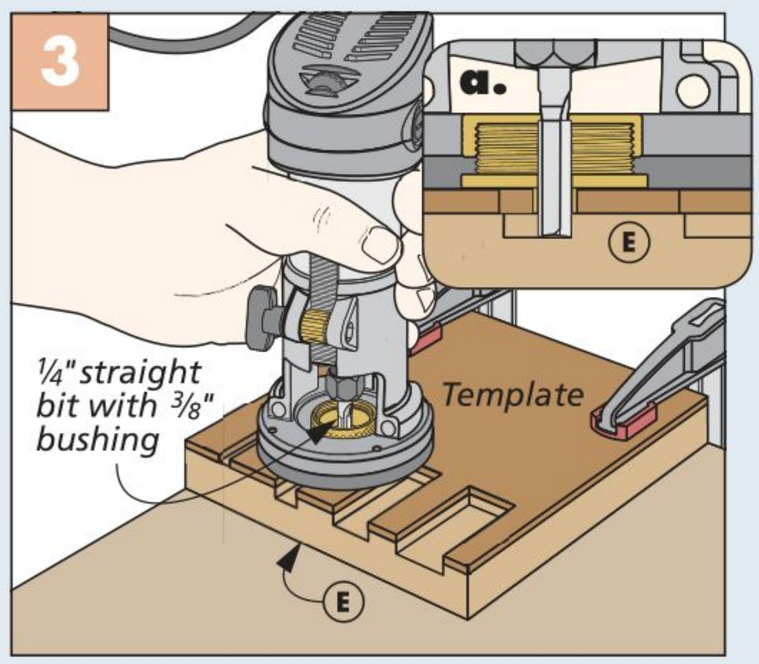
How-To: ROUT THE CHISEL CRADLES



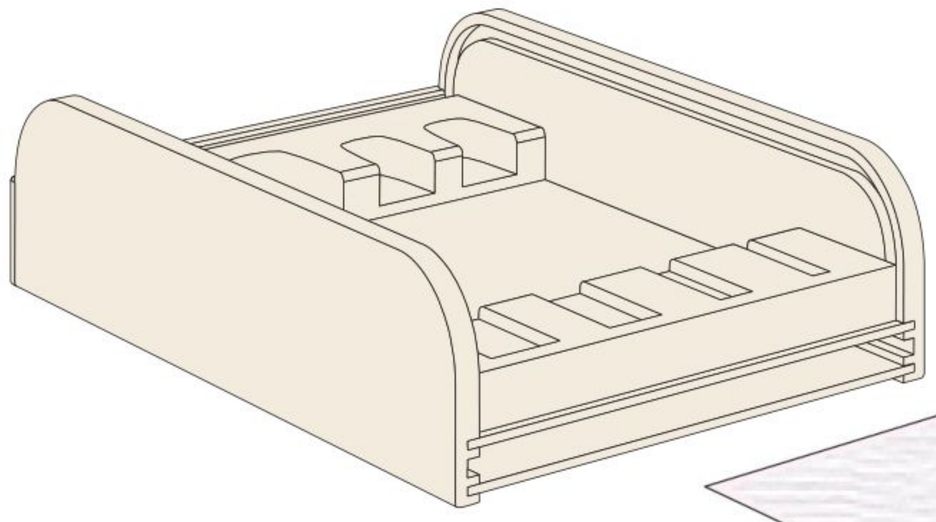
Chisel Handle Recesses. Use a core box bit to rout the handle recess. Follow the template, moving deeper as necessary.



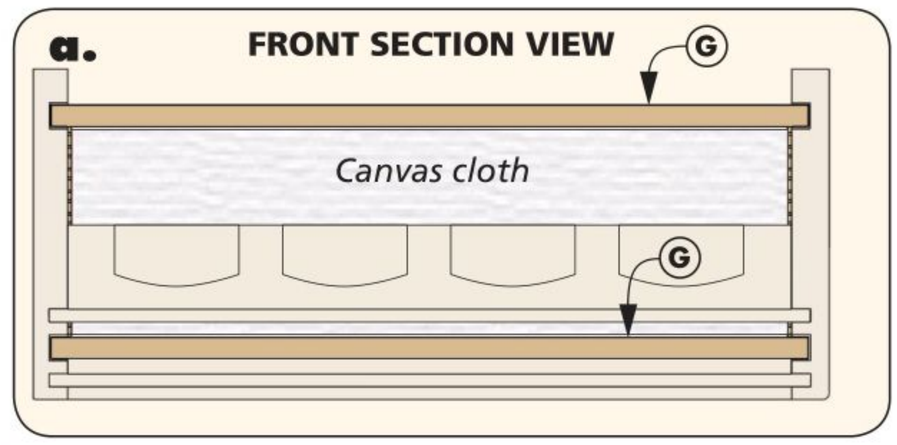
Back Edge Bevel. Bevel the back edge of the handle cradle to 45°, then sand the sharp point to a small flat.

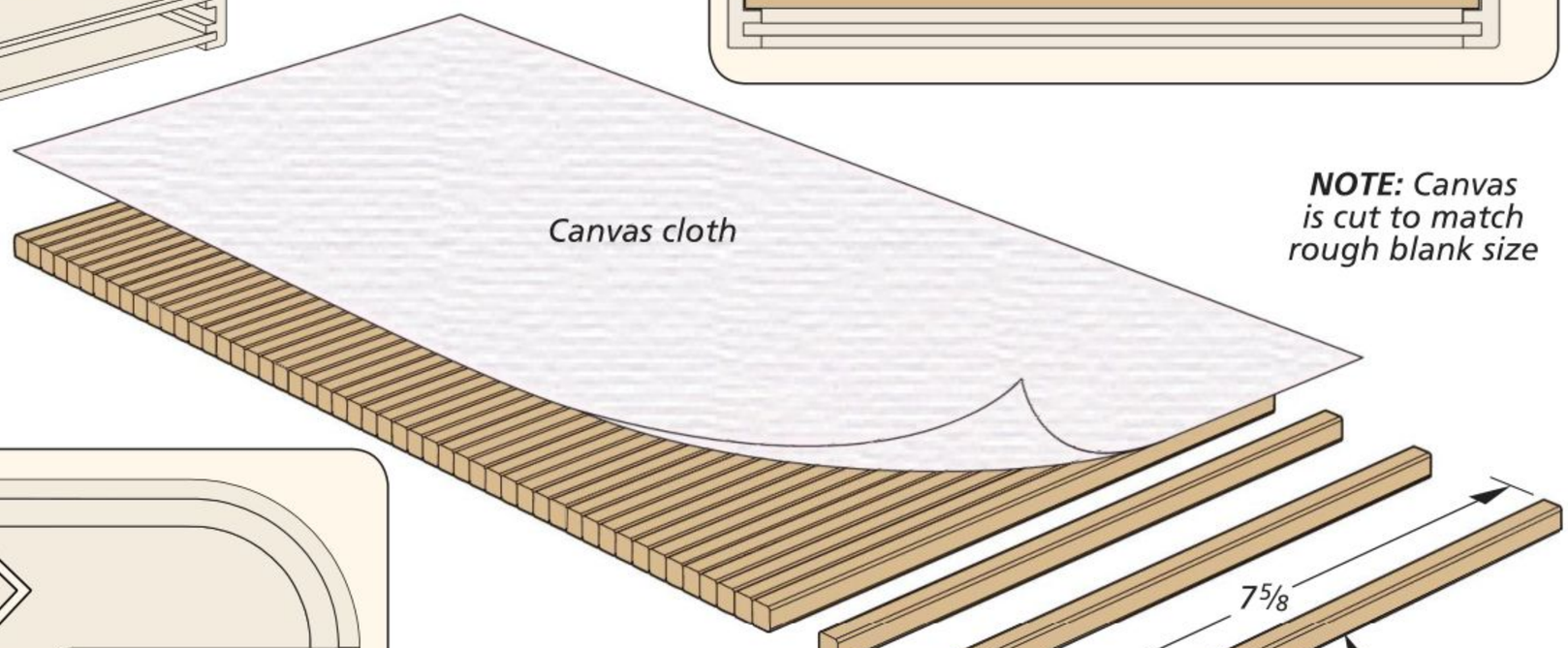


Blade Recesses. Make a blade template at the table saw. Use a guide bushing and straight bit to rout the recesses.



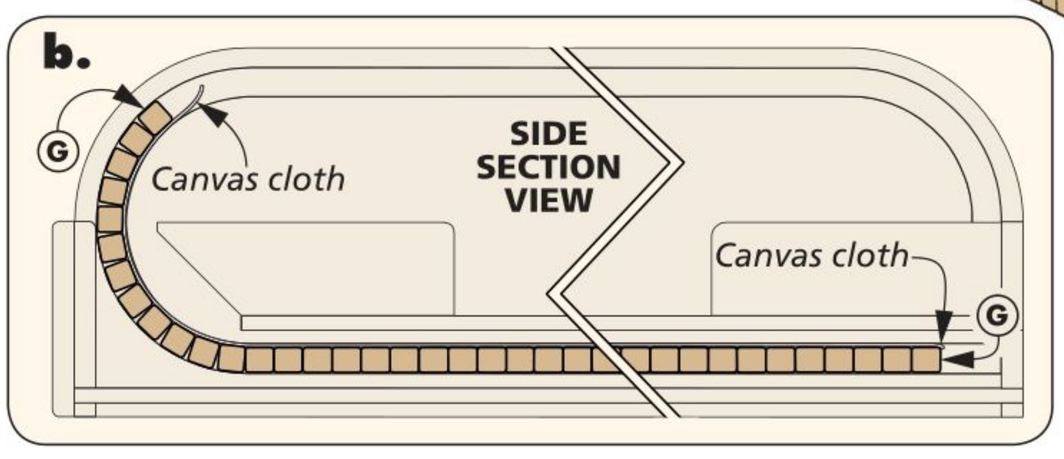
NOTE: *Tambour strips are left long, then cut to size on sled with canvas cloth attached*





NOTE: *Canvas is cut to match rough blank size*

NOTE: *Tambour strips are made from ¼"-thick hardwood*



Building the TAMBOUR DOOR

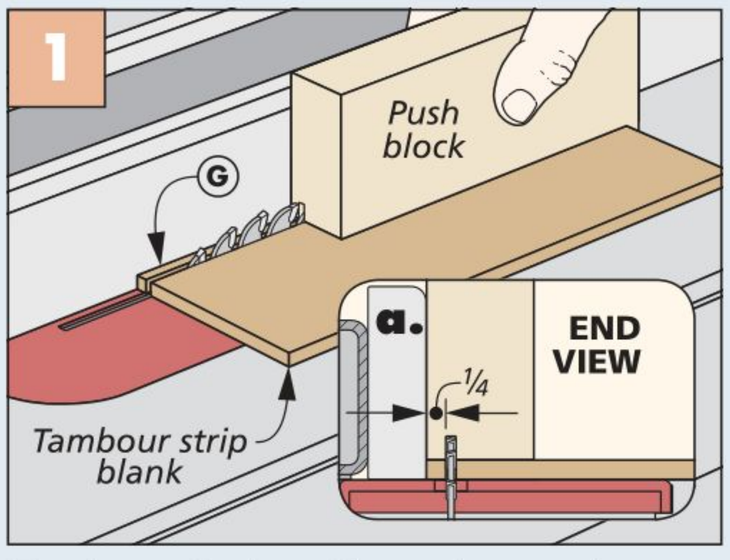
A well-built tambour door slides smoothly and effortlessly. Not only that, but it's fun to open. These few steps will have your door working in no time.

TAMBOUR STRIPS. The door starts as a series of hardwood strips. The strip stock is planed slightly thinner than ¼" (to allow room for the canvas backer). The strips are then ripped to width at the table saw, but leave them a little long. Figure 1 below gives all the details.

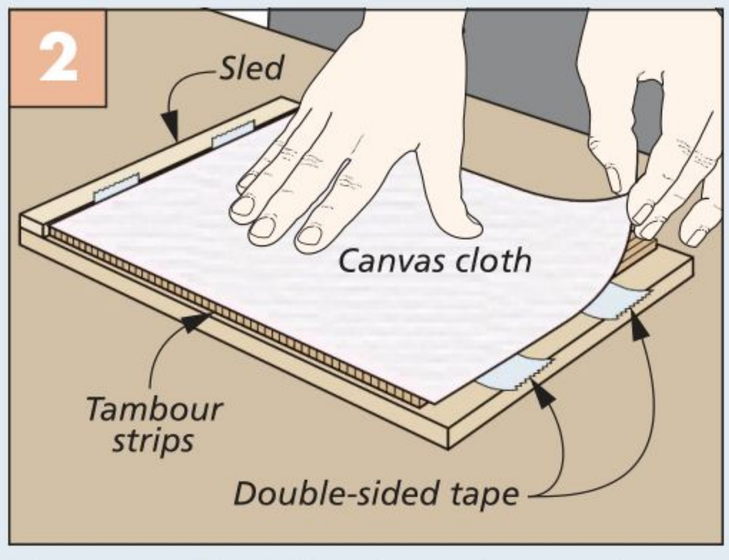
To hold the strips together as one continuous door, a piece of canvas is glued onto the back of the strips. A simple sled aids in aligning the strips before applying the cloth. The sled is just a piece plywood with a cleat glued 90° to one edge (Figure 2). The tambour strips are aligned to the cleat and held down with double-sided tape. With the strips in place, the canvas cloth can be glued on top with wood glue. One end of the canvas needs to be left a little long so that a handle can be glued on later. Once the glue has tacked up, the sled with attached strips can all be cut to final width (Figure 3).

Before the glue cures fully, you'll want to pull the tambour door off the sled. Once the door is off, roll the strips to separate them (Figure 4). Then stand the curled door on edge to finish drying. This breaks any glue between the slats and ensures the door will operate smoothly.

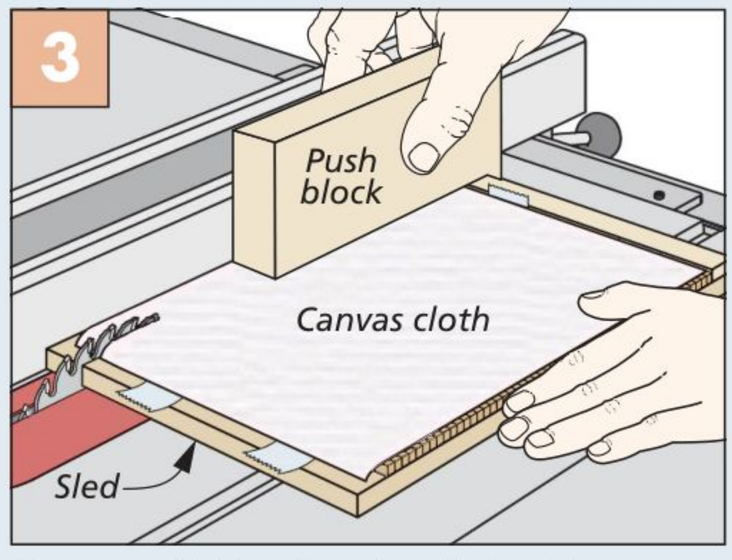
How-To: SHAPE, ASSEMBLE, & INSTALL THE TAMBOUR



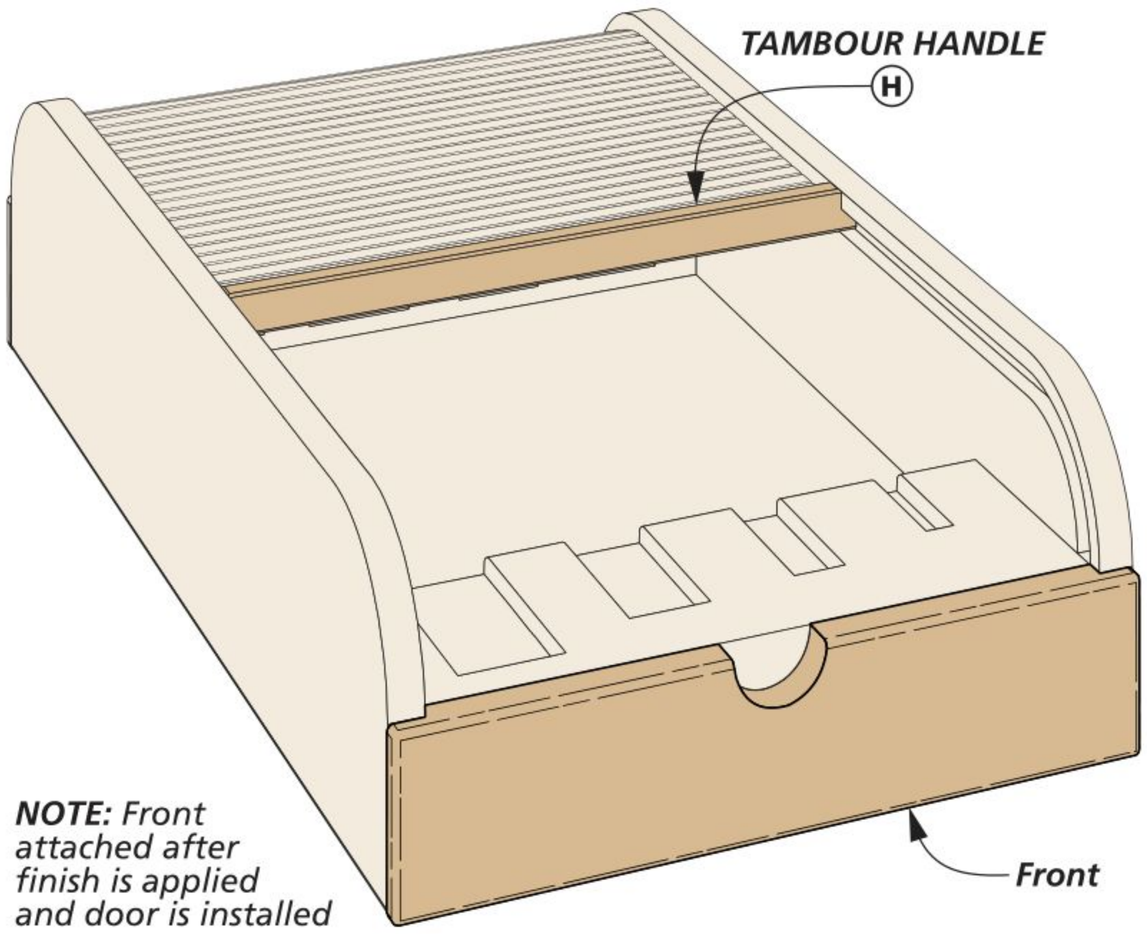
Tambour Strips. Rip tambour strips to width from a large blank. Use a push block to safely make the cuts.

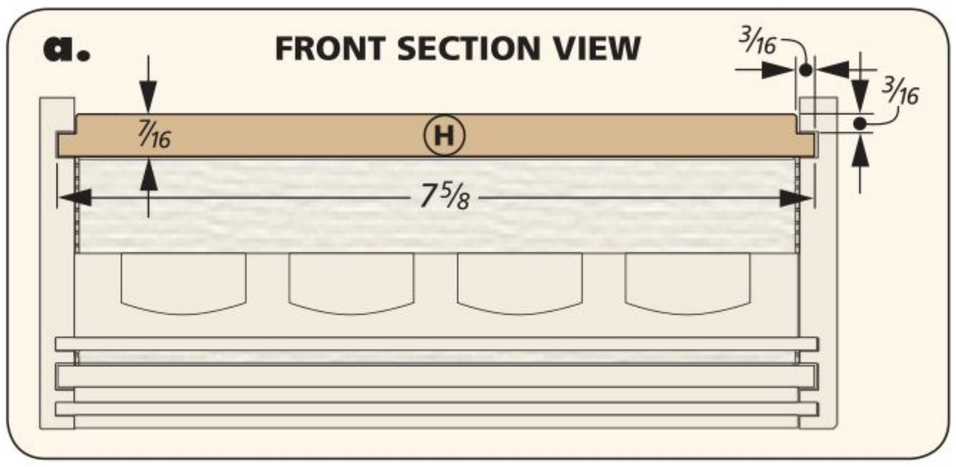


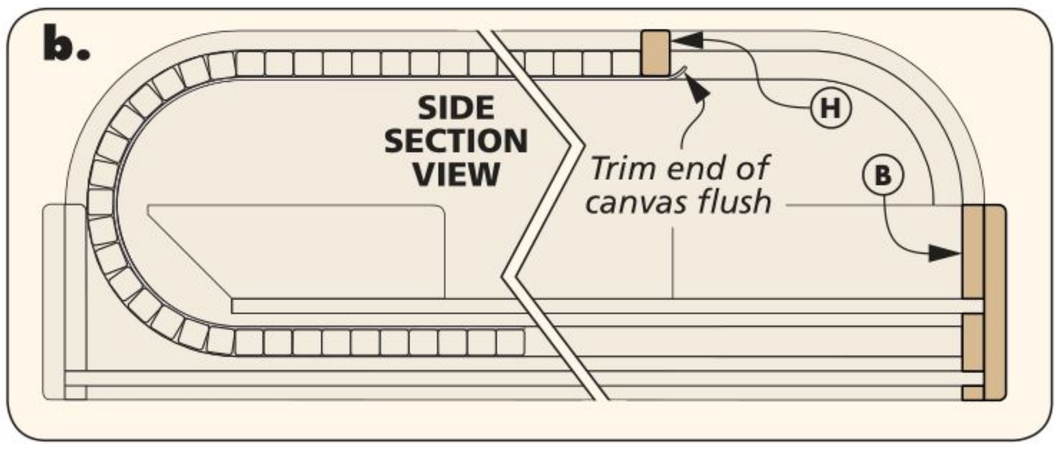
Tambour Sled. Attach tambour strips to a plywood sled using double-sided tape. Then apply canvas cloth with glue.



Cut to Width. Cut the sled with attached tambour strips to final width at the table saw.







TAMBOUR HANDLE. The last steps before the door can be installed are to ease the tambour edges with sandpaper and add a handle. The handle is a little taller than the door and has rabbets on both ends to ride in the tambour grooves (detail 'a'). Figure 5 shows how to make the handle.

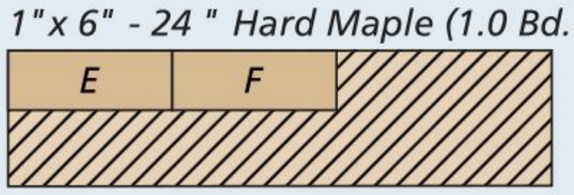
Before installing the tambour door, the case and door get sprayed with satin lacquer. Remember to mask off the areas where the front end will be glued to the sides.

INSTALL DOOR. After the finish is dry, the door can be inserted into the tambour groove and slid into place. Finally, glue the tambour handle onto the remaining tail of canvas (Figure 6). Cap off the case by gluing the front in place (detail 'b'). With the handle and front installed, the case is ready to go on full display in your shop. W

Materials, Supplies & Cutting Diagram

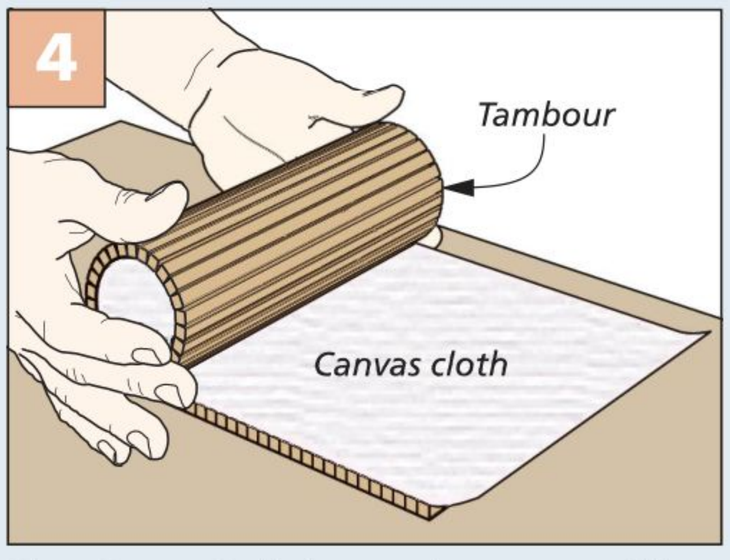
A	Sides (2)	3/8 x 3 3/16 - 12 3/4	**C**	Bottom (1)	1/8 ply. - 7 5/8 x 12 3/4	**G**	Tambour Strips (53)	1/4 x 1/4 - 7 5/8
B	Front/Back (2)	3/8 x 1 11/16 - 8	**D**	False Bottom (1)	1/8 ply. - 7 5/8 x 11 5/16	**H**	Tambour Handle (1)	1/4 x 7/16 - 7 5/8
			E	Handle Cradle (1)	13/16 x 2 5/8 - 7 1/4			
			F	Blade Cradle (1)	13/16 x 2 1/2 - 7 1/4	•	(1) 13 1/2" x 8" Canvas Cloth	

1" x 6" - 24 " Hard Maple (1.0 Bd. Ft.)

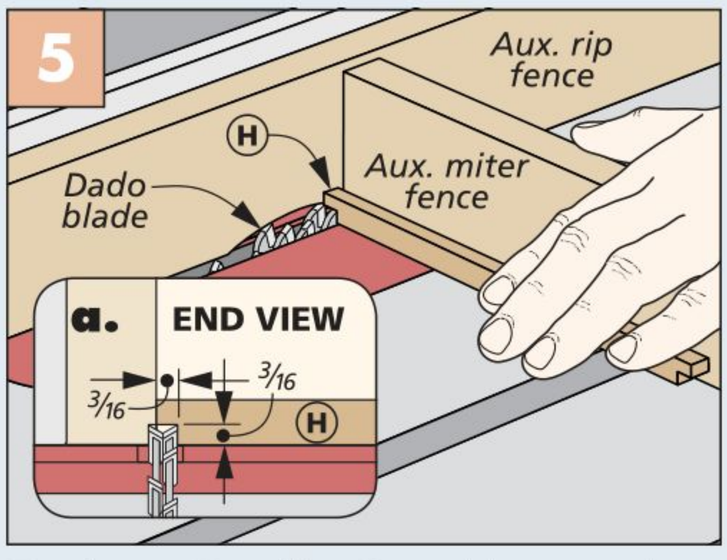


***ALSO NEEDED:** One 24" x 48" sheet of 1/8" birch plywood*

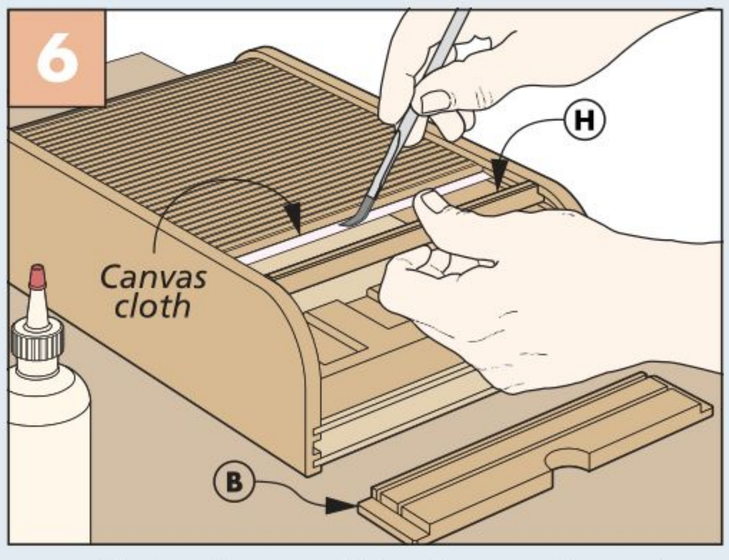
1/2" x 4" - 96" Walnut (2.7 Sq. Ft.)



Flex Door. Roll the tambour assembly to break loose any excess glue from between the edges of the strips.



Tambour Handle. Cut rabbets on the ends of the tambour handle with a dado blade at the table saw.



Install Tambour. Slide the tambour into the groove and then glue the handle to the canvas. Trim off any excess canvas.

Designer Project

Elegant

Dressing Table

Get ready in the morning in style when you add this vanity table and three-piece mirror set to your master bedroom suite.

Having an organized, dedicated spot in the bedroom to prepare yourself for the day ahead is a luxury most of us could use. This practical dressing table meets that need quite nicely.

Designed to suit any décor, this vanity will fit with a modern bedroom design, as well as a retro-look room. Best of all, it's packed with features that'll make you look forward to getting ready for your day, or a night out.

STORAGE GALORE. First up are three large drawers in the left pedestal that'll hold a myriad of cosmetics, jewelry, and any other accessories a well-turned out person requires. Plans for an optional divider system for the center drawer can be found online at *Woodsmith.com*.

Moving to the right pedestal, you'll find a pullout unit disguised to mimic the drawers on the other side. This unit is set up to hold a hair dryer, curling iron, and other hair care products, as shown in the right photo at the bottom of the next page.

MIRROR, MIRROR. The three-piece mirror ensemble is what really sets this table apart. The center mirror is mounted on pivoting hardware while the two outer mirrors are hinged for easy adjustability to ensure you get just the right view. All in all, it's a fine addition to any home that's sure to please.

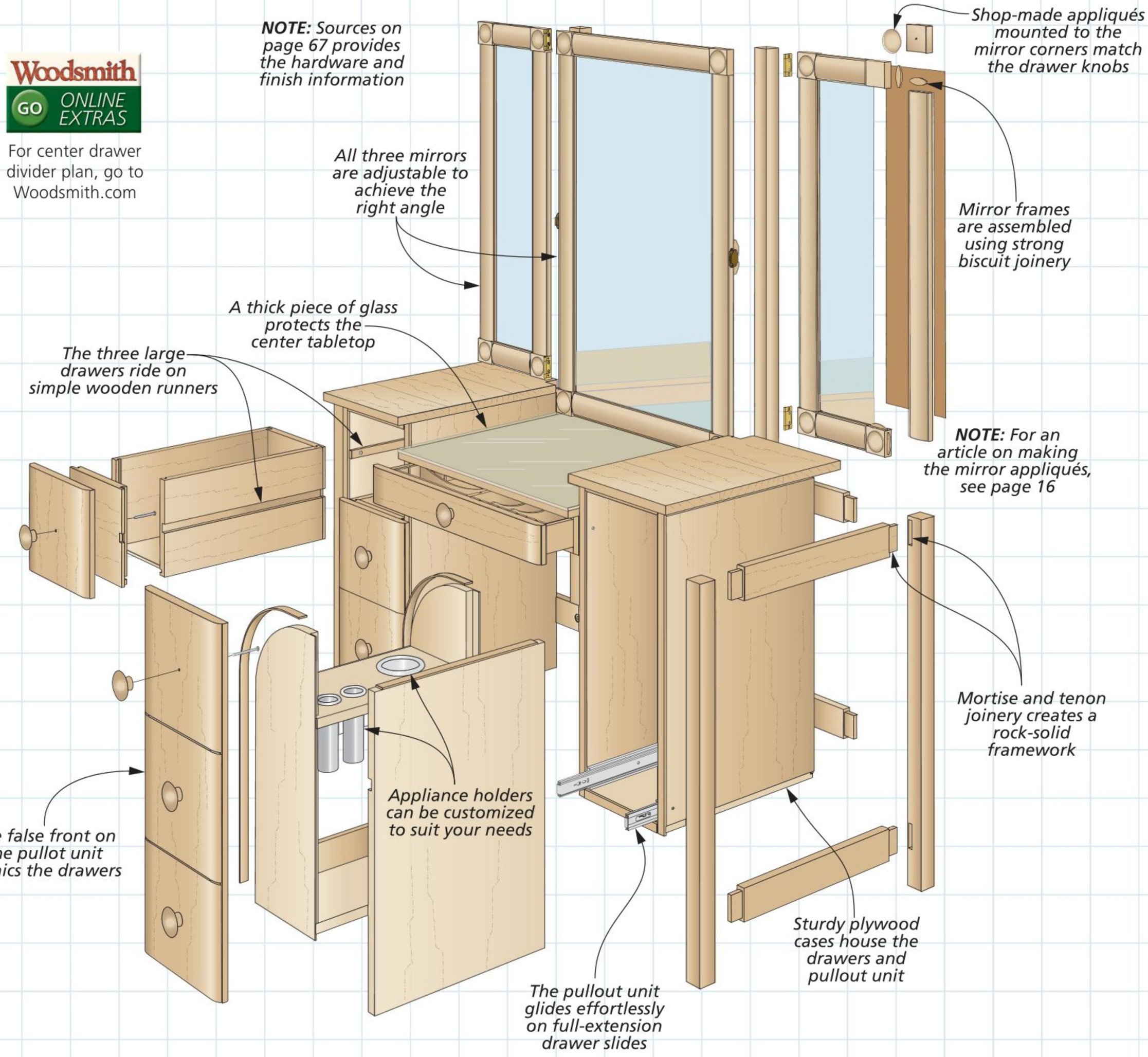
Written by: Robert Kemp; Project design: Dennis Volz

Construction Overview / OVERALL DIMENSIONS: 49"W x 64"H x 20½"D

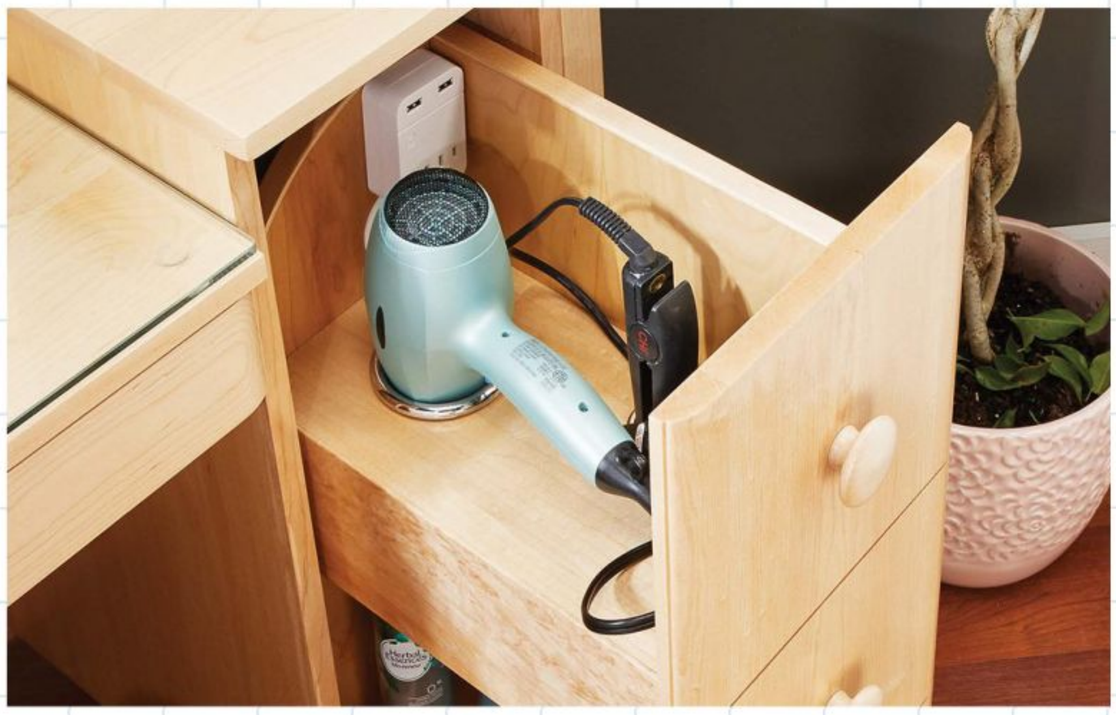
Woodsmith GO ONLINE EXTRAS

For center drawer divider plan, go to Woodsmith.com

NOTE: Sources on page 67 provides the hardware and finish information

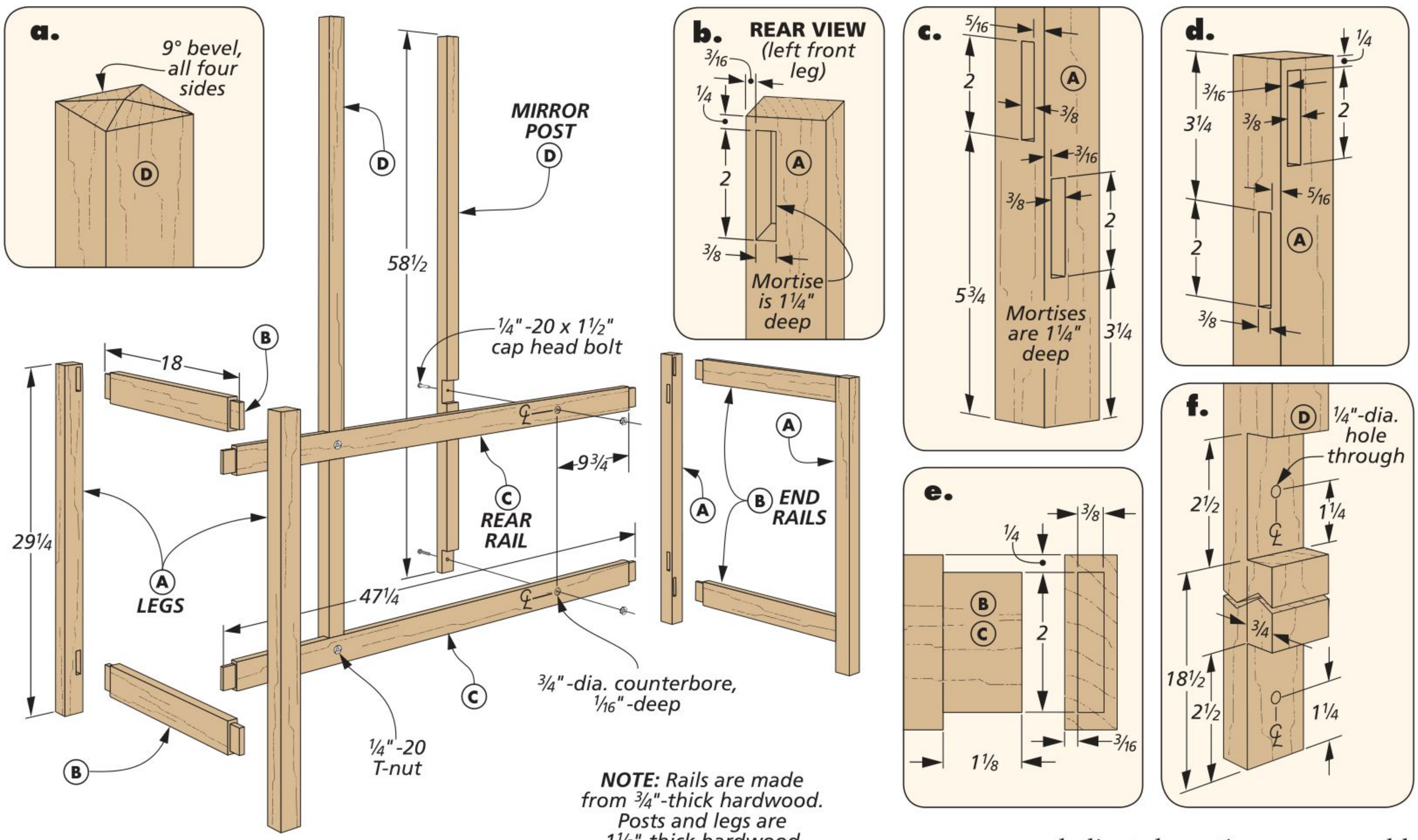


▲ The center mirror pivots on simple hardware to get the optimal angle, whether sitting down or standing up. A thick piece of glass on the center table protects the surface from dings or spills.



▲ The pullout unit on the right has special accessory holders that keep things handy and organized. A small power strip mounted in the back provides a convenient plug-in location.

Illustrations: Harlan V. Clark



NOTE: *Rails are made from ¾"-thick hardwood. Posts and legs are 1½"-thick hardwood*

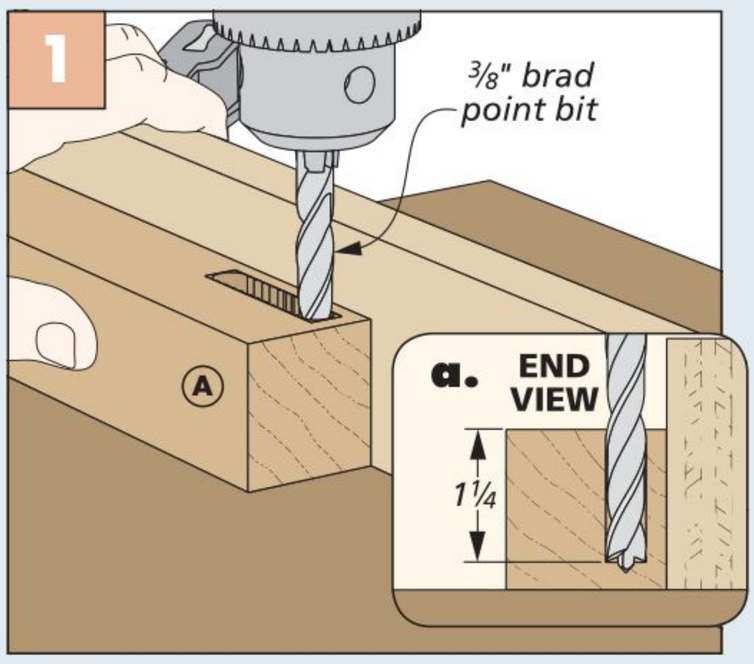
Start with the FRAME & SIDE CABINETS

The core of the dressing table consists of a hardwood framework that surrounds the cabinets. The framework is made up of legs, rails, and a couple of long posts that support the mirrors. The mirror posts are fastened to the framework so they're easily removable when you need to move the dresser. I began the frame construction by making the legs and rails.

