



PRECISION JOINERY:
Details that Make a Difference

The #1 Table Saw Technique:
SECRETS REVEALED

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Vol. 35 / No. 209

TIPS & TRICKS FOR **SEAMLESS MITERS**



ALSO:

Tools That Work:
Time-Tested Clamps

Small Shop Solutions
That Are Big on Features

Better-Looking Plywood Projects:
The Keys to Success

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Entertaining family or friends in the near future? Then this stylish serving center is sure to be a hit at your next gathering. Simple construction techniques ensure success from start to finish.



Craftsman-Style Bar page 32

I have some exciting new things to talk about in the world of *Woodsmith* these days. And one of those is a couple of new departments we're featuring for the first time in this issue: *Hand Tool Skills* and *Woodworking Essentials*.

We've always wanted a place to focus on hand tools and the proper techniques for using them. The *Hand Tool Skills* department gives us the perfect home for that kind of information. The focus will be presenting the tools in the context of a modern workshop, using them to complement, not replace, your power tools. In *Woodworking Essentials*, we'll take the time to break down the basics of woodworking into easy-to-digest tasks. We'll dig a little deeper into a technique or operation, presenting not only the how, but the why of each task. Let me know what you think of these new departments.

Back Issue Library. Besides the new departments, new things are happening elsewhere that I'm just as excited about. It wasn't too long ago that we offered all of the back issues of *Woodsmith* on a DVD. It provided access to all the great tips, projects, and articles and put it right at your fingertips. Well, we're taking the library access to a new level.

Now you can access all our great content online, from anywhere, on any device with a browser. So if you're away from home, traveling, or simply stopping by your woodworking buddy's shop, you can quickly and easily search for information about tips, tools, and projects, just like you can from the DVD.

Even better, if you already own the DVD, the online access is free. And if you're also a magazine subscriber you'll receive the latest issue of *Woodsmith* as an update as soon as it's available — even before it arrives in your mailbox. For more information about the features and benefits of online access to the *Woodsmith* back issue library, just head online to Woodsmith.com.

Bryan



This symbol lets you know there's more information online at Woodsmith.com. There you'll see step-by-step videos, technique and project animation, bonus cutting diagrams, and a lot more.

Tips & Techniques



Vertical Cutting Jig

When it comes to cutting tenons, I usually turn to the table saw. Plus, many projects require cuts that can only be made by passing the workpiece vertically through the blade. Rather than cobbling something together every time one of these cuts arises, I built the vertical cutting jig for my saw that you see above.

JIG DETAILS. The jig just requires a few parts and hardware, and it's easy to make, as shown below. It consists of two basic components: a fence and a guide.

The fence mounts to the saw's rip fence with two commercial

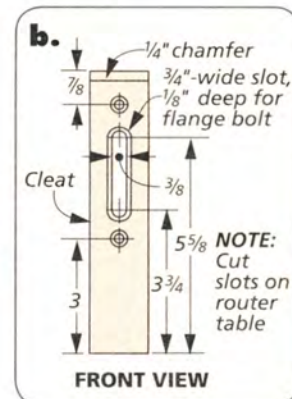
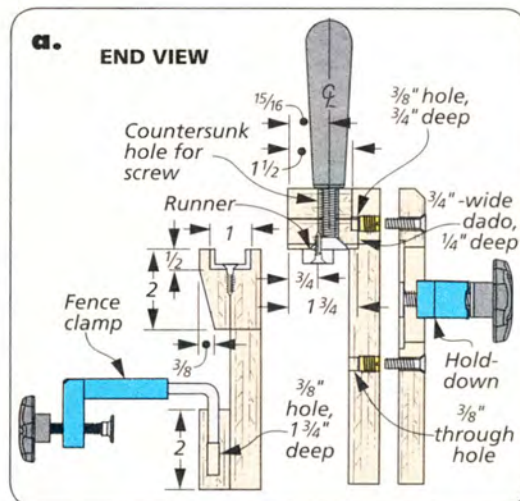
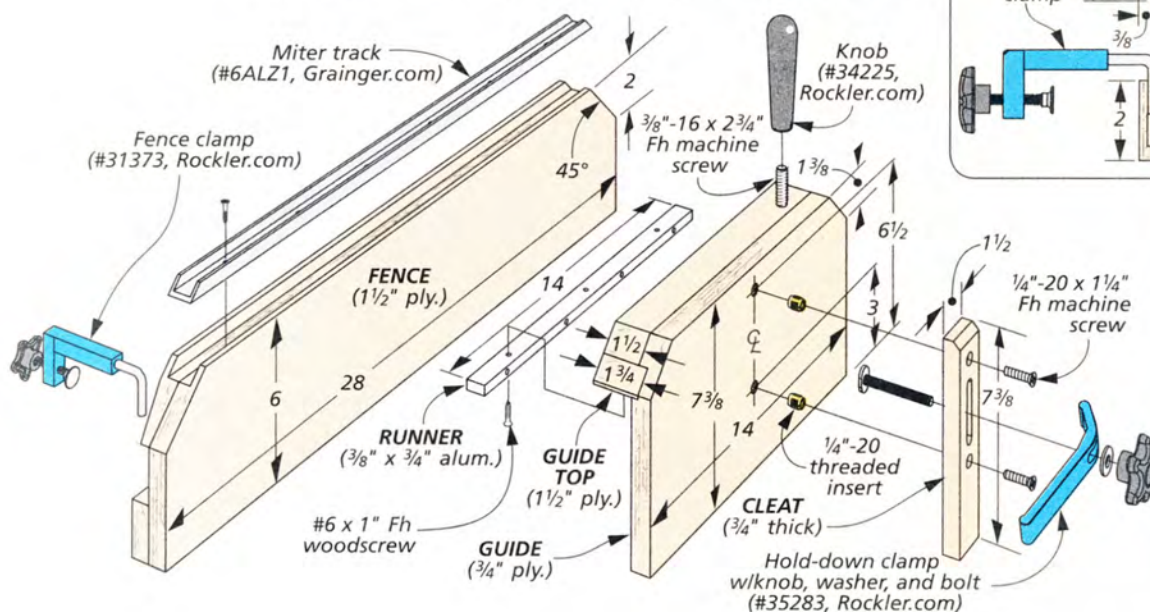
fence clamps. This makes it easy to adjust the fence in relation to the blade. On its own, the fence is a great tall auxiliary fence.