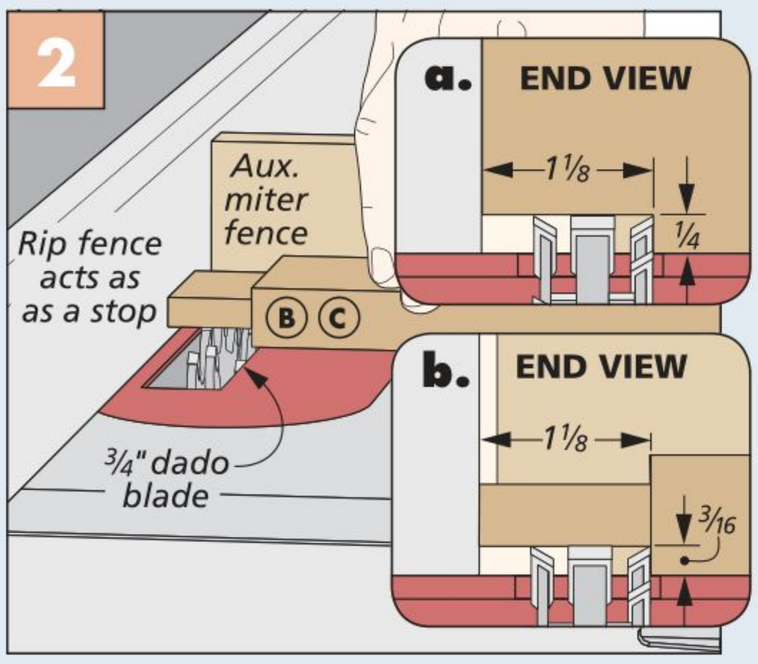
LEGS & RAILS. After cutting the four leg blanks to size, lay out the mortise locations (details 'b,' 'c,' and 'd'). If you own a dedicated mortiser, now would be a good time to use it. If not, you can use the method I used, shown in Figure 1 below, to make the mortises.

The six rails are up next. The tenons on the ends require just a couple simple setups at the table saw, as shown in Figure 2. I also took the time now to drill the counterbored holes in the rear rails and installed the T-nuts for mounting the mirror posts shortly. The legs and rails can then be assembled. I broke this

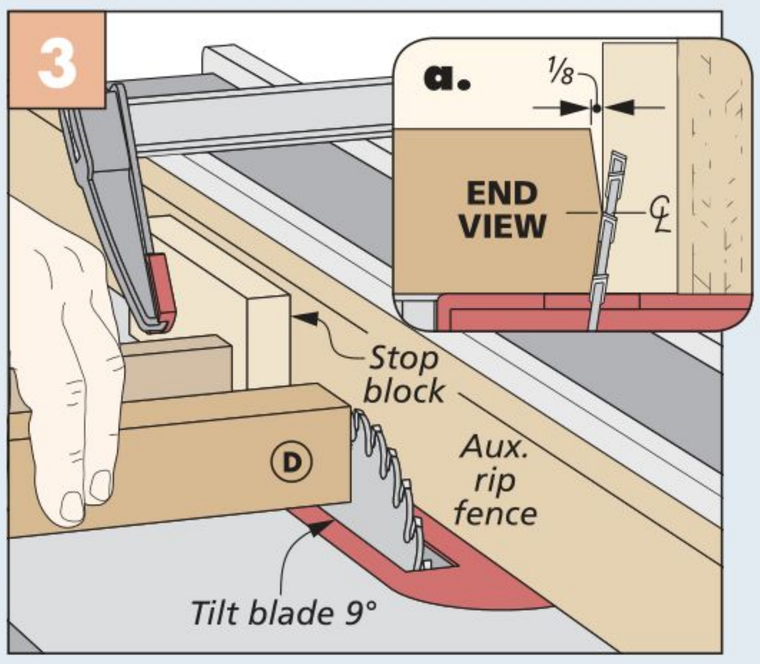
How-To: CUT THE FRAME & CABINET JOINERY



Drilling Mortises. Remove the bulk of the waste for the mortises at the drill press. Clean up the edges with a chisel.



Cutting Tenons. Use a dado blade in the table saw to cut the tenons on the ends of the rails.



Bevel Posts. Use a stop block attached to the rip fence to assist in cutting the angle on the top of the posts.

assembly into two stages. First, I glued the end rails into the legs. When that was dry, I connected the end assemblies with the rear rails.

MIRROR POSTS. The mirror posts are pretty straightforward to make. Start off by cutting them to size, but leave them slightly long. The facets cut on the top of each post (detail 'a', previous page) can be made at the table saw by tilting the blade (Figure 3). With that done, cut the posts to their final length.

The wide notches in the posts can be nibbled out with a dado blade at the table saw, as shown in Figure 4 below. Use the counterbored holes in the rear rails to lay out the corresponding mounting holes in the posts before bolting them in place.

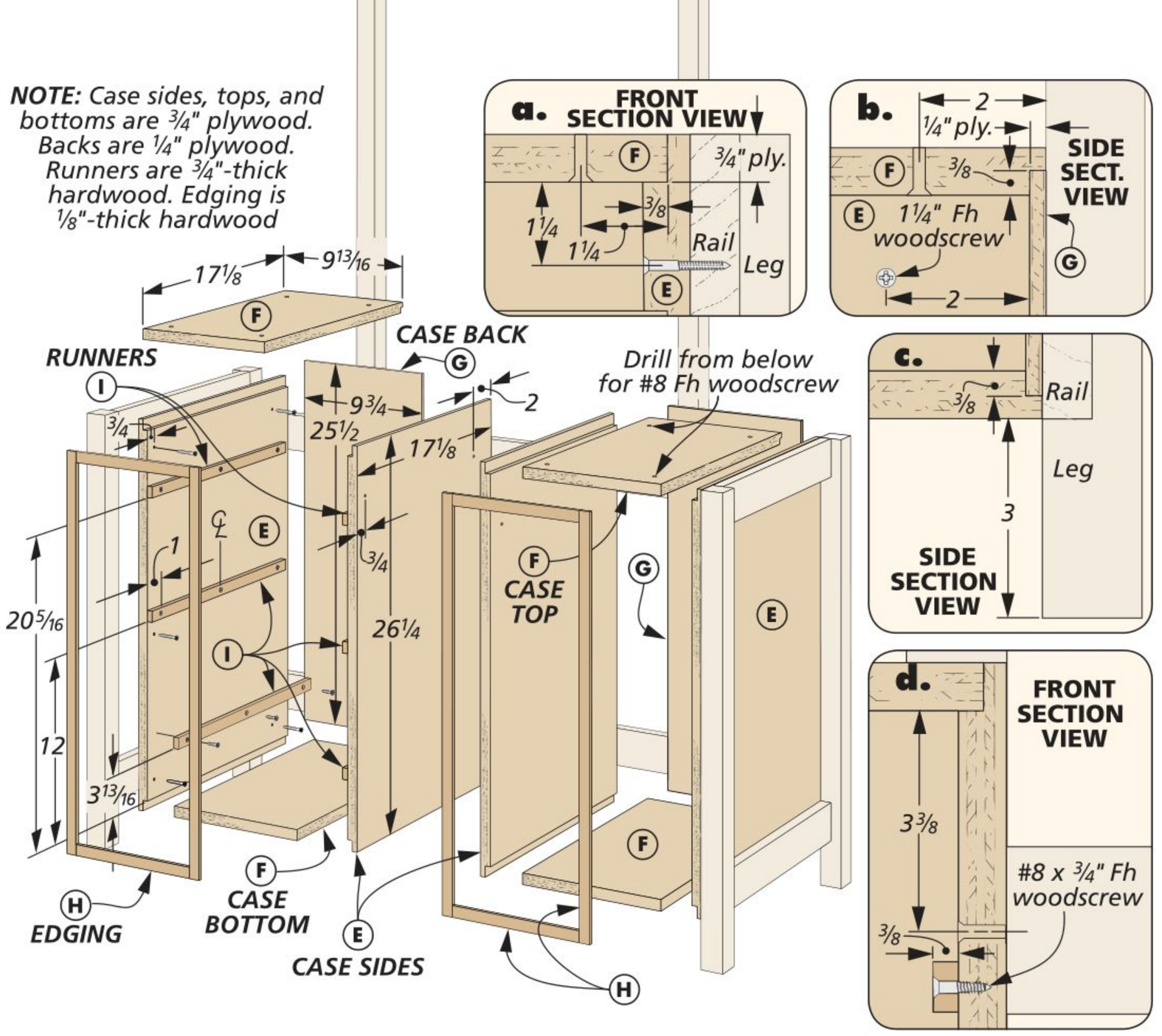
MAKE THE SIDE CABINETS

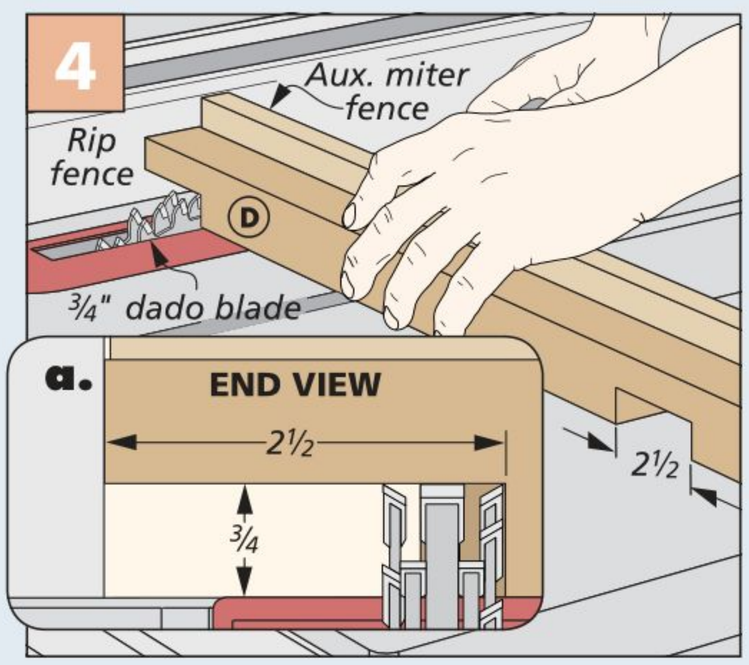
The completed framework is now ready for the two side cabinets. These cabinets are simple plywood boxes with hardwood edging to cover the plywood edges along the front. The left case has a series of hardwood runners installed to guide the three drawers.

SOLID JOINERY. Start the side cabinets by cutting the rabbets along the top and bottom edges of the side pieces at the table saw (Figure 5). Next, the case sides, top, and bottom receive a rabbet along their back edge to hold a plywood back. You can stay at the table saw to make these cuts, as shown in Figure 6. At this point, I did a test assembly on the case parts. While the parts were together, I measured the back opening and cut the case backs to size.

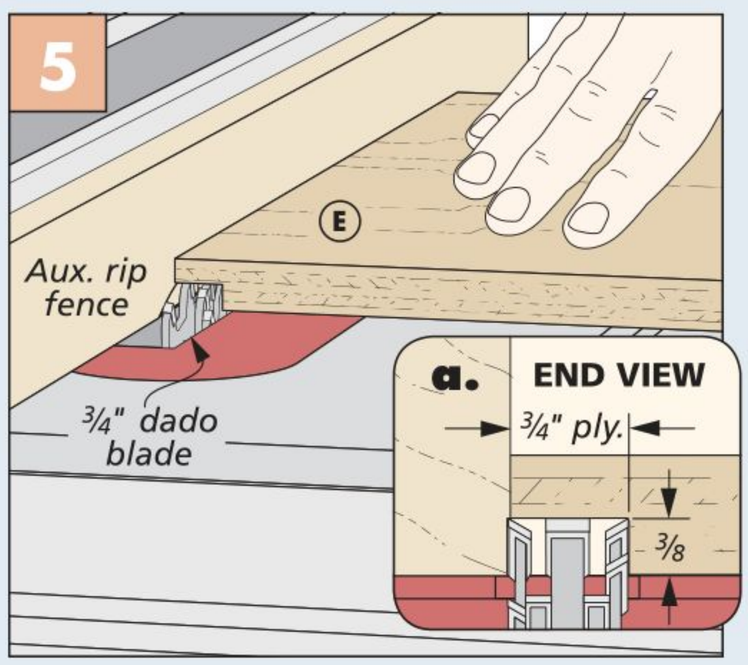
HARDWOOD RUNNERS. Before assembling the cabinets with glue, I did one more thing — and that's to install the drawer runners. Because the cabinet opening is somewhat narrow, it can be tricky to fit a drill inside after the cabinet is assembled. So I made sure to attach the runners to the case sides while they were flat on my bench. With the runners out of the way, glue the case parts together. I also used a few pin nails to hold the plywood backs in place.

HARDWOOD EDGING. The strips of edging are the last pieces to add before attaching the cabinets to the framework. These are simply cut to length from pieces that match the thickness of the plywood and glued in place around the front edge. Now, attach the two cabinets to the frame, flush with the top of the rails. Don't put any screws into the removable mirror posts.

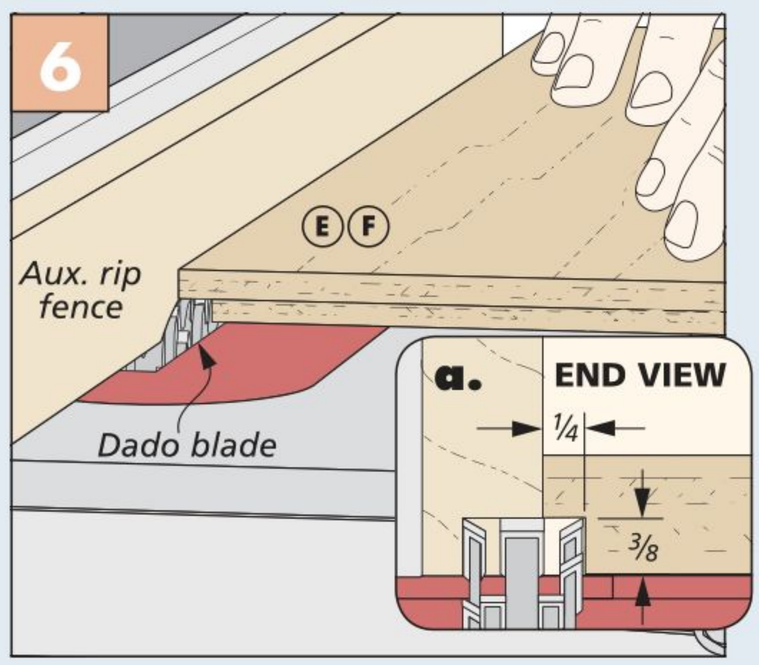




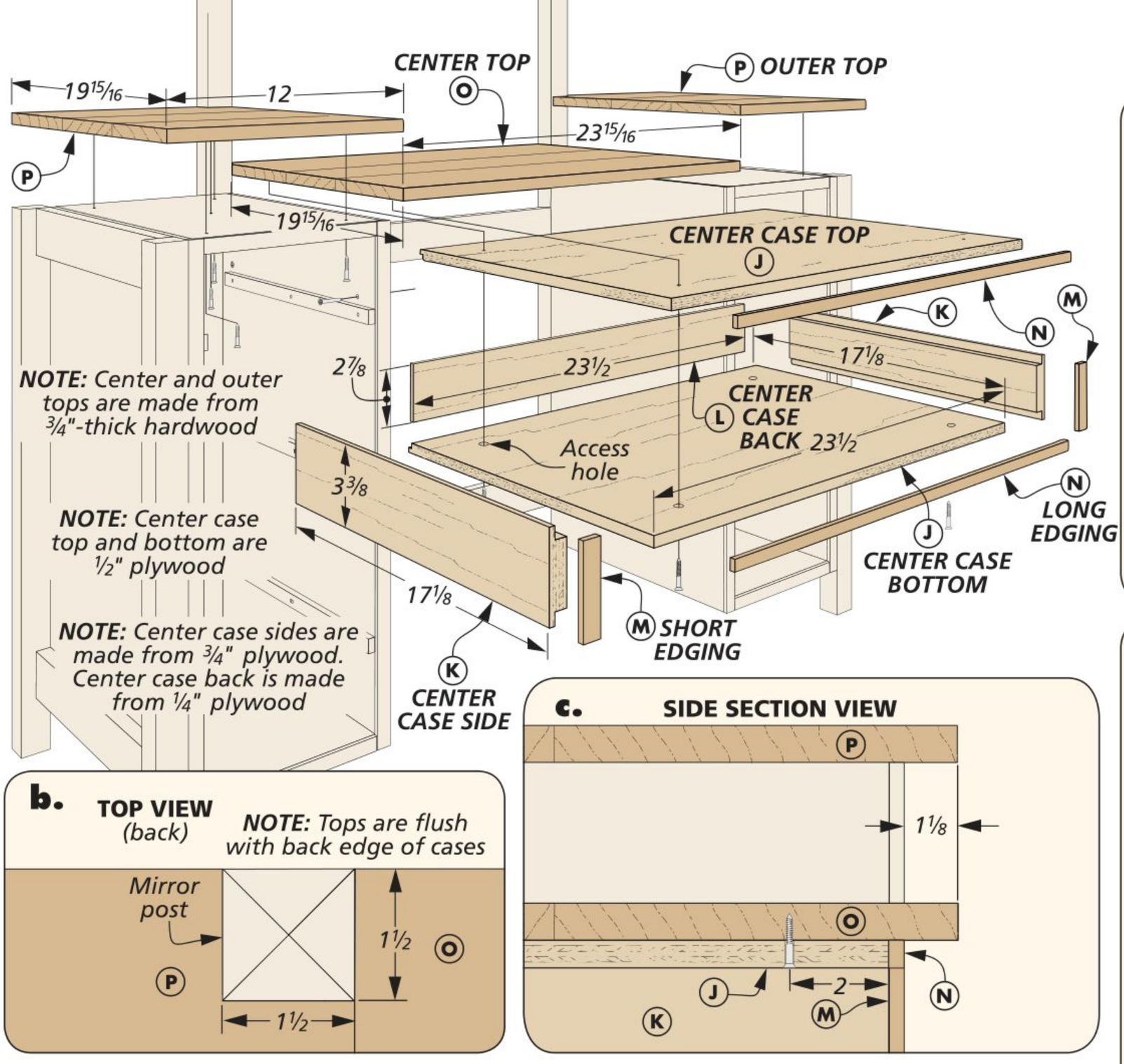
Notch the Mirror Posts. Switch back to a dado blade to cut the wide rabbets and notches in the posts.

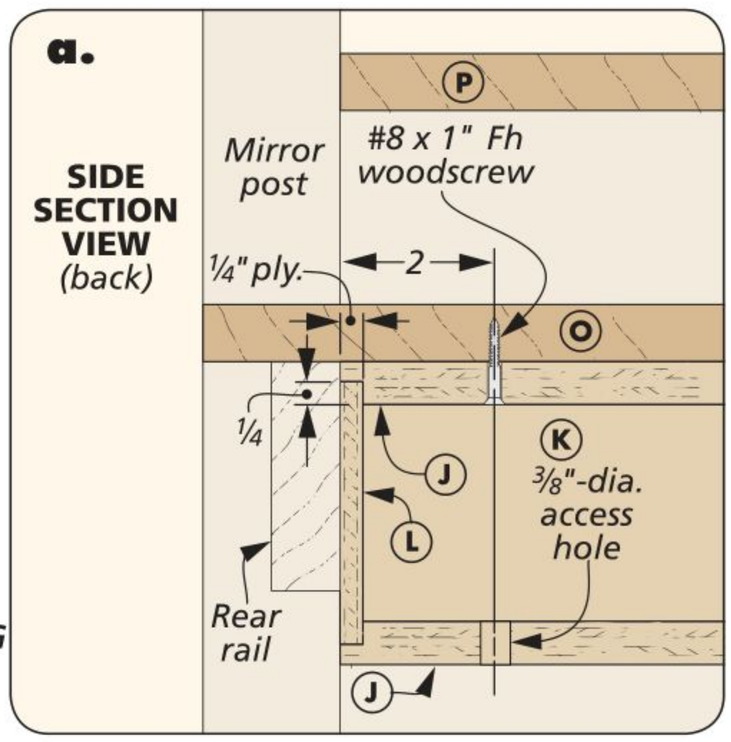


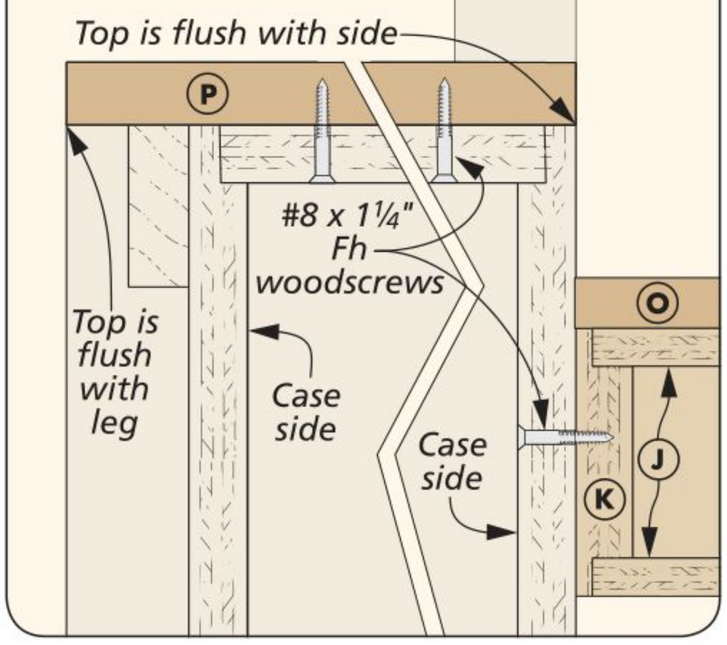
Rabbet Case Sides. With a dado blade partially buried in an auxiliary rip fence, cut the rabbets in the side panels.



Rabbet Back Edge. A rabbet along the back edge of the sides, top, and bottom holds the plywood case back.







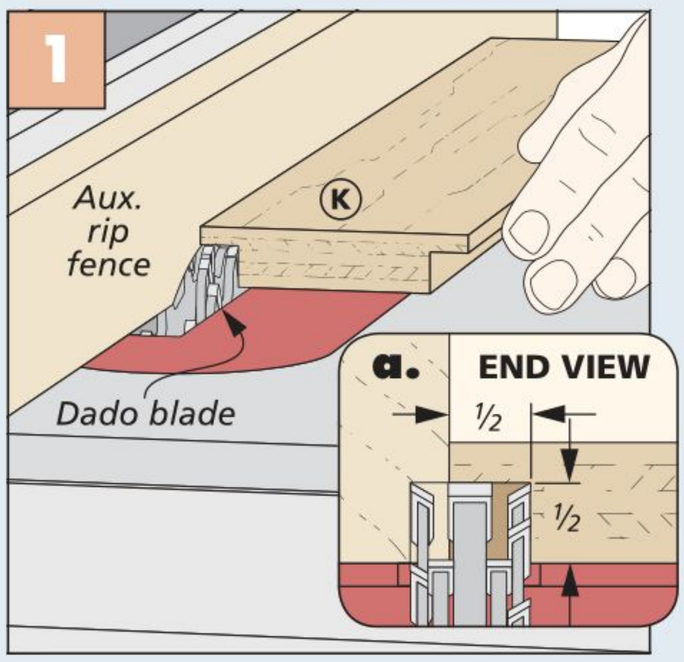
Add the CENTER CASE & TOPS

Bridging the gap between the two outer cabinets that you just installed in the framework is a single, thin case that holds the center drawer. This plywood case is made in a similar fashion as the two larger cases, with just a couple of exceptions that I'll explain shortly.

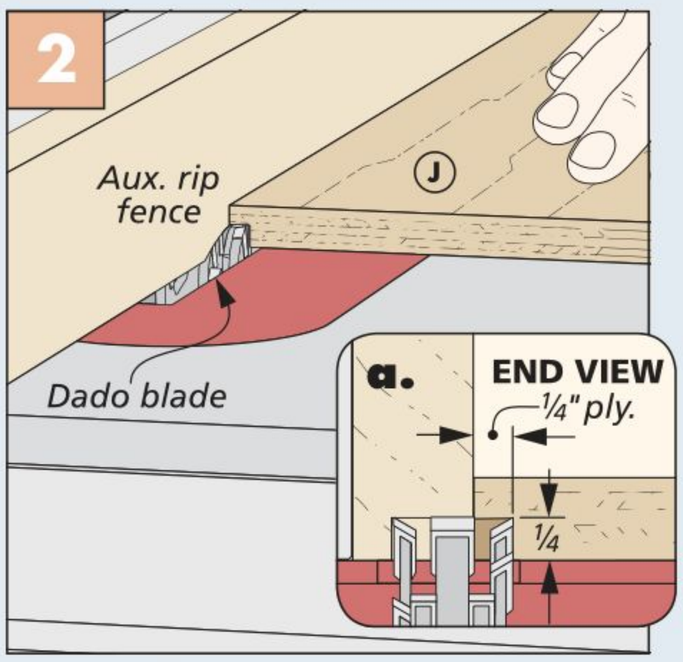
After building the center case, the table is capped off with three hardwood panels that span the entire table top. The trick here is to glue up enough stock to cut all three pieces. This way, you'll end up with a pleasing continuous grain pattern running across the top.

PLYWOOD CENTER CASE. Because I wanted to maximize the drawer space in the center cabinet, I used 1/2" plywood for the top and bottom panels, but 3/4" for the sides to maintain its sturdiness. The extra 1/2" may not seem like much, but it makes a significant difference in

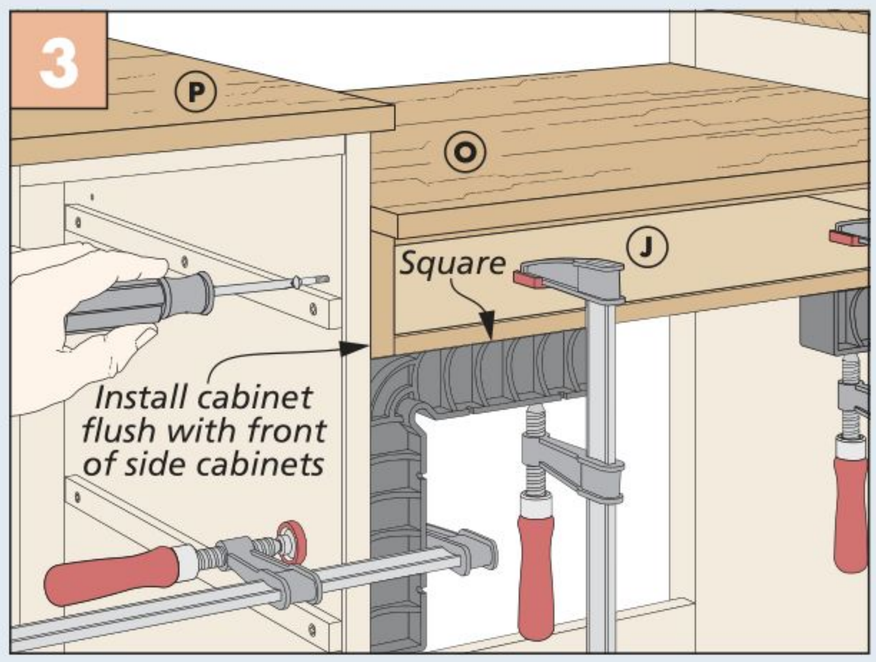
How-To: CUT THE RABBETS & INSTALL THE CENTER CASE



Cutting Rabbets in Sides. Again, I turned to a dado blade to make the rabbets in the center case sides.



Rabbet for Back. Like the side cases, the back fits into a rabbet in the sides, top, and bottom.



Installing the Center Cabinet. A pair of assembly squares come in handy for installing the center case between the side cases.

a shallow drawer. With the case parts cut to size, follow Figures 1 and 2 at the bottom of the previous page to cut the case joinery.

I also drilled four holes in the bottom before putting the center case together (detail 'a', previous page). These holes provide clearance for a long driver bit for attaching the top panel shortly. You can then assemble the case and add the hardwood edging. The case fits between the two outer cases (Figure 3).

TOP IT OFF. Before moving on to the drawer, I made the tops. As I said before, I wanted a continuous grain pattern along the top. So I glued up several boards to cover the entire surface.

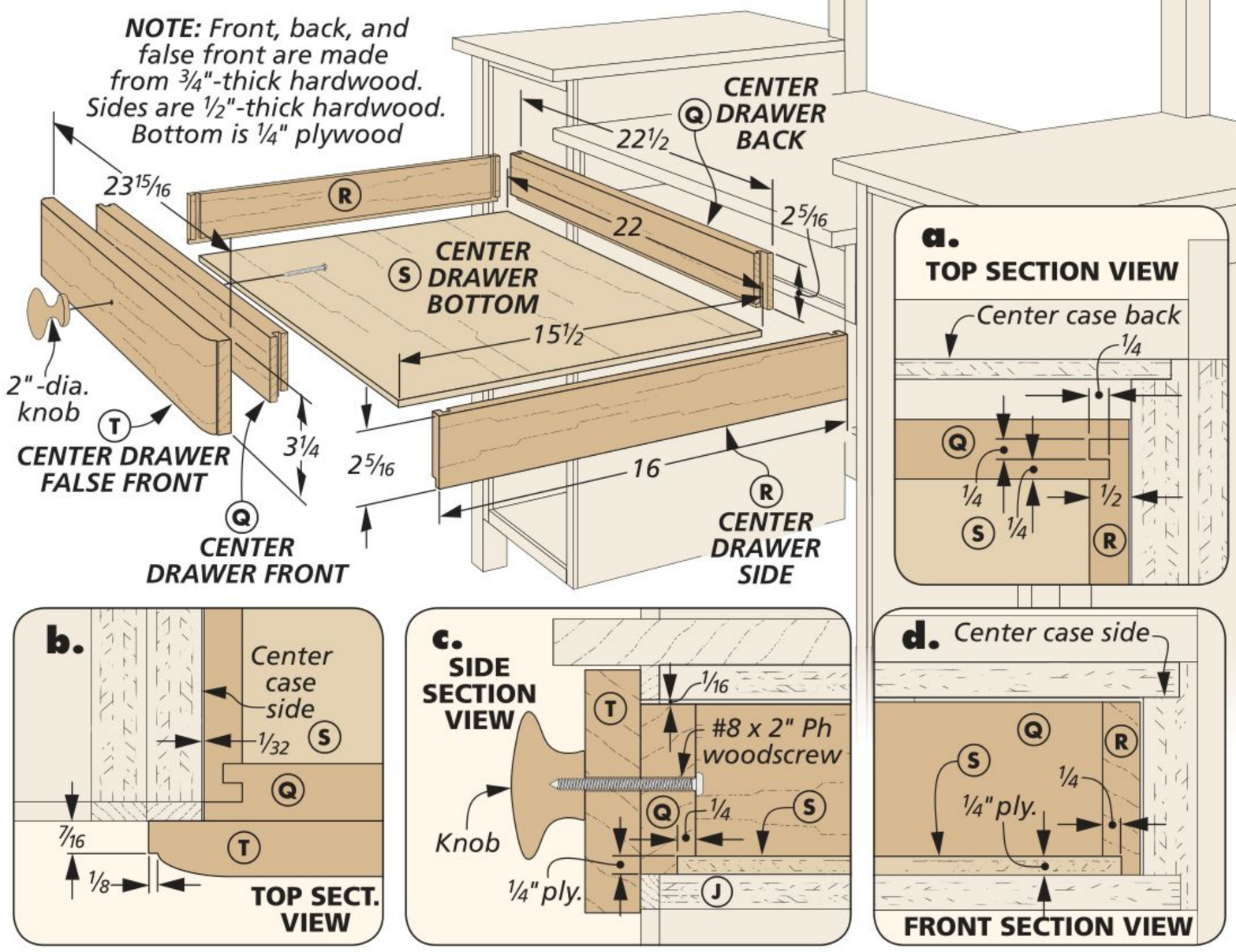
After squaring the panel, I crosscut the pieces to fit on the cases and attached them from underneath with screws. Be sure to note that you'll need to notch the rear inside corners of the outer tops to fit around the mirror posts (detail 'b').

MAKE THE CENTER DRAWER

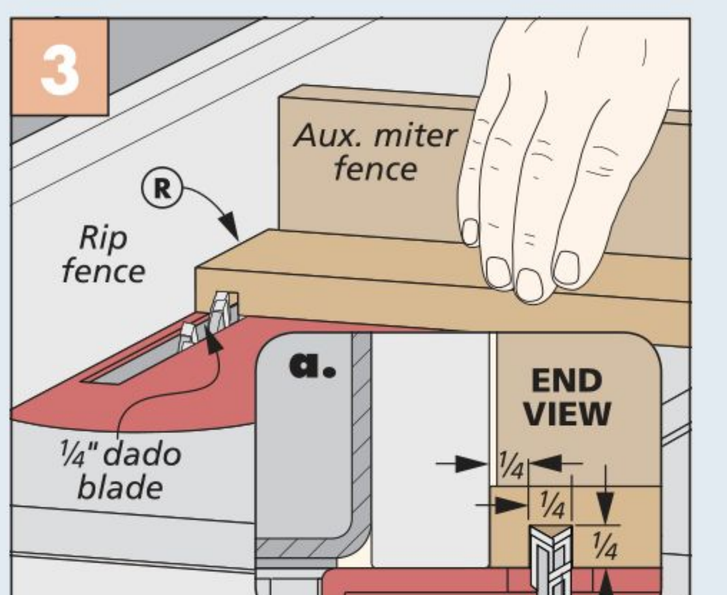
To wrap up the center of the table, you'll add the drawer. To maintain as much space in the drawer as possible, I decided against using metal drawer slides here. So for the drawer construction, I relied on tried-and-true locking rabbets to hold the front and rear of the drawer to the sides. This joint will take a lifetime of use and remain strong.

LOCKING RABBET DETAILS. Before cutting your parts to size, you'll want to note one thing — like the drawer case, I made the drawer sides out of ½"-thick material to keep as much space in the drawer as possible. With this in mind, the How-To box at right provides all of the details for making the locking rabbets at the table saw. A rabbet around the bottom perimeter of the front, back, and sides hold the bottom (details 'c' and 'd', above right).

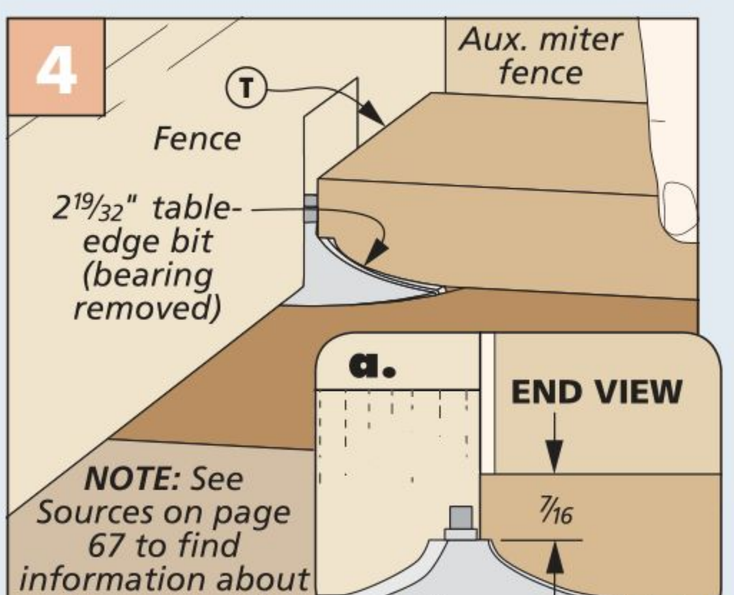
FALSE FRONT PROFILE. The false drawer front is the final piece. I used a table-edge router bit to make the profile on the edges of the drawer fronts (and later, the mirror frames). Figure 4 shows how to get the result you need. I removed the ½"-dia. bearing that came on the bit and simply used the router fence as a guide to get the fillet on the edge that I was looking for (Figure 4a).



How-To: LOCKING RABBET & MOLD THE FRONT



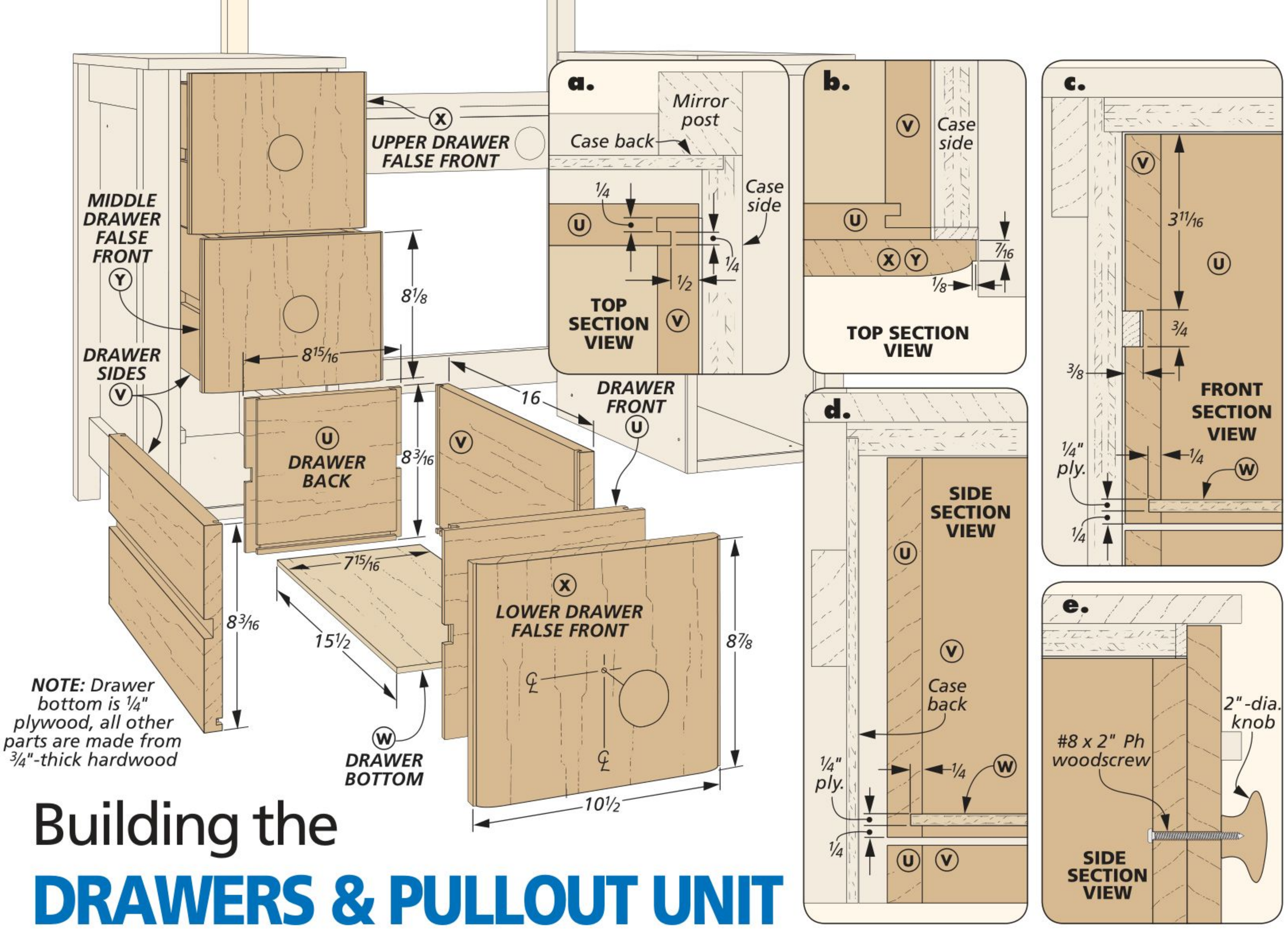
First Cut of Locking Rabbet. Stand the workpieces on end to make the deep groove for the locking rabbets.



Second Cut of Locking Rabbet. Lay the workpiece flat to clip the tongue on the inside face.

Dado for Locking Rabbet. Use the rip fence as a guide to cut the dadoes in the drawer sides.

Rout Profile. Use a table-edge bit with the bearing removed to create the profile on the end of the false front.



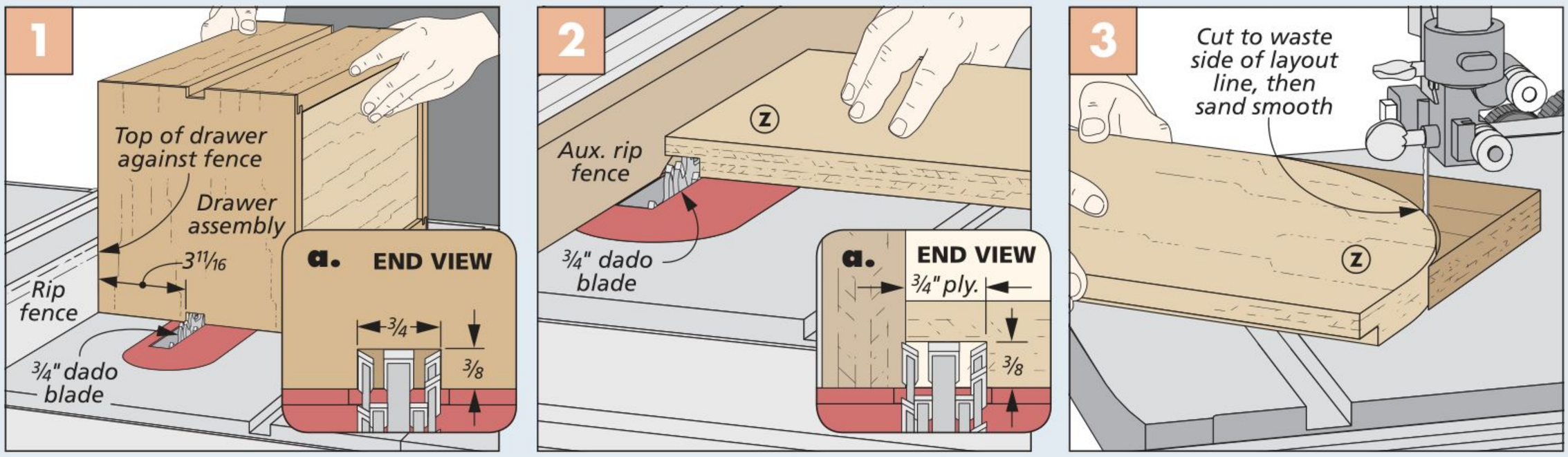
Building the DRAWERS & PULLOUT UNIT

Now, you can move on to filling the space in the two outer cabinets. The left bank has three spacious drawers. On the right side, a pullout unit provides a place to hold a few hair care accessories, as well as taller items on the shelf down below. The false front on the pullout unit is even disguised to look like three individual fronts, but in reality, it's one continuous piece.

LARGE DRAWERS. Having made the center drawer, you're already familiar with the construction method for making the larger drawers. The main difference here is that instead of just a rabbet to hold the bottom plywood panel, I opted for a narrow groove to support heavier items.

Once the drawers are assembled, I made another trip back to the table saw to cut the wide grooves along the outside

How-To: CUT DRAWER GROOVES & PULLOUT UNIT JOINERY



Drawer Grooves. The grooves on the sides of the drawers that fit over the runners are made with a dado blade.

More Rabbets. Stay at the table saw to cut the rabbets in the pullout unit front and back panel.