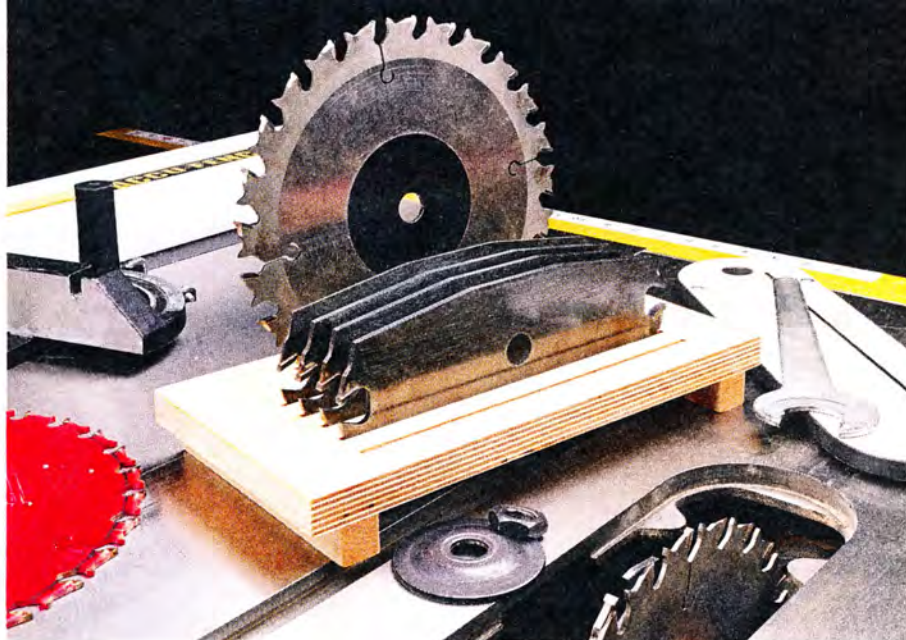
The fence's miter track accepts a runner mounted to the underside of the guide. And a wood cleat and hold-down clamp on the guide keep the workpiece secure as you cut.

USING THE JIG. After clamping the fence to your saw's rip fence, all you do is secure the workpiece to the guide

and set the runner in the miter track. Then position the rip fence to make the cut. The guide will carry the workpiece smoothly through the blade.

Gerald Welf
Fridley, Minnesota





Dado Caddy

A dado blade is one of my favorite tools, but I'm not a big fan of digging through the box to find the right combination of scoring blades and chippers. So I came up with the dado blade caddy you see above to put everything out in the open.

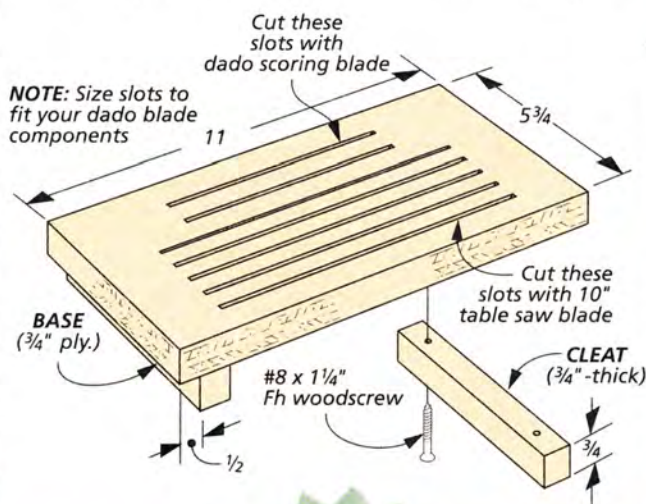
BUILDING THE CADDY. To make the caddy, I started with an extra-long piece of plywood and raised the spinning saw blade into the base in order to cut the slots for blades and chippers. To do this, you'll want to use the saw's rip fence to position each slot, and

clamp the plywood blank securely to the front and back of the saw table for each cut.

Once that's done, you can simply cut the base

to length, attach the hardwood cleats, and set all your blades and chippers in place.

*Matthew Dollinger
Beaverton, Oregon*



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Brad Nailer Guide

Brad nailers sure are handy for speeding up assemblies, but they have a frustrating tendency to cause nails to "blow out" the side of a piece and mar your finished work. This is usually caused by not holding the nailer square to the workpiece when driving in the nail.

To make my nailer more accurate, I created the handy guide you see at right. It ensures that the nailer will always be perfectly square with the work when driving in nails. And it's adjustable to center nails on any thickness of workpiece.

GUIDE DETAILS. The two main assemblies for this nailer guide are a base and a fence. The base is an assembly of plywood and hardboard. A centered slot accepts the nose of the nailer and two adjacent slots are used

to secure the fence. The base also has a couple of support blocks with aluminum brackets that are used to secure the nailer.

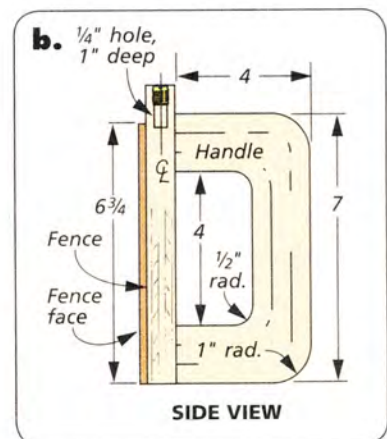
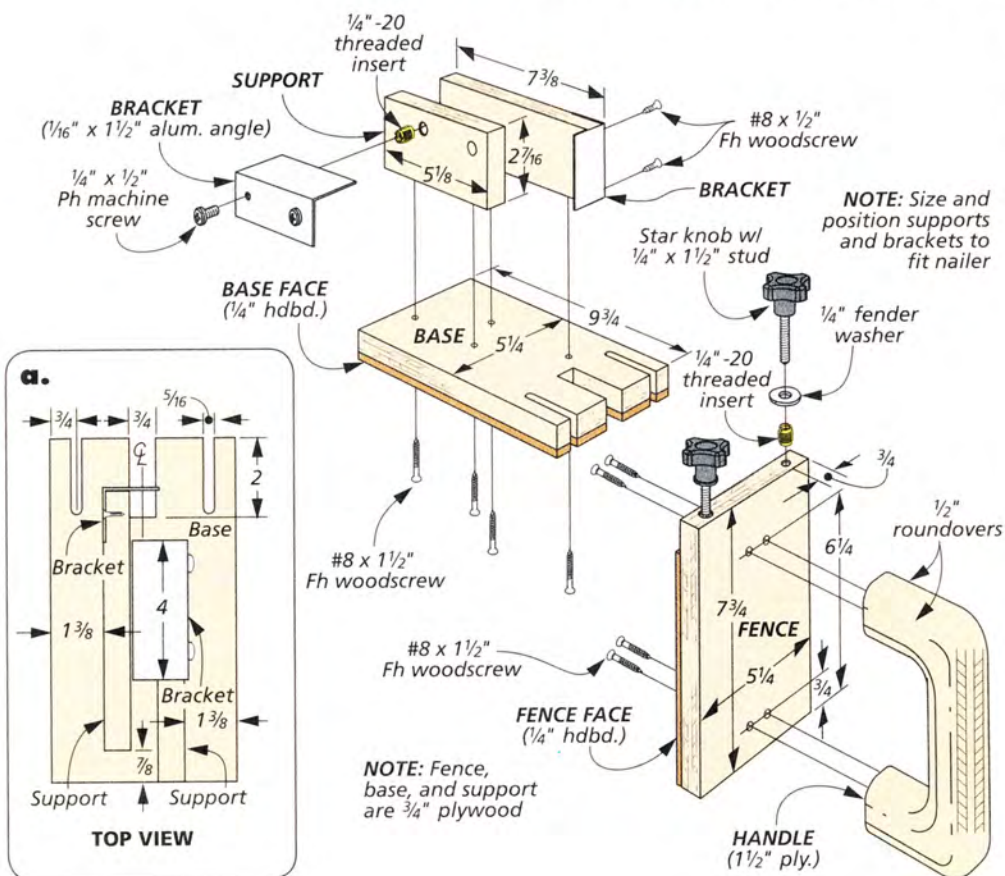
As for the fence, it has a couple of knobs at one end that fit the



slots on the base. This makes the guide adjustable for different thicknesses of material. And an added handle makes the guide easy to use (photo above).

USING THE GUIDE. Once the guide is complete, you set the nailer in place between the supports and add the aluminum brackets to lock it in place. Then adjust the fence in relation to the base to center the nose of the nailer on your workpiece. Lock down the knobs, and then you're ready to drive nails by sliding the guide along the piece as shown above.

Charles Mak
Calgary, Alberta





One-Touch Dust Control

Since I don't own a tool-actuated vacuum, using a tool with dust collection used to require turning on the tool and bending over to switch on the vacuum. But then I found a "smart" power strip at my local

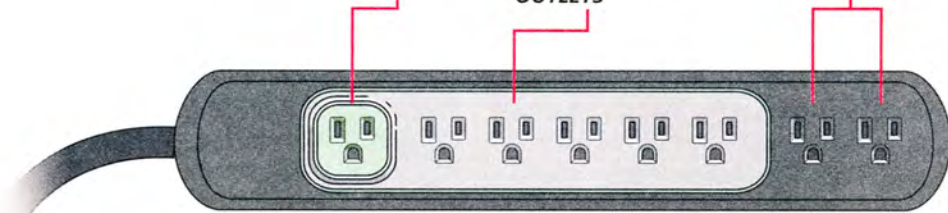
home center. It has master and master-controlled outlets that allow an electronic component and its accessories to be switched on and off together.

As it turns out, the same concept works in the

shop, too. All you have to do is plug a tool into the master outlet and the vacuum into the master-controlled outlet to create a tool-actuated vacuum.

Mark Dobson
West Springfield, Pennsylvania

MASTER OUTLET MASTER-CONTROLLED OUTLETS STANDARD OUTLETS



WIN THIS PORTER-CABLE COMBO ROUTER

Simply send us your favorite shop tips. If your tip or technique is selected as the featured reader's tip, you'll win a *Porter-Cable* combo router kit just like the one shown here. To submit your tip or technique, just go online to Woodsmith.com and click on the link, "SUBMIT A TIP." You can submit your tip and upload your photos for consideration.



The Winner!

Congratulations to Gerald Welf, the winner of this Porter-Cable router. To find out how you can win this router kit, check out the information on the left.

Quick Tips

BAND SAW BLADE CUFFS

To organize coiled band saw blades, *Bill Huber* of Haslet, Texas, secures them with inexpensive *Cable Cuffs* (available at home centers) and adds a label to each one.



GLUE SPREADER

Silicone spatulas are cheap, and they make great glue spreaders. *John Cusimano* of Lansdale, Pennsylvania, keeps a few different sizes of them around the shop to handle a variety of gluing tasks.



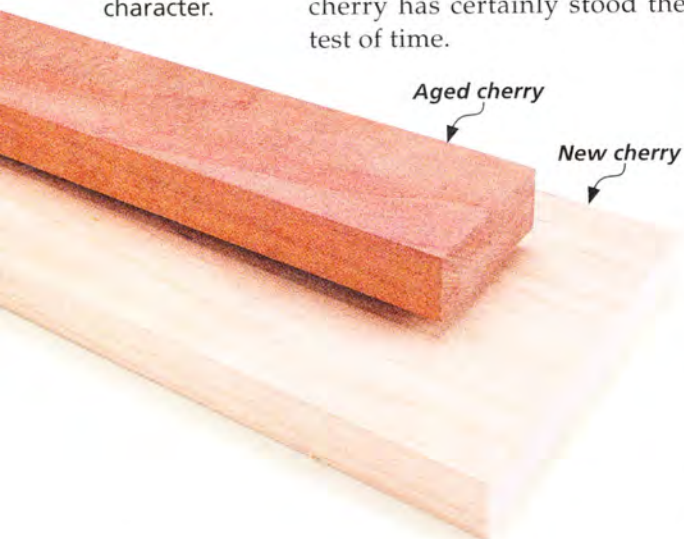
working with Cherry

Few American hardwoods have the natural beauty and great workability of black cherry.