Curves on Pullout. Lay out the curve along the top edge of the pullout front and back and cut it at the band saw.

face of the drawer sides, as shown in Figure 1 on the previous page. These grooves are sized to slip over the runners.

FALSE DRAWER FRONTS. Each drawer has a false front to cover the grooves for the runners. I glued up enough stock so that the false fronts have a continuous grain from top to bottom.

As you can see in the drawing on the previous page, the false front on my center drawer is slightly shorter than the other two. This is so I ended up with even spacing from top to bottom. Finally, the profile along the edge of the false fronts is made using the same router bit that was used on the center drawer. A few spacers make installing the false fronts a breeze.

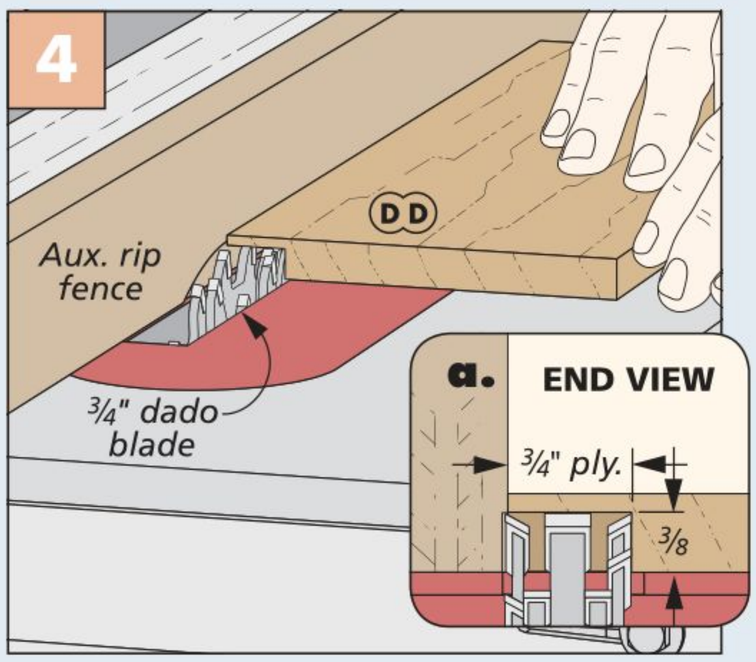
PULLOUT UNIT

The pullout unit goes together using simple rabbet and dado joinery. Start with Figure 2 on the previous page and follow the remaining How-To boxes to cut the parts to shape. Figure 5 shows the method I used to cut the large holes in the shelf to hold a few accessory drop-ins. These holes can be customized to better suit your needs.

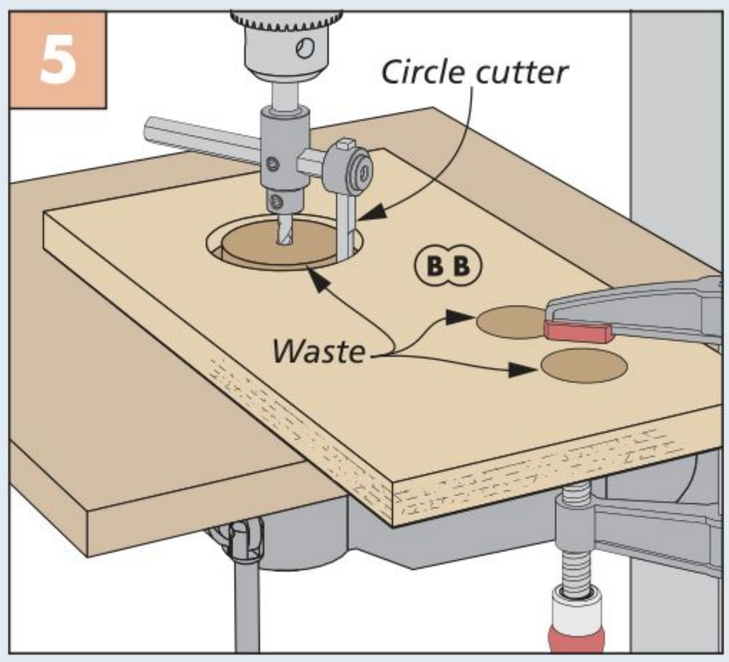
Now assemble the pullout unit. I glued the shelf and base to the front and back before attaching the side piece. You can then glue the shelf and base sides in place.

CURVED HARDWOOD EDGING. The last pieces to add before positioning the pullout unit in the cabinet is a few strips of hardwood edging. You'll notice that the pieces on the front and back follow the curve along the top edge. Turn to Shop Notes on page 64 to see how I tackled this task. After the edging is in place, the pullout unit is installed on a set of drawer slides (detail 'a', above).

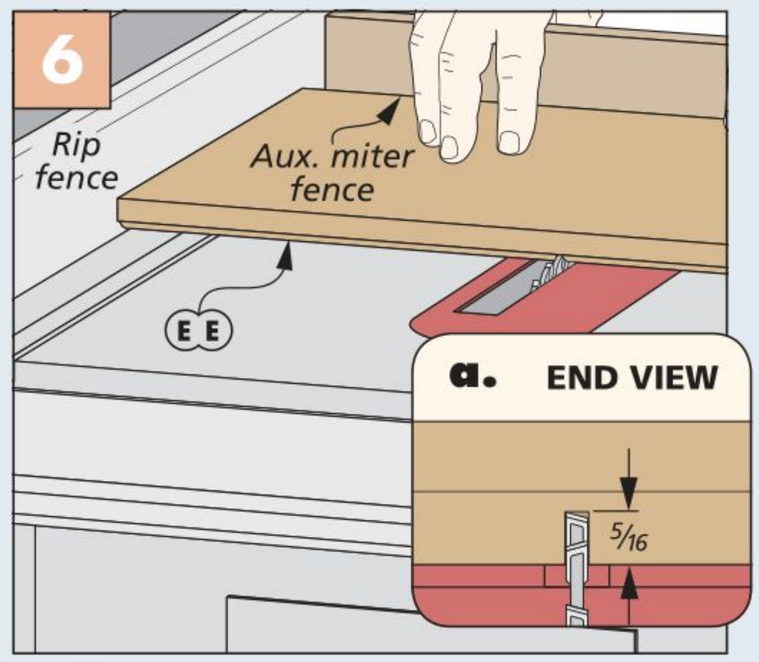
FALSE FRONT. Like the drawer fronts on the left cabinet, the false front on the pullout unit has vertical matching grain and the same profile along the outer edges. But instead of cutting it into three pieces, the pullout false front has shallow kerfs in the face to give the appearance of divided drawers (detail 'e,' above). Figure 6 below shows how to get this look. Finally, glue the false front to the pullout unit.



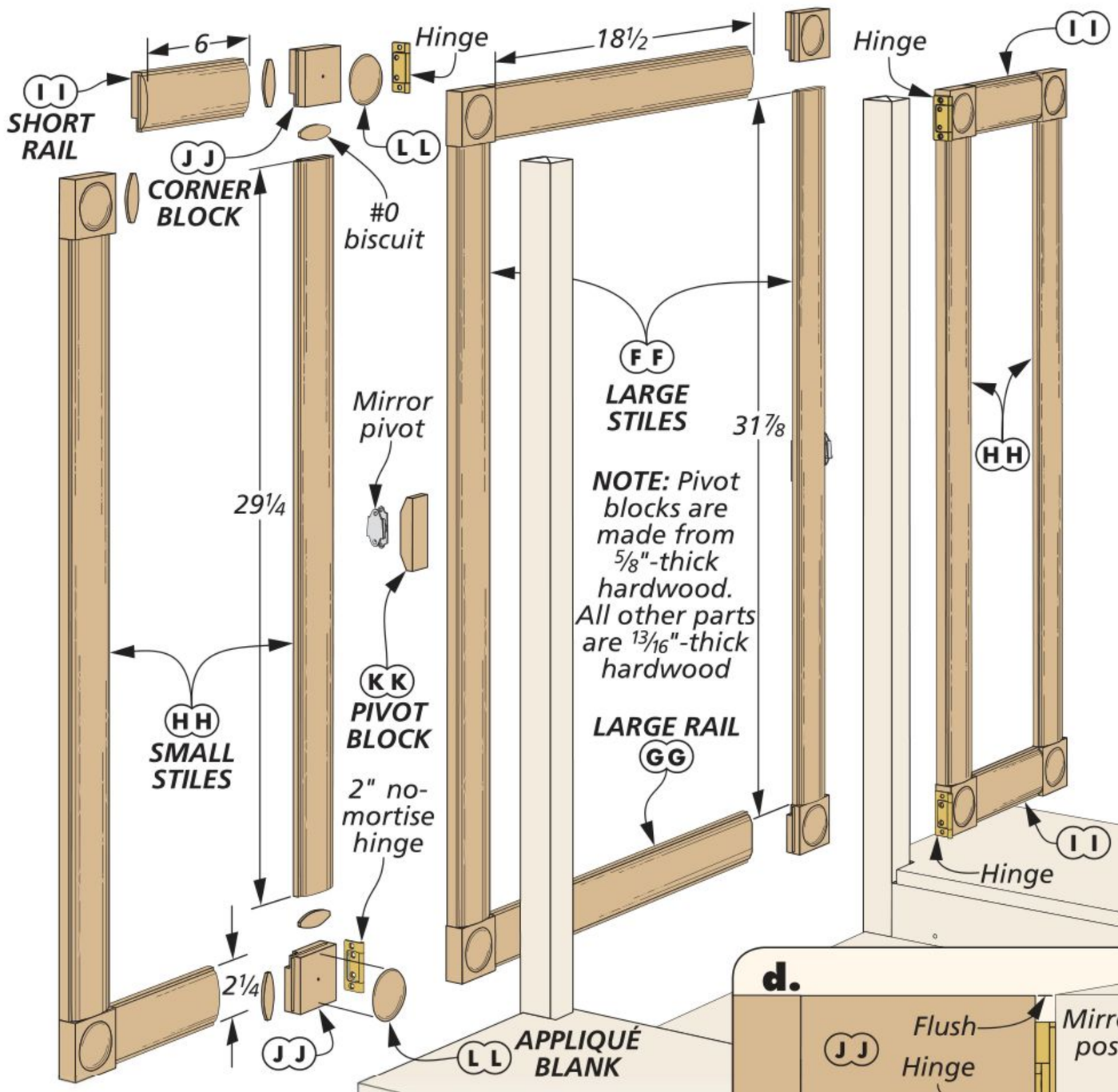
Rabbet Sides. The base and shelf sides have a rabbet along one edge to fit over their respective part.

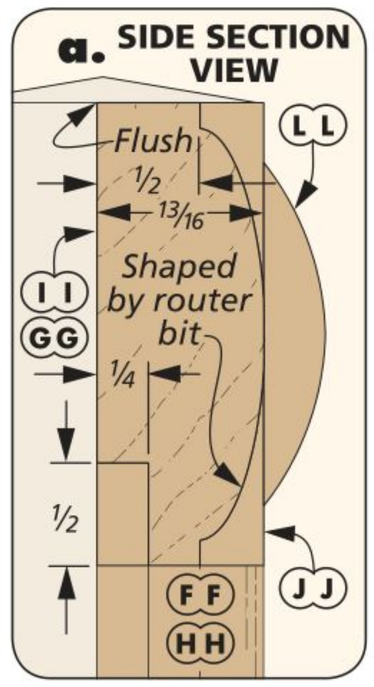


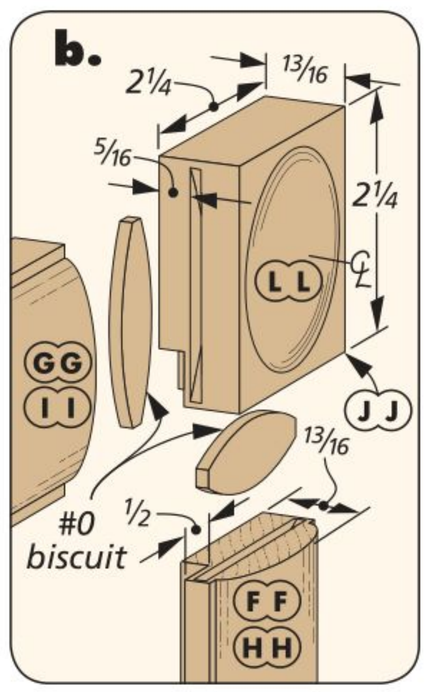
Wing It. Use a circle cutter (also known as a wing cutter) to make the holes for the appliance holders in the shelf.

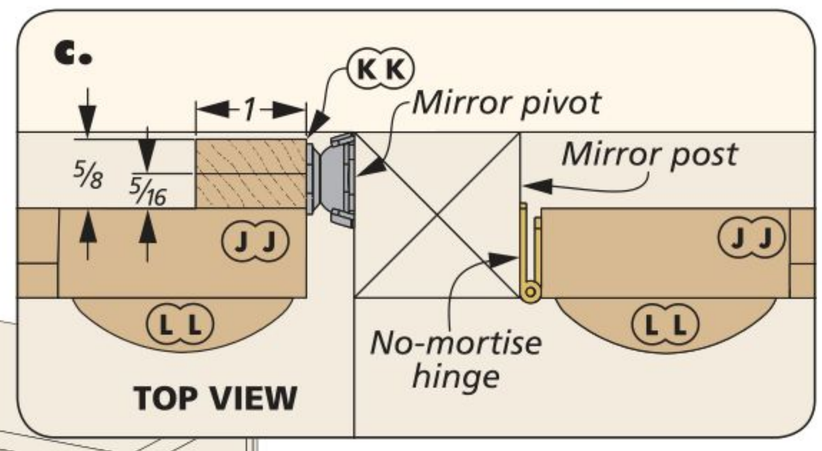


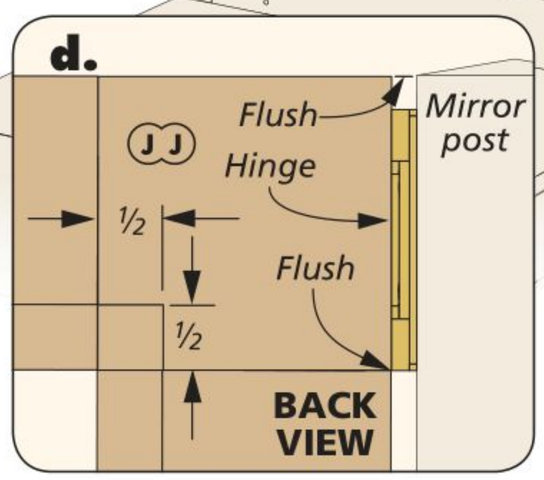
Kerfs in Front. Use a standard width blade in the table saw to make the kerf cuts in the pullout unit false front.

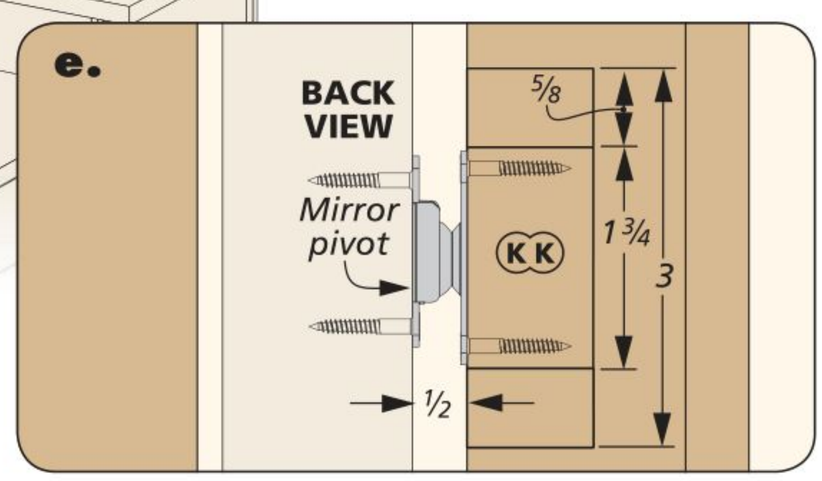










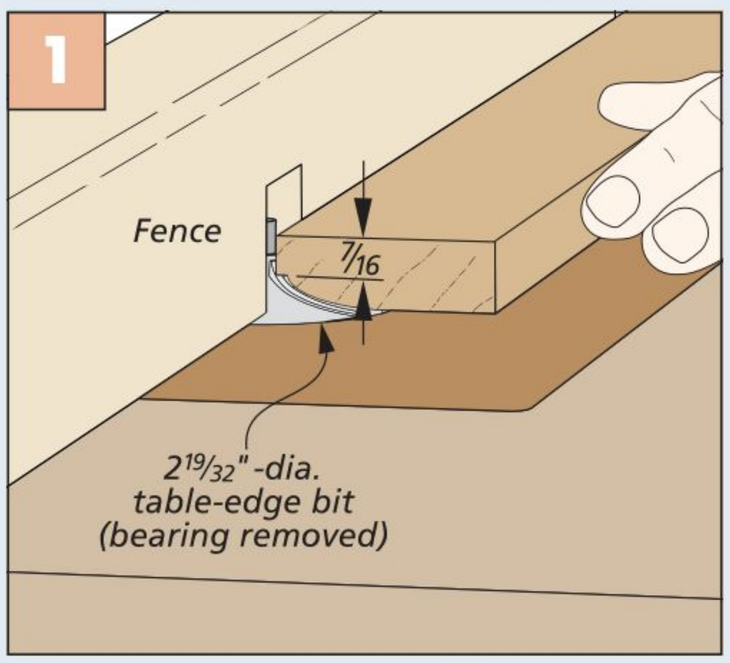


Constructing the MIRROR FRAMES

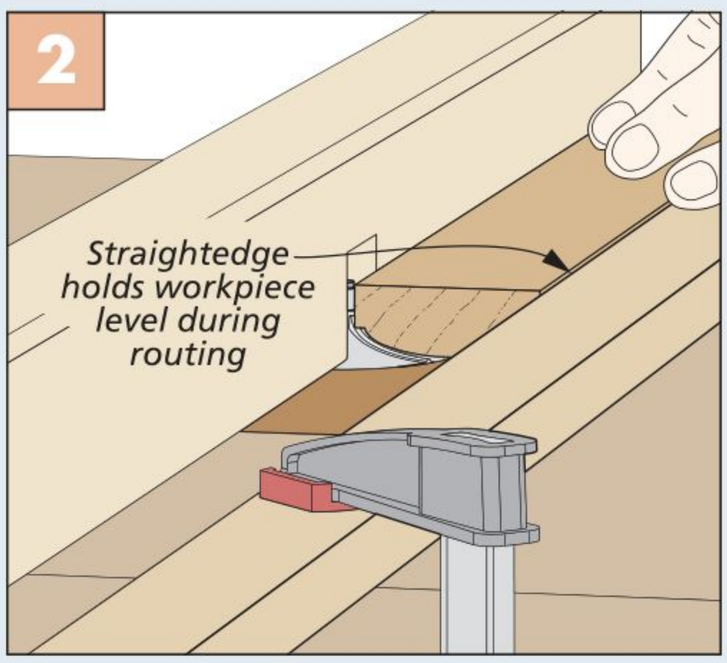
With all of the work on the lower portion of the vanity complete, you can move on to making the mirror frames. The center mirror is installed on a set of pivots that allow you to tilt the mirror for just the right angle. The outer mirrors are mounted on hinges so they can be folded inward for an all-around view.

RAILS & STILES. I started by cutting all of the stock for the stiles and rails to size. Since these parts butt against corner blocks, they can be cut to final length, as well. Then, using the same router bit that was used to make the profile along drawer fronts, set up the router table as shown in Figure 1 below. Use a long straightedge to make the pass on the other edge (Figure 2).

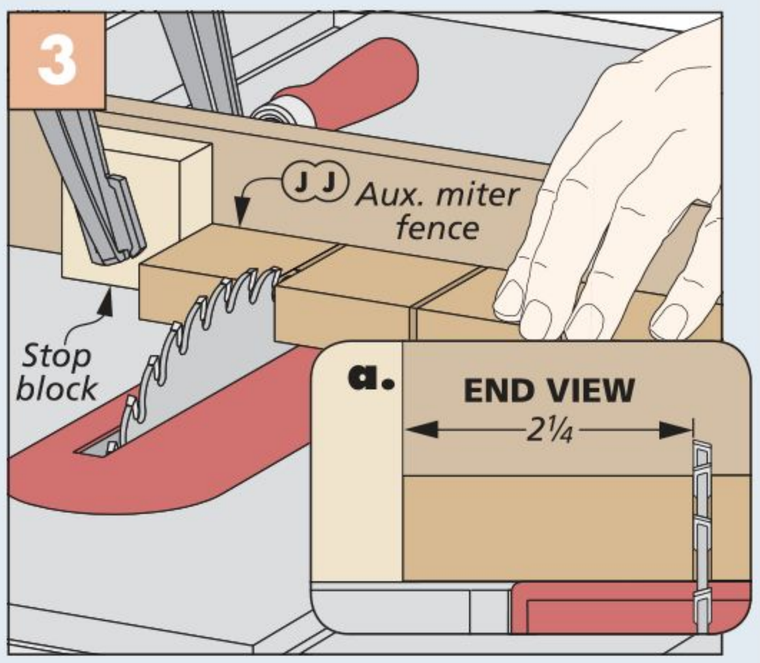
How-To: SIZE THE MIRROR FRAME PARTS



Routing the Frame Profile. Use the table-edge router bit to make the profile on one edge of the stile and rail blanks.



Complete Profile. As a guide, clamp a straightedge to the router table for the second profile pass.



Corner Blocks. From an extra-long blank, cut the corner blocks to size using a stop block for consistent cuts.

CORNER BLOCKS. Now cut the corner blocks to size (Figure 3, previous page). These blocks secure the mirror frames together. I used biscuits for a quick and strong assembly. If you don't own a biscuit joiner, dowels would work here also. Now, cut the slots for #0 biscuits in the ends of the rails, stiles, and two adjacent edges of the corner blocks.

ASSEMBLE FRAMES. Figure 1 at right shows the process for assembling the frames. The key is to take your time and use a few assembly squares to keep the frames aligned while the glue sets up.

RABBET FOR MIRROR. Each mirror slips into a rabbet along the back face of the frames. I used a rabbeting bit in a handheld router to take care of this step (Figure 2). Use a sharp chisel to clean up the corners on each frame, as shown in Figure 3.

DECORATIVE APPLIQUÉS. One nice detail on the mirror frames is the application of small, round appliqués on each corner block. These appliqués are simply round discs with a domed top. To create this unique shape, I turned to the same table-edge router bit that's been used throughout this project.

Because of the small size of the discs, it's not safe to rout the profile freehand. So I made a simple jig setup to safely make these at the router table (Figure 4). The article on page 16 walks you through this entire process, from making the jig, to cutting out the appliqué blanks and sanding the finished product.

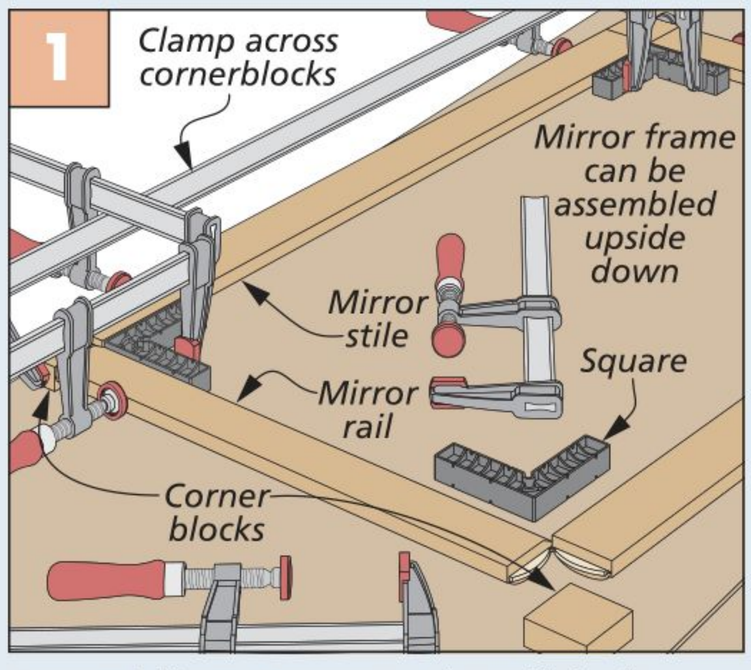
The appliqués are then glued to the corner blocks. But don't just slap them on any old way. Be sure to orient the grain in the same direction, as shown in Figure 5. This little attention to detail makes a big difference in the project's final look.

LARGE MIRROR PIVOT BLOCKS. One last step is needed before moving on to adding the mirrors and mounting them to the table. And that's the addition of two pivot blocks to the back of the large mirror frame (Figure 6). These pivot blocks provide a mounting surface for the two-piece pivot hardware. A little glue and a couple of clamps will hold them in place until the glue sets up.

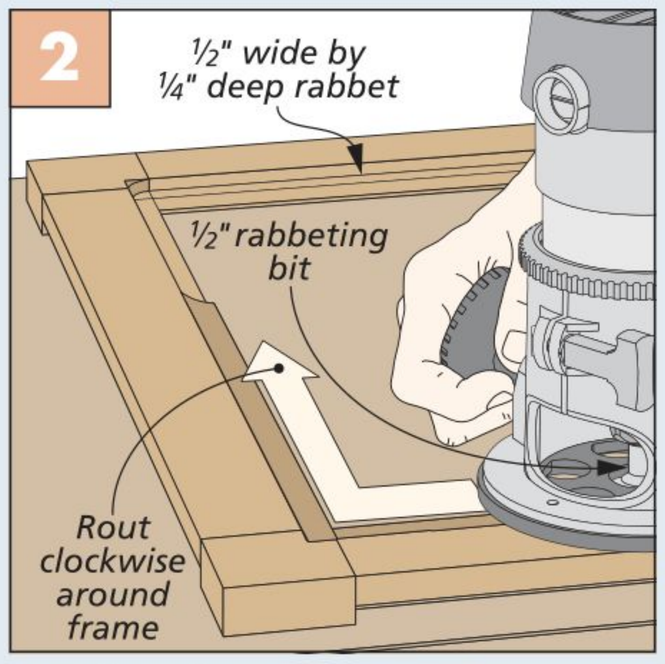
MOUNTING FRAMES. Attaching the mirror frames to the mirror posts is simply a matter of locating the hinges for the side frames and the pivoting hardware for the center frame, as shown in the main illustration on the previous page. The mirror frames are positioned so that the tops are flush with the top edge of the mirror posts.

I attached the frames before adding the mirrors and backers to make the frames easier to handle. I also enlisted a helper to assist in marking the hardware locations while I held the mirror frames in place.

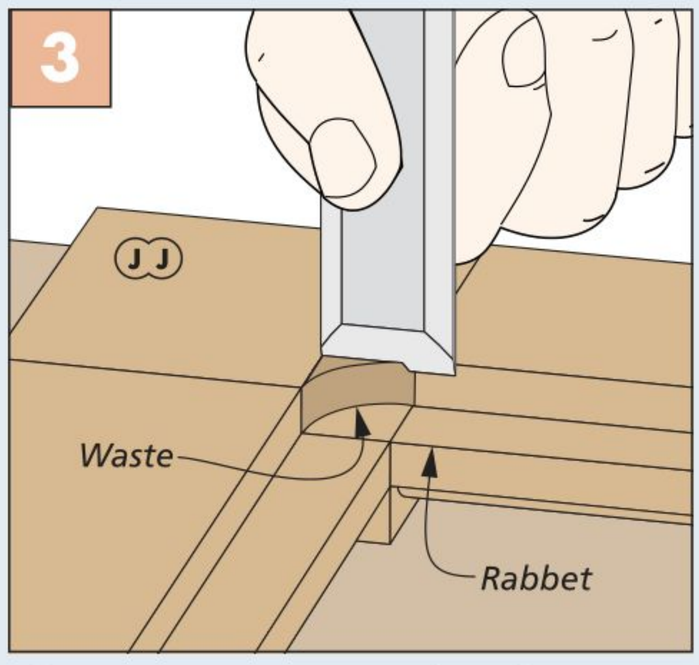
How-To: PREPARE THE COMPLETED FRAMES



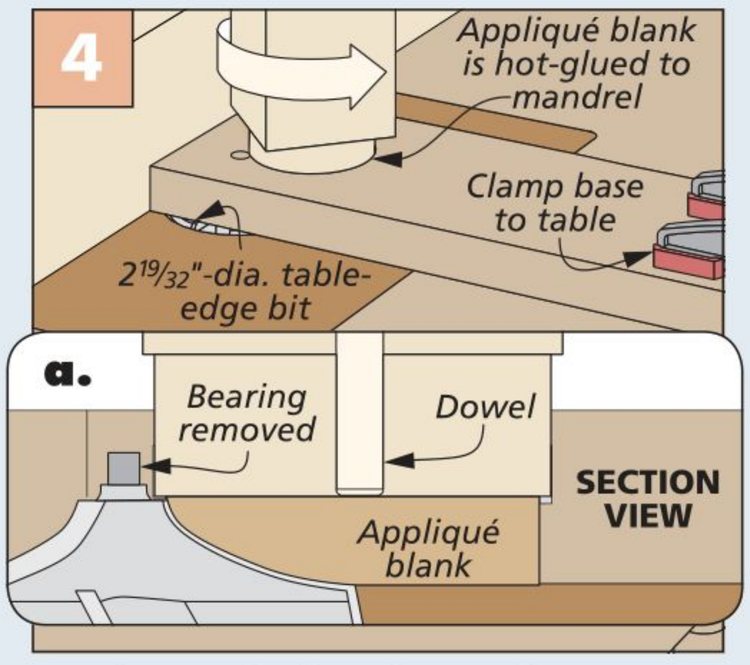
Assembling Frames. A handful of assembly squares are helpful when clamping the frame parts together.



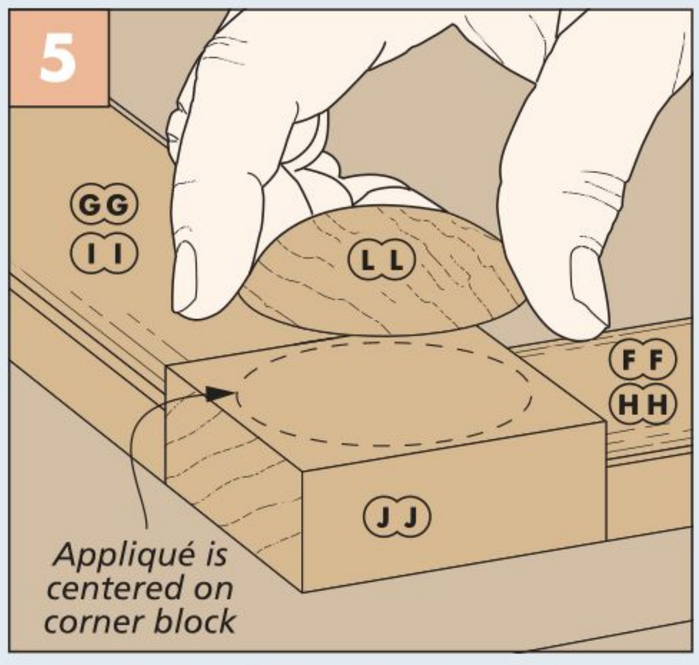
Routing the Rabbet. Use a handheld router to make the rabbet in the back face of each frame.



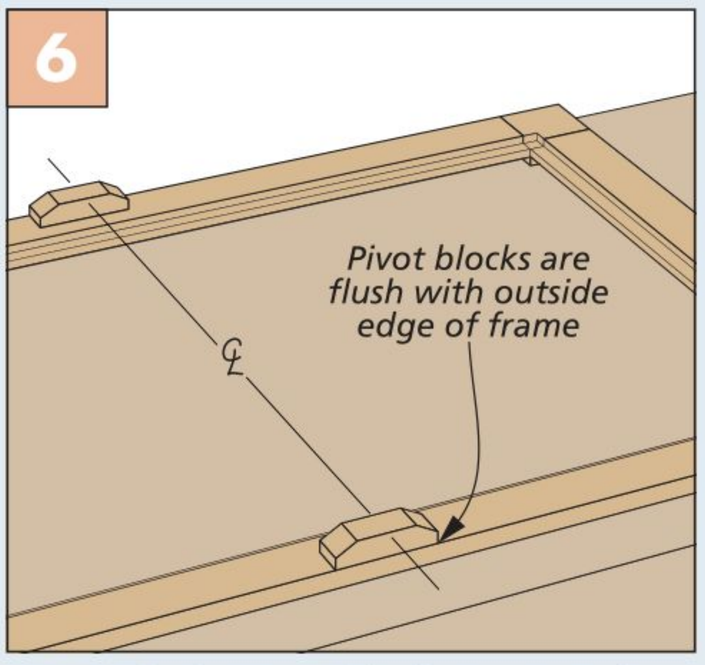
Clean Up Corners. Grab a sharp chisel to remove the rest of the waste from the corner of the rabbets.



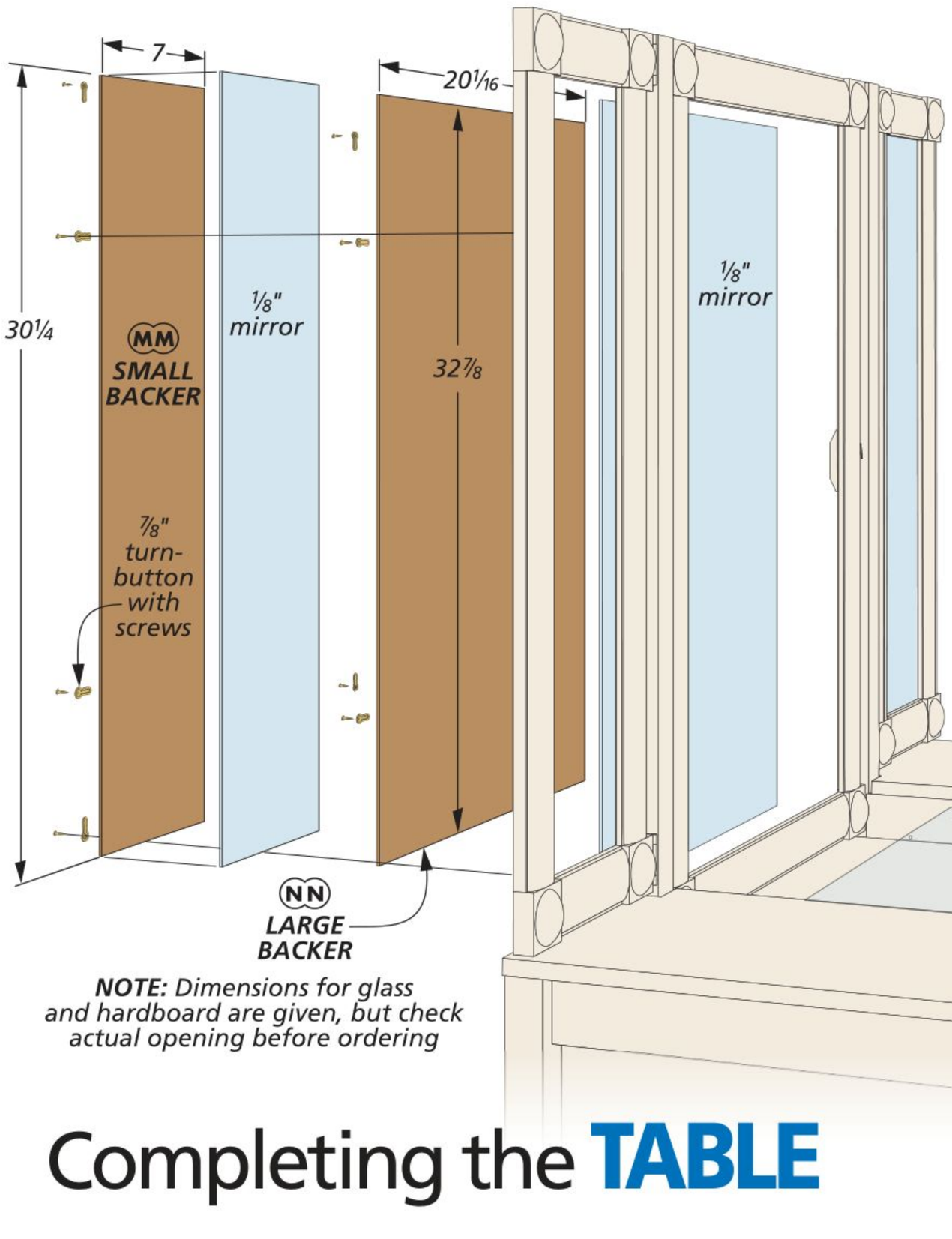
Appliqué Blanks. The article on page 16 provides all the information you'll need for making the appliqués.



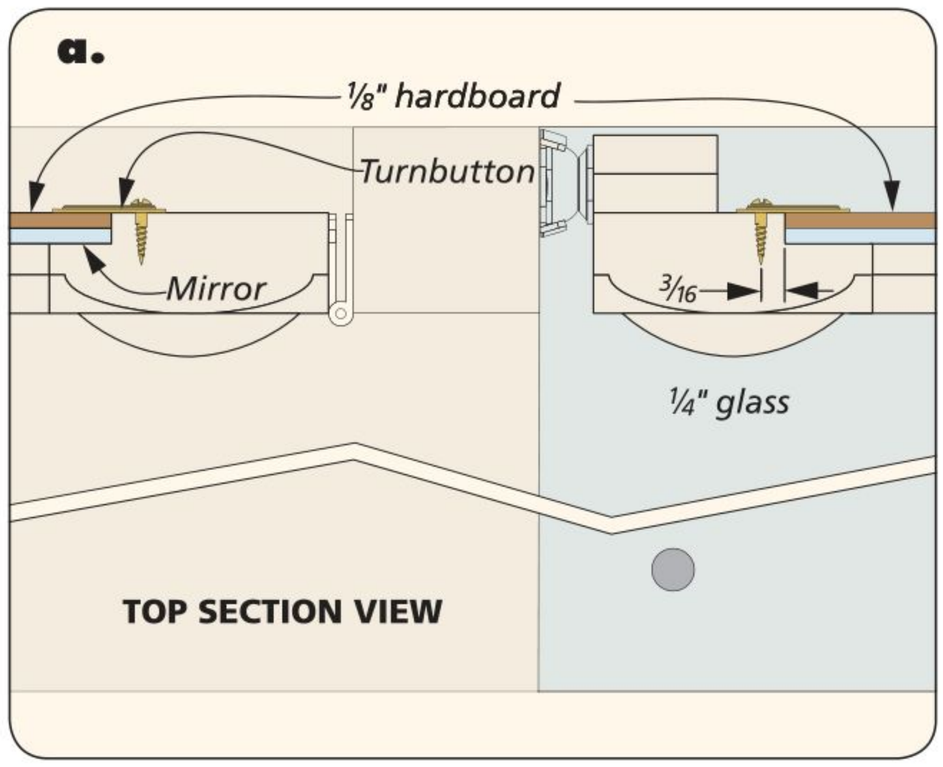
Consistent Placement. Be sure to orient the grain pattern of each appliqué in the same direction.

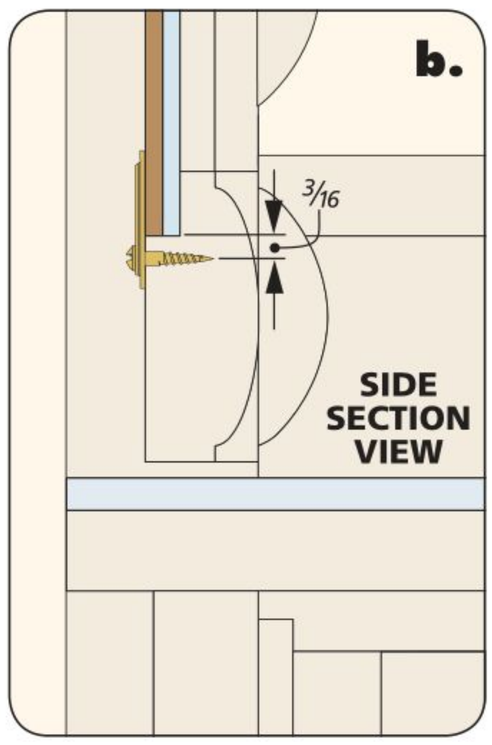


Pivot Blocks. Two blocks mounted on the back of the large frame provides a spot for the pivot hardware.



NOTE: *Dimensions for glass and hardboard are given, but check actual opening before ordering*





Completing the TABLE

Now that the bulk of the woodworking for the dressing table is complete, you're ready to add the finishing touches. But before going any further, now is a good time to apply a finish to your table. I opted to finish mine with just a few coats of spray lacquer.

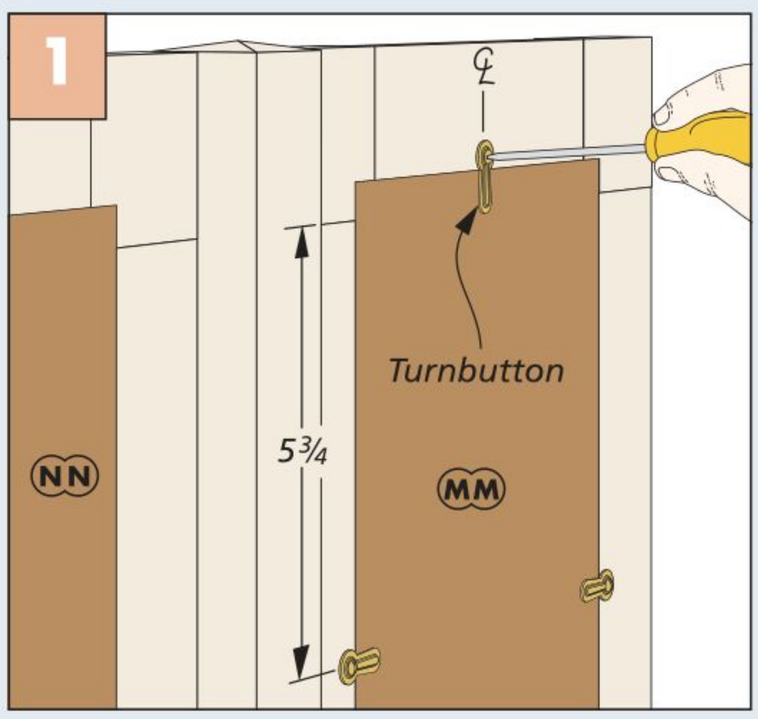
BACKER TEMPLATES. Next up, I cut pieces of hardboard to size for the mirror backers. I took these backers with me when I went to my local glass shop to have the mirrors cut to size. Using the backers as templates helps to guarantee an exact fit in the frames. The mirrors and frames are held in place with turnbuttons attached to the backs of the frames (Figure 1, at right).

CENTER GLASS. While I was at the glass shop, I also had a thick piece of glass cut to size to fit on top of the center case, as shown above. This protects the top from any spills or dings that may occur. A few non-slip grip pads keep the glass from sliding around. And to give it a nice, finished look, I had a bullnose profile ground on the front edge of the glass top (photo at right).

CONVENIENCE DETAIL. Before putting the table into service, I added another item to make it a little more user friendly. And that's the small power strip mounted in the back of the pullout unit. The lower right photo on page 31 shows its position. A couple of grommets protect the cord on the power strip.

With the mirrors, glass top, and all the other accessories in place, this high-class vanity is ready to make someone very happy in its new home. W

How-To: TURNBUTTONS



Installing Turnbuttons. Space the turnbuttons around the perimeter of each mirror frame to hold the backer.

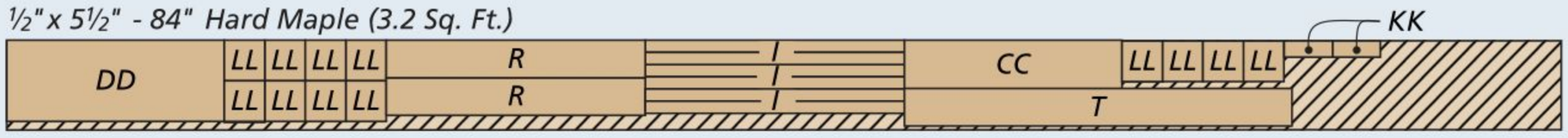
▲ A bullnose profile is ground on the front edge of the glass top. Non-slip grip pads hold the glass in place.

Materials, Supplies & Cutting Diagram

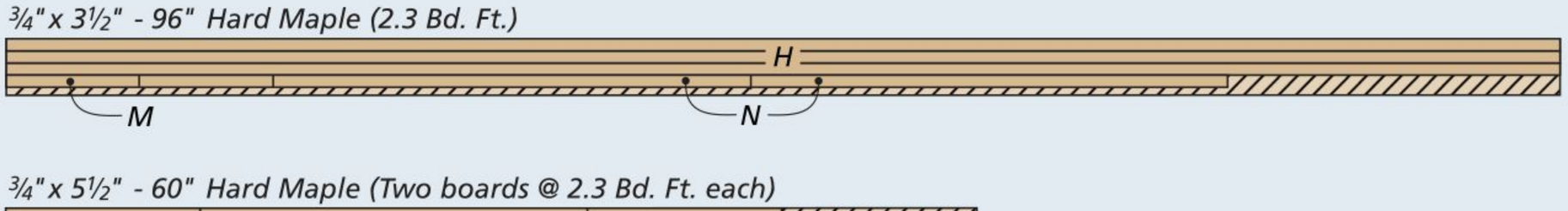
A	Legs (4)	1½ x 1½ - 29¼
B	End Rails (4)	¾ x 2½ - 18
C	Rear Rails (2)	¾ x 2½ - 47¼
D	Mirror Posts (2)	1½ x 1½ - 58½
E	Case Sides (4)	¾ ply. - 17⅛ x 26¼
F	Tops/Bttms. (4)	¾ ply. - 9¹³⁄₁₆ x 17⅛
G	Case Backs (2)	¼ ply. - 9¾ x 25½
H	Edging	⅛ x ¾ - 228 rgh.
I	Drawer Runners (6)	⅜ x ¾ - 16
J	Cntr. Top/Bttm. (2)	½ ply. - 17⅛ x 23½
K	Cntr. Case Sides (2)	¾ ply. - 17⅛ x 3⅜
L	Cntr. Case Back (1)	¼ ply. - 2⅞ x 23½
M	Short Edging	⅛ x ¾ - 8 rgh.
N	Long Edging	⅛ x ½ - 46 rgh.
O	Center Top (1)	¾ x 19¹⁵⁄₁₆ - 23¹⁵⁄₁₆
P	Outer Tops (2)	¾ x 19¹⁵⁄₁₆ - 12
Q	Cntr. Dwr. Frt./Bk. (2)	¾ x 2⁵⁄₁₆ - 22½
R	Cntr. Drawer Sides (2)	½ x 2⁵⁄₁₆ - 16
S	Cntr. Dwr. Bttm. (1)	¼ ply. - 15½ x 22
T	Cntr. False Front (1)	¾ - 3¼ x 23¹⁵⁄₁₆
U	Drwr. Fronts/Backs (6)	¾ x 8³⁄₁₆ - 8¹⁵⁄₁₆
V	Drwr. Sides (6)	¾ x 8³⁄₁₆ - 16
W	Drwr. Bottoms (3)	¼ ply. - 7¹⁵⁄₁₆ x 15½
X	Top/Bttm. False Fronts (2)	¾ x 8⅞ - 10½
Y	Middle False Front (1)	¾ x 8⅛ - 10½
Z	Pullout Front/Back (2)	¾ ply. - 7⅞ x 21¾
AA	Pullout Side (1)	¾ ply. - 14¾ x 21¾
BB	Pllt. Base/Shelf (1)	¾ ply. - 7⅝ x 14³⁄₁₆
CC	Pullout Base Side (1)	½ x 3 - 13⁷⁄₁₆
DD	Pullout Shelf Side (1)	½ x 5 - 13⁷⁄₁₆
EE	Pullout False Front (1)	¾ x 10½ - 26⅞
FF	Large Mirror Stiles (2)	¹³⁄₁₆ x 2¼ - 31⅞
GG	Large Mirror Rails (2)	¹³⁄₁₆ x 2¼ - 18½
HH	Small Mirror Stiles (4)	¹³⁄₁₆ x 2¼ - 29¼
II	Small Mirror Rails (4)	¹³⁄₁₆ x 2¼ - 6
JJ	Corner Blocks (12)	¹³⁄₁₆ x 2¼ - 2¼
KK	Pivot Blocks (2)	⅝ x 1 - 3
LL	Appliqué Blanks (12)	½ x 2½ - 2½
MM	Sm. Backers (2)	⅛ hdbd. - 7 x 30¼
NN	Lrg. Backer (1)	⅛ hdbd. - 20¹⁄₁₆ x 32⅞

- (22) #8 x 1¼" Fh Woodscrews
- (4) #8 x 1" Fh Woodscrews
- (18) #8 x ¾" Fh Woodscrews
- (7) #8 x 2" Ph Woodscrews
- (4) ¼" x 20 T-Nuts
- (4) ¼" x 20 -1½" Bolts
- (1 pr.) 16" Drawer Slides w/Screws
- (7) 2"-dia. Birch Drawer Knobs
- (1) 3"-dia. Blow Dryer Holder (chrome)
- (1) 1½"-dia. Appliance Holder (chrome)
- (2) Cord Grommets
- (1) Electrical Outlet w/Cord
- (2 pr.) 2" No-Mortise Hinges w/Screws
- (2 pr.) Mirror Pivots w/Screws
- (1) ¼"-Glass (cut to fit)
- (3) ⅛"-Mirrors (cut to fit)
- (26) ⅞" Turnbuttons w/Screws

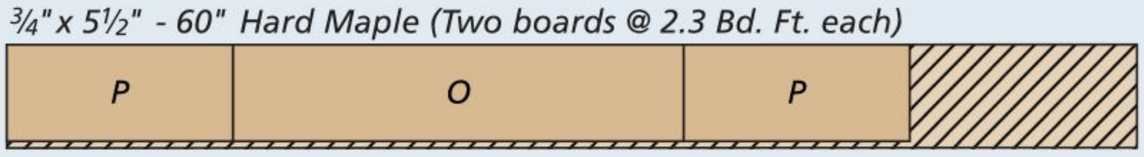
½" x 5½" - 84" Hard Maple (3.2 Sq. Ft.)



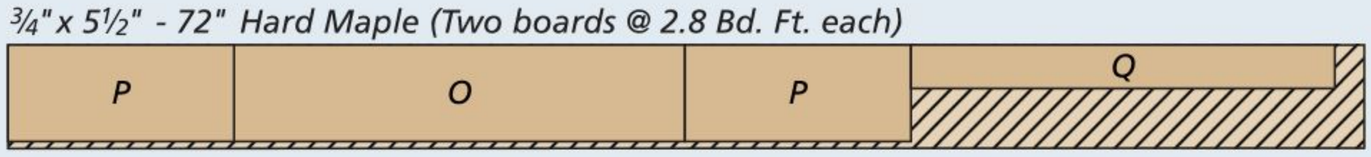
¾" x 3½" - 96" Hard Maple (2.3 Bd. Ft.)



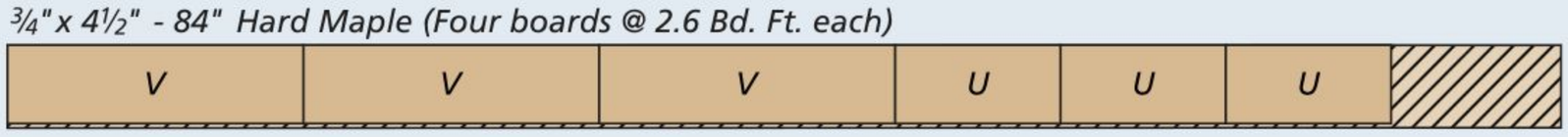
¾" x 5½" - 60" Hard Maple (Two boards @ 2.3 Bd. Ft. each)



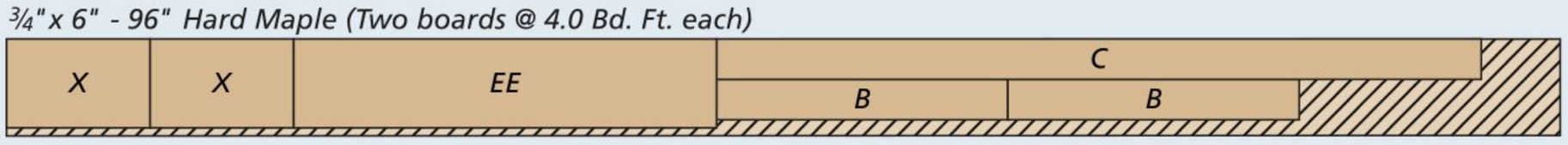
¾" x 5½" - 72" Hard Maple (Two boards @ 2.8 Bd. Ft. each)



¾" x 4½" - 84" Hard Maple (Four boards @ 2.6 Bd. Ft. each)

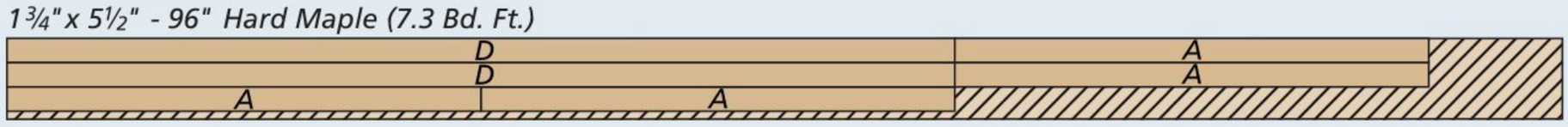


¾" x 6" - 96" Hard Maple (Two boards @ 4.0 Bd. Ft. each)



1" x 5" - 72" Hard Maple (Two boards @ 3.1 Bd. Ft. each)

1¾" x 5½" - 96" Hard Maple (7.3 Bd. Ft.)



ALSO NEEDED: *One 48" x 48" sheet of ¼" maple plywood*
One 48" x 48" sheet of ½" maple plywood
One 48" x 96" sheet of ¾" maple plywood
One 48" x 48" sheet of ⅛" hardboard

Shop Project

Rotary tool Router Table

Small projects are easy to make when you have a tiny router table. A good rotary tool is all you need.

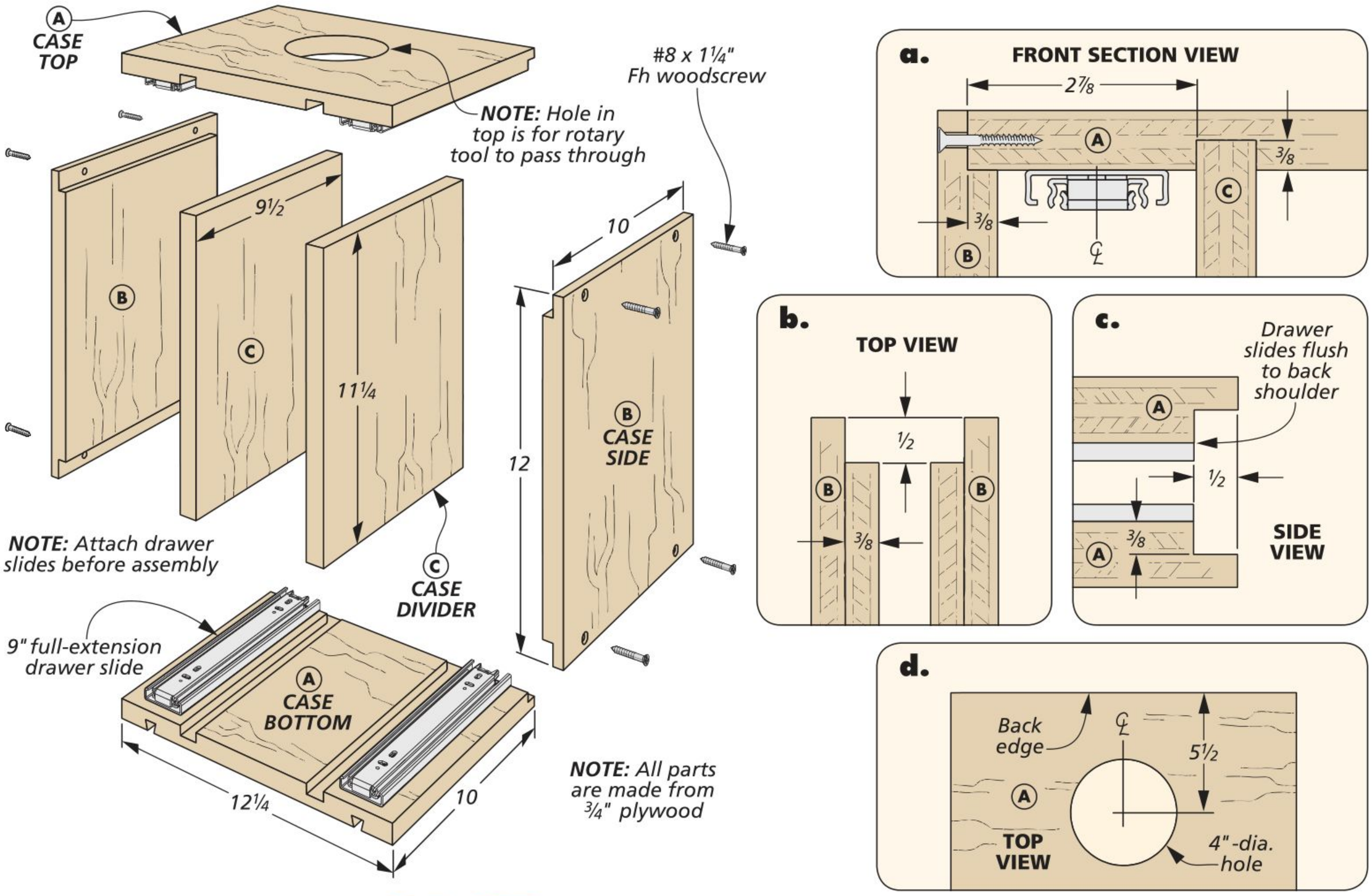
We have several routers and router tables in the *Woodsmith* shop. So it's a bit of a stretch to say we "need" another router table. But this is a different deal. Honestly, it's a mini router table. It's mini because it uses a rotary tool instead of a full-size router. Like clamps, you can never have enough routing tools.

If you don't already have one, rotary tools and their matching router bits are readily available at your local home center. And they do a bang-up job when it comes to making things on a small scale. Despite their size, there's little drop-off in getting precise results in most woodworking tasks.

Building on these qualities was the driving force behind this project. It starts with a generously sized tabletop that has a no-maintenance plastic laminate top with a miter gauge slot to aid in the routing process. As for the maple fence, it's got a T-track as well for featherboards and stop blocks.

▲ The case has two pull-out racks on either end that give you plenty of room to store bits and accessories. Attaching them to full-extension drawer slides gives you complete access to the contents.

Writen by: Erich Lage; Project design: Dillon Baker



Start with the CASE

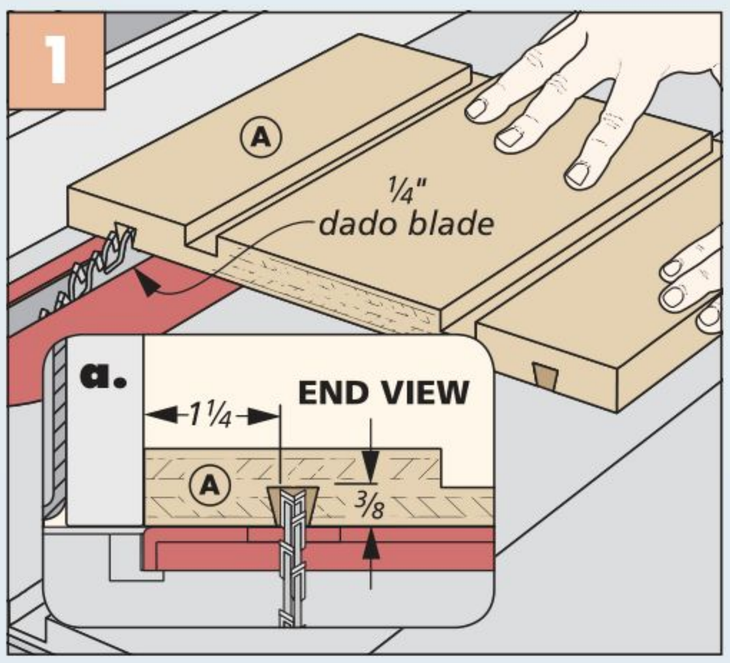
The sturdy design of this small case is what makes it work as a mobile workstation. Using ¾" plywood makes it strong and stable. I began the case by cutting the top, bottom, sides, and dividers to size. While at the table saw, you can make the dadoes and rabbets in the top and bottom for the dividers and back, followed by the rabbets in the sides for the top, bottom, and back. As you see in the photos on the previous page, I used a pair of *Matchfit* clamps to quickly lock the table in place on the bench. The clamps fit in two dovetail slots that you'll make in the bottom of the case. When the work is done, it's easy to release the table and stow it away.

BOTTOM DETAILS. As you can see in the box to the left, these dovetail slots are pretty easy to make. Start by removing the bulk of the waste with a dado blade (Figure 1). Then cut the dovetail profile over at the router table (Figure 2).

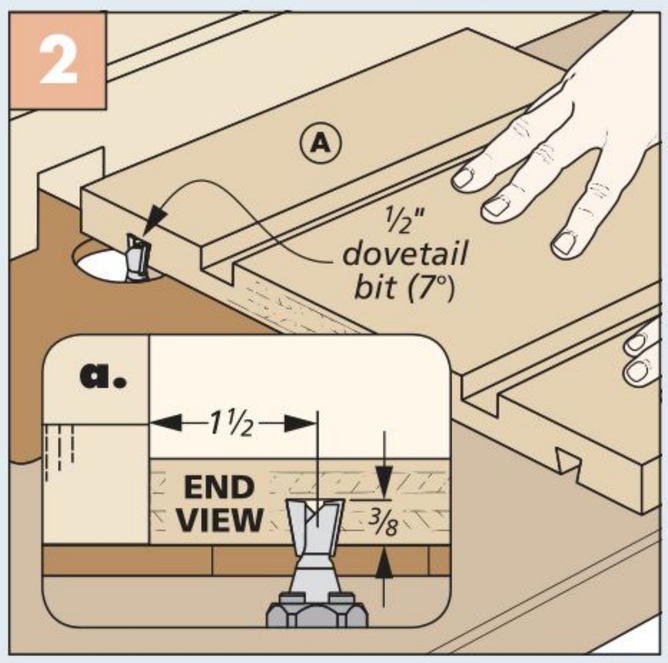
TOP DETAILS. The case top needs a little work as well. As you can see in detail 'd' above, it has a good-sized hole in it for the rotary tool to pass through. After marking the hole location on the top, I cut it out with a jig saw. This hole is hidden by the table top, so it doesn't have to be perfect.

BEFORE ASSEMBLY. The two compartments on each side of the case are for a couple of slide-out bit storage racks. These racks will ride on metal drawer slides. Because the openings are so narrow, I decided to install the slides before putting the case together. With that done, it's just a matter assembling the case with glue and screws. Then you can turn your attention to the top and fence.

How-To: MAKE THE DOVETAIL SLOTS

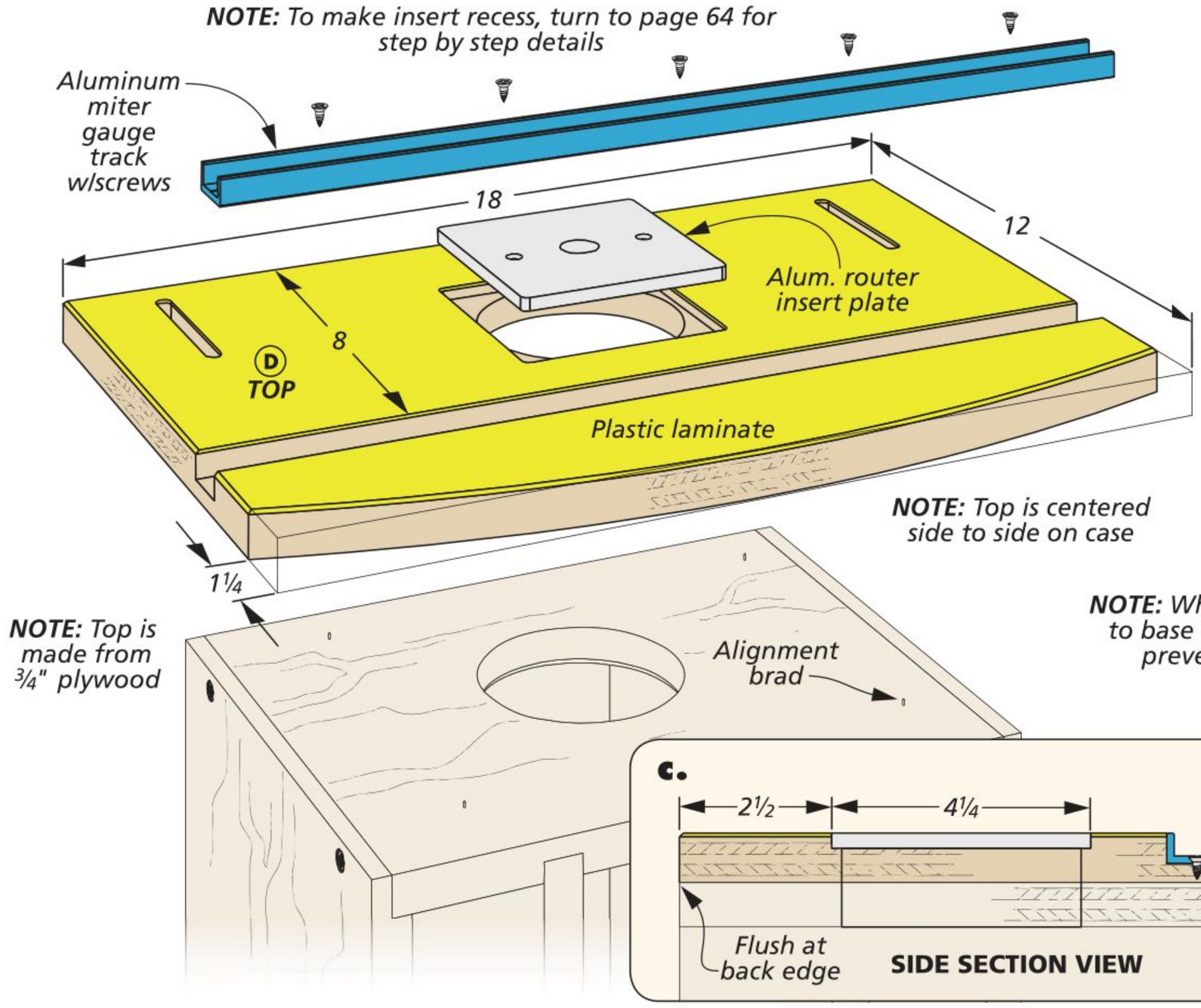


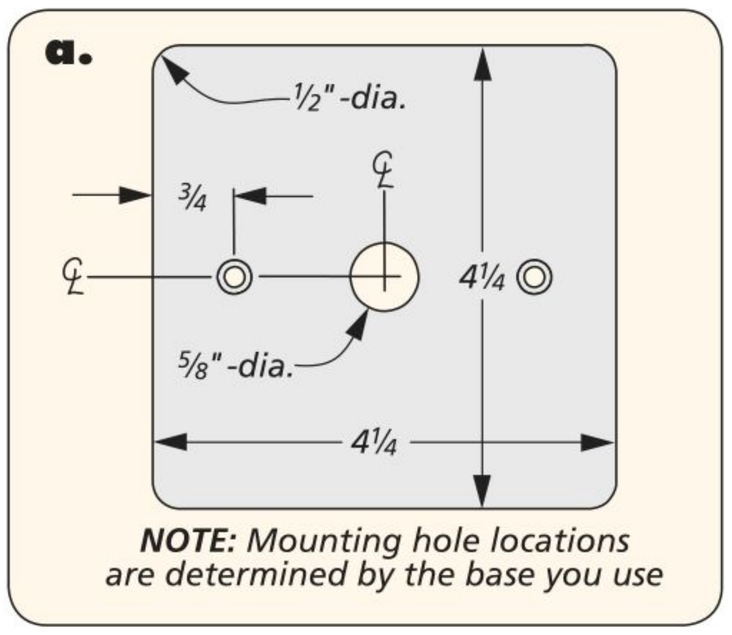
Dado First. Use a dado blade to make the first pass on the bottom. This will remove the majority of the material.

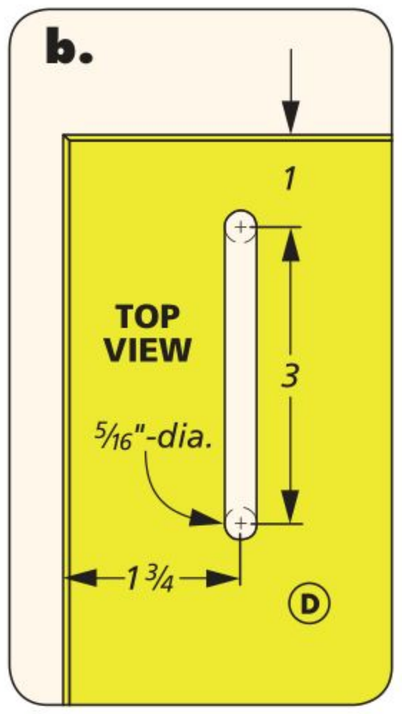


Rout Profile. To complete the profile for the clamp head, move over to the router table and use a dovetail bit.

Illustrations: Dirk Ver Steeg







Making the TOP & FENCE

With the case done and set to the side, I turned my attention to the tabletop. As the main drawing above shows, the top is a piece of plywood covered with plastic laminate. It has a groove cut in the front to hold an aluminum miter track. The top also has a recessed opening to hold a shop-made insert plate that's attached to the rotary tool. There are also two slots near the back for the bolts that hold the fence in place. First off is shaping the top.

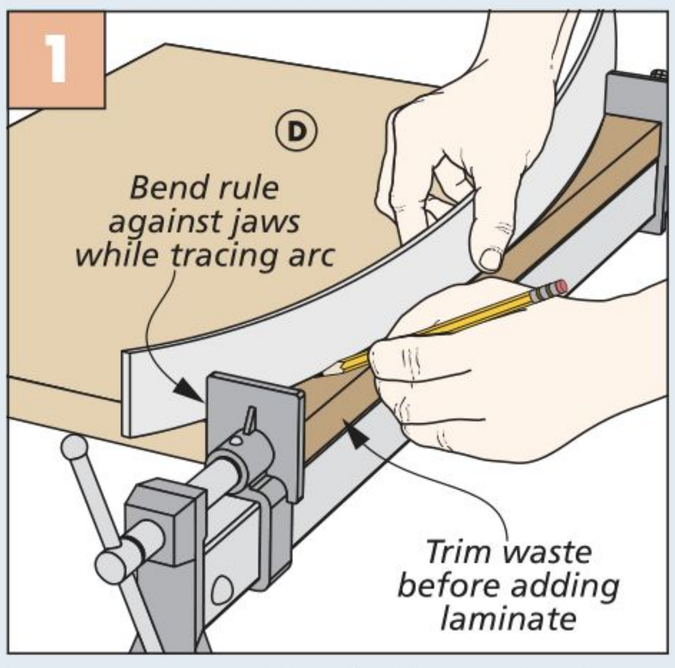
CUT TOP TO SIZE. Begin by cutting the top to size, taking into account the arc that runs along the front. Details on how to lay out the arc are shown in Figure 1 in the How-To box to the left. I used a jig saw and trimmed the table to the waste side of the layout line. Then it's just a matter of smoothing out the blade marks with a belt sander.

PLASTIC LAMINATE. Plastic laminate is the perfect material for any worksurface that you're going to slide things over. It can take a beating and cleans up easily and quickly. I cut the piece for the tabletop a little larger than needed and then trimmed it flush with a 25° bevel laminate trimming bit (Figure 2).

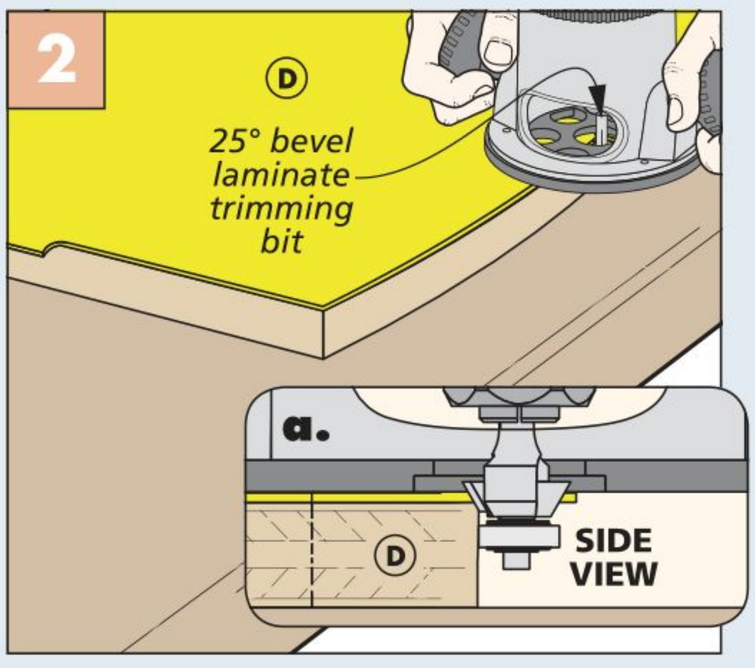
MITER GROOVE. When you're done cleaning up the edges, take the top over to the table saw to cut the groove needed for the miter track. As you can see in Figure 1 on the next page, I ran several strips of painter's tape on the surface to prevent scratching. You'll notice in detail 'a' that two passes are needed to make the 1"-wide groove.

FENCE SLOTS. Next, you'll need to lay out and drill the endpoints of the slots for the fence bolts to pass through (detail 'b' above). Then you can make the slots with a straight bit at the router table (Figure 2, next page).

How-To: MAKE THE ARC & TRIM THE TOP



Lay Out Arc. Use the jaws of a bar clamp to mark the endpoints of the arc on the top blank.



Trim Laminate. While trimming the top, be mindful of contact cement building up on the router bit bearing.

ROUGH OPENING. A few simple steps are all it takes to accurately locate the rough opening in the tabletop for the rotary tool. First, lay the top face down on the workbench. Then set the base in position (also upside down) on the top and trace the rough opening location on the underside. Drill a pilot hole and cut out the rough opening with a jig saw.

MILL INSERT PLATE. I used an after-market router base to mount my rotary tool to the table. To pair nicely with that base, I made an insert out of ¼"-thick aluminum, as you see in the main drawing and detail 'a' on the previous page. After shaping the plate, use it to lay out the recess in the top. Shop Notes on page 64 shows how to make the recess.

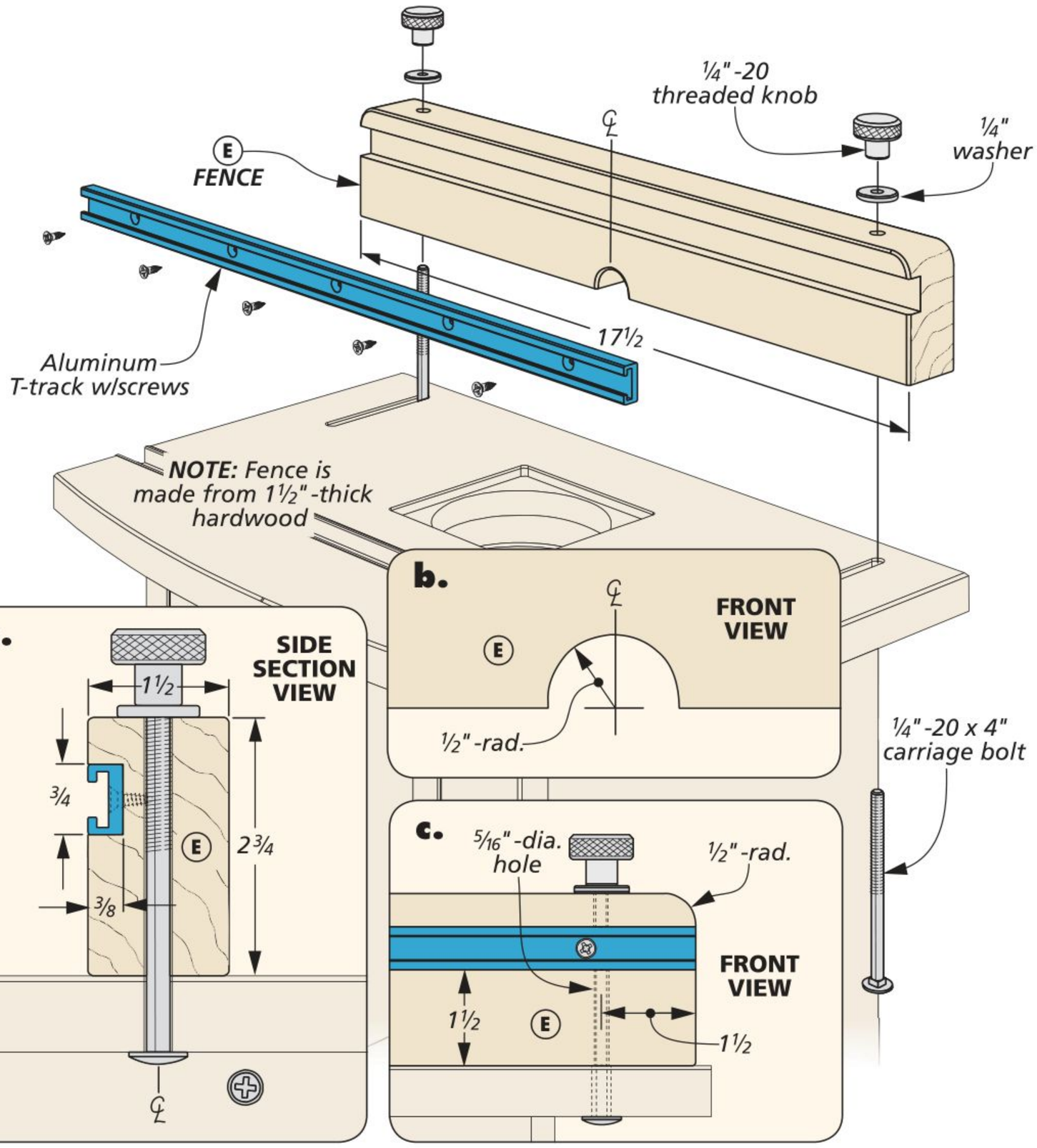
GLUE UP. Since there's a lot of glue surface between the top and the case, I decided to glue the two parts together without any screws. But first, I drove several small brads in the top of the case and clipped their heads off. This prevents the parts from sliding around while clamping them together.

THE FENCE

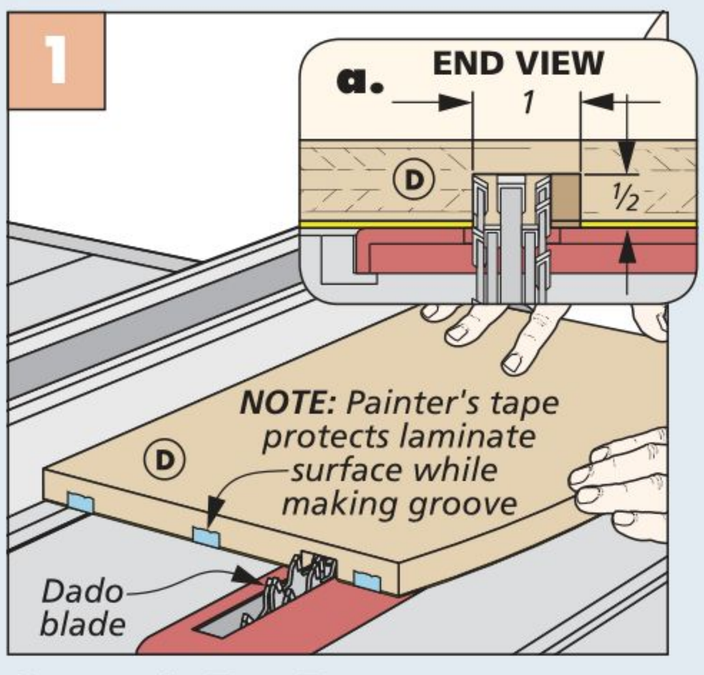
The fence is made from 1½"-thick hardwood. It's designed to attach to the table with two carriage bolts (details 'a' and 'c'). This allows it to be easily adjusted yet lock firmly in place when needed. A groove in the face of the fence holds a length of T-track for attaching featherboards or stop blocks.

CUT TO SIZE. To begin the process, cut the hardwood blank to size. Then, use a dado blade to cut the groove in the face for the aluminum T-track.

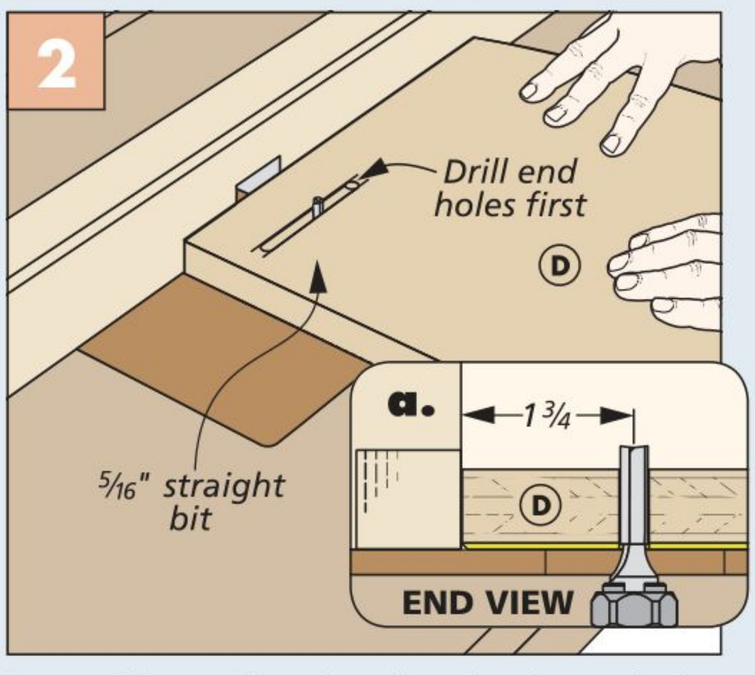
NOTCH. The fence has a half-circle notch centered in the lower edge that serves as an opening for the router bit. Use a Forstner bit at the drill press to machine this. A backer board clamped between the fence and workpiece prevents the bit from wandering (Figure 3). To finish up, round the corners (detail 'c').