The cherry tree is deeply ingrained in American history, from the old story about George Washington to the fine furniture pieces that have been crafted from its wood for many centuries. And though the tale about our first president chopping down his father's cherry tree may be a myth, the quality of furniture constructed from cherry has certainly stood the test of time.

▼ Cherry darkens with age to give furniture more character.



CHERRY OVERVIEW. The lumber that we commonly call “cherry” today is actually from the black cherry tree, or *Prunus serotina*. Though the small, bitter cherries that grow on the tree are edible, they’re not the cherries that we usually pick up at the grocery store.

Black cherry trees reach 60 to 80 feet tall when fully mature and are around two to three feet in diameter. They grow throughout North America, from Nova Scotia all the way down to Mexico and Guatemala.

WORKING WITH CHERRY. Inside the tree is a finely grained wood with tight, closed pores that make it easy to work with. On the hardness scale, cherry measures somewhat harder than Douglas fir but softer than oak. This puts it in a woodworking “sweet spot” that cuts pretty nicely whether you’re using power or hand tools. The fine



▲ Boards with both heartwood and sapwood usually have a greater color variation.

pores mean it holds details very well when trimming with chisels and planes or when carving it by hand. And it’s less prone to tearout. Though it machines superbly with power tools, it does have a tendency to burn. But this can be avoided by keeping your bits and blades clean and sharp.

APPEARANCE. Cherry lumber is often known for its attractive heartwood, which ranges in

color from reddish pink to a dark reddish brown. But at the lumberyard, you'll probably notice that some cherry boards feature a mixture of heartwood and sapwood, which tends to be lighter or more yellow than the heartwood (see the middle photos on the opposite page).

Although sapwood is not considered a defect, it's generally seen as less desirable than heartwood when you're looking for lumber with consistent color and grain for a furniture project. Still, there are some woodworking projects where the interesting color variations can be an asset.

UNIQUE FEATURES. One unusual aspect about cherry that's



▲ Curly cherry is available, but it is uncommon and generally a more expensive wood.

worth noting is that the wood tends to darken dramatically over time. As the months go by, the heartwood will change from its light red color to a deep reddish brown (far left photo, opposite page).

This will occur both on bare wood or on finished furniture, especially when the wood is subjected to direct sunlight. For many woodworkers, this is a desirable feature of cherry, as it adds depth and character to the furniture as it ages. In fact, many try to imitate this appearance by applying a stain to darken the wood. (You'll find more information about staining cherry in the box below.)

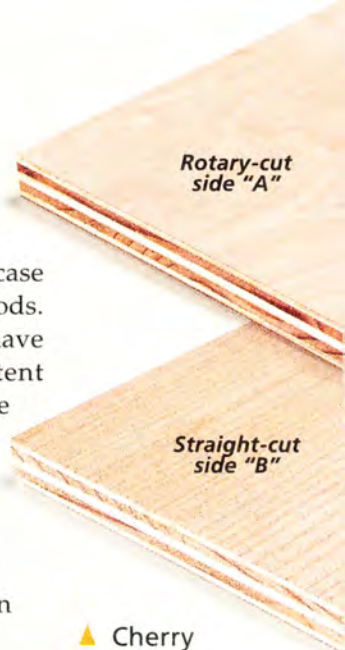
VARIATIONS. Like some other American hardwoods, such as maple and walnut, cherry can sometimes feature natural variations in the wood that make for some prized pieces of lumber. Some cherry boards, for example, have a striking "curly" figure that can add great beauty to a piece (photo at left). Curly cherry is fairly uncommon, however, so you can expect the price to jump considerably on these pieces. Crotches and burls

of cherry also exhibit beautiful figure and are often used as pieces of veneer.

You can also get cherry lumber that is riftsawn or quartersawn, as is also the case with oak and other hardwoods. These boards will tend to have a straighter, more consistent grain pattern than the more common flatsawn cherry boards. Though they often have nice figure, they don't have the characteristic "ray fleck" that you'll see in a quartersawn piece of oak.

CHERRY PLYWOOD. Cherry plywood is readily available with either a standard ply or MDF core. Most types of cherry plywood feature a rotary-cut "A" side with a continuous grain pattern, while the "B" side has straight-cut sections and sapwood. The photos on the upper right give you an idea of what the two sides often look like.

CONSIDER CHERRY. Cherry is certainly worth a look for your next project. You'll be hard-pressed to find wood that's nicer looking and easier to work with at a reasonable price. **W**



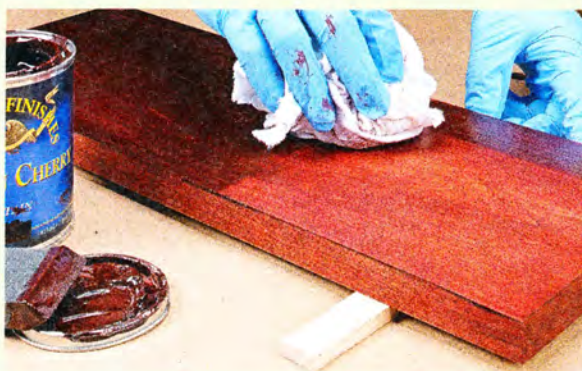
▲ Cherry plywood features a rotary-cut "A" side and a straight-cut "B" side.

How-To: Staining Cherry

Cherry furniture tends to darken quite beautifully over time, but if you don't want to wait, you can duplicate that look by applying a stain to darken the wood.

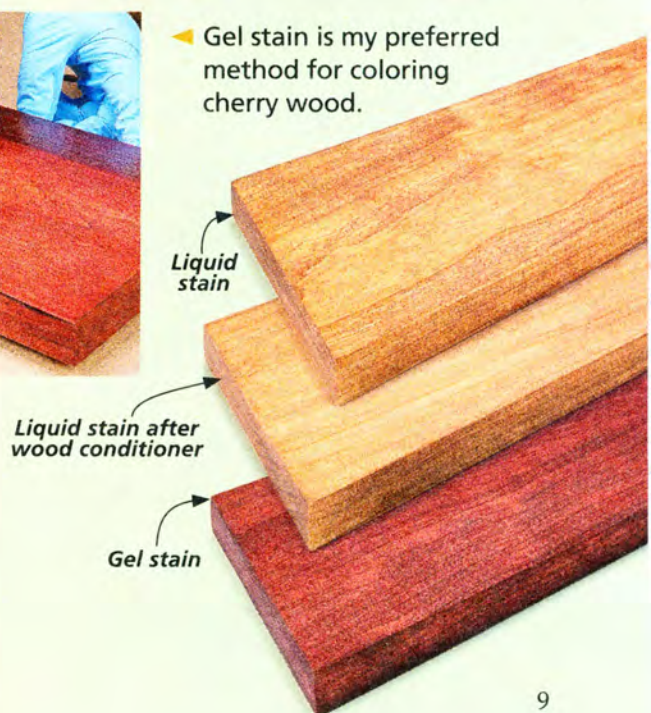
The only problem is, the tight, closed pores that make cherry such a joy to work with also make it somewhat difficult to stain. The wood tends to absorb the stain unevenly, leading to blotchiness, as you can see in the top board at right.

Luckily, there are two solutions to this problem. One is to apply a conditioner to the wood before applying the stain. The conditioner makes the stain absorb more evenly.



But my favorite method is to use a gel stain on cherry. Gel stain does not penetrate as deeply as liquid stain, so it tends to produce a more consistent color on the wood surface without any blotchiness.

▶ Gel stain is my preferred method for coloring cherry wood.





the versatile

Handscrew

This traditional woodworking clamp still has a lot of uses in the modern shop. And it can handle many tasks that other clamps can't.

▼ The square jaws on a handscrew make a perfect stop block.

As far as woodworking tools go, you can't get much more traditional than a handscrew. These clamps have been in shops for centuries, but they have often

fallen out of regular use in favor of more modern clamps.

STILL USEFUL. If you think this makes the handscrew a relic of the past, though, I would beg to differ. I still use mine frequently. And they can perform a number of woodworking tasks that other clamps simply can't do. Here are just a few of my favorite examples.

INSTANT VISE. Unlike a lot of clamps that have a single point of contact on each jaw, a handscrew's jaws are quite wide. This makes them perfect for pulling off the trick shown above: Using two handscrews to set up a vise anywhere on a worksurface. This is useful for anything from carving to drilling holes in the end of a post.



▲ Skewing the jaws gives direct clamping pressure on workpieces with beveled faces.

All you have to do is clamp the piece in the handscrew, and use a second handscrew to clamp the first one to the worksurface.



ONE-PIECE STOP BLOCK. I can think of many instances when I've cut a wood block from scrap and then clamped it to a fence for use as a stop block. But with the wide, square jaws of a handscrew, you get both the clamp and the stop block in one handy unit. This is perfect for drilling repetitive holes at the drill press or cutting parts to identical size at the table saw, as you can see in the lower left photo on the opposite page.

ADJUSTABILITY. Both bar and pipe clamps are great if the pieces you're clamping together have square faces. But what do you do if the faces of the pieces aren't parallel with one another? Only the handscrew lets you skew the jaws to account for these situations. So if you ever need to clamp tapered or beveled pieces, handscrews deliver

direct clamping pressure easily (see the frame in the lower right photo on the opposite page).

SMALL PART HOLDER. I've covered several of the unique features of the jaws of a handscrew, but another one that's easy to see is that they're made from wood. This makes them soft enough to prevent marring your work, but it also serves another advantage: They won't do any major damage if you get them too close to a spinning bit or blade. For this reason, I like to use a handscrew for holding small parts while machining them. Routing an ogee profile on the edge of a small molding piece, as shown at right, is just one of many examples that comes to mind.

CABINET ASSEMBLY HELPER. I still use a lot of bar and pipe clamps for assembling cabinets, but I find that handscrews often come in handy in some unconventional ways. For example, there's nothing more frustrating than trying to hold case sides upright while bringing in the divider pieces for assembly. A handscrew can act as a broad "foot" to hold the side upright while you work on putting it together (like you see in the photo at left).

Wide cabinets are another good example.



▲ Handscrews are great for machining small parts, thanks to the wood jaws.

If the cabinet stretches beyond the reach of your bar clamps, you don't need to buy longer ones. Instead, clamp a couple of handscrews to the divider panels, and then use bar clamps to pull the dividers and case sides together, as shown in the lower left photo.

ALIGNMENT TOOL. The wide jaws of a handscrew are also great for aligning pieces from top to bottom. When I'm attaching edging to plywood shelves, for example, I use handscrews to align the edging, and then use pipe clamps to draw the edging tight to the panel for glueup (below right).

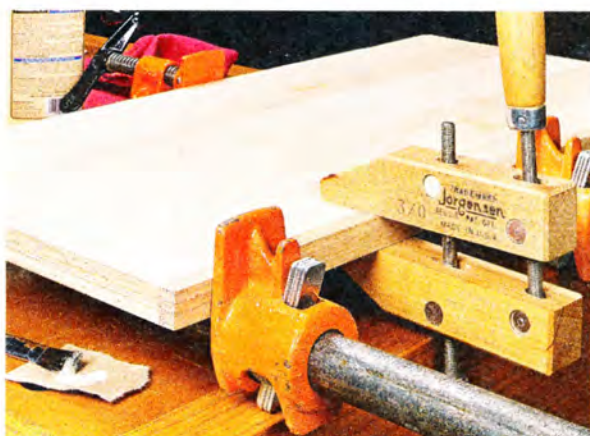
AND SO MUCH MORE. Of course, these are just a handful of the many vital tasks that handscrew clamps can handle around your shop. So if you have some handscrews, it's time to dust them off and put them back to work. You'll be amazed at all the ways these age-old shop tools will help out in your modern shop. **W**



▲ A handscrew provides support to hold cabinet sides upright while putting together a complicated assembly.