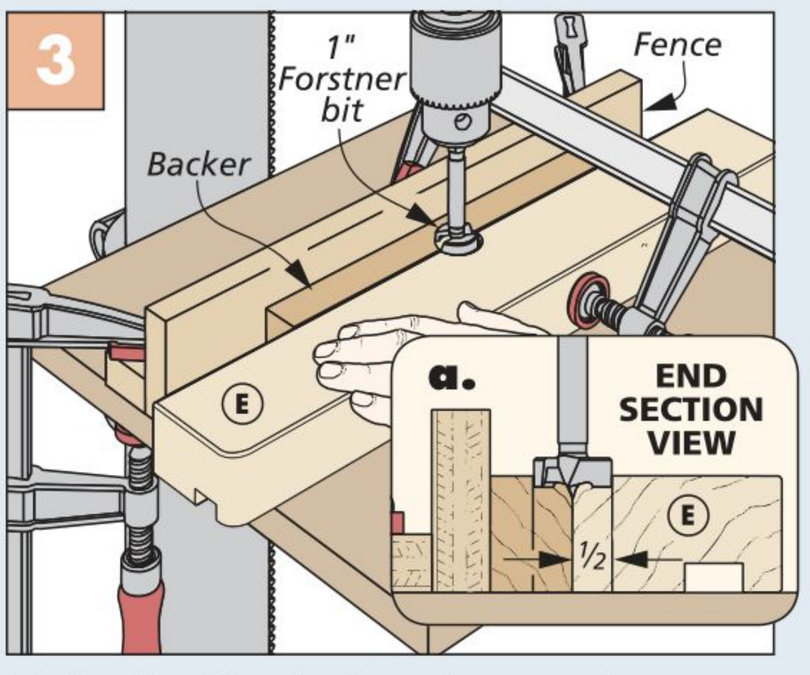
How-To: COMPLETE THE TOP & FENCE



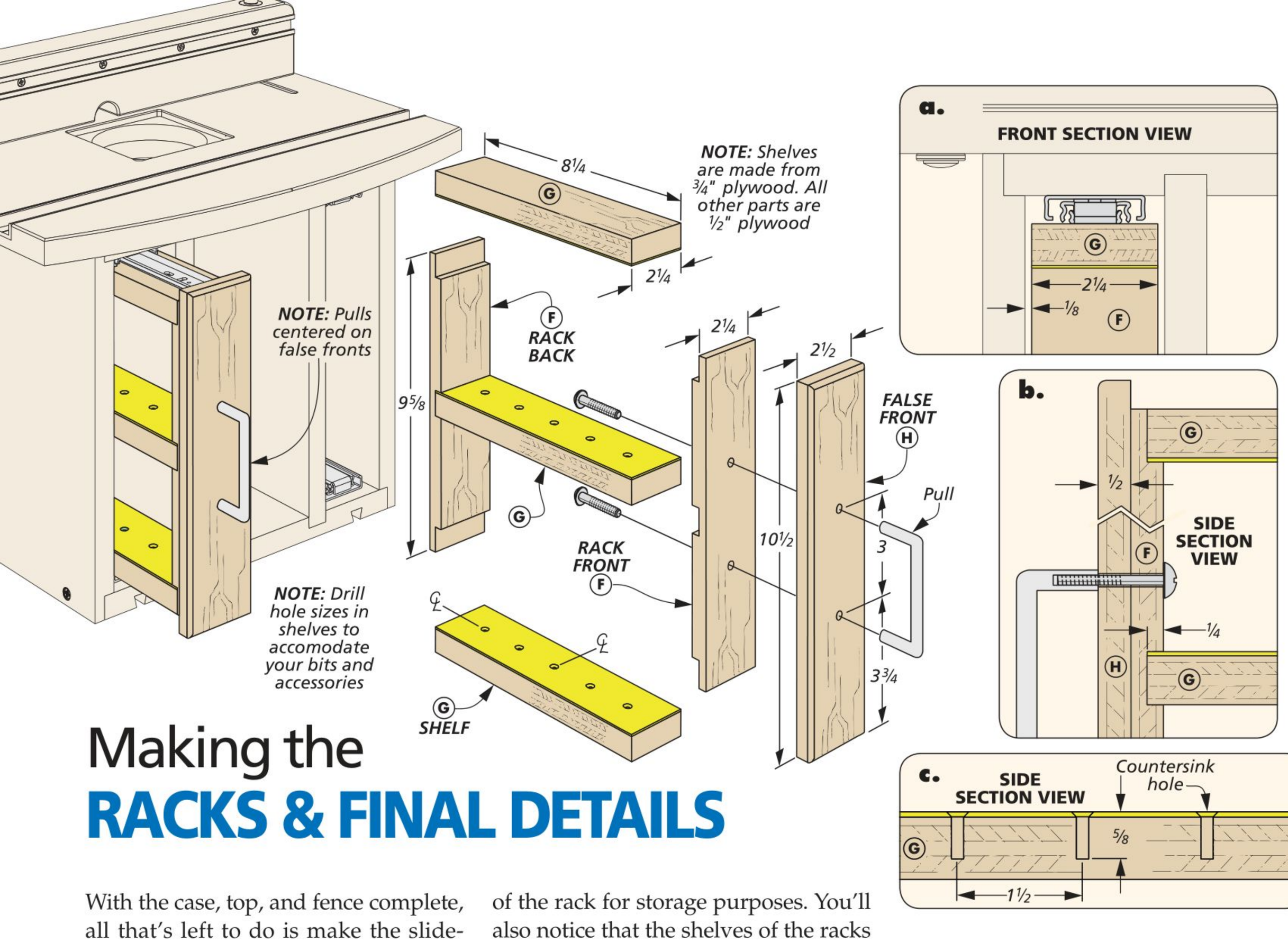
Groove in Top. Two passes are required to make the groove for the aluminum miter gauge track.



Rout Slots. The slots for the fence bolts can be made by making multiple passes with a straight bit at the router table.



Make the Notch. To make a precise half-circle notch, clamp the workpiece and backer to the drill press fence.



Making the RACKS & FINAL DETAILS

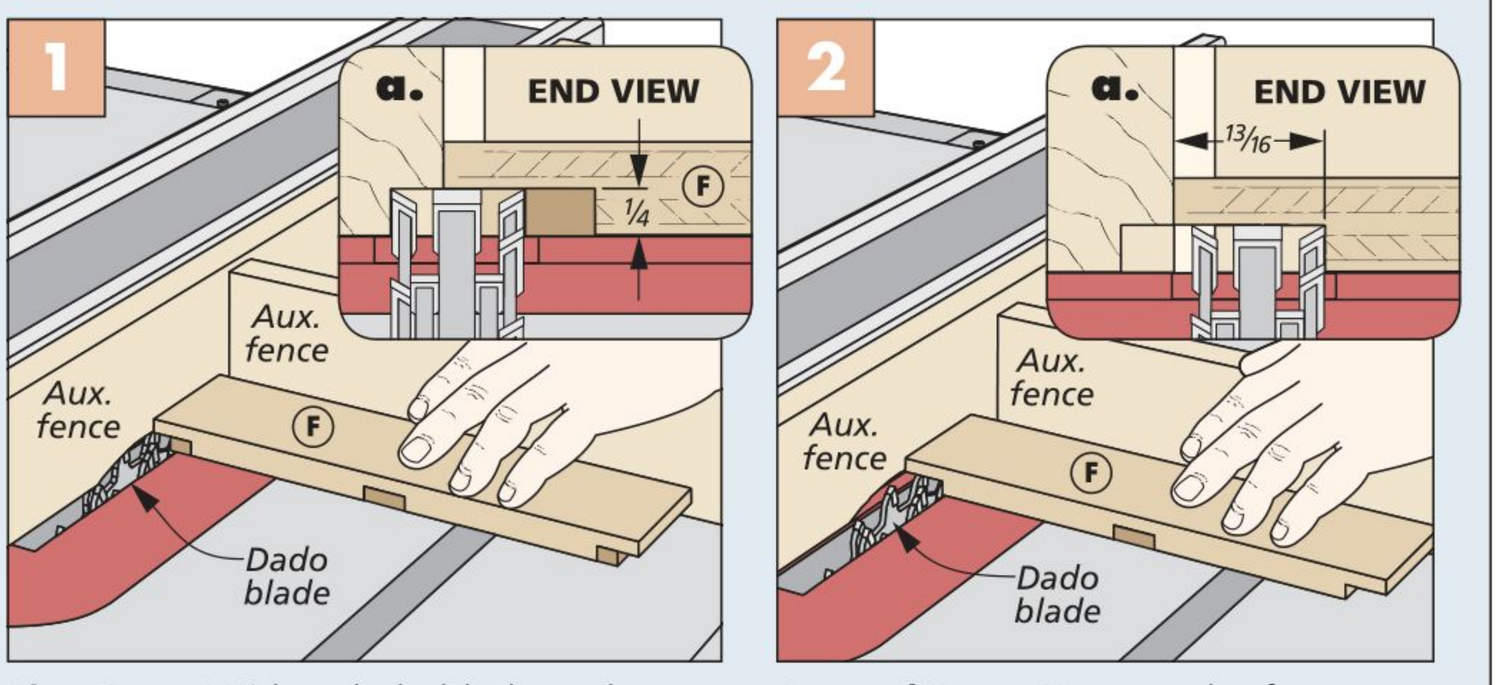
With the case, top, and fence complete, all that's left to do is make the slide-out racks that hold the router bits and any other accessories that you wish to store there. The racks you see in the main drawing above are attached to full-extension drawer slides. These slides give you access to the full depth of the rack for storage purposes. You'll also notice that the shelves of the racks are covered with plastic laminate. This helps to keep the rack clean.

LAMINATE FIRST. To simplify the process of making the shelves, glue plastic laminate to an oversized piece of plywood, then cut the six pieces to size. Although it's not necessary, I went ahead and added laminate to the underside of the two top shelves (details 'a' and 'b'). I did this for the convenience of cutting all the rabbets and dadoes (detail 'b') in the front and back workpieces to the same width.

RACK FRONT AND BACK. Speaking of the rack fronts and backs, they (along with the false fronts) are all made from ½" plywood. After cutting the parts to their final size, you can cut the rabbets and dadoes in the front and back pieces. The How-To box at left shows how to do this at the table saw.

BIT HOLES. Before assembling the racks, it's a good idea to drill the holes (in the shelves) for your bits and accessories. The size of bit needed to do this might vary, depending on what you want to store in the shelves. It's best to do a tally of the parts and measure their shank sizes. The bits I put in my shelves called for a 9/64" bit. While I was doing layout and drilling, I went ahead and drilled the holes in the false fronts as well.

How-To: WIDER DADOES



First Pass. With a dado blade and an auxiliary fence, cut a shallow first pass in both ends of the workpieces.

Second Pass. Now set the fence to make the shoulder cut. Repeat this process for the center grooves

▲ The insert you're making for the top attaches perfectly to a precision after-market rotary tool base.

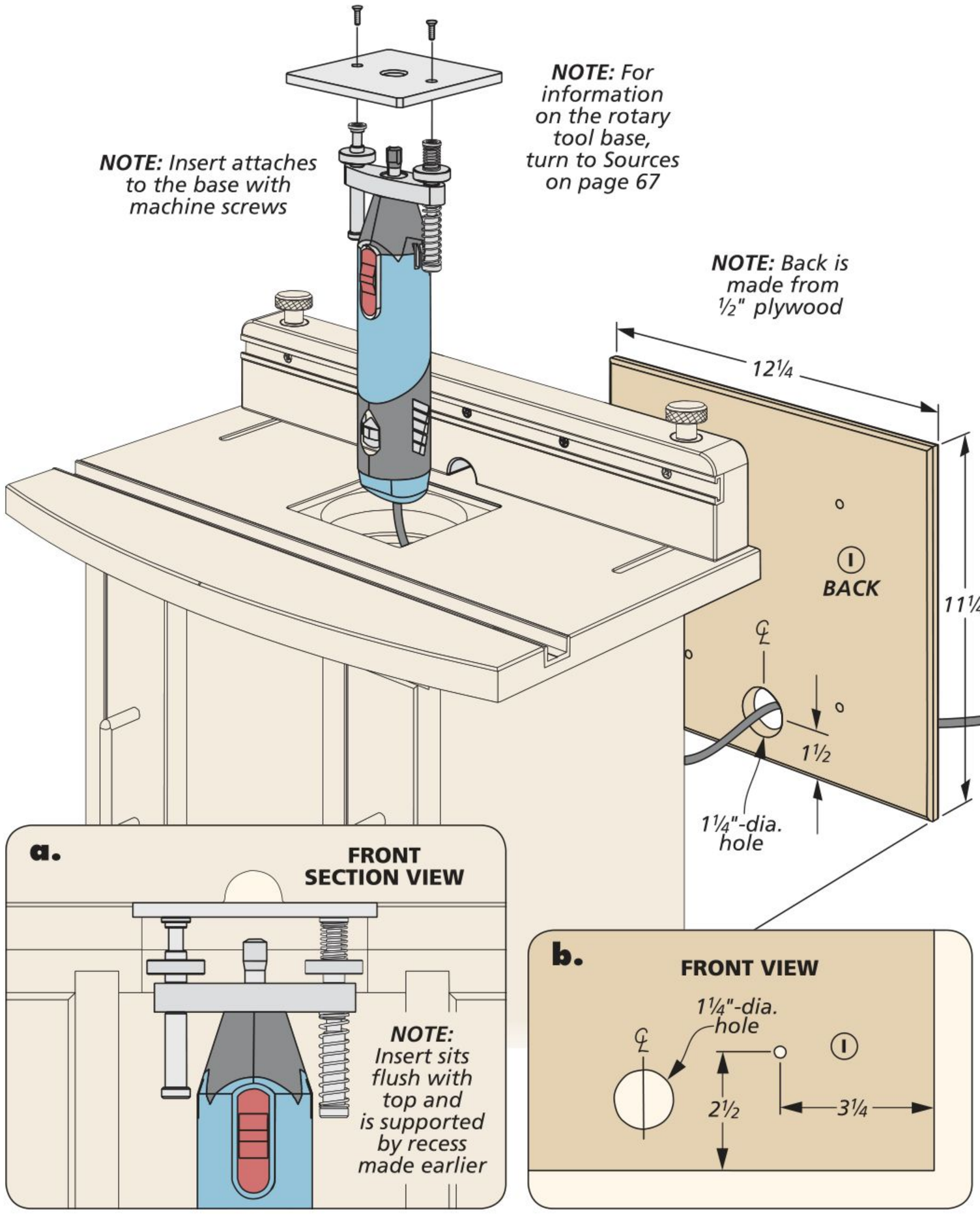
Those measurements are in the main drawing on the previous page. Then I glued the racks together.

INSTALL RACKS. When you've finished assembling the racks, it's time to attach them to the slides and roll them into the cabinet. With that done, you can easily fit the false fronts to the racks. Start by placing a strip of double-sided tape on the face of the racks. Then center the false front in the opening. Using the holes in the false front as a guide, finish drilling the holes for the pulls.

CASE BACK. To finish up the woodworking duties, I made the plywood back that you see in the main drawing above. Detail 'b' shows the location of the holes needed to attach the back to the case. The large hole that's centered in the lower portion of the back is for the electrical cord of the rotary tool.

ATTACH THE INSERT. The after-market rotary tool base I chose is one that's originally made for guitar and musical instrument makers. The working parts are all milled in steel and brass to precise standards (photo above). You'll need to remove the thin base and attach the insert plate you made earlier.

FINISH. This little router table is a shop tool, so I wasn't too concerned about the finish. Nonetheless, to aid in the ease of cleaning, I sprayed the case with two coats of lacquer. With that, the rotary tool router table is ready for operation. Between the quality parts and great design, it'll provide you years of reliable use. W



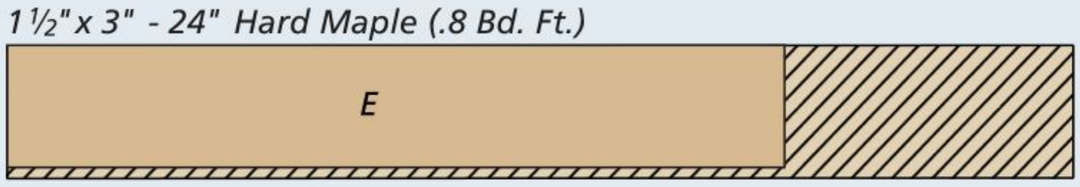
Materials, Supplies, & Cutting Diagram

A	Case Bottom/Top (2)	¾ ply. - 10 x 12¼	
B	Case Sides (2)	¾ ply. - 10 x 12	
C	Case Dividers (2)	¾ ply. - 9½ x 11¼	
D	Top (1)	¾ ply. - 12 x 18	
E	Fence (1)	1½ x 2¾ - 17½	
F	Rack Front/Back (4)	½ ply. - 2¼ x 9⅝	
G	Shelves (6)	¾ ply. - 2¼ x 8¼	
H	False Fronts (2)	½ ply. - 2½ x 10½	
I	Case Back (1)	½ ply. - 12¼ x 11¼	

- (12) #8 x 1¼" Fh Woodscrews
- (4) #8 x 1½" Fh Woodscrews
- (12) #6 x ⅜" Fh Woodscrews
- (2 pr.) 9" Full-Extension Slides w/Screws
- (1) 36" Miter Track
- (1) 48" T-Track
- (2) ¼" x 20 x 4" Carriage Bolts
- (2) ⅜" I.D. x ⅞" O.D. Steel Washers
- (2) ¼" x 20 Knobs
- (2) 3" Pulls w/Screws
- (2) ¼" x 5"x 5" Aluminum Plate
- (1) Rotary Tool Router Base
- (1) 24" x 48" Plastic Laminate

ALSO NEEDED: *One 48" x 48" sheet of ¾" Baltic birch plywood. One 48" x 24" sheet of ½" Baltic birch plywood*

1½" x 3" - 24" Hard Maple (.8 Bd. Ft.)



Heirloom Project

Old-World Butcher Block

This table is the real deal. The end-grain top is designed to take the blows and slices from your finest knives without damaging them.

On the south side of the city I live in, there's an Old-World grocery store that still sells a full line of products that come from the Italian cooking tradition. It's a wonderful place to visit and purchase spices, pasta, and homemade sausage.

In the aisle just outside the meat counter is a butcher block table that I'm pretty sure is older than me. It's been retired from the daily duties that a butcher requires, but could easily be called back into service at any time.

This butcher block table is built in the same spirit as that old butcher block that I saw in the store. This new version truly qualifies as an heirloom project. It will easily provide generations of service and assistance in any kitchen.

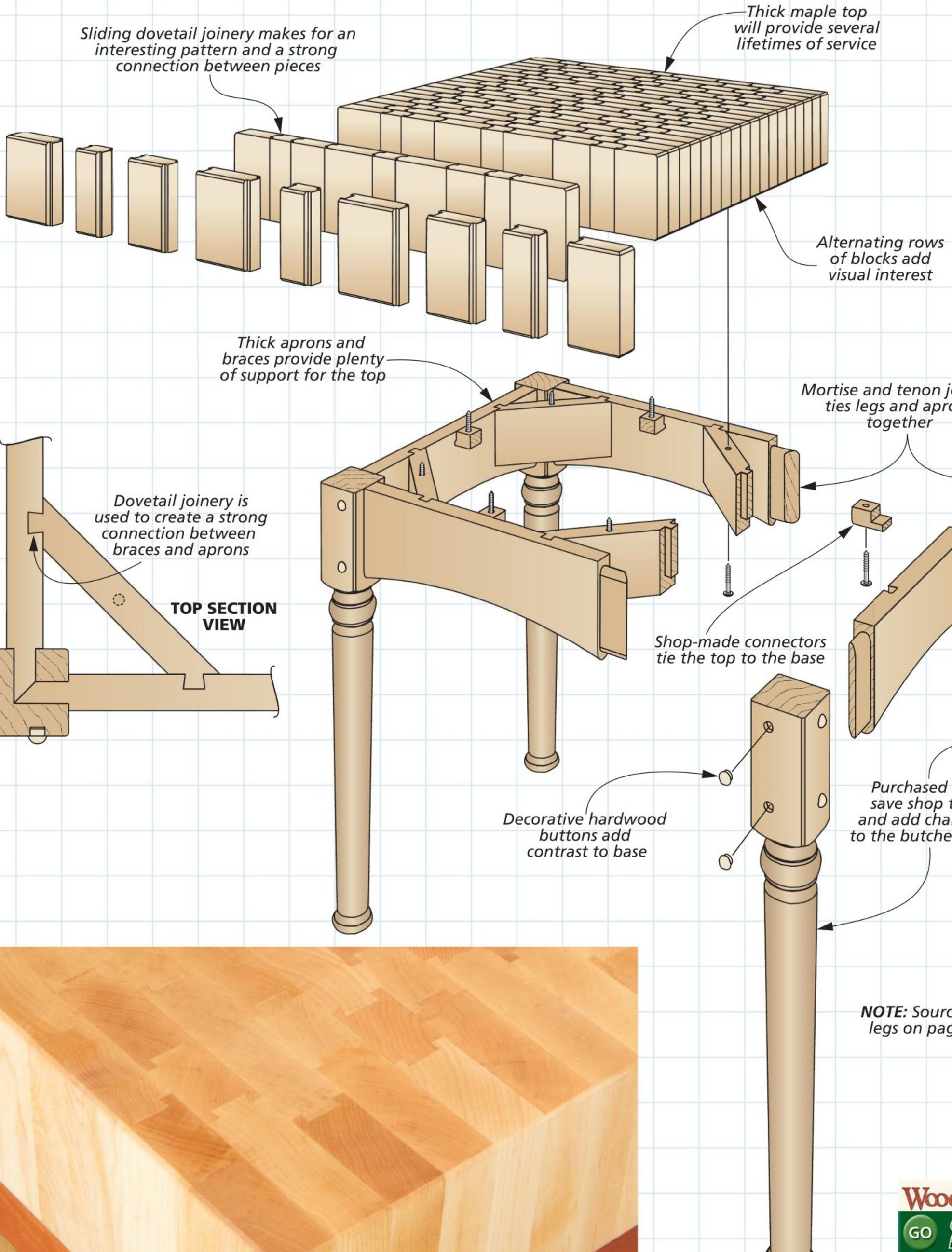
As you see in the photo on the next page, the top is made from 8/4 maple pieces that are dovetailed and laminated together to create the classic, thick end-grain top. It's made to last for a very long time. There's a lot of work that goes into making the top, but not to worry, there's a method to the madness that keeps everything under control.

To add some interest and contrast to the project, the aprons and braces are made from African mahogany. It's easy to mill and takes stain well. The legs are purchased from a reliable online source.

I chose to start from the ground up on this project, that means focusing on the base. So turn the page and roll up your sleeves.

Written by: Erich Lage; Project design: Dillon Baker

Construction Overview / *OVERALL DIMENSIONS: 25"W x 34"H x 25"D*



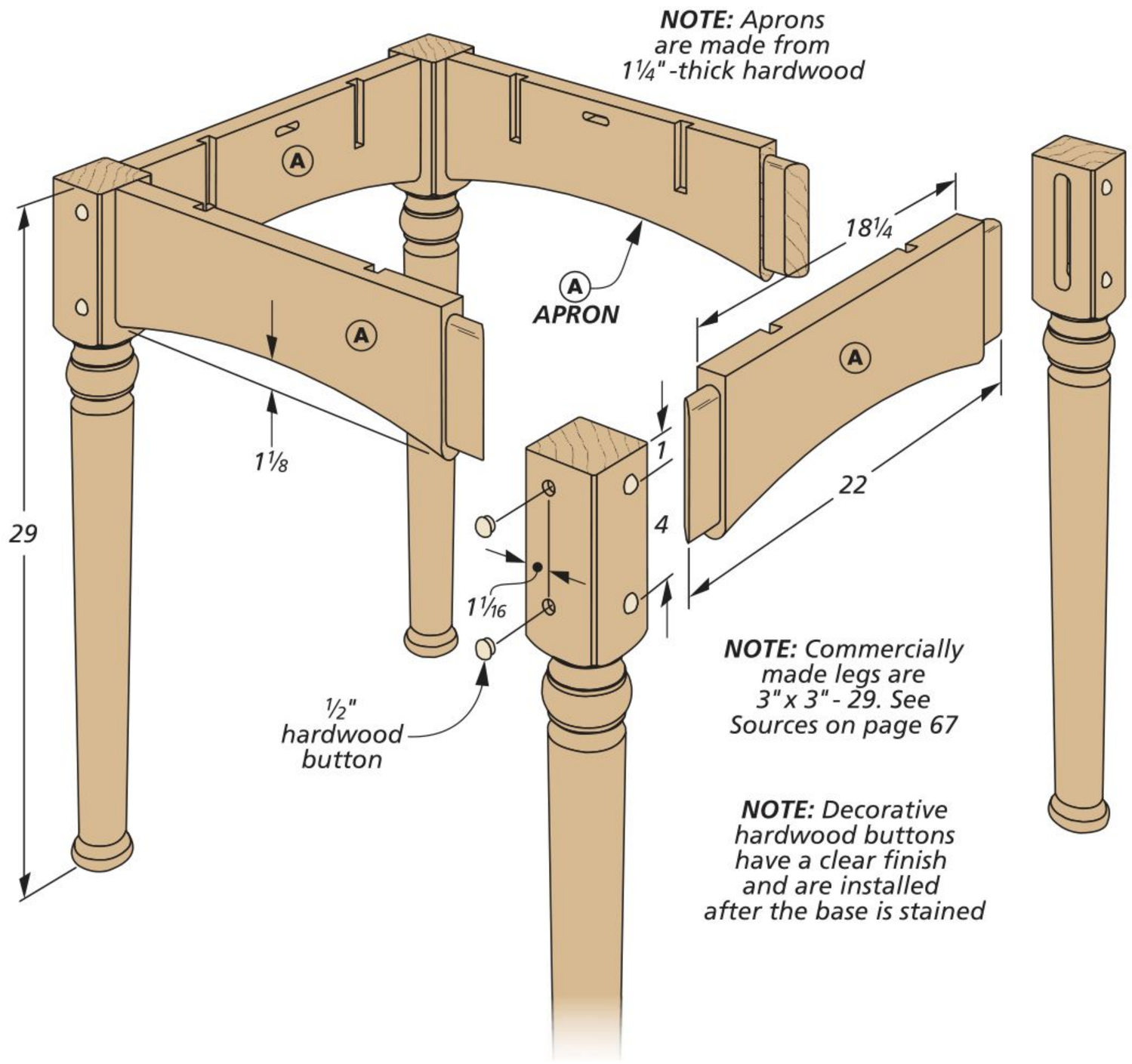
NOTE: *Sources for legs on page 67*

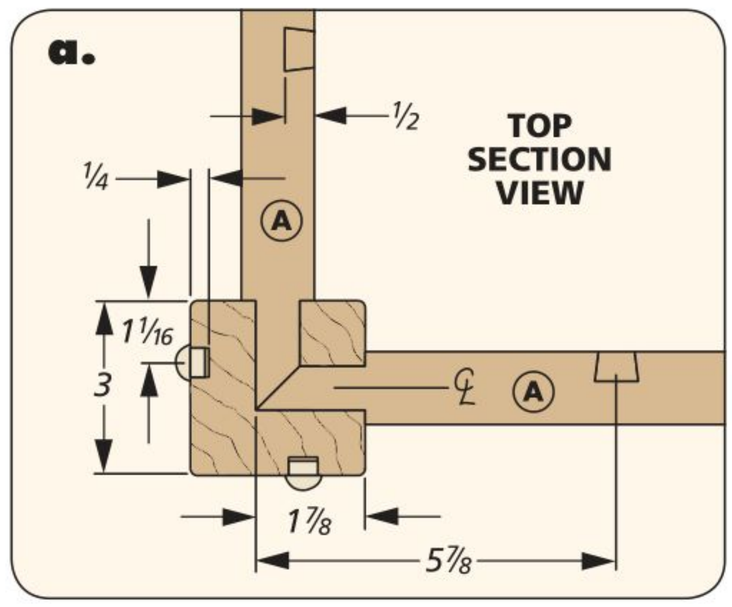
Woodsmith GO ONLINE EXTRAS

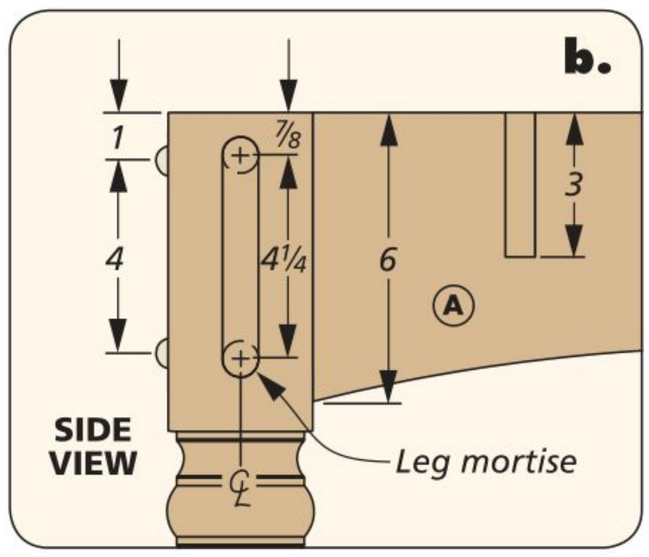
For full-size leg pattern, go to Woodsmith.com

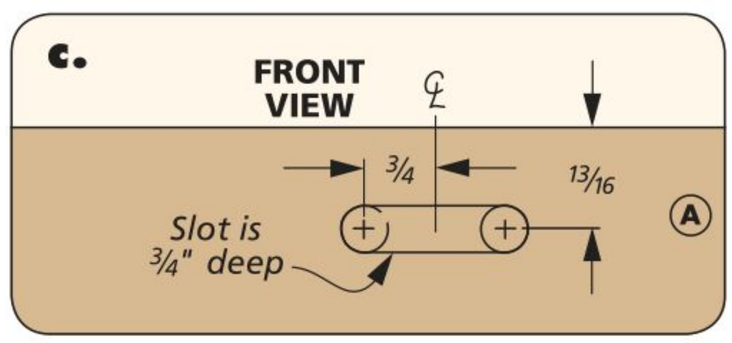
▲ The maple top is made up of thick, tall pieces that are dovetailed together. The pattern looks complex, but it isn't. The blocks in each row in the top follow the same assembly sequence, they're just assembled in alternating rows.

Illustrations: Dirk Ver Steeg









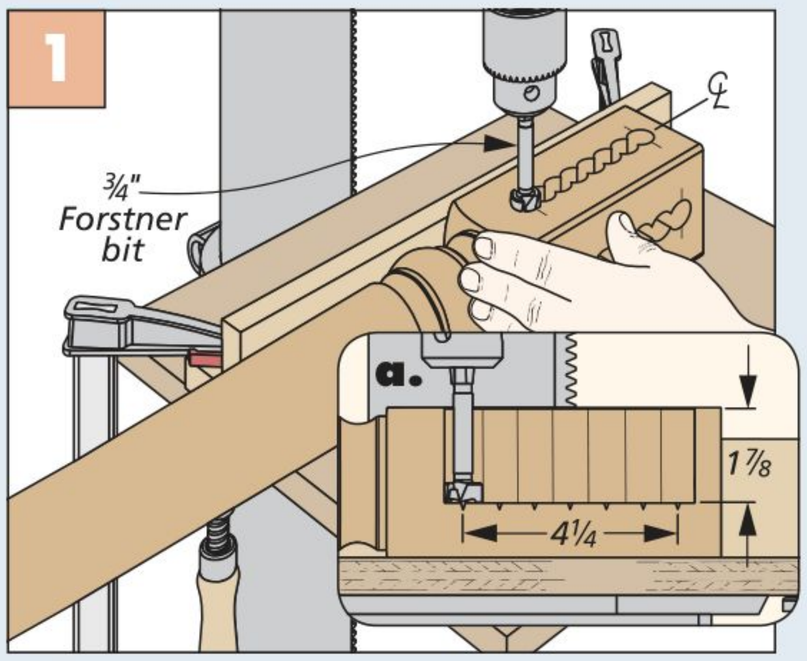
Making the BASE

To support a top of thick hardwood like the one on this project, a strong, stable base is required. As you see in the drawings and details above, I chose to use thick 8/4 stock for the aprons and planed it to final thickness.

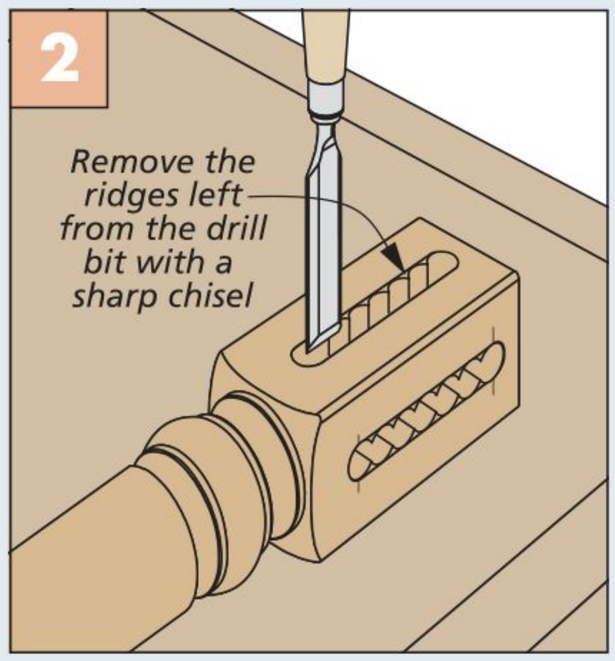
I was tempted to turn the legs myself, but considering the amount of time I was going to put into making the top, I chose to purchase the legs from an online supplier. Of the multiple options of well-made legs available, I chose the style you see above. The décor of your kitchen may push you in another direction, but it's a good timesaver to consider.

MORTISES. Each of the four legs has a pair of mortises that attach the legs to the aprons (details 'a' and 'b').

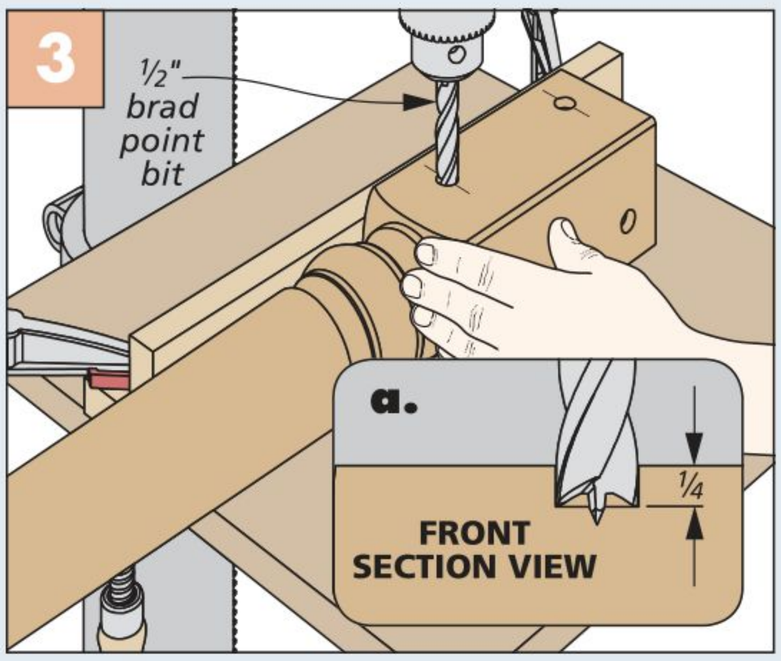
How-To: CREATE THE LEG JOINERY



Drill Mortises. To make the mortises in the legs, drill a series of overlapping holes the length of the mortise.



Clean Up. You can square up and clean the walls of each mortise quickly with a chisel.



Holes for Buttons. Two sides of each leg have a pair of decorative buttons. Drill a shallow hole for these at the drill press.

After laying out their locations, drill them at the drill press and clean up the walls with a chisel (Figures 1 and 2, previous page). While I was at the drill press, I machined the holes for the decorative plugs (Figure 3).

APRONS

The four aprons have mitered tenons on the ends and a shallow arc on the bottom. On the inside face of each piece are two stopped dovetail dadoes that house a set of braces. Also, there's a small slot for a shop-made connector. To start, I sized the aprons to their overall dimensions, then installed my dado set in the table saw to make the tenons.

TENONS. As you can see in Figure 1 below, the rounded tenons start out square. As I do most of the time, I cut the shoulders of the tenons and clean up the sides (detail 'a'). Then adjust the blade height and cut the shoulders in the sides (detail 'b'). Back over at the bench, I used a rasp and file to match the curved ends of the mortise.

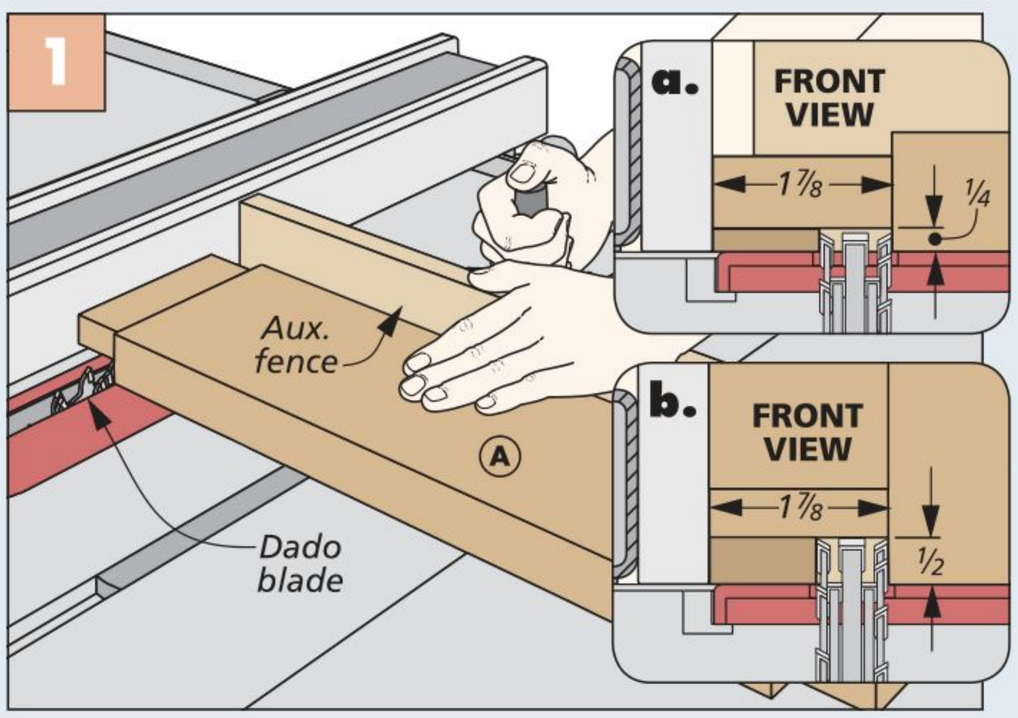
DOVETAIL DADOES. To make the two dadoes on the inside face of the aprons that hold the braces in place, I turned to my router table. As you see in Figure 2 below, I made all the dovetail dadoes on the left end of the apron pieces first. Next up was making the dado on the right end (Figure 3). All you have to do here is come at the operation from the other side of the router table. Just be sure to use a backer board to hold the apron square to the fence.

SLOTS FOR CONNECTORS. Figure 4 below gives you all the information you need to make the slots for the connectors. All of the slots are centered toward the top of the aprons. Detail 'c' on the previous page shows how far down from the top to make this slot.

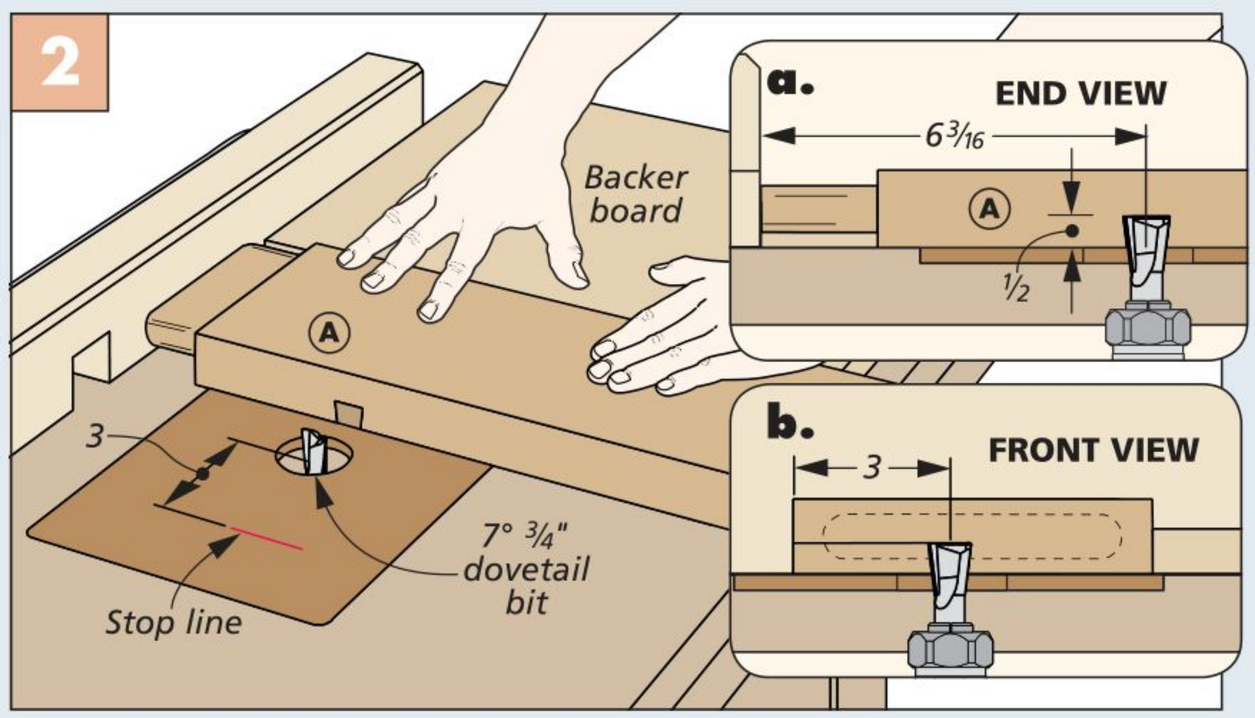
MITER THE TENONS. Looking at the drawings and detail 'a' on the previous page you'll note the tenons are mitered on the ends. These cuts are easy to make over at the table saw.

MAKE THE ARC. There's one more detail to attend to before gluing up the base. Each of the aprons has an arc that runs the length of the bottom edge (main drawing, previous page). Once that's cut and sanded smooth, I rounded the edge with a ½" roundover bit (Figure 5).