▲ For a wide assembly where your clamps don't have enough reach, attach handscrews to the dividers. Then clamp across the sides and the handscrews to draw the assembly together.



▲ Handscrews are adept at aligning solid-wood edging with a panel when gluing it to the edge of a plywood shelf.



compact

Router Tables

A small router table could be the perfect addition to your shop — even if you already have a router table. Here's a look at the options.

The router table is one of the tools I turn to most often in my shop. So often, in fact, that I recently decided to add a second one to my shop setup.

Now, this may seem excessive, but let me explain. Having a

second router table has cut down considerably on my setup time and allowed me to complete projects more quickly. Plus, with the advent of the compact router tables that are available now, I was able to bring a second router table

into my shop without burdening my bank account or taking up extra space in my shop.

COMPACT ROUTER TABLE ADVANTAGES.

If you're working in a small shop or just getting started in woodworking, the benefits of a compact router table are easy to see. Their small size means they won't occupy a lot of floor area. Instead, you just secure them to a worksurface when you need to rout, and then store them away when not in use.

However, I would argue that a compact router table is a nice shop addition for the seasoned woodworker, as well. In my shop, for example, I've set up my larger router table with a more

▼ Benchtop router tables are available with open or enclosed bases.



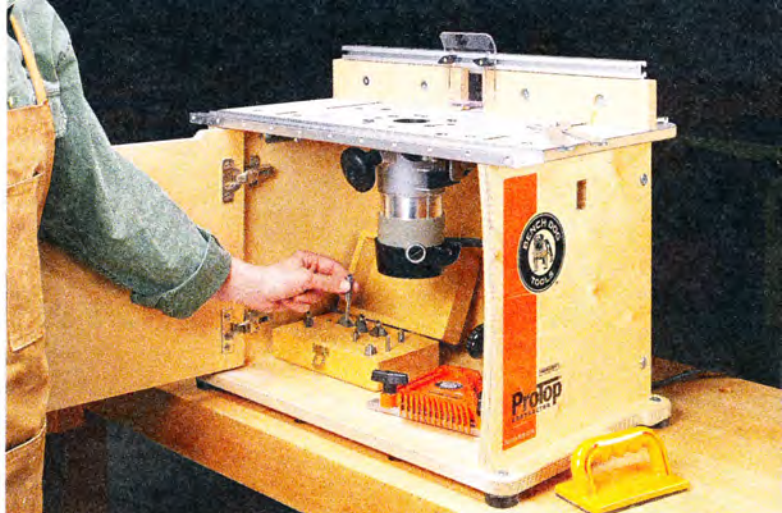
Kreg Benchtop Router Table



Bench Dog ProTop



▲ By adjusting the position of the added mounting rail, *Rockler's Trim Router Table* mounts easily to the side of a worksurface (opposite page) or in an end vise (above).



▲ A benchtop router table with an enclosed base, like this *Bench Dog ProTop*, provides plenty of storage for bits and other accessories. This makes it easier to transport.

powerful, variable-speed router for tasks like joinery or routing large dadoes. The compact router table, on the other hand, has become strictly a tool for profile tasks like roundovers, chamfers, and coves. Plus, when I need to work outside or at a friend's house, the compact router table can come right along with me.

ROUTER TABLE CHOICES. When it comes to choosing a compact router table for your shop, you have several options. Probably the least expensive and most basic of the bunch is the new *Trim Router Table* from *Rockler*. This setup gives you what you need and nothing more:

a tabletop, base plate for the router, and an adjustable fence. It's designed specifically to accept the smaller compact, or trim, routers that have become popular in recent years.

It doesn't seem like much, but I enjoyed the simplicity of working with the *Rockler* table. You add your own hardwood rail to the table, and then set it up for use by clamping it to a worksurface in one of a couple different ways (see the main photo on the opposite page and the left photo above). The *Rockler* table is quick and easy to set up, but it has all the features you need for the most common routing tasks.

ENCLOSED BENCHTOP TABLE. If you're looking for something a little fancier from your compact router table, *Bench Dog* makes a benchtop router table with an enclosed cabinet (above right). This model is a little pricier, but it offers you the option of putting most of your router gear right inside the table for easy storage and portability. To use the table, you simply set it on the benchtop and start routing. Enclosed benchtop tables are available from a few other manufacturers, as well.

OPEN BENCHTOP TABLE. Several manufacturers offer benchtop router tables with an "open" base for easy access to the router. These range quite a bit in quality, price, and features. The *Kreg* model shown at left is on the pricier side, but it has a number of nice features, including an easily adjustable fence, non-skid rubber feet, insert plate levelers, and reducer rings for using different diameters of router bits.

THE RIGHT TABLE FOR YOU. Whether you're in the market for your first router table or are looking to expand your shop's tool selection, you certainly have plenty of options when it comes to compact router tables. All these tables have their own unique advantages, but ultimately, the right choice for your shop will come down to your budget and finding the features that match the work you want to do. **W**



▲ One big advantage of the benchtop router tables is that they don't add another stationary tool "footprint" to an already crowded shop. Just stash them away below the workbench when not in use.

flawless

Plywood Edging

Blend hardwood edging seamlessly with your project's plywood parts by using a pair of router bits and this simple technique.

▼ Edge banding bits simplify cutting centered, seamless plywood edging.



Hiding the edges of plywood is a challenge that woodworkers have faced since the invention of the material. Simply put, plywood makes building large cabinets easy, but nobody wants to see those exposed plywood edges. So covering them up with a thin strip of hardwood is the typical solution.

The only problem is, getting that edging to align and blend seamlessly with the plywood can often be challenging. The edging has a frustrating tendency to slip around on the plywood as you apply clamps to it. And no matter how good you are at choosing hardwood that matches the plywood, the seam between the part and edging is often still visible.