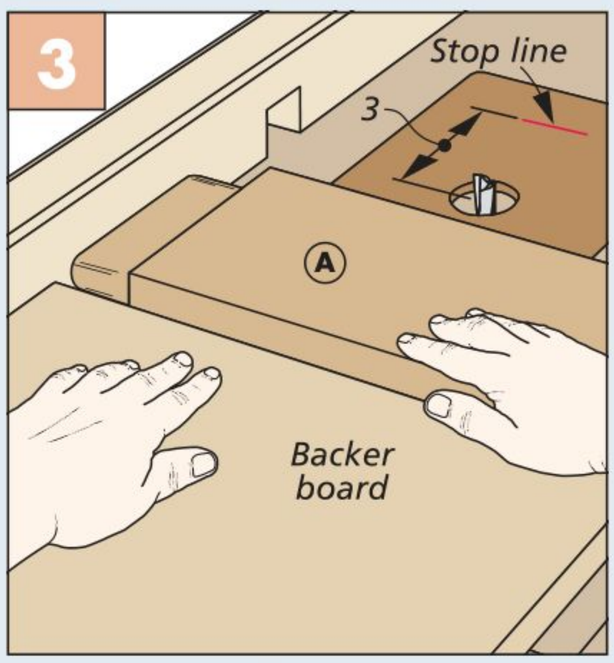
How-To: MAKE THE APRONS



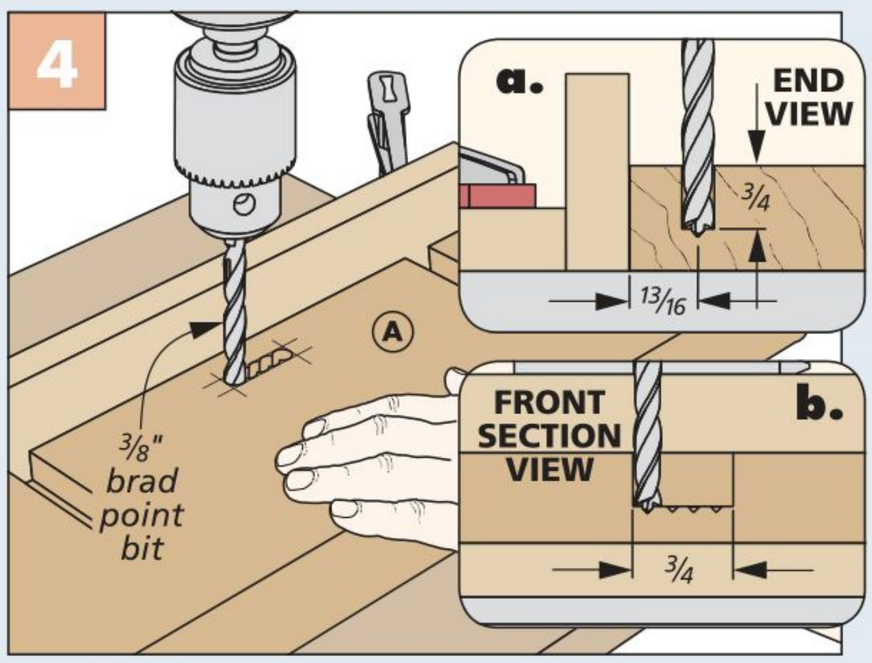
Tenons First. Cut the tenons on the aprons, starting at the shoulder. Then nibble away the cheek. Adjust the blade for the edge and repeat the process



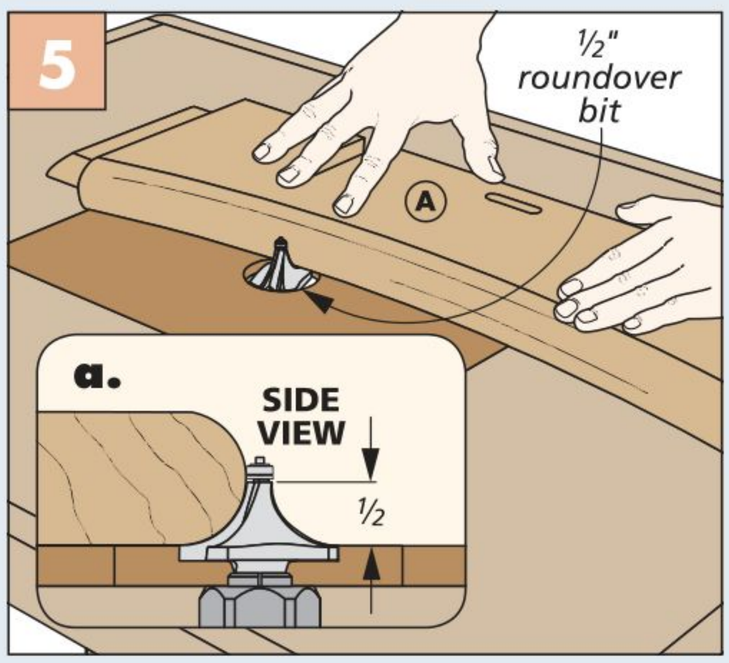
Dovetail Dado. When making the dovetail dado on the left side of the aprons, mark a stopping point on the router table. Rout all four aprons before moving on to the right side dadoes.



More Dovetail Dadoes. Repeat the operation from the other side of the router table.



Slot for Connector A series of overlapping holes made with a brad point bit makes the slot needed for the tongue of the connectors.



Round Over Arc. A roundover bit is used to soften the arc on the bottom edges of the aprons.

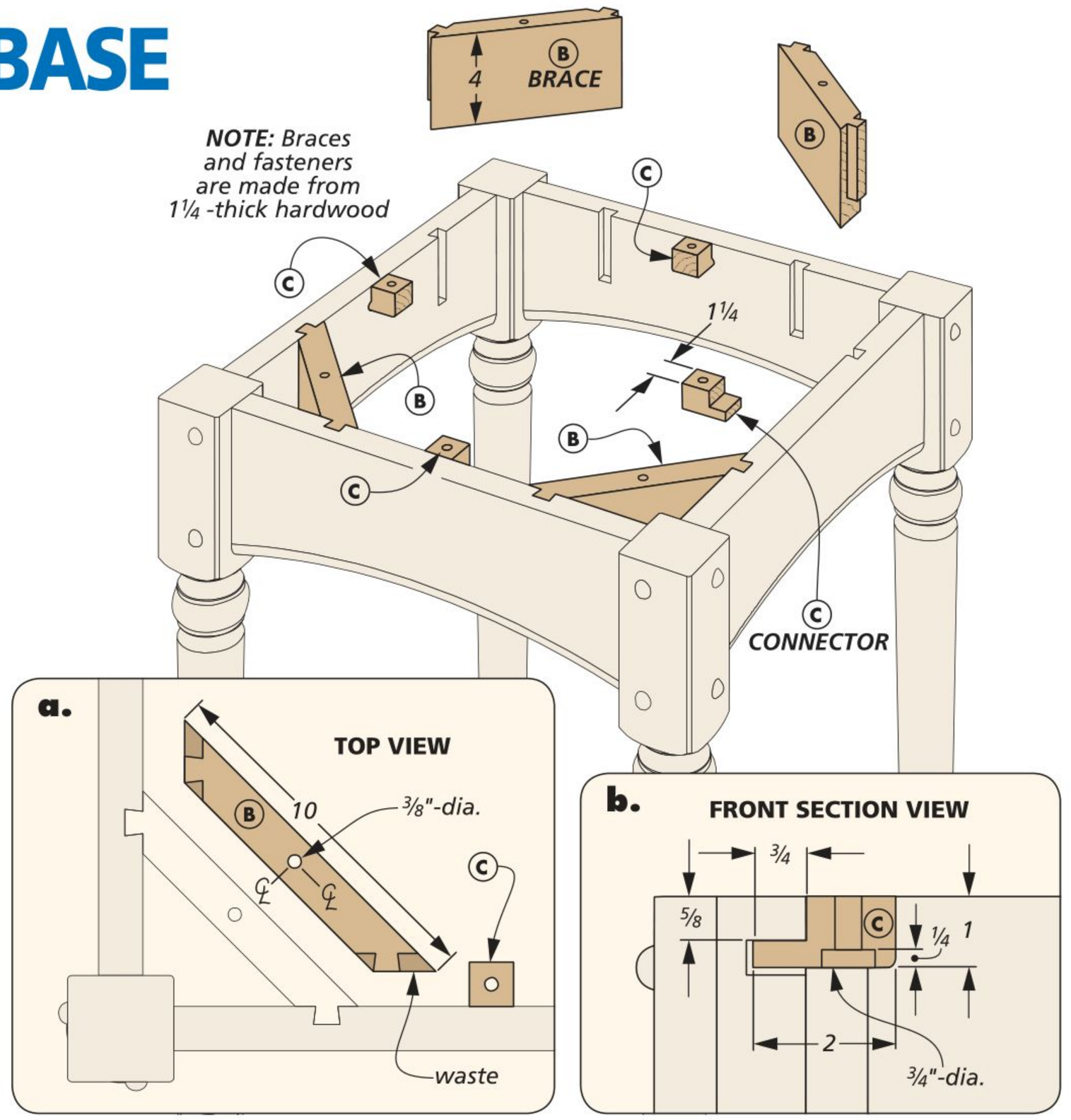
Completing the BASE

With the outer shell of the base complete, there's some internal work that needs to be done. The parts that you're making here will help support the thick top and add rigidity to the table. They're not complicated pieces, but some of them are a fairly precise fit, so take your time.

To start, as the main drawing here shows, there are four braces that run at a 45° angle from one apron to another. They're locked to the aprons by mating with the dovetail dadoes that you made earlier. Running through the center of each brace is a counterbored hole that's used to screw the top to the base.

In the center of each side, there's a connector. This is a shop-made connector that rests in a slot in the apron and is also fastened to the top. With all of these connection points, it's obvious that this top is not going anywhere. Let's make some sawdust, starting with the braces.

CUT TO SIZE. Start by cutting the four pieces for the braces to their overall size. You'll notice in detail 'a' that the overall size is long enough to give you room to make custom fit dovetails on the ends of the pieces. More on how to do that in a little bit. For now, drill the counterbored hole in the center of the brace. Drill the counterbore first, then flip the workpiece and drill the through hole (Figure 1 on the next page).



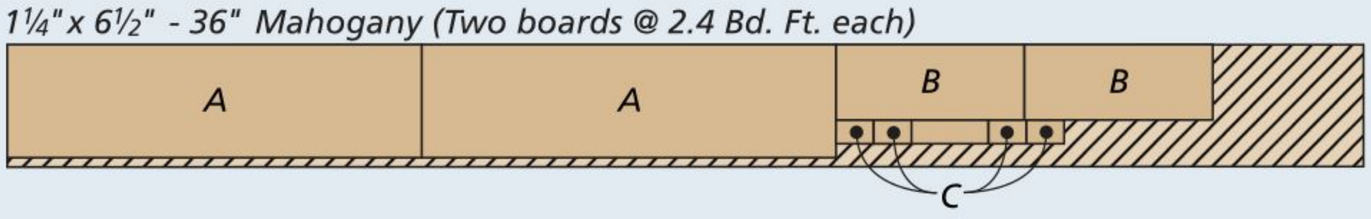
FITTING THE BRACES. Here's a quick rundown of how you're going to fit the braces. First, you need to make a jig that supports and guides the braces past a router bit. The details for that jig are in Shop Notes on page 64. Afterwards, you're going to make a master brace that's used as a pattern to mill the remaining three braces.

With the jig and brace workpieces in hand, I headed over to the router table. The detail in Figure 2 shows how to set

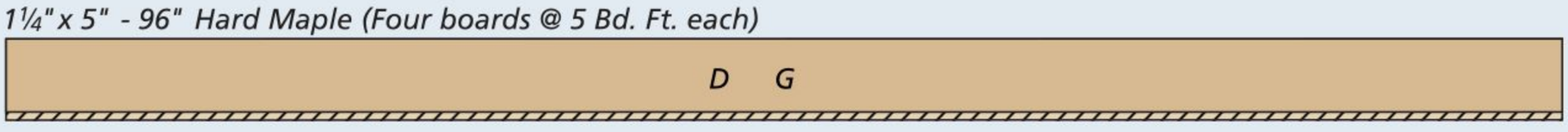
Materials, Supplies & Cutting Diagram

A	Aprons (4)	1¼ x 6 - 22	**E**	Small Field Blank (30)	1¼ x 2 - 11 rgh.	•	(16) ½"-dia. Maple Buttons
B	Braces (4)	1¼ x 4 - 10	**F**	Med. Field Blank (20)	1¼ x 3 - 11 rgh.	•	(8) 7mm x 50mm Connecting Screws
C	Connectors (4)	1 x 2 - 1¼	**G**	Large Field Blank (20)	1¼ x 4 - 11 rgh.	•	(4) 3"x 3"- 29" Turned Leg
D	Wide End Blank (10)	1¼ x 4 - 11 rgh.	**H**	Narrow End Blank (10)	1¼ x 3 - 11 rgh.		

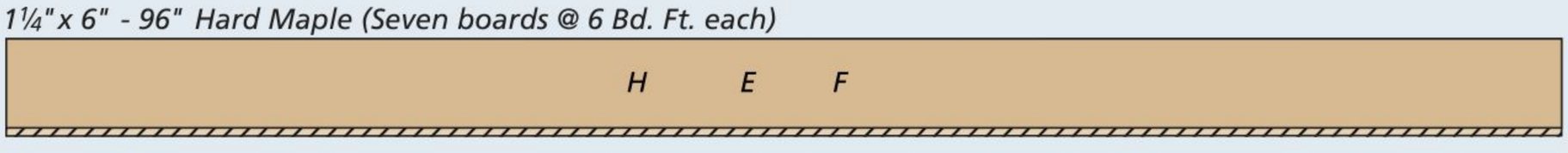
1¼"x 6½" - 36" Mahogany (Two boards @ 2.4 Bd. Ft. each)



1¼"x 5" - 96" Hard Maple (Four boards @ 5 Bd. Ft. each)



1¼"x 6" - 96" Hard Maple (Seven boards @ 6 Bd. Ft. each)



up the dovetail bit, then how to cut the inside shoulders of the tail.

With the inner shoulders fit, I set the brace in place across the aprons like you see in Figure 3. From the underside, I used a sharp pencil to mark the location of the inner cheek. Then it's back to the router table to cut the outer shoulders, as shown in Figure 4 below.

MOVING FORWARD. After confirming that the master brace fits in each corner, you can settle in at the router table and make the remaining three braces, using the master to locate the jig position properly for each one.

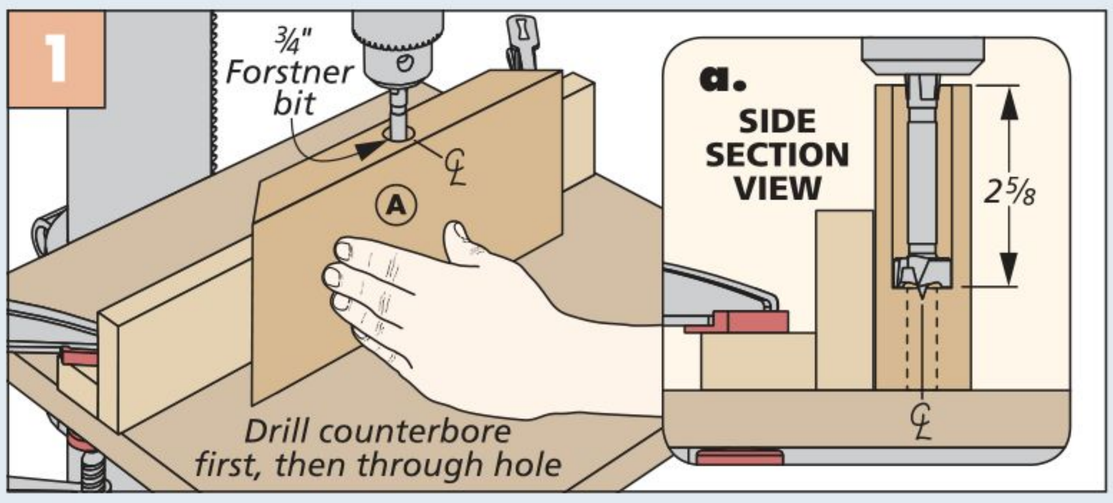
Looking at the completed braces in the drawing on the previous page, note that the lower portion of the dovetail has been trimmed away. I did this at the table saw (Figure 5). Now it's time to glue the braces in place, making sure they're flush with the top of the aprons.

FINALLY THE CONNECTORS. Making the connectors is a snap compared to the braces. The process starts with a long blank that lets you make each piece while keeping your hands away from the saw blade. Figure 6 shows you how.

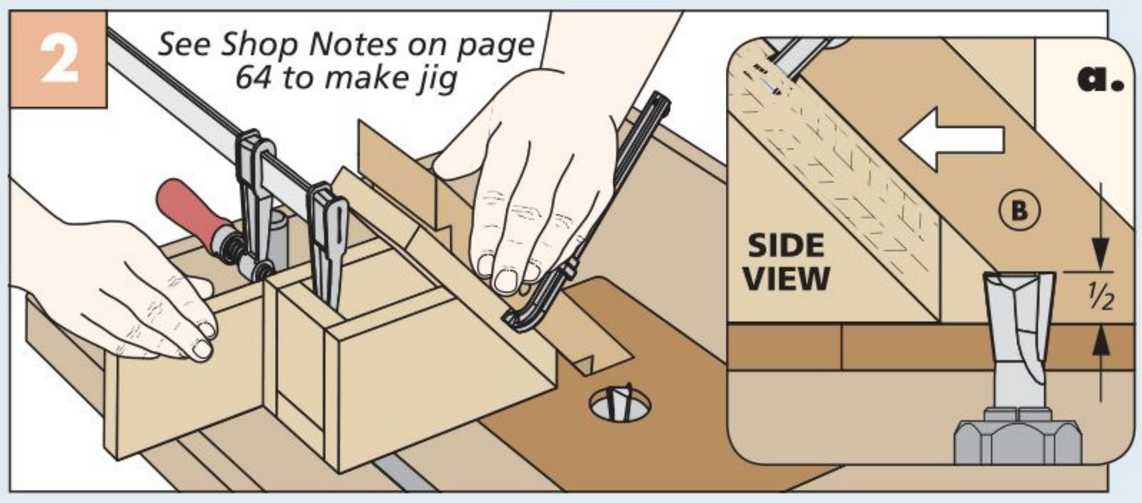
After cutting a rabbet in each end of the blank, head to the drill press and make the counterbored hole (detail 'b'). Cut the two connectors free with a hand saw and repeat the process for the remaining two. Set aside the connectors until you're ready to attach the top.

STAIN AND FINISH. Before moving on to the top, stain the base and install the decorative plugs. For a nice contrast, the plugs will remain unstained.

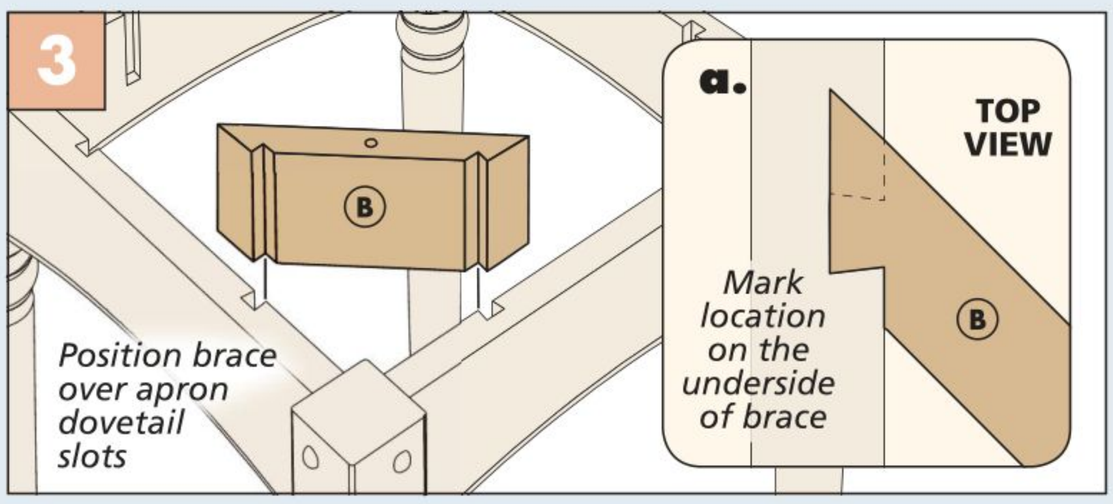
How-To: MAKE THE BRACES & CONNECTORS



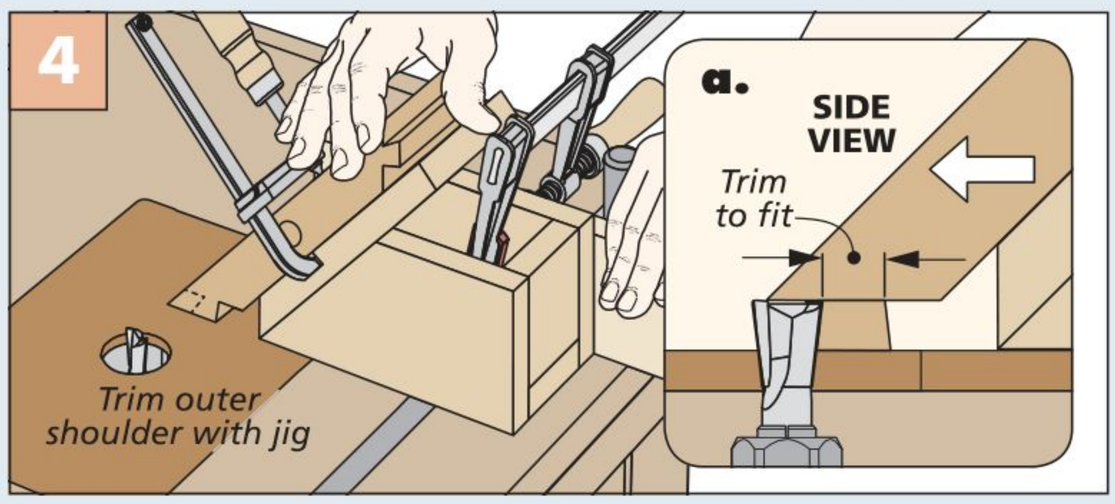
Drill Counterbore. Lay out the location of the mounting hole on both edges of the brace blank. After drilling the counterbore, flip the piece and drill the through hole.



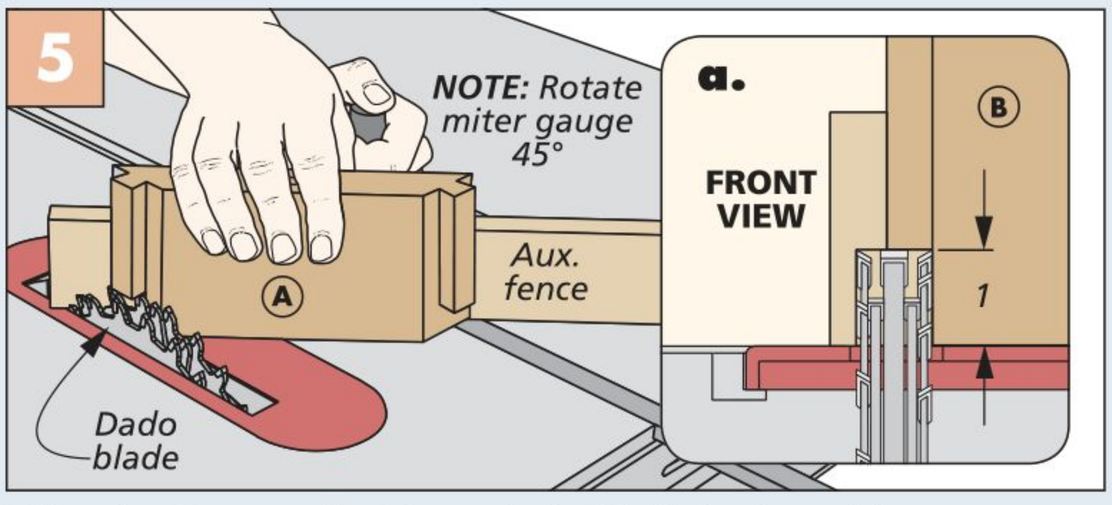
Inside Shoulders First. With the master brace clamped to the jig, cut one end of the inside shoulder. Then flip the workpiece end for end and make the opposite cut.



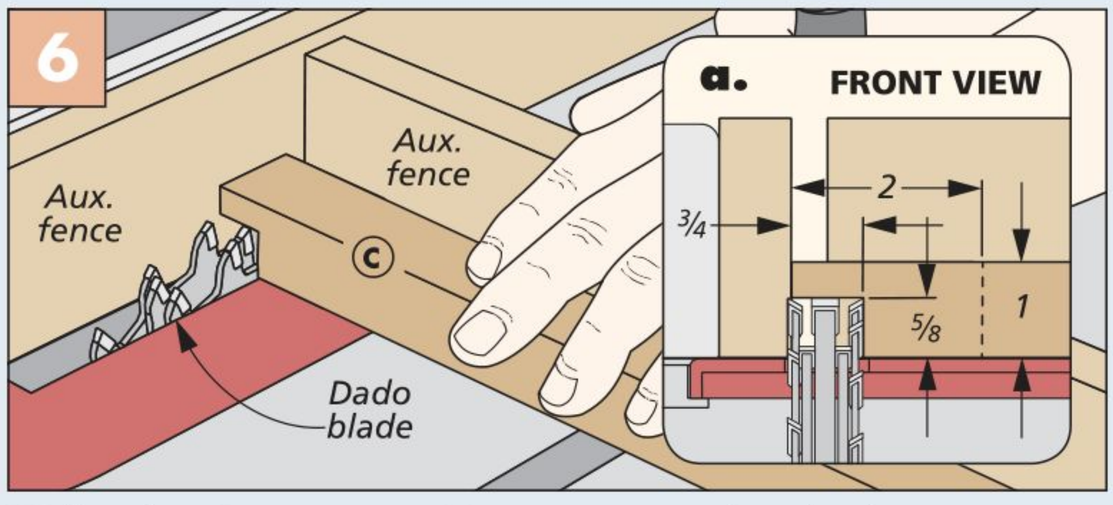
Mark for Outer Shoulder. To accurately locate the outer shoulder, position the master brace on the apron. Trace the outer dovetail slot location onto the brace.



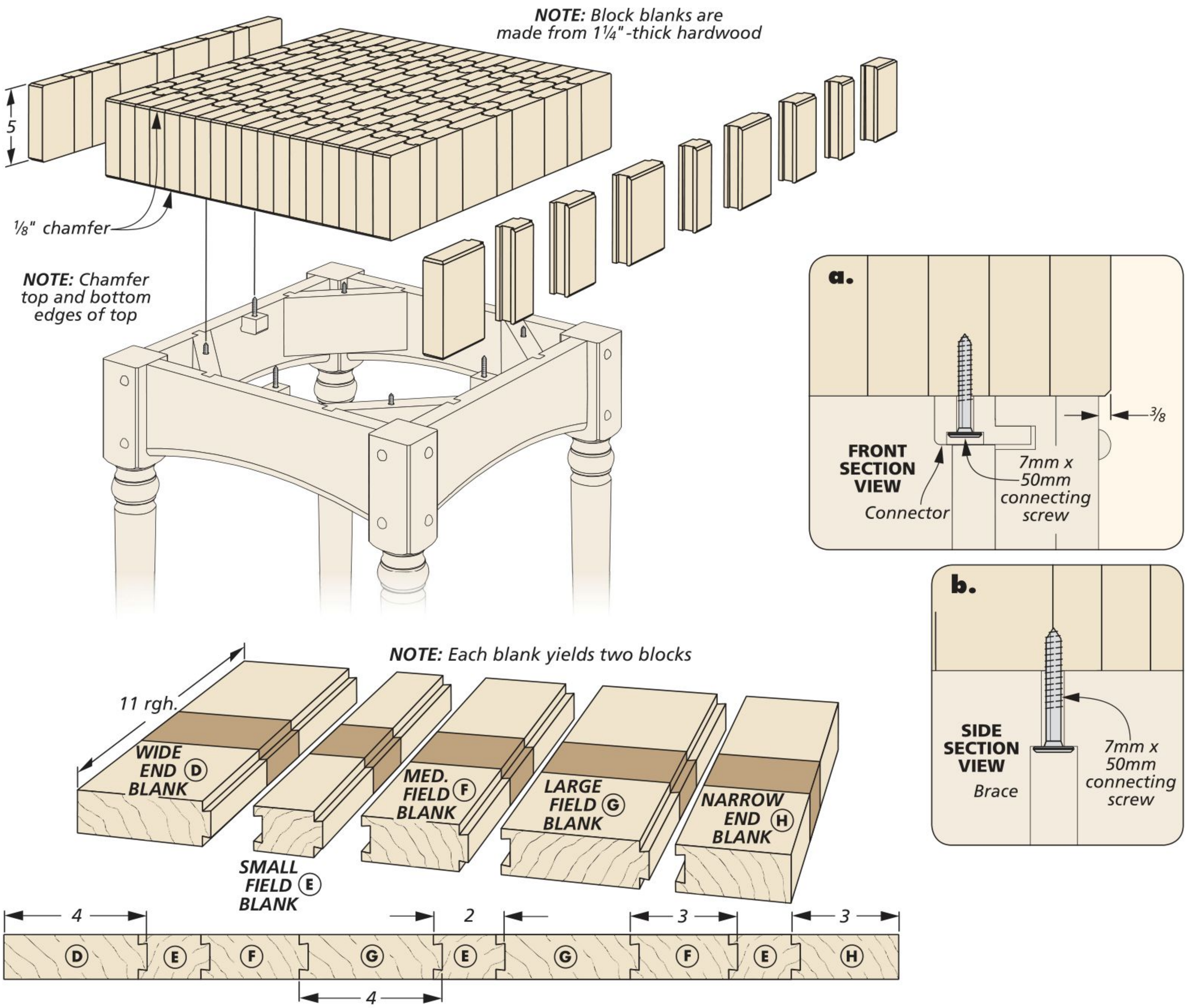
Rout the Outer Shoulder. Back at the router table with the master brace in the jig, cut the outer shoulders. It's best to sneak up on the fit by doing it in several passes.



Trim the Dovetails. Use a dado blade in the table saw to remove the lower portion of the dovetail. Adjust and move the miter gauge to trim the opposite dovetails.



Make the Connectors. To protect your hands, the connectors are made out of a long blank. Cut the rabbets first, then drill the needed holes and cut the connectors free.



Making the END-GRAIN TOP

All that's left to do is make the top, so we're in the home stretch. It's a lengthy home stretch, but when all is said and done, it's going to be worth the effort.

The top is made from maple hardwood with the end grain facing up, as is the tradition with butcher blocks. The history behind this has to do with preserving the edges on cutting instruments. When a knife, or cleaver, strikes the end-grain surface of this table, the grain will yield to the edge of the blade and then close back up (long grain doesn't yield much when a knife strikes it and has a dulling effect). This gives the knife more life between sharpenings.

As you use your table, the end grain will fray in places from the blows. When that happens, all you have to do is use a scraper to shave away the imperfections in the surface and you're ready to go again. That's why the top is so thick, to give you years of service.

Lots of butcher block surfaces are just square blocks glued or bolted together. This top stands apart in the way the blocks are assembled. As you see in the drawing at the top of this page, the blocks are glued up into rows using sliding dovetails. This creates an attractive pattern in an otherwise plain surface. It also aids in assembly by controlling the problem of blocks slipping around during the glueup phase.

CUT TO SIZE. As you see in the drawing above, the top is made up of 20 identical rows of blocks. Each row contains nine blocks of varying widths — that's a lot of blocks. So I chose to cut the process in half by doubling up the assembly.

It's a simple thing really. Just cut the blanks for the blocks in 11" lengths. This allows you to glue up two rows at a time. (Make some extra pieces so that you can test fit the dovetails and sockets.) Then you can trim the rows to final length at the table saw. First, you need to cut the joinery that holds the blocks together.

SOCKETS FIRST. In the spirit of efficient woodworking, I chose to make the sockets first. It's a lot easier to adjust the size of the dovetail than the socket. Figure 1 shows how.

DOVETAILS SECOND. To make a perfect fitting dovetail, I started with one of the extra pieces that I made to practice on. You'll want to sneak up on the dovetail size by adjusting the fence after each set of passes on the workpiece (Figure 2). The blanks should slide together easily with hand pressure. You have a lot of blocks to bring together, so you don't want the fit to be too tight.

GLUE UP THE ROWS. To get the ball rolling, apply glue to the tails and sockets and clamp up the rows following the pattern in the drawing on the previous page. Keep the ends as closely aligned as possible when doing this (Figure 3). When dry, trim and cut each row into 5"-long sections (Figure 4).

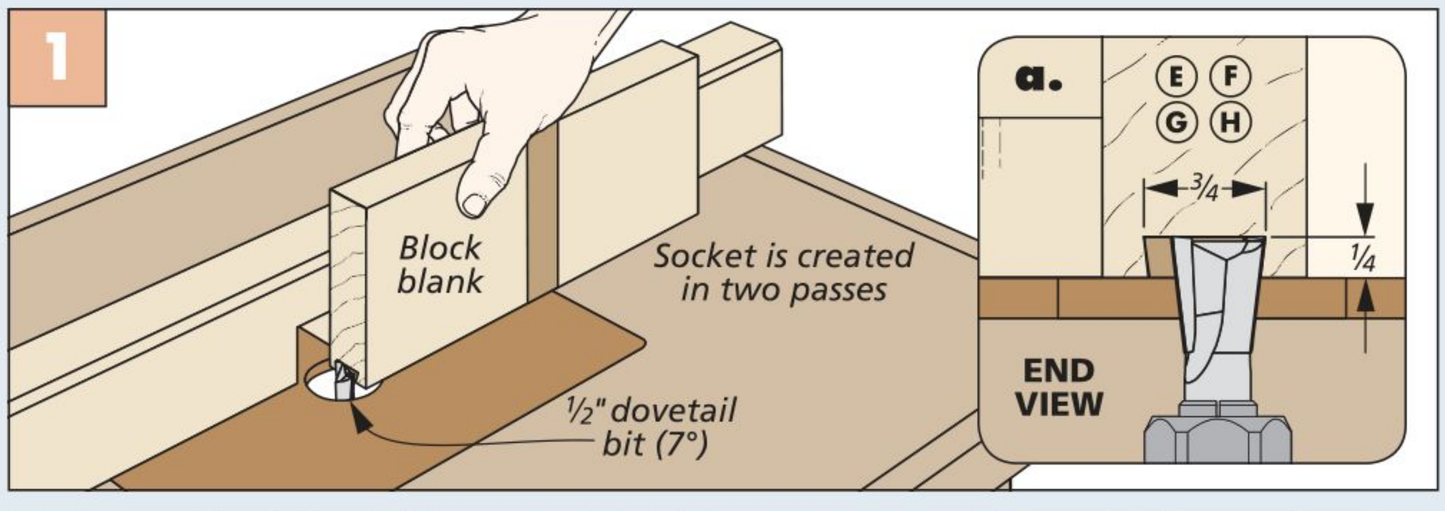
GLUE UP THE SECTIONS. With rows alternating, glue up the top in five-row sections. This makes the glueup more manageable. To keep the sections from shifting while the glue dries, use clamps and cleats at the base of the section. Figure 5 shows what this will look like.

GLUE UP THE TOP. Next, I glued those sections together two at a time, taking my time to make sure they were properly aligned to each other. Be sure that the row patterns alternate when you glue the sections together. When the top is completely glued up, you can plane, scrape, and sand the surfaces as needed. Finally, chamfer the top and bottom edges of the block.

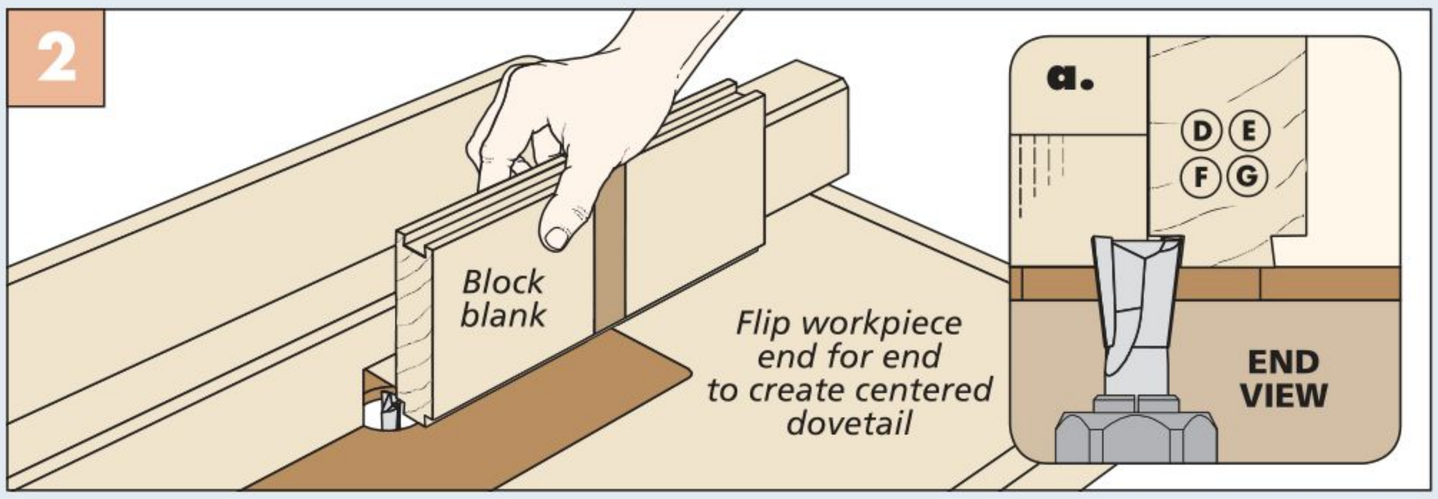
TOP IT OFF. I found the easiest way to assemble the table was to lay the top face down on the workbench. Then I dropped the base in place to mark the location of the pilot holes on the top (Figure 6). After the pre-drilling was done, I attached the base to the top.

OIL THE BLOCK. High-quality mineral oil is widely available. It's an odorless oil that's perfect for the butcher block. After applying, let it soak in and repeat as needed. You can wax and buff the block as needed. Your butcher block table may never have the worn patina of one from an Old-World grocery store. But its classic style is second to none. W

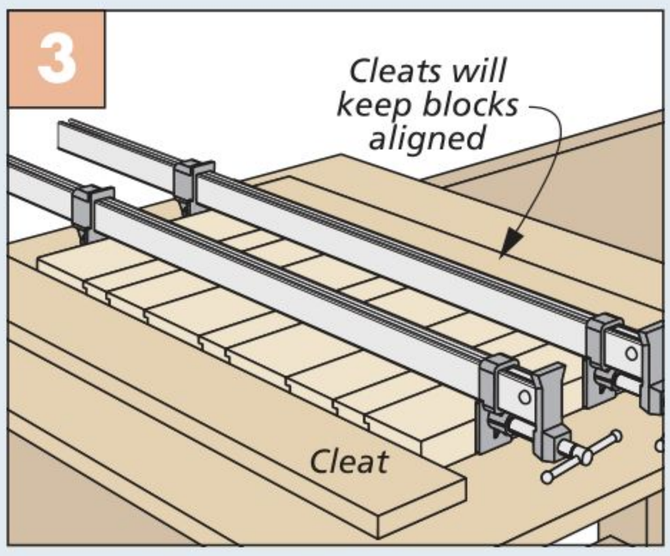
How-To: CREATE A BUTCHER BLOCK



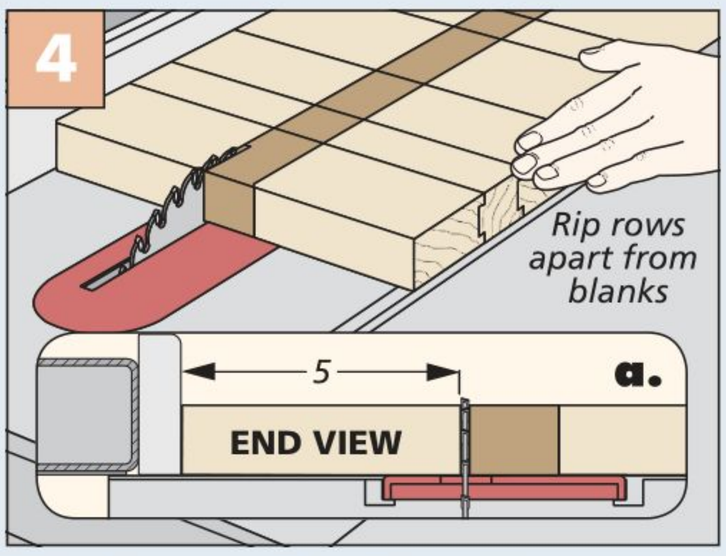
Centered Sockets. With a dovetail bit in the router table, make the centered socket in two passes by flipping the workpiece end for end.



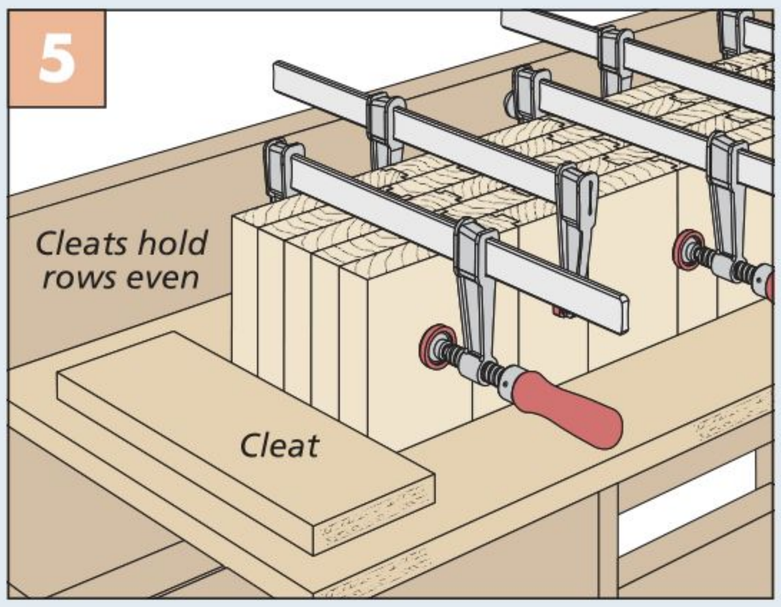
Fit the Dovetails. The best way to ensure to a perfect fit between the sockets and dovetails is to start with a practice piece and sneak up on the fit.



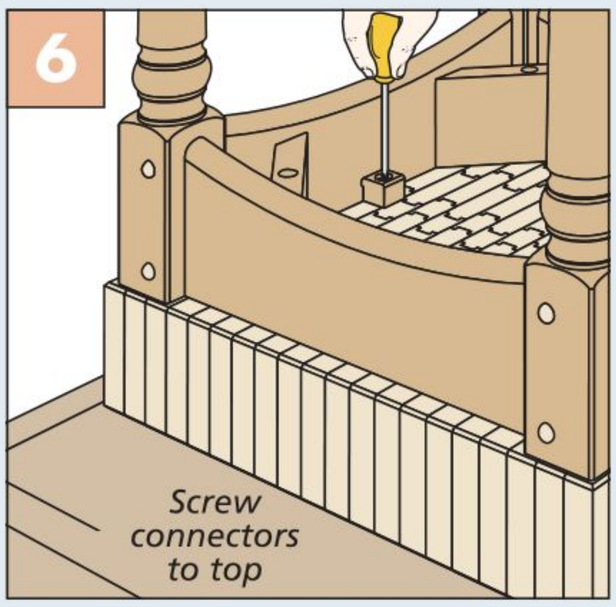
Glue Up Rows. Start by gluing up the extra-long blanks into rows, keeping the ends even.



Trim Rows to Size. The table saw quickly brings things in order and trims each row to its proper length.



Glue Up in Sections. It's critical to keep the rows in each section even. Trapping the sections between cleats helps.



Base to Top. Assembling the table upside down ensures the top is centered on the base.

Getting the most from a Scraper


A dull scraper produces more dust than shavings

One of the simplest tools in my woodworking arsenal is an ordinary card scraper, like you see above. It's a lifesaver when dealing with figured grain, grain that changes direction, or for removing mill marks or tearout.