EDGE-BANDING BITS. One way to achieve better results when

you're joining hardwood edging to plywood is to cut the mating parts with edge-banding router bits first (photos at left). These bits create mating profiles in the plywood and edging. The end result is an interlocking joint that's sure to align. Then, once the joint is assembled, you can cut the edging off flush with the plywood surface or rout a profile on the edging to make the joint line virtually disappear.

ABOUT THE BITS. The two pairs of router bits shown at left are manufactured by *MLCS* (refer to Sources on page 51). As you can see, one set of bits creates mating 90° profiles, and the other creates 60° profiles along with a matching tongue and groove. In working with the bits, I didn't find one style had an advantage over

the other, though the 90° bits are less expensive. Both sets work with plywood ranging from 1/2" to 1" in thickness.

STOCK PREPARATION. Before you get started at the router table, you'll need to prep the plywood and hardwood parts. The plywood can simply be cut to its final dimensions, but I like to leave the hardwood just a hair thick and wide for now. Having a wider piece makes it safer and easier to rout the edging, and you'll trim the edging to its final size after it gets attached to the hardwood.

USING THE BANDING BITS. With the parts prepped for the router table, the next order of business is to mark the centerline on the thickness of both the plywood and hardwood pieces. Then, since each bit has a centerpoint, you can adjust the bit height so that the centerpoint of the bit matches the centerline on the workpiece.

Two of these four bits have guide bushings, but I like to use the router table fence to set the depth of cut instead. This way, you can dial in the fence setting for the plywood-cutting bit so that it

cuts the V-groove without removing any extra material from your plywood. This isn't an issue for the bits that cut the edging.

At this stage, your first bit should be set up and ready to rout the plywood, as in Photo 1. Still, I'd recommend making some test cuts to dial in the bit height and fence setting perfectly. Then you're ready to rout the profile on the plywood parts.

When you switch to the bit that cuts the edging, I suggest following the same steps to set up the bit and make some test cuts. This way, you can test the fit of the edging in a plywood part and fine-tune the cut before cutting the actual hardwood edging (Photo 2).

ASSEMBLY. With proper setup and cutting, the profiles in the hardwood and plywood should fit together like a hand in a glove. So now you're ready to glue and clamp them together as shown in Photo 3. Since you left the edging a hair thicker than the plywood, you can now sand or trim it flush to match the plywood.

TRIM THE EDGING. Once the glue dries, the last step in completing your parts is to rip them to final width. And thanks to the joint created by the router bits, you have the option of trimming right up to the edge of the plywood and creating an invisible joint if desired (Photo 4).

Of course, you can also add a decorative profile to the edging to blend it seamlessly with the plywood. Some options are shown in the margin photos at right. You'll just want to make sure to account for the extra width that this will add when you're planning the size of the parts for your project.

These edge-banding bits have found a permanent home in my router bit collection, and once you give them a try, I think you'll feel the same. After you get accustomed to setting up and using them, they'll add a seamless, professional touch to your plywood projects. **W**

How-To: Edge Banding



▲ **Rout the Profiles.** Establish the bit height and fence setting by making a few test cuts. Then you're ready to rout the mating profiles in the plywood shelf and the wide hardwood blank.



▲ **Glue & Clamp.** Once the profiles are cut, apply glue and then assemble the mating parts with clamps. If needed, you can sand or trim the hardwood flush with the plywood surface afterward.



▲ **Rip to Width.** When the glue dries, you can trim the shelves to final width on the table saw. Trim the edging flush with the plywood or leave it a little wider if desired.



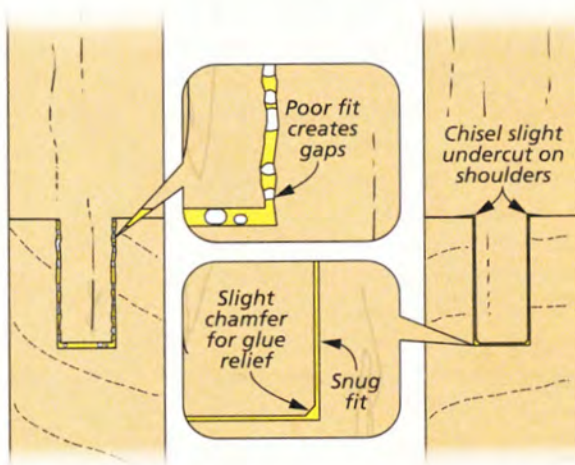
▲ These bits allow you to cut the edging flush (top) or leave it wide and add a profile (bottom).



perfecting a

Mortise & Tenon Joint

Cutting joinery with power tools works great. But fine-tuning the fit with a chisel and a hand plane kicks your craftsmanship up to the next level.



▲ The joint on the left has poorly mated surfaces, resulting in a weak bond. On the right, flat glue surfaces create a stronger bond.

Learning to make solid mortise and tenon joinery is a fundamental woodworking skill. And with the power tools in most woodworking shops, it's not a difficult joint to make. You just drill out most of the waste for a mortise and cut a matching tenon on the table saw using either a dado blade or a tenon jig. After that, it's just a matter of cleaning up the sides of the mortise with a sharp chisel.

Before going any further, it's worth taking a closer look at the joint. As you can see in the drawing at left, a mortise with uneven walls combined with a tenon that still has saw marks makes for a

joint that has two unmatched components and a lot of surface that never comes in contact.

No matter how strong your glue is, it can't save a joint like this. The second drawing shows a tight-fitting mortise and tenon joint. The smooth walls of the mortise and the flattened face of the tenon provide plenty of surface contact for the glue to do its job. So, the question is, how can you turn the rough-sawn tenons and drilled-out mortises into a tight-fitting joint.

The answer is in learning how to use a couple of hand tools effectively. The first tool is the simple

chisel, or in this case, a couple of chisels. With a chisel, you can pare away the ridges left by the overlapping drilled holes and make a smooth surface. The second tool you'll need is a shoulder plane like the one in the main photo on the facing page.