If you've never used a scraper, or gave up on the one you have, I'll bet it's because you found it a challenge to sharpen. I know I did. So one day I sat down at my bench and tried a number of different sharpening techniques. I ended up with a simple process that gave me repeatable results. And best of all, it doesn't require a lot of time or specialized tools.

THE EQUIPMENT. Before you can get started, you'll need to assemble a basic kit of equipment (photo below). A mill bastard file is used to clean up the edge of the scraper. Then you'll use a pair of sharpening stones to refine the faces and edges. Finally, a burnishing tool allows you to work the "soft" spring steel to form a hook. This hook allows the scraper to act like a plane blade to create those thin, wispy shavings.

THE BASICS OF SHARPENING

The first step is to clean up and straighten the long edges of the scraper. That's where the file comes into play. You can buy jigs for holding a file in the proper orientation as you do this, but I find it easy enough to secure the scraper in a face vise so it extends above the surface, as in Photo 1 on the next page. I like to use a permanent marker on the edge to gauge my progress.

FILE IT CLEAN. With the file held square to the edge, make a few passes to remove any existing hook and hardened steel (Photo 2). As soon as the marker disappears and the file takes an even cut along the entire edge, you'll know this step is complete.

SMOOTH SURFACES. The next goal is to create smooth, polished surfaces that meet to form a sharp cutting edge. For a scraper, those surfaces are the wide, flat faces and the edges you just filed.

To polish these surfaces, I use waterstones (1000- and 6000-grit). I start with the faces of the scraper. What's nice is you don't need to polish the entire face. Just focus on a ¾"-wide strip along the long edges of the scraper (Photo 3). The goal here isn't a mirror finish, but just enough of a polish so you start to see a reflection in the surface.

◀ Aside from a burnisher, you probably already have all the equipment you need to sharpen a scraper in your shop.

Written by: Bryan Nelson

▲ Running a marker along the edge helps provide a good gauge of progress as you reshape and straighten the edge.

▲ With the file parallel to the edge and square to the scraper, file the edge until it's flat and the marker is gone.

▲ Polish each face and edge of the scraper, working your way up from the 1000-grit stone to the 6000-grit.

Next, polish the edge of the scraper, as shown in Photo 4. Here, I switch to the edge of the stone (be sure the edge is flat). I prefer to use the edge of the stone to avoid gouging the surface. Be sure to polish both long edges of the scraper. This will allow you to form four cutting edges in total.

REFINING THE EDGE. To refine and burnish the edge, all you need is something harder than the scraper. It's possible to do this with the shank of a screwdriver. But I feel I get a better hook (and therefore better results during use) when I use a dedicated burnishing tool. And I make sure the burnisher is smooth by polishing it with wet/dry sandpaper, working up to 2000-grit.

With the burnisher ready to go, position the scraper on a flat, solid surface like the edge of a bench (be sure the top is square to the edge). Lay the burnisher flat on the scraper and then using firm pressure, slide the burnisher back and forth along the edge a half dozen times or so, as in Photo 5. This "draws" and consolidates the steel along the edge, resulting in a better hook.

FORMING THE HOOK. Now you're ready to form the hook. Here again, secure the scraper in your face vise. Using moderate pressure, slide the burnisher along the edge. Be sure to stay square to the faces and edge (Photo 6). Half a dozen passes should do it. At this point, you should begin to feel the hook when you run your fingernail over the edge.

The final step is to tilt the burnisher a few degrees and angle it away from the direction you burnish (Photo 7). This will "roll" the hook over, allowing it to cut better. After a few passes, increase the angle a couple more degrees and repeat the process.

Don't worry about exact angles here, it isn't all that critical. The angle (and the amount of pressure you use) simply helps in establishing the size and aggressiveness of the hook.

That takes care of one edge. You'll repeat the process for the other three edges. You may even want to try different angles to see how it affects the hook. As the scraper dulls, you'll notice more dust than shavings (inset in main photo). This means it's time to resharpen.

▲ Polish the edge, as well. Here it's best to use the edge of the stone to avoid grooving the face of the stone.

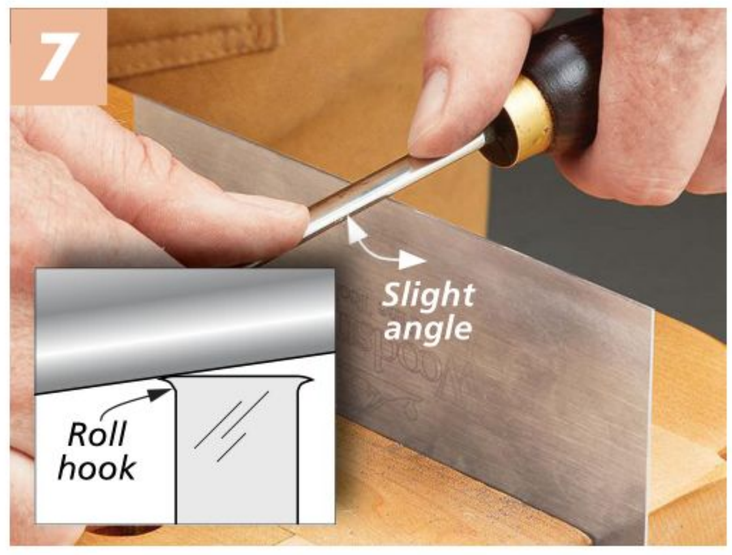
REFRESHING THE EDGE. The nice thing is you don't need to repeat the whole process from the beginning. You can simply draw out the existing hook, as in Photo 5, and then re-roll it.

Depending on the size and quality of the hook, you may be able to do this three or four times before resharpening. Eventually, you'll need to go back to refiling and honing the edge as before.

Once you've mastered this process, keeping your scraper in top shape won't take much time at all. And you'll find yourself using it on every project. W

▲ With the scraper flat on the bench, press the burnisher firmly down as you push it along the surface.

▲ Pressing the burnisher against the edge begins to form the hook, as shown in the inset drawing.



▲ Angle the burnisher down and away for a few passes. This will roll the freshly formed hook to its final shape.

Illustrations: Bob Zimmerman

The basics for

Perfect Tenons

The first large, stationary tool that I purchased when I began woodworking was a table saw. After doing a little research, it seemed like a sensible choice at the time. But I also know plenty of folks who started with a band saw as their first piece of equipment. And some even begin with a router mounted in a simple table.

No matter which of these is your preferred tool, all three are capable of making one of the staples of solid craftsmanship — the tenon. The tenon is half of the equation for solid mortise and tenon joinery. Here, I'll take a look at what you need to know to get the best results making tenons, whether you use the table saw, band saw, or the router table.

Of course, if you're so inclined (or only need to cut a couple of tenons) you might turn to a hand saw to get the job done. The box at the bottom of page 61 provides a snapshot of techniques for guaranteed success using a hand saw to cut tenons efficiently and accurately.

▲ Starting with properly dimensioned and square stock is the key to creating quality tenons.

GENERAL STOCK PREPARATION

Whichever method you choose to create your tenons, the first order of business is to prepare the stock properly. Having your workpieces planed to the correct (and consistent) thickness is just the starting point for achieving snug-fitting tenons. You'll also want to make sure that your pieces are square – that is, the edges are straight and parallel to one another and the ends are

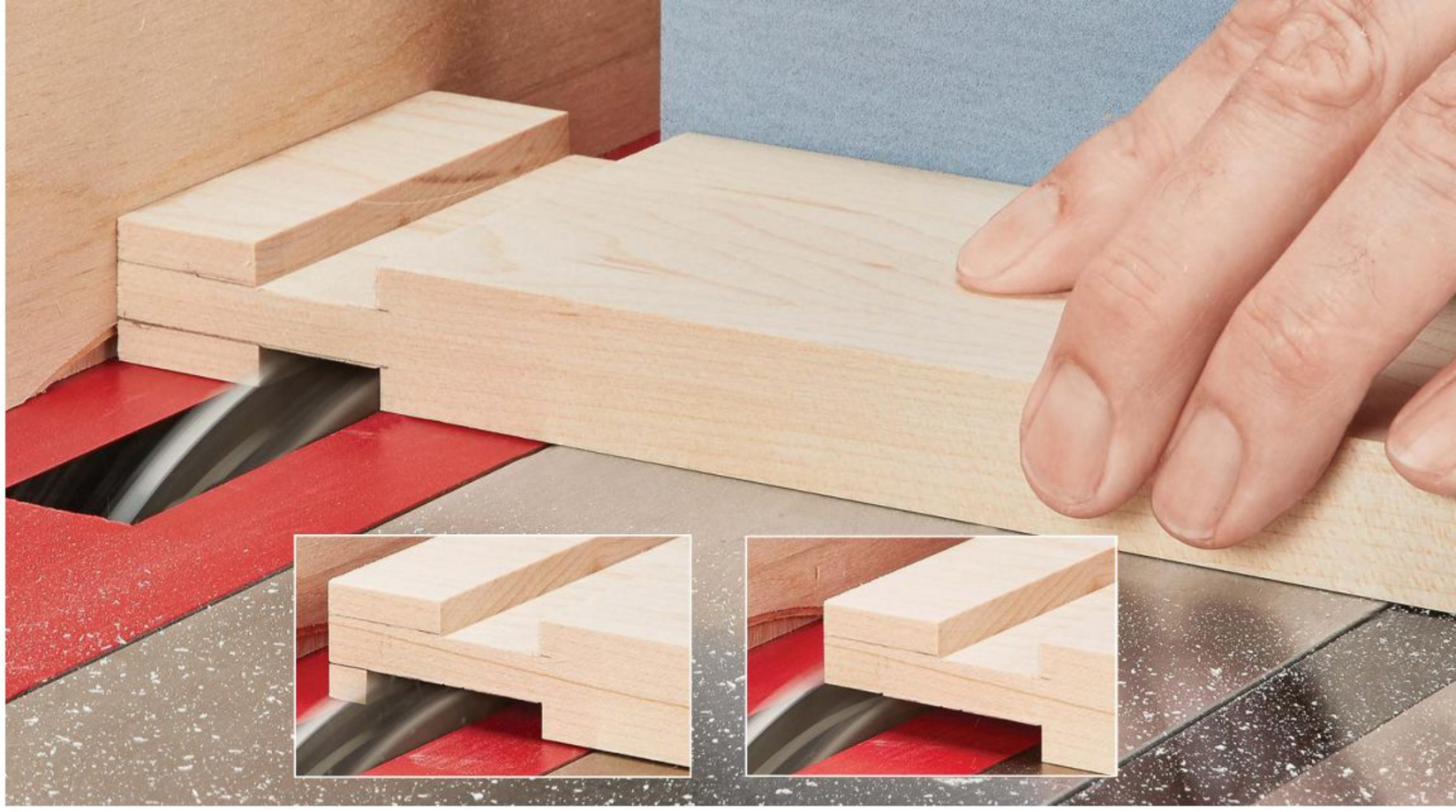
▲ When cutting tenons on a machine, just score the tenon length with a marking gauge (upper photo). If cutting by hand, lay out all cut lines (lower photo).

Written by: Robert Kemp

cut perfectly square to the edges. The left margin photo on the previous page shows what I mean.

LAY OUT FOR SUCCESS. When cutting tenons using the table saw, band saw, or router table, laying out the entire tenon isn't necessarily a critical step. You'll be using the machine's fence as positive stops and guides for locating the tenons most of the time. But I still find it helpful to mark the length of the tenon on a test piece, either with a sharp pencil or a marking gauge, as shown in the upper right photo at the bottom of the previous page.

However, when cutting tenons with a hand saw (or if you need to make tenons of multiple sizes), then it's necessary to lay out the cut lines for the tenon in their entirety (lower right photo, previous page). These layout lines act as a clear "roadmap" when you're ready to start cutting and help to eliminate any mistakes.



▲ When using a dado blade, use an auxiliary rip fence as a stop and form the tenon shoulders on both faces of the workpiece. Then, move the workpiece away from the fence and make continual passes to remove the remaining waste (inset photos).

TABLE SAW

The first tool I'll go over, the table saw, offers the most versatility when it comes to making tenons. It has the capability of making the tenons in a variety of ways. Which method you choose will depend on several factors, including the number of tenons you need to make to how much clean up work you're willing to do with a chisel or hand plane to get a perfect fit.

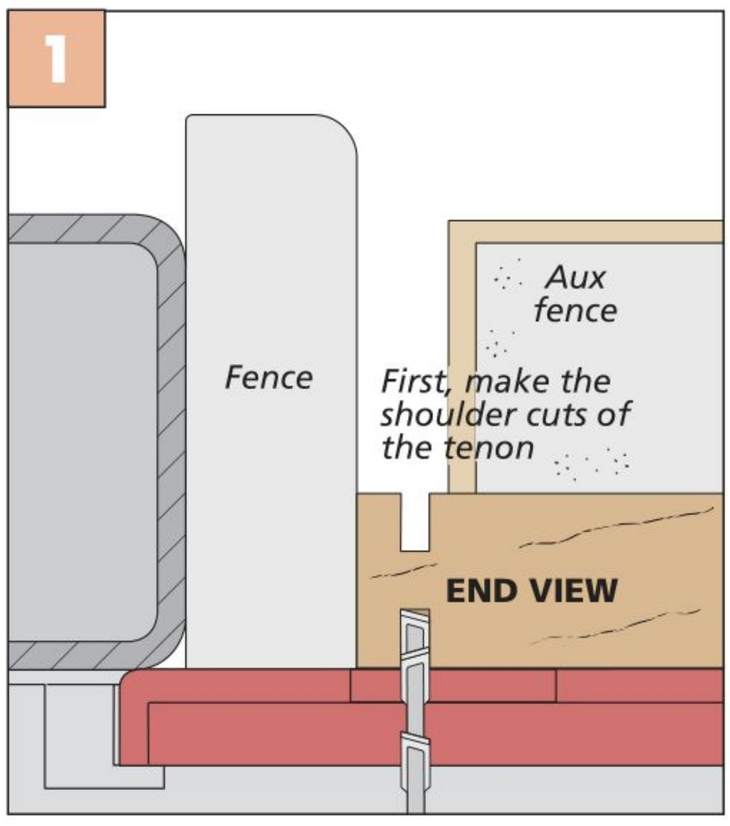
DADO BLADE. When you have a lot of tenons to cut, it's hard to go wrong with a dado blade loaded in the table saw. This method allows you to remove a lot of material with each pass. The photos above show the basic setup and procedure for making the cheek cuts on your workpiece.

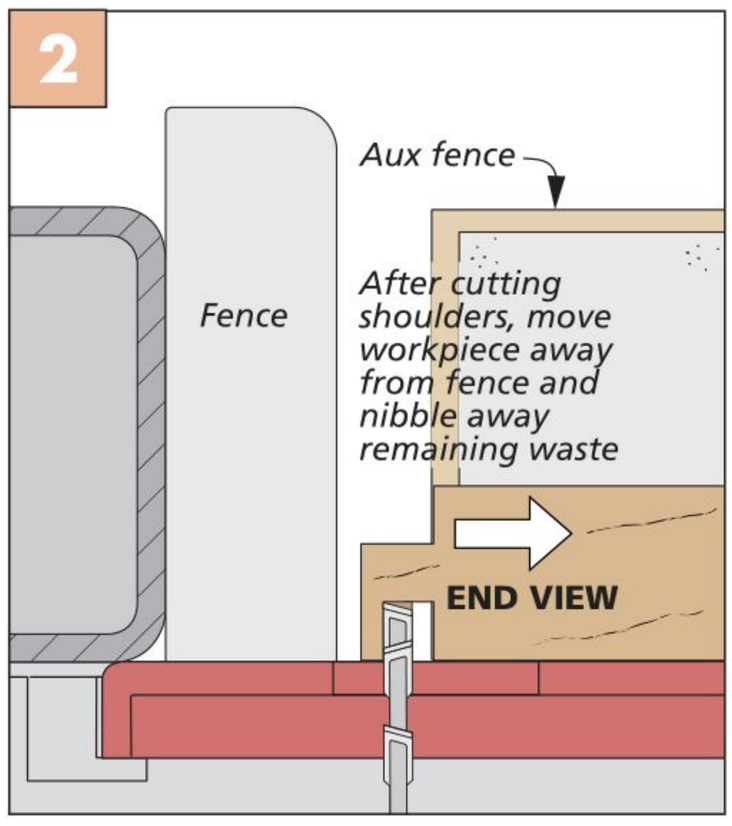
The rip fence is used as a stop to set the length of the tenon, while the miter gauge and auxiliary fence guides the piece and helps prevent tearout on the back side. To cut the short ends of the tenon, you simply need to rotate the workpiece on edge and repeat the process (main photo on previous page).

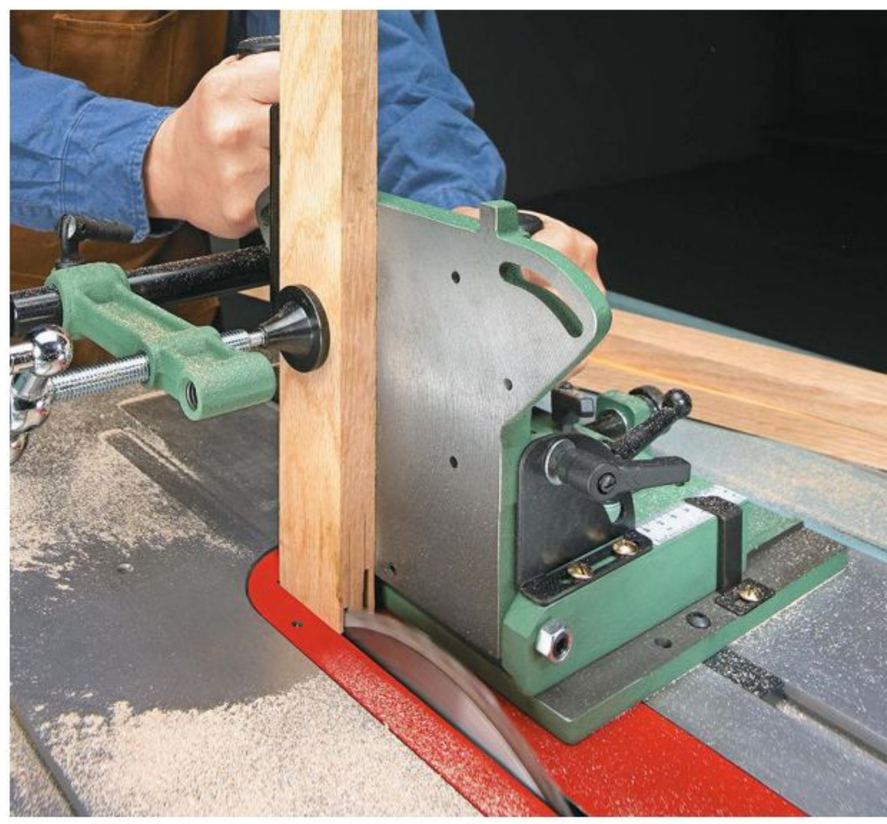
As I mentioned before, even using the best of dado blades, you'll be left with a slightly rough surface, requiring a little cleanup work for a smooth fit in a mortise. But for most woodworking tasks, this is a solid go-to method.

SINGLE BLADE METHOD. As its name implies, the single blade method uses just one blade in the saw (usually a combination blade) and is typically the easiest and quickest to set up. But with a single blade, you'll be removing less material with each pass. So this method works best when cutting just a few tenons, or stub tenons where you're only removing a small amount of material (Figures 1 and 2, below). And like the dado blade method, you'll still have a little clean up work to do.

TENONING JIG. Now, if the work you do requires you to make a lot of tenons, it's hard to go wrong with a tenoning jig on the table saw (photo below). While there's a higher upfront cost for purchasing one of these jigs, it allows you to hold a workpiece vertically and make the cheek cuts in one pass, resulting in smooth and accurate tenons that require little cleanup work.

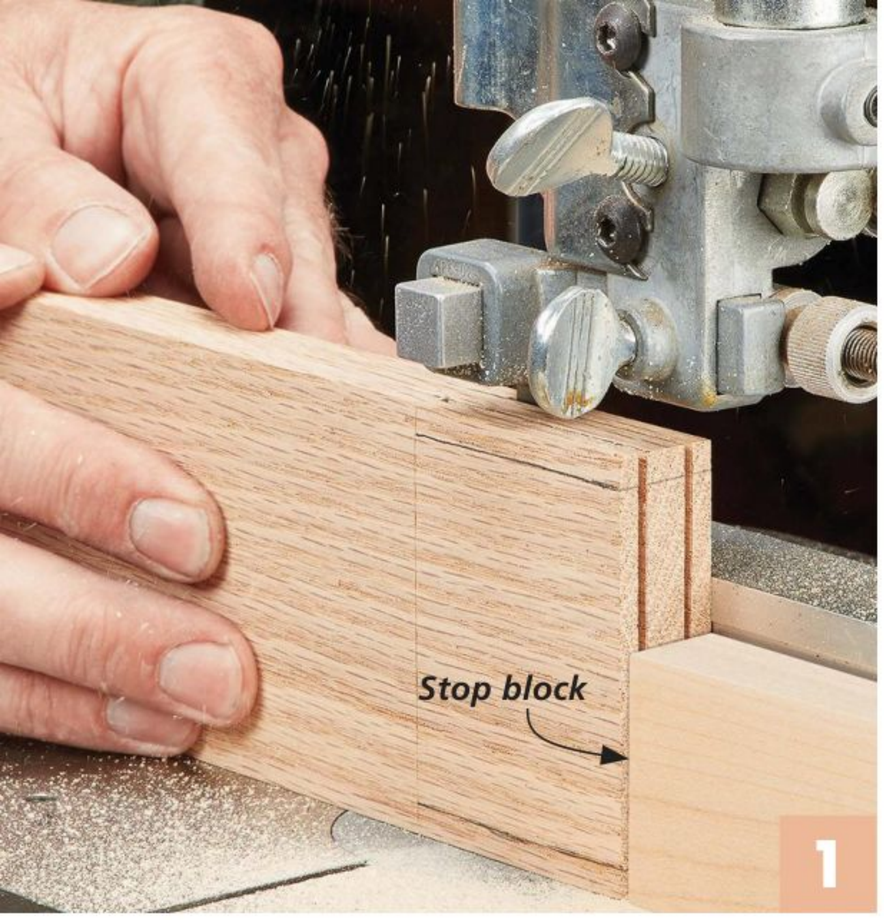






▲ If your woodworking projects call for a lot of tenons, investing in a quality tenoning jig might be right for you.

Illustrations by: Bob Zimmerman



▲ Using the fence as a guide, make the wide cheek cuts first when using the band saw. A stop block determines the tenon length.

▲ Lay the piece flat and make the narrow cheek cuts (top). Then make the shoulder cut to remove the edge waste (bottom).

▲ Stand the workpiece on edge again and, using a miter gauge, make the shoulder cut on the wide face of the workpiece.

BAND SAW TENONS

For those that prefer to use the band saw, tenons can be cut in just as efficient a manner as the table saw. And much like using a tenoning jig on the table saw, you'll find that the cuts come out much smoother right off the blade. The only trade-off is that the band saw might be just a tad slower than making tenons on the table saw.

NEEDED ACCESSORIES. While a table saw usually comes with a rip fence and miter gauge, that's not always the case with a band saw. So before going any further, make sure you have the appropriate accessories you'll need to make tenons on the band saw.

First, a reliable fence is a must. It should lock solidly in place and be perpendicular to the band saw's table. A shop-made fence works just fine as long as it meets those criteria.

A simple miter gauge is also necessary. It might also be necessary to add a tall auxiliary fence to the miter gauge if your workpieces are wide. You'll want to be able to fully support them when making the long cheek cuts.

The only other items you'll need are a couple of shop-made stop blocks and clamps. Some people prefer a featherboard, as well, to hold the workpiece against the fence. But you can get by without this item.

THE BAND SAW SETUP. Once you have everything you need for the proper setup, you're ready to make a tenon. The photos at the top of the page show the process for the most efficient way to make the cuts.

Unlike the table saw, you'll make the cheek cuts first, as shown in the first photo above. A stop block clamped to the band saw fence will ensure the lengths of the tenons are all uniform. If the width of the tenon edges is the same on all four sides, you won't need to move the fence for the next cut (Photo 2).

For the shoulder cuts of the tenon, you'll need to reposition the fence and use the miter gauge to hold the workpiece square to the blade (Photo 3). Make sure the waste piece doesn't get trapped between the blade and the fence when cut free. I use a short auxiliary fence clamped to the band saw fence to keep this from happening.

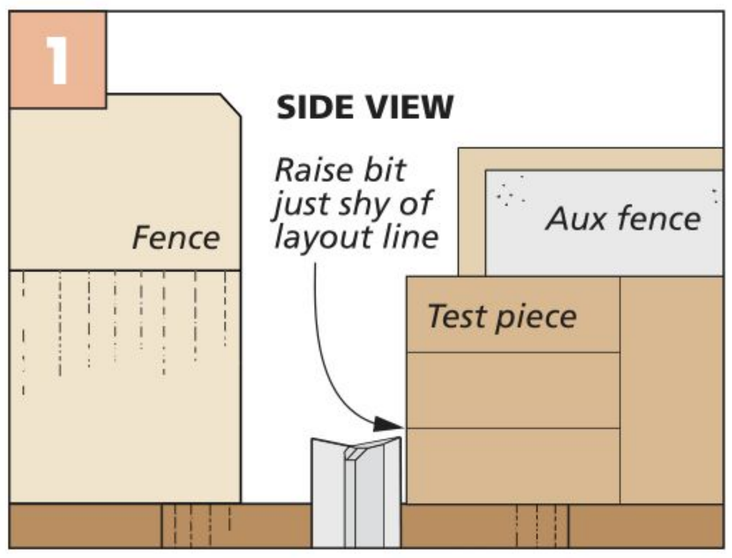
All that's left now is to stand the workpiece on edge and complete the long shoulder cuts on the face of the board (Photo 4). Use the same short fence as the previous cut. At this point, you'll have a tenon that requires very little (if any) clean up work to get a smooth tenon face.

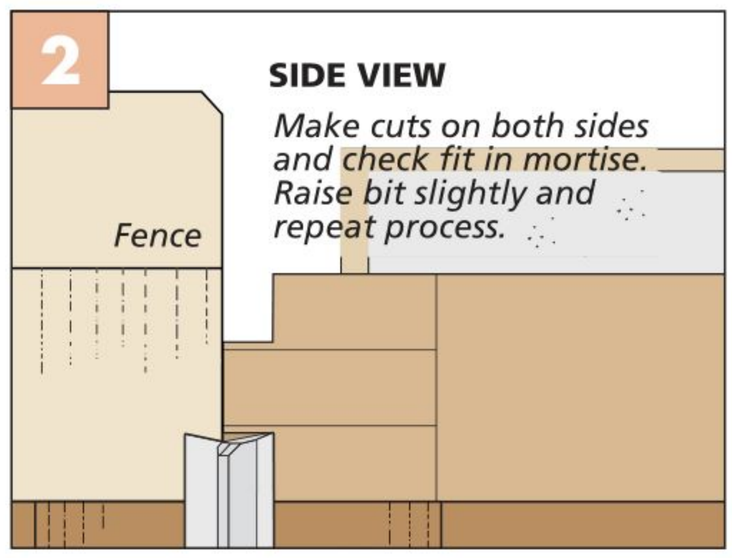
ROUTER TABLE TENONS

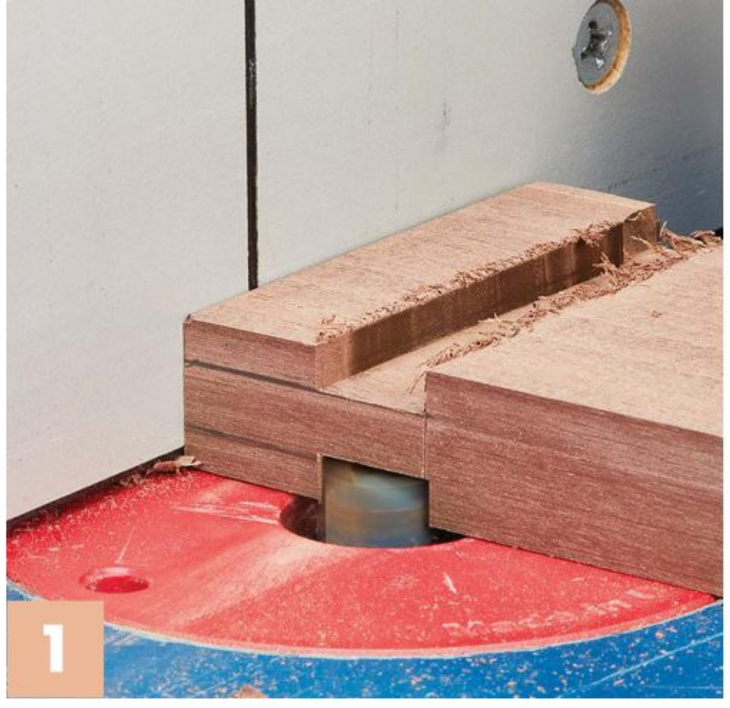
While mainly associated with making profiles on workpiece edges, many people are surprised to learn they can also make precision joinery, like tenons, at the router table. And the results speak for themselves with crisp, clean shoulders and cheeks that are ready to assemble right off the machine.

The router table is also perfect for making similar, exposed joinery like through tenons, half-laps, and bridle joints. I even turn to the router table for making tenons on small projects where safety is more of an issue.

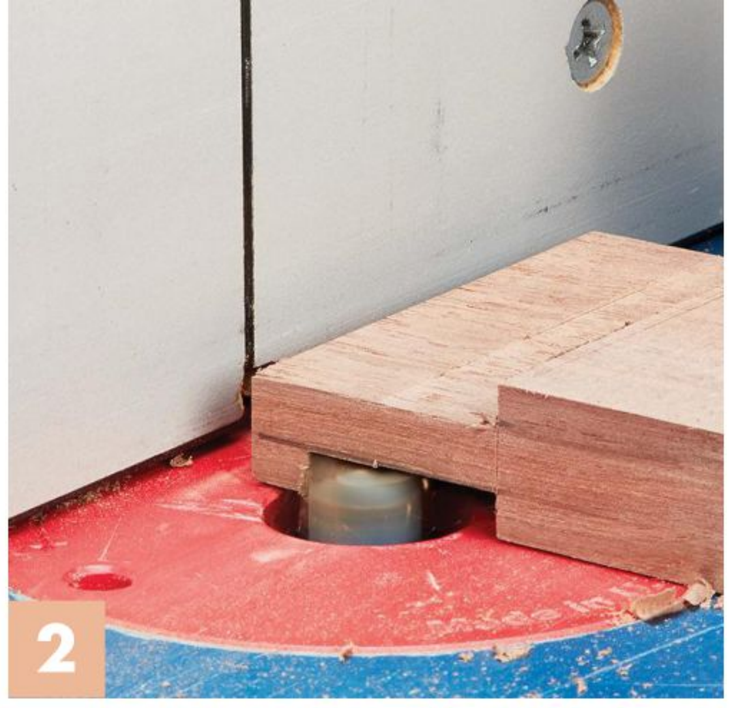
THE PROCESS. As you can see in the series of photos at the top of the next page, making a tenon on the router table follows a similar tack as on the table saw. You'll use the fence to set the length of the tenons and make the shoulder cuts. A miter gauge is used to help keep the workpiece 90° to the fence. After that, it's just a matter of moving the workpiece away from the fence and making progressive passes to remove the rest of the waste material.



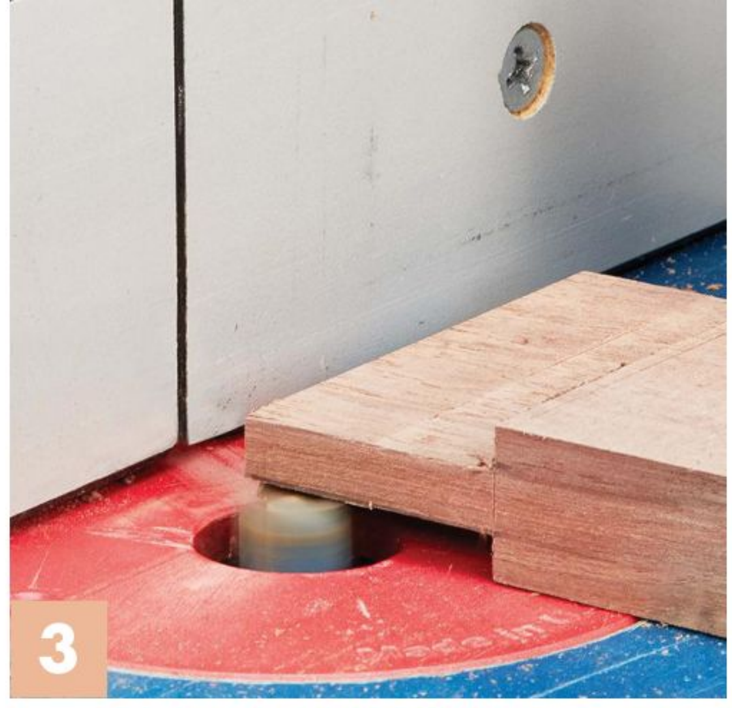




▲ When making tenons on the router table, first use the fence as a stop and rout the shoulders on both wide faces.



▲ Move the piece away from the fence and continue making passes on both sides to remove the remaining waste.



▲ When complete, you can move the piece around over the bit to remove any ridges that may be present.

QUICK SETUP. Moving past the clean results, another plus of making tenons at the router table is that in many instances, the setup is quicker and a little more user-friendly than the other machine methods. There's no dado blade to install or tenoning jig setup to hassle with. You simply install a straight bit in the router table and you're ready to go.

Dialing in the setup is pretty straightforward, as well. As the illustrations at the bottom of the previous page show, you'll start with the router bit positioned slightly below the layout line of the tenon cheek (Figure 1). Like the other machine setups, I always check my setups on a test piece.

After making one pass on each side, you can check the thickness of the tenon by doing a test-fit in the mortise. If the tenon doesn't fit (or is too snug), simply raise the straight bit and repeat the process, as shown in Figure 2. When the thickness is just right, position the fence for the shoulder cuts and get to work.

BIGGER IS BETTER. There's one other facet worth mentioning when it comes to making tenons on the router table. If you're making large tenons, it helps to use a good size bit to remove more material in one pass. I usually have a 1"-dia. bit reserved for this purpose. But smaller bits will also work.

If you're more of a hand tool person, keep reading below for a few tips. No matter the method you choose, you probably already have the means in your shop to turn out quality tenons. W

How-To: MAKE HAND-CUT TENONS

If you're just building your power tool arsenal, or you simply prefer the relaxed (and quiet) rhythm of using a hand saw, you can still make quality tenons. The process is quite similar to making tenons using a power tool. From properly prepared stock to a crisp layout, you'll follow the same procedures shown earlier.

But what's more important when cutting with a hand saw is ensuring that your workpiece is properly secured. A sturdy vise and bench dogs are helpful for this task, as shown below. And if you're just learning how to use a hand saw, you might want to start with larger workpieces until you have a sound control over the process.

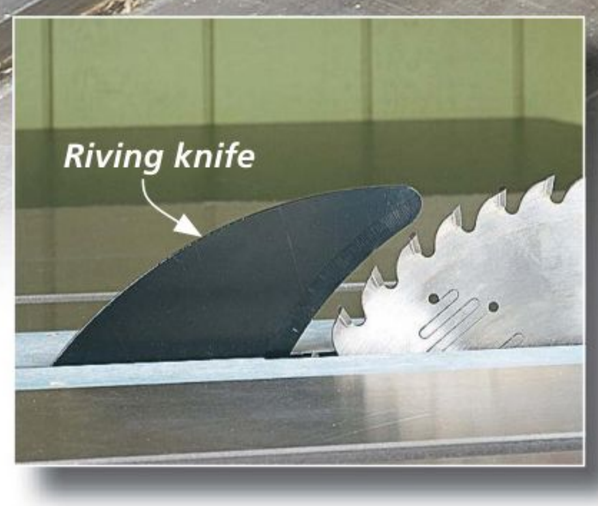
The photos below walk you through the best order to tackle tenons when cutting by hand. The key is to take your time and practice on a few test pieces until you get it right.

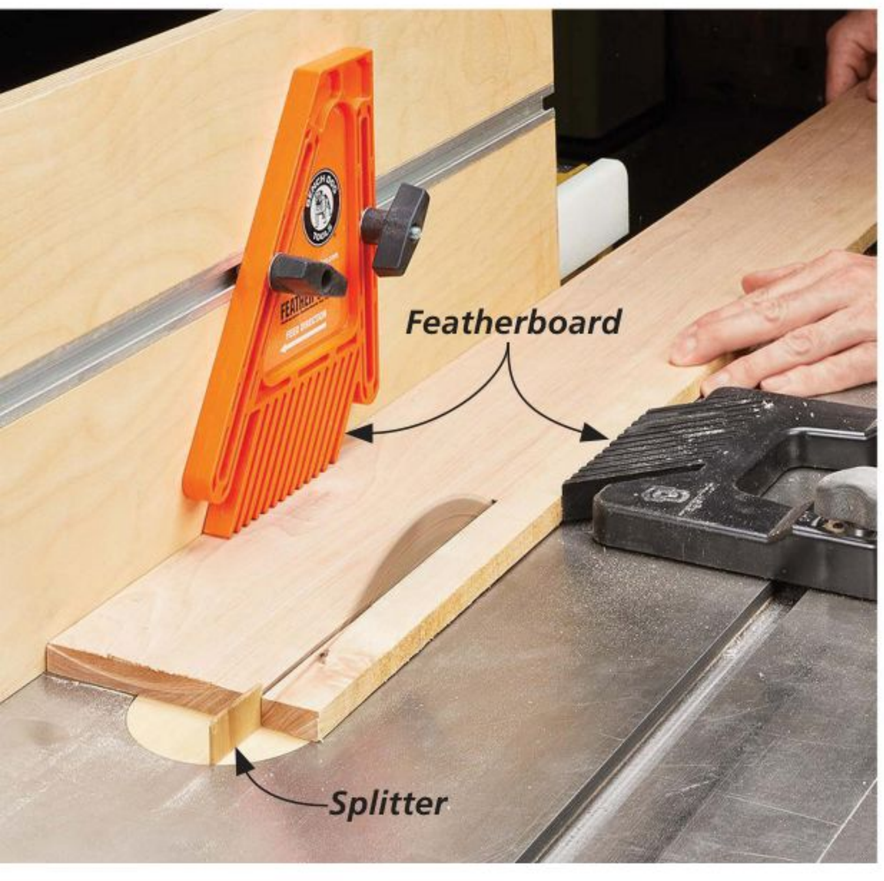
▲ After laying out the tenon location on the end of the workpiece, transfer the layout marks down each face.

▲ Clamp the workpiece to the bench and make the shoulder cuts first, being sure to cut on the waste side of the lines.

▲ Reposition the workpiece and level the saw to complete the cheek cuts. Take it slow to avoid overcutting.

Making Safe Rip Cuts





▲ Featherboards (above), hold-downs (main photo) and a splitter or riving knife (inset) are essential for safe rip cuts.

Ripping a workpiece to width is one of the first steps in any woodworking project. To do this common task at the table saw, there are a few things to keep in mind to ensure the best results.

TABLE SAW TUNE-UP. To begin, there are a couple of things to check before you start ripping workpieces. The first is to make sure the saw blade and rip fence are parallel to each other. Your saw's manual can show you how to make these adjustments. And it's important to start with a clean, sharp rip blade.

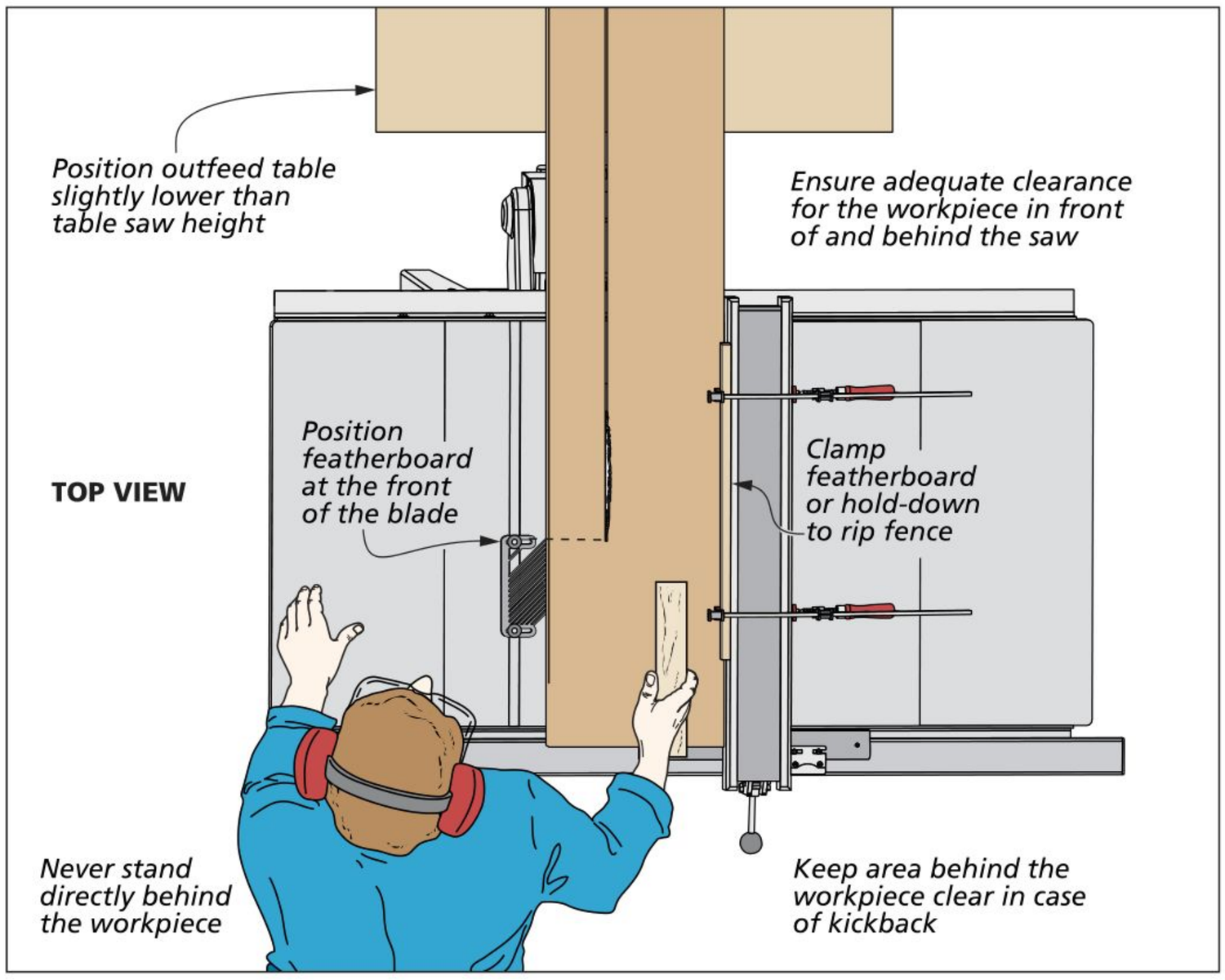
SPLITTERS & RIVING KNIVES. One potential problem that occasionally pops up during a rip cut is the tendency for the saw kerf to close up and pinch the blade. This is caused by internal stress in the board that's released during the cut. The downside is that it can cause burning and dangerous kickback.

To alleviate this problem, it's important to use a splitter or a riving knife (main photo and inset photo). It sits behind the blade to prevent the saw kerf from closing up. Most table saws include one of these devices, or you can make your own. The key is that it must be no thicker than the saw blade and be perfectly aligned behind the blade. Otherwise, the workpiece can catch, preventing a complete cut.

HOLD-DOWNS. When ripping long boards, it can be difficult to keep the leading end of the workpiece flat on the saw table at the start of the cut. To help with this, it's a good idea to use a hold-down, as shown in the main and left

Written by: Randy Maxey

▲ A shop-made push block with a hook is perfect for guiding the workpiece through the blade at the end of the cut.



photos on the previous page. This can be as simple as a board clamped to the rip fence. Rigging a featherboard to the fence is a great solution, as well. Plus, the pressure of the fingers on the featherboard help prevent kickback.

SIDE PRESSURE. For a consistent, smooth cut, one edge of the workpiece should be straight throughout its length. This is the reference edge that rides against the rip fence. Any peaks or hollows along this edge can allow the workpiece to shift during the cut or bind between the blade and rip fence.

While we're on the subject, holding the workpiece firmly against the rip fence during the cut can be a challenge, especially on large or long workpieces.

To help with this, I like to use a featherboard. It's positioned at the front of the blade and adjusted to apply pressure on the edge of the workpiece. You can see this in the lower left photo on the opposite page and the illustration above.

For shorter workpieces that are easier to handle, you can use your hand to accomplish this task (main photo, previous page). Just remember to keep your hand stationary on the saw table.

PUSH BLOCKS. Before ripping any board, I make sure to have a push block nearby. It has a hook on the back side that engages the tail end of the workpiece to push it through the blade to complete the cut. A good example is the push block shown in the photo above. It's made from a short length of 2x4.

I don't use the push block until the end of the workpiece is near the edge of the saw table (photo and illustration above). If you try to use the push block too early, the downward pressure can lift the workpiece away from the blade, which can cause burning or kickback.

CLEARANCE & SUPPORT. I like to make sure I have plenty of clearance in front of and behind the saw for the workpiece before turning on the saw. And for longer boards, it's important to have outfeed support to prevent the workpiece from lifting at the end of the cut.

BODY POSITION. The illustration above highlights the things I've been talking about. It also shows the proper body and hand position during a rip cut. The most important point is to never stand directly behind the blade. Kickback is always unpredictable, so you don't want to be standing in the path of the workpiece when it happens. So I like to stand to the side, with one hand controlling the workpiece while a featherboard keeps it tight to the rip fence.

THIN STRIPS. When ripping thin strips, such as shelf edging, it's tempting to set the rip fence close to the blade to make the cut. But it's not the only solution.

Another option is to use a jig designed for this purpose. You can see a shop-made version at left. Commercial versions are also available. The jig is positioned ahead of the blade and secured to the saw table. The distance between the jig and the blade determines the thickness of the thin strip. Adjust the rip fence so the workpiece is trapped between the jig and fence. Repeat for each strip needed.

Following these simple steps will help you make safer and better rip cuts. And this will result in better projects. W

▲ This simple jig makes ripping thin strips safe and easy. It keeps the cutoff on the outside of the blade instead of trapping it between the blade and rip fence.

Illustrations: Bob Zimmerman

Shop Notes

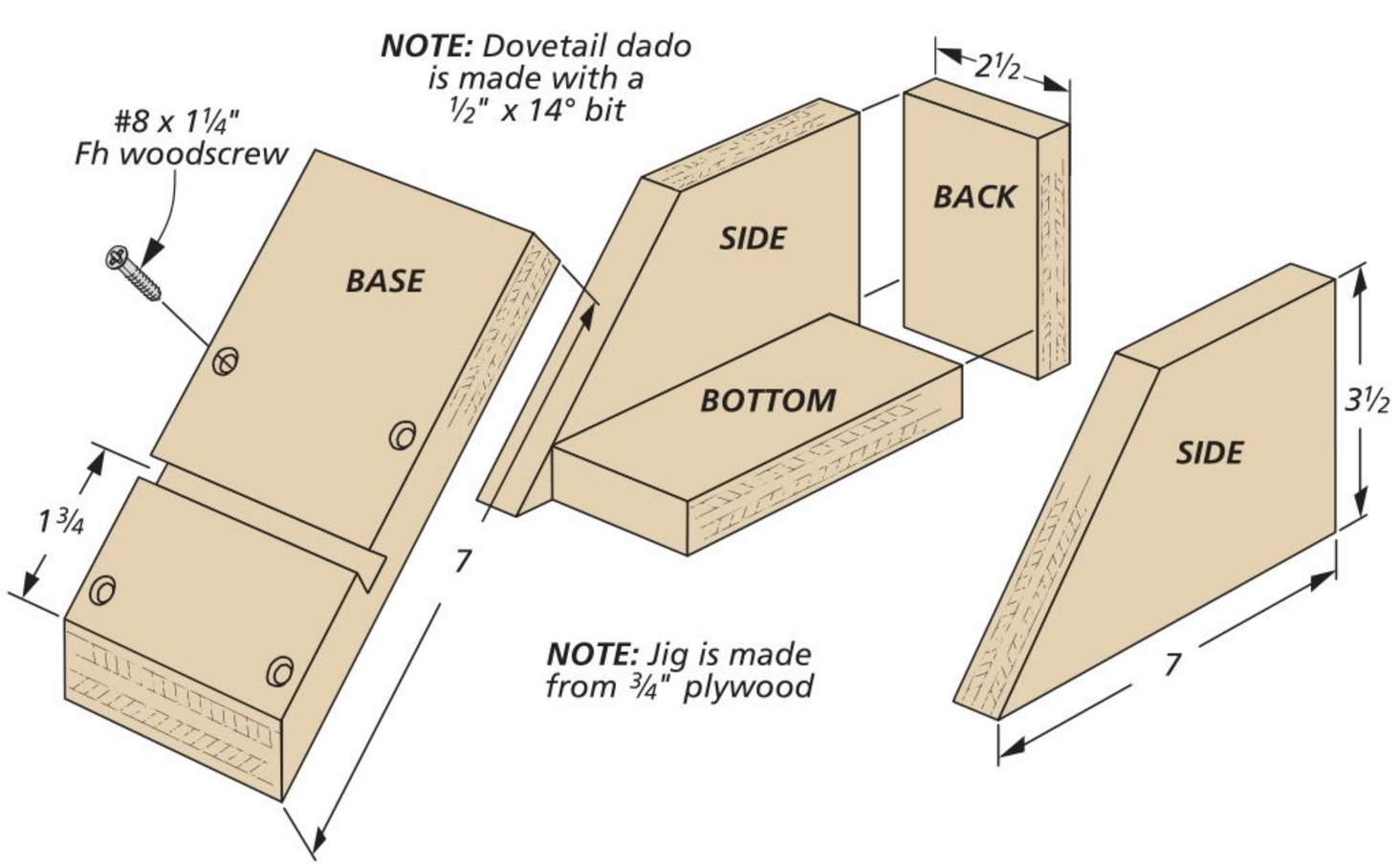
Dovetail Tenoning Jig

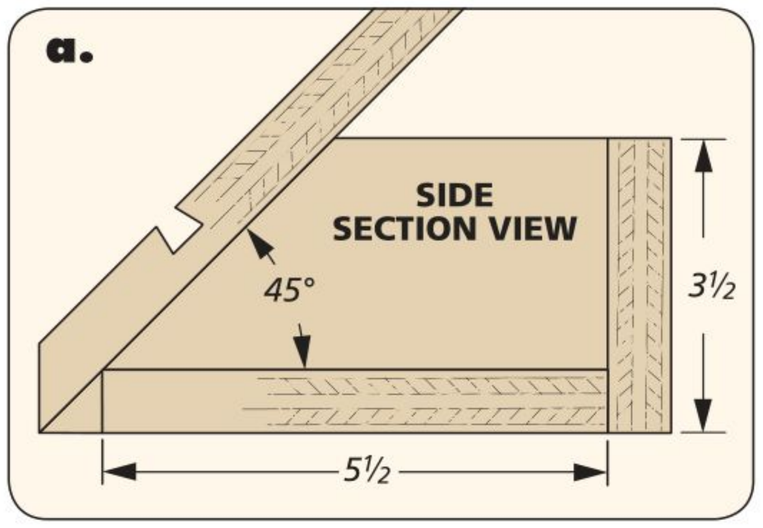
To make the tenons on the ends of the braces for the butcher block table on page 48, you need a jig (photo above). The jig is used at the router table to guide the braces past the router bit.

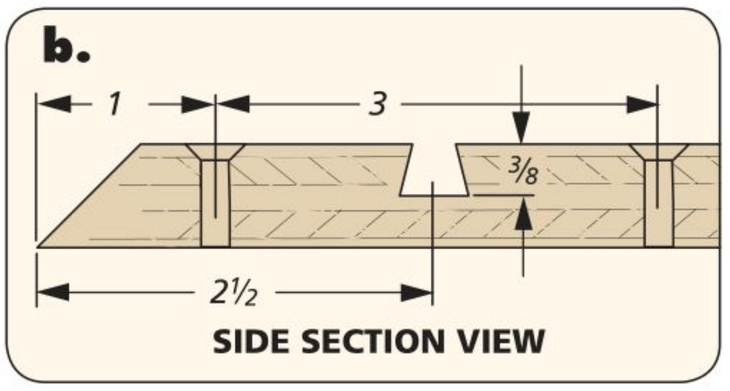
PLYWOOD BOX. The jig is simply a box that has one side angled, and is open at the top to allow you to clamp it to a miter gauge. The angled face serves as a base for clamping the workpiece while routing the dovetailed tenons. A dovetail slot in the base combined with a *Matchfit* clamp is what holds the brace in place on the jig.

QUICK CONSTRUCTION. I started by cutting the back, bottom, and side pieces to length. That's followed by cutting the miters on the side pieces. Gluing those four pieces together was the next order of business. While that was drying, I turned my attention to the base.

At the router table, cut the groove for the *Matchfit* clamp (detail 'b'). Follow this by drilling some countersunk screw holes. To finish, tilt the blade on your table saw to cut the mitered end and then attach it to the box with screws.







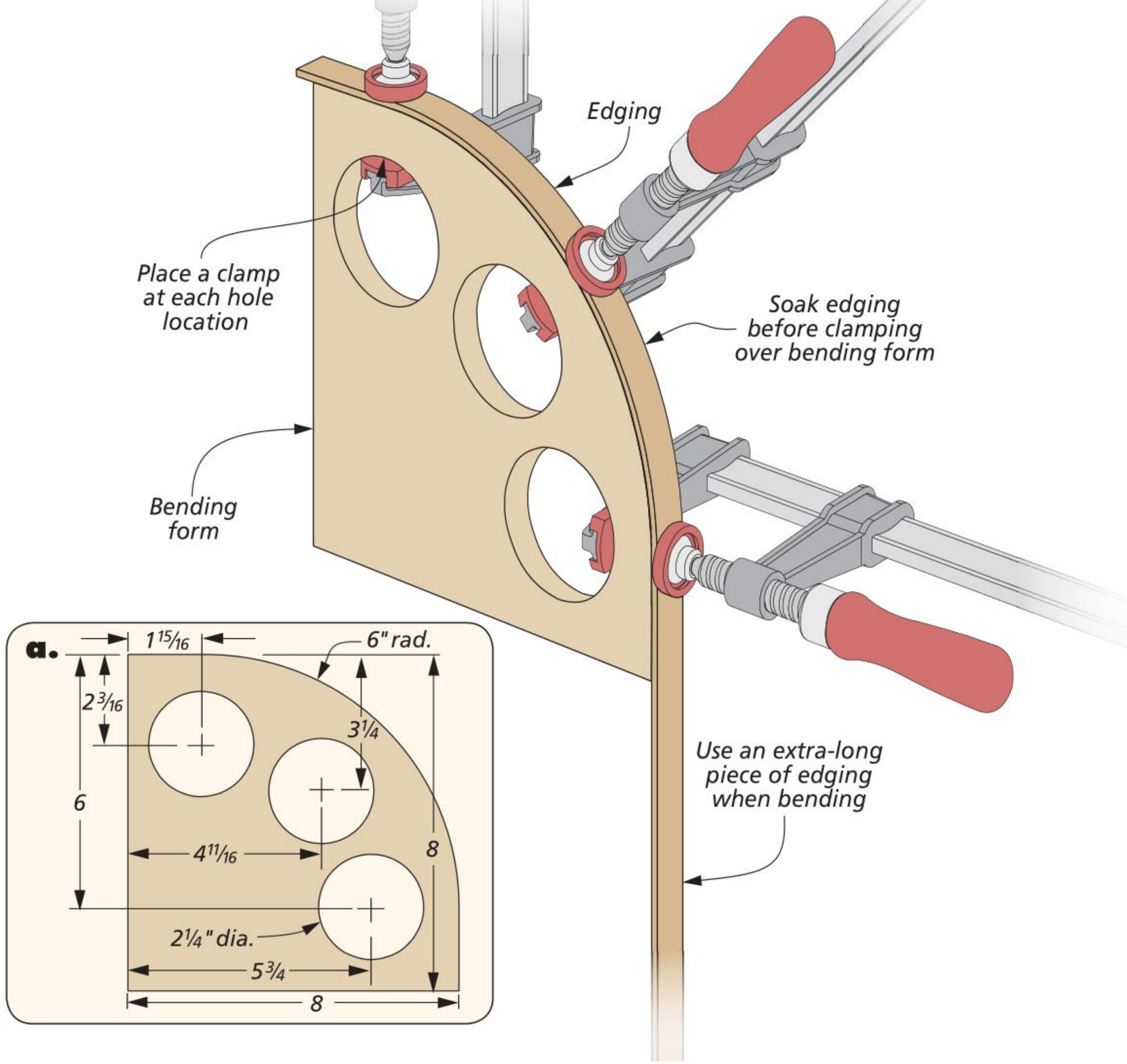
Bending Thin Edging

The pullout unit in the dressing table on page 30 is mostly made of plywood. I covered the exposed plywood edges with thin strips of hardwood. On the curved front and back pieces, I was struggling to bend the pieces and glue them in place at the same time.

My solution to was to make the small bending form shown at right. This form allowed me to prebend my edging after soaking the pieces in warm water.

EASY TO BUILD & USE. The process for making the bending form is simple. After cutting it to size at the band saw and sanding the curved edge to match the pullout unit parts, drill three large holes to accept clamp heads.

Then I soaked an extra-long piece of edging in warm water for several minutes before clamping it to the form. After letting it sit overnight, the piece holds its shape and can easily be glued in place. A few pin nails speed up the process and are easy to conceal.



Installing a Router Plate Insert

The router table on page 42 has an aluminum insert plate attached to the rotary tool. You need to create a snug fitting, recess in the top of the table to house the plate. An easy way to tackle the problem is to use the insert as a template, along with some guide strips and a pattern bit to rout a matching opening.

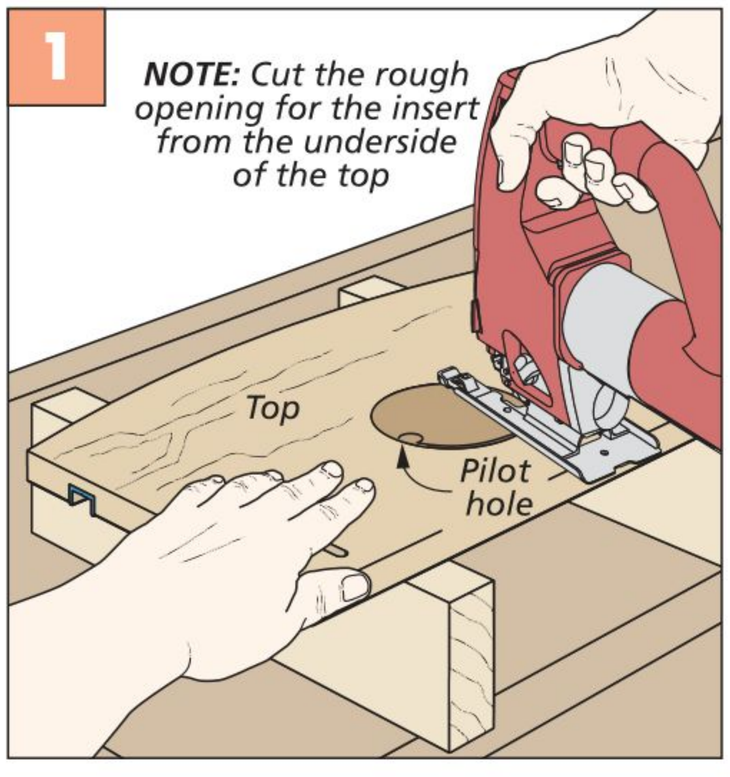
SIMPLE PROCESS. Start by transferring the rough opening location of the case to the underside of the top. Now drill a pilot hole large enough for a jig saw blade to pass through. This sets you up to cut the hole from the underside of the top (Figure 1). This hole doesn't have to be perfect since it's going to be covered by the aluminum insert.

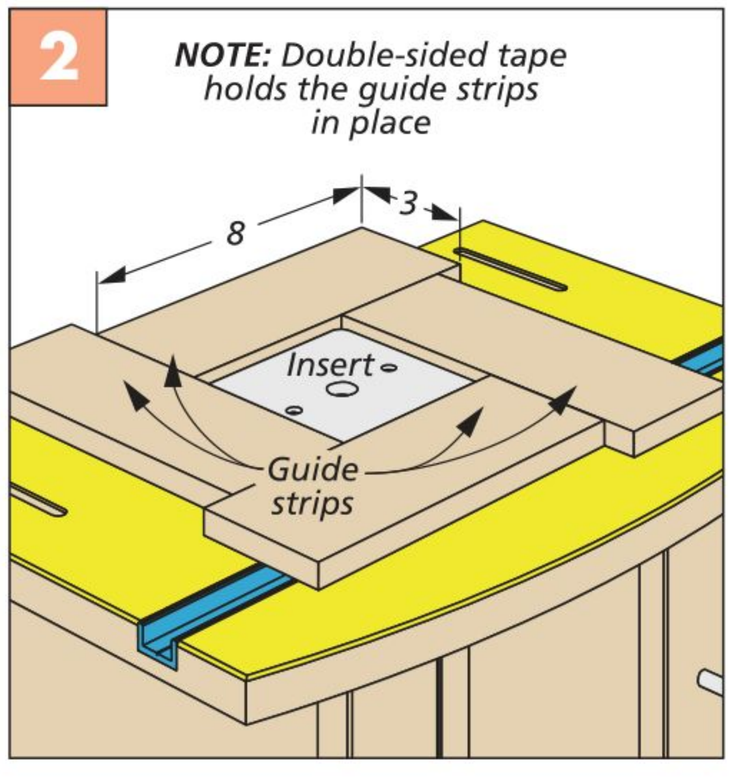
At this time, I glued the top to the case. When the glue is dry, use a pencil and a square to lay out the location of the insert on the top. These marks indicate where to position the insert.

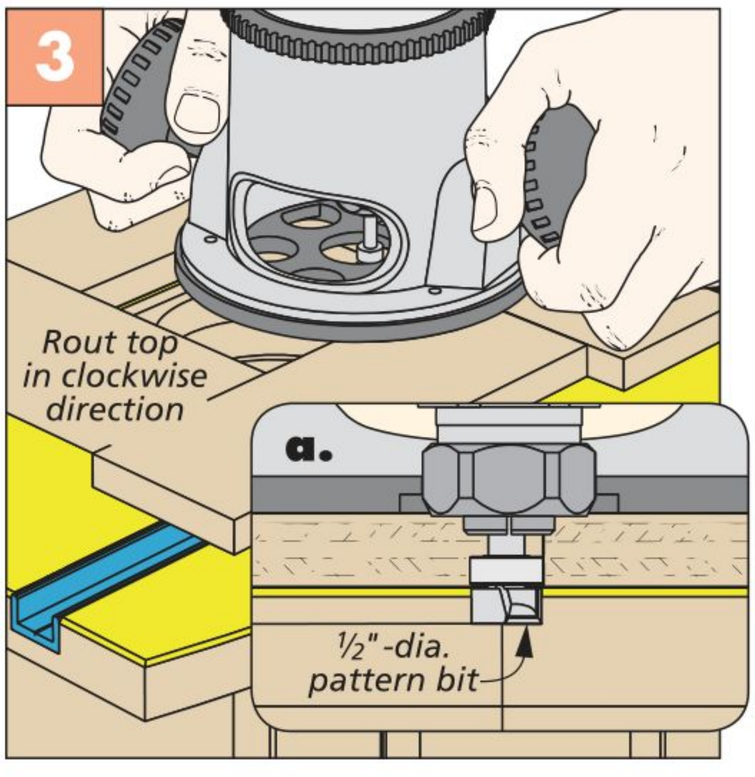
Next, I made four strips that guide the pattern bit around the perimeter of the insert opening. Figure 2 shows how to place the guide strips. The strips are held in place with double-sided tape. Remove the insert and set up your router with the pattern bit.

SETUP & ROUT. To set the depth of the bit properly, lay the insert on the guide strips to act as a spacer. Then with the router sitting on top of the insert, adjust the pattern bit so it just touches the surface of the table.

To rout the opening, position the router so the base is supported by the guide strips (Figure 3). Then rout the recess in a clockwise direction.







Shaping Curved Doors

The wood hinge cabinet on page 18 has doors with sculpted fronts. The left door is concave, and the right door is convex.

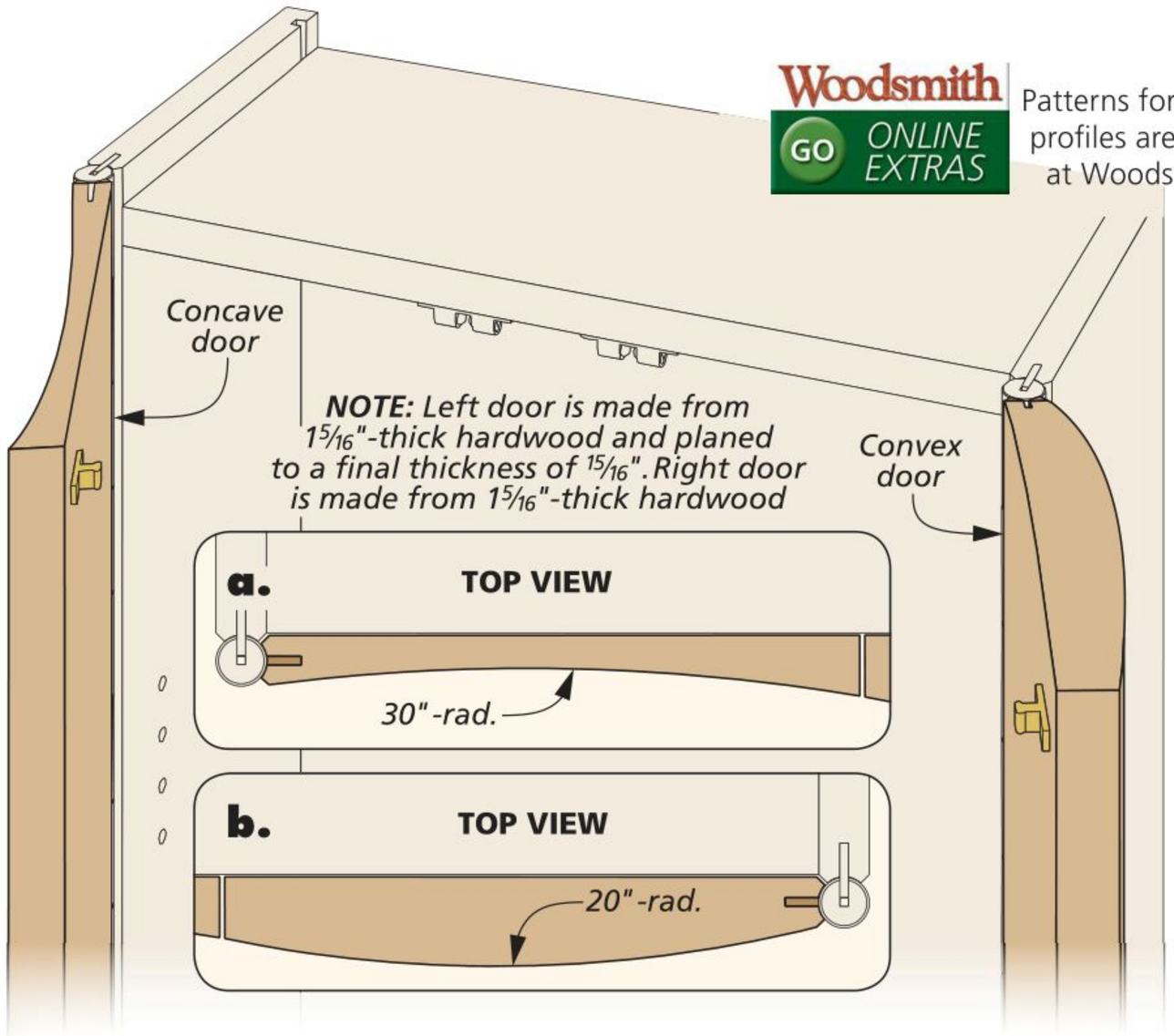
MACHINE OUT WASTE. While much of the fine-tuning of the doors will happen with hand tools, most of the waste will be removed at the table saw. Start by using the pattern available at *Woodsmith.com* and attach it to both ends of the doors. I started with the right door.

RIGHT DOOR. At the table saw, use a tall auxiliary fence and tilt the blade to cut a large bevel as close to the template line as possible. You can even make multiple passes with the blade at different angles to start forming the front of the door into the curve shape (Figure 1). After the rough shape is cut, the curve can be refined by hand.

To get to the final shape of the door, use a hand plane and remove the facets left from the table saw (Figure 2). While this will leave you with a pretty nice surface, a card scraper or large, soft sanding block will help smooth out the curvature.

Woodsmith GO ONLINE EXTRAS

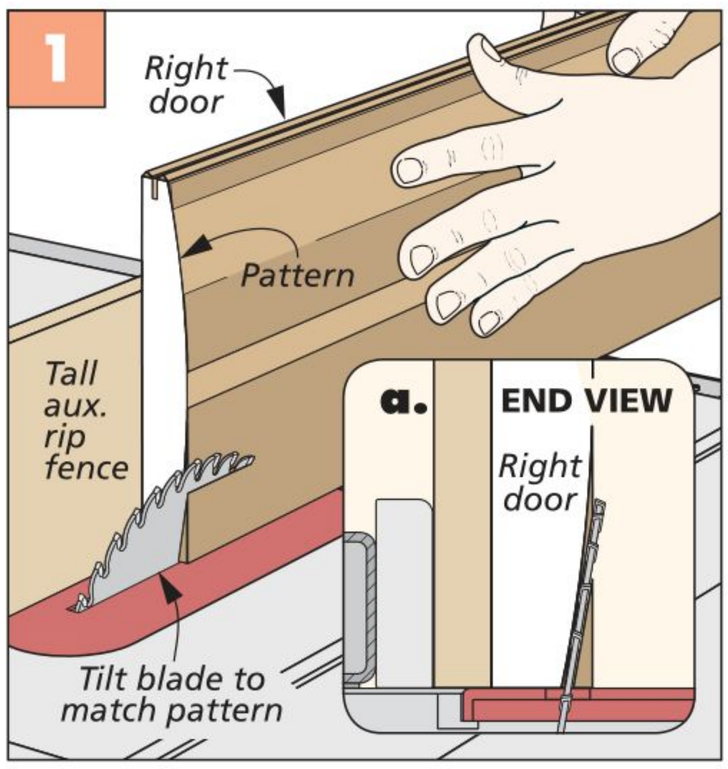
Patterns for the door profiles are available at Woodsmith.com

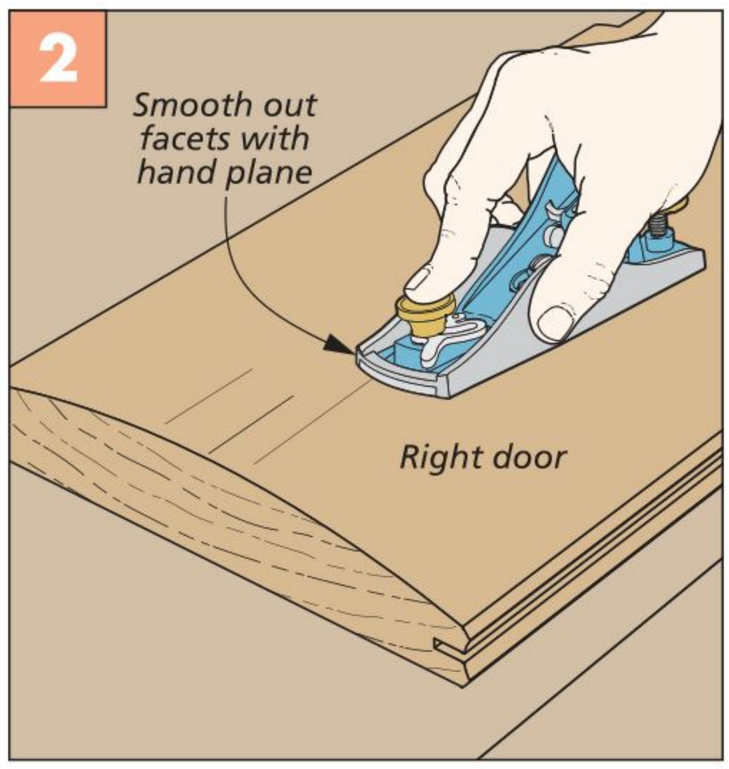


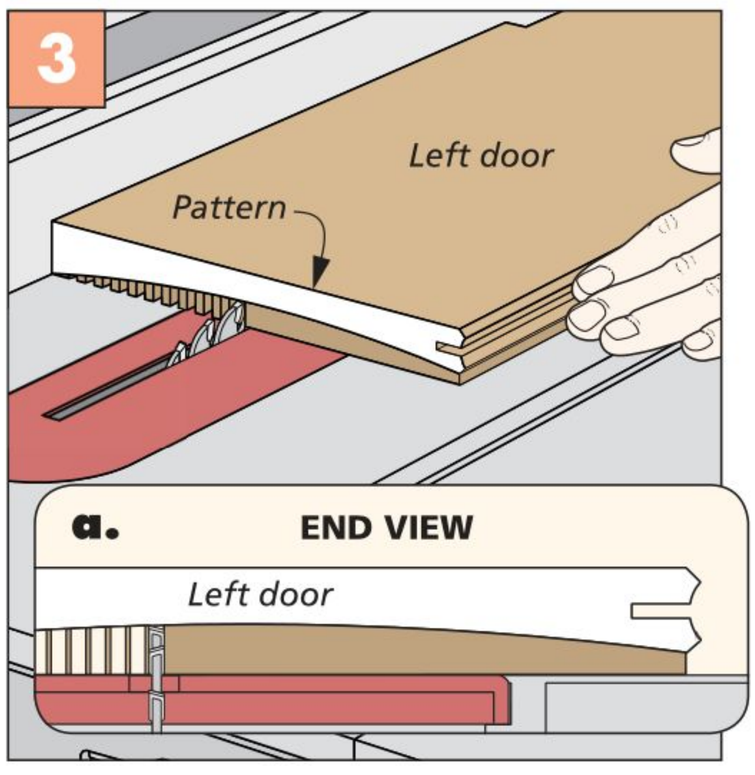
LEFT DOOR. With the right door complete, you can move to the left door and head back over to the table saw. To remove the waste on the left door, you're going to make a series of kerfs that are deepest in the middle of the door, but get shallower as they follow the curve towards the edge. This is done by simply adjusting the blade height to the template curve and setting the fence. Then, make a pass. Move the fence and lower the blade as you get to the outside edge (Figure 3).

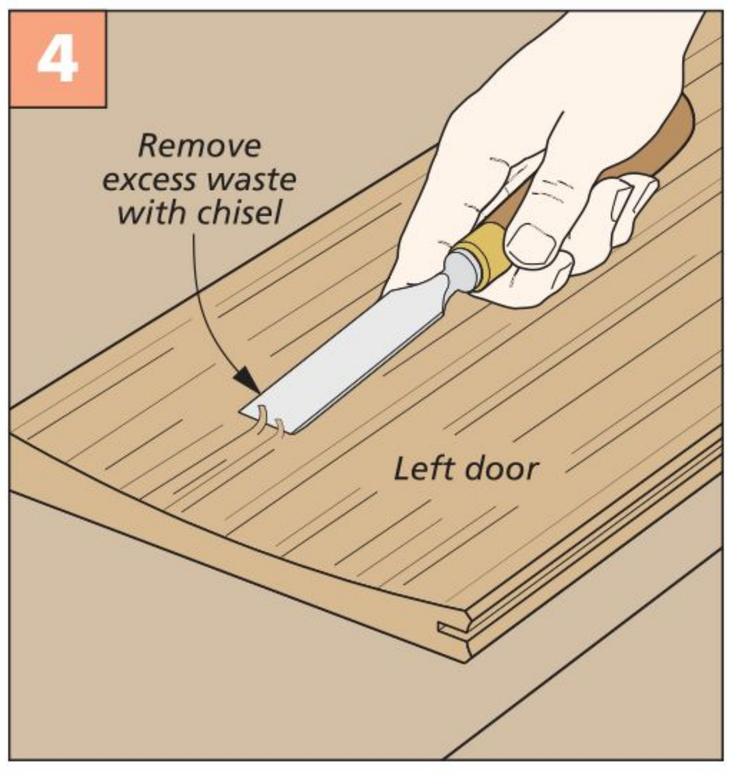
SHAPE BY HAND. With the majority of the waste removed, you can once again head over to the bench to do some hand shaping. Start by breaking out any remaining fins of waste with a chisel, as seen in Figure 4. If you have a plane with a curved sole, you can quickly eat through the remaining waste and ridges. Otherwise, a curved card scraper and a shaped sanding block do the trick (Figure 5). Just sneak up on the curved line, but don't go past it.

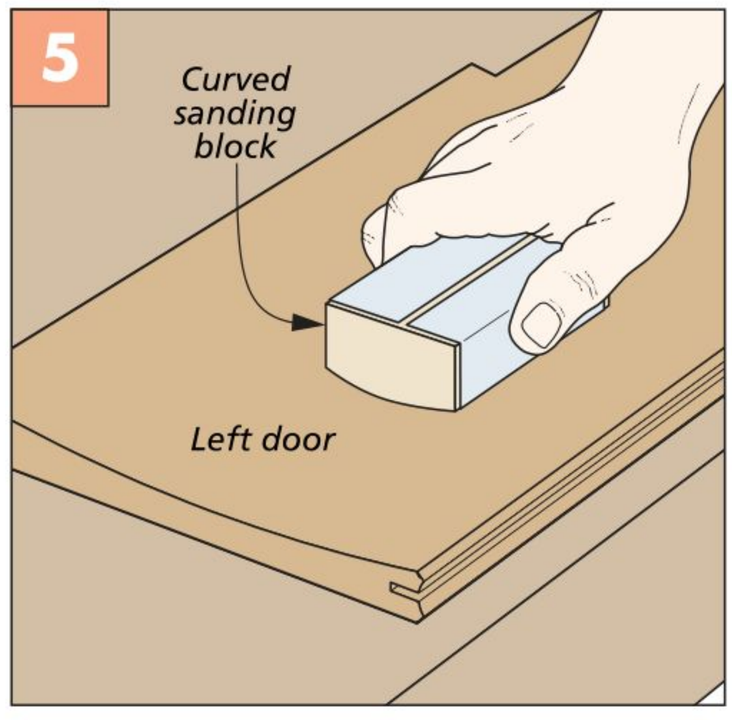
The goal is to have a fluid, subtle wave on the doors. After the faces are shaped, the curves on the top and bottom of the doors can be cut at the band saw. W

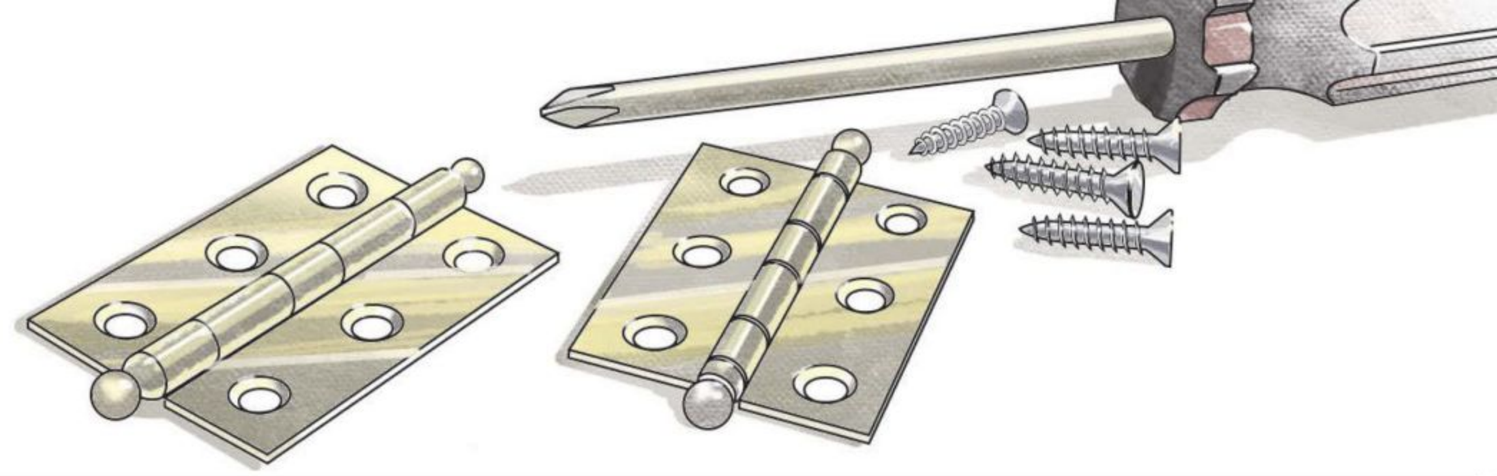












hardware & supplies
Sources

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 right margin for contact information.

WAXES IN THE SHOP *(p.10)*

- **Amazon**
  - *Beeswax* . . . . . varies
  - *Carnauba* . . . . . varies
  - *Alfie Shine* B06WCZ3NZS
  - *Johnson Paste Wax* 00203
  - *Behlen Tung Oil* B740-00035
- **Woodcraft**
  - *Renaissance Wax* 08G22

HEARING PROTECTION *(p.14)*

- **Amazon**
  - *SoundVision Glss* . B00IGXWI1M
- **Rockler**
  - *ISOtunes Pro* 54033

WOOD HINGE CABINET *(p.18)*

- **Rockler**
  - *Z-Clips* 46357
  - *Ball Catches* 28613
  - *Shelf Pins* 30473

DRESSING TABLE *(p.30)*

- **Amazon**
  - *Wooden Knobs* . . .B00M0193LO
- **Buy-Rite Salon & Spa**
  - *Blow Dryer Holder* . . PIB-1502A
  - *Appliance Holder* PIB-1502B
- **Lee Valley**
  - *Mirror Pivots* 00K65.01
  - *Bttm. Mount Slides* . . . 02K43.40
  - *30mm Bolts* 00N16.30
- **Rockler**
  - *No-Mortise Hinges* 28720
  - *Grommets* 57269
  - *Freud Table-Edge Bit* 38757

ROTARY TOOL TABLE *(p.42)*

- **McMaster-Carr**
  - *¼"-20 x 1" Knob* 6399K52
  - *¼" Alum. Plate* 8975K432
  - *3" Steel Pull* 18645A21
- **Amazon**
  - *9" Drwr. Slides* . B00NWONJ0E
- **Rockler**
  - *48" T-Track* 20054
  - *36" Miter Track* 48037

The case is sprayed with two coats of lacquer.

BUTCHER BLOCK TABLE *(p.48)*

- **Stewart-MacDonald**
  - *Precision Tool Router Base*. 5260
- **Osborne Wood Products**
  - *Dining Table Legs* 1025
- **The Home Depot**
  - *7mm x 50mm Screws* 818168
- **Widgetco**
  - *½" Buttons* 5-500-MAP-MW

The top is finished with mineral oil. The base is stained with *Watco* cherry stain that's available at home centers. The base is then sprayed with two coats of lacquer.

SCRAPERS *(p.56)*

- **Lee Valley**
  - *Veritas Burnisher* 05K32.01

MAIL ORDER SOURCES

Project supplies may be ordered from the following companies:

amazon.com

Buy-Rite Salon & Spa
855-270-1441
buyritebeauty.com

The Home Depot
800-466-3337
homedepot.com

Lee Valley
800-871-8158
leevalley.com

McMaster-Carr
630-833-0300
mcmaster.com

Osborne Wood Prod.
800-849-8876
osbornewood.com

Rockler
800-279-4441
rockler.com

Stewart-MacDonald
800-848-2273
stewmac.com

Widgetco
800-877-9270
widgetco.com

Woodcraft
800-225-1153
woodcraft.com

Woodsmith
800-444-7527
store.woodsmith.com

looking inside

Final Details

◀ *Roll-Top Chisel Case.* This chisel case stores your tools in style. Slide back the tambour door to reveal a set of your favorite chisels. You'll find complete plans for building it on page 24.

▲ *Wall Cabinet.* Gentle curves give this cabinet a modern, graceful look. But don't overlook the wood hinges that connect the doors to the case. We'll walk you through the construction beginning on page 18.

◀ *Dressing Table.* With a nod to post-war modern design, this dressing table is an updated version of a classic bedroom vanity. Step-by-step instructions can be found starting on page 30.