MORTISES

The first step to getting smooth walls is to pare away the ridges left by drilling out the waste. Keeping the chisel straight as you do this can be a challenge. By clamping a shop-made guide next to the mortise and clamping the workpiece to a bench, you can use the guide to keep the chisel vertical (photo at right).

TECHNIQUES. I usually make the first few chisel cuts with the aid of a mallet. This is the quickest way to remove waste. After getting rid of the biggest parts, paring cuts will finish up the mortise.

You'll need to find a position that allows you to use your weight to your advantage. For most of us, this means leaning

over the workpiece a little bit so your paring cuts are forceful enough to shave away the waste. That's the important task for now, just getting things smooth on the sides of the mortise.

When you have achieved that, make a final stroke down the side. One stroke guarantees that there aren't any steps, or notches in the mortise. Use the same technique (with a narrower chisel) on the ends of the mortises.

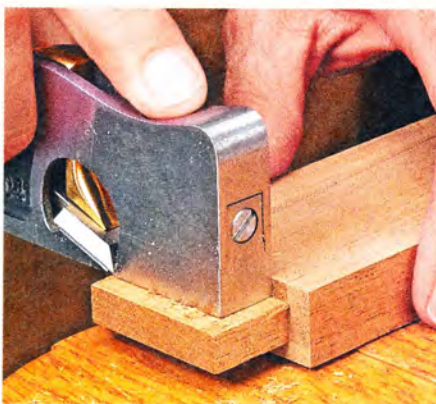
TENONS

The same problems arise after cutting tenons, especially if you use a dado blade to make the cuts. You can see the ridges on the surface of the cheeks that prevent a good glue bond. Fortunately, the solution is pretty simple.

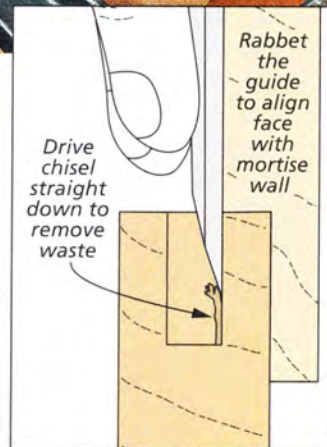
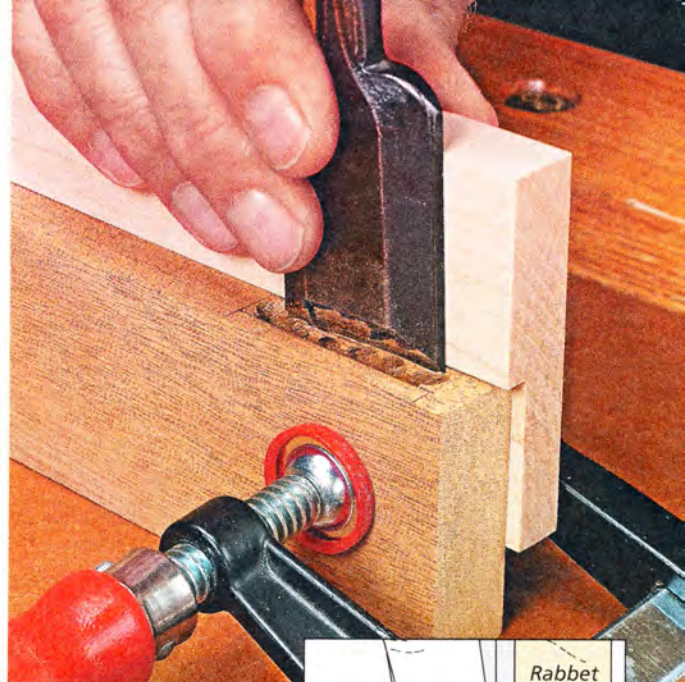
SHOULDER PLANE. To say that a shoulder plane was made for the task of refining joinery is an understatement. The name actually comes from its role in trimming the shoulders of the tenon. One thing that distinguishes a shoulder plane from most others

is that the blade is just a hair wider than the plane body. This allows you to cut right up to the corner of a joint.

On many shoulder planes, the mouth is also adjustable. This lets you size the opening to suit the task at hand. Open it up a bit for rough work, or bring it close to the blade for fine work. The top photo at left shows how you can use the shoulder plane



▲ A shoulder plane makes quick work of removing saw marks on cheeks and stepped shoulders.



▲ A simple guide block helps you keep the paring cuts square.

to smooth the cheeks. The bottom photo shows the plane in use cleaning up a stepped shoulder, which is a small rise from being slightly off the mark at the table saw.

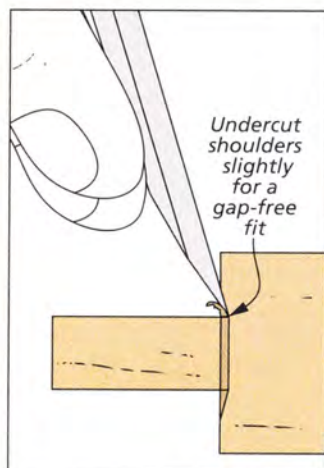
TECHNIQUES. For both tasks, the first step is to secure the workpiece in a vise or clamp it to the bench. With the workpiece secured, there are a just few things to keep in mind.

First, set the blade for a shallow cut. You want to take off very thin, wispy shavings as you go. Practice on a test piece using the same stock as your project.

The second thing to watch out for is tearing out the edges of the workpiece as you finish the cut. If the wood fibers are unsupported, you'll need to plane just over halfway, then complete the cut from the opposite edge.

UNDERCUTTING. Another trick for getting a tight joint line is to slightly undercut the shoulders. The idea is to remove a tiny bit of material that could prevent the joint from closing when it's glued up (drawing at left).

With these hand tools and the right techniques for using them, you're well on your way to producing first-class mortise and tenon joints every time. **W**





mahogany Coffee Table

With solid-wood parts, a beveled glass top, and unique gridwork, this is one table you'll be proud to showcase in your home.

Building a coffee table is high on the project list for many woodworkers. So the goal of this latest offering is to provide something truly different: A table that's sure to stand out from any store-bought coffee table.

I think you'll agree that this project fills the bill. For starters, it's built entirely of solid mahogany.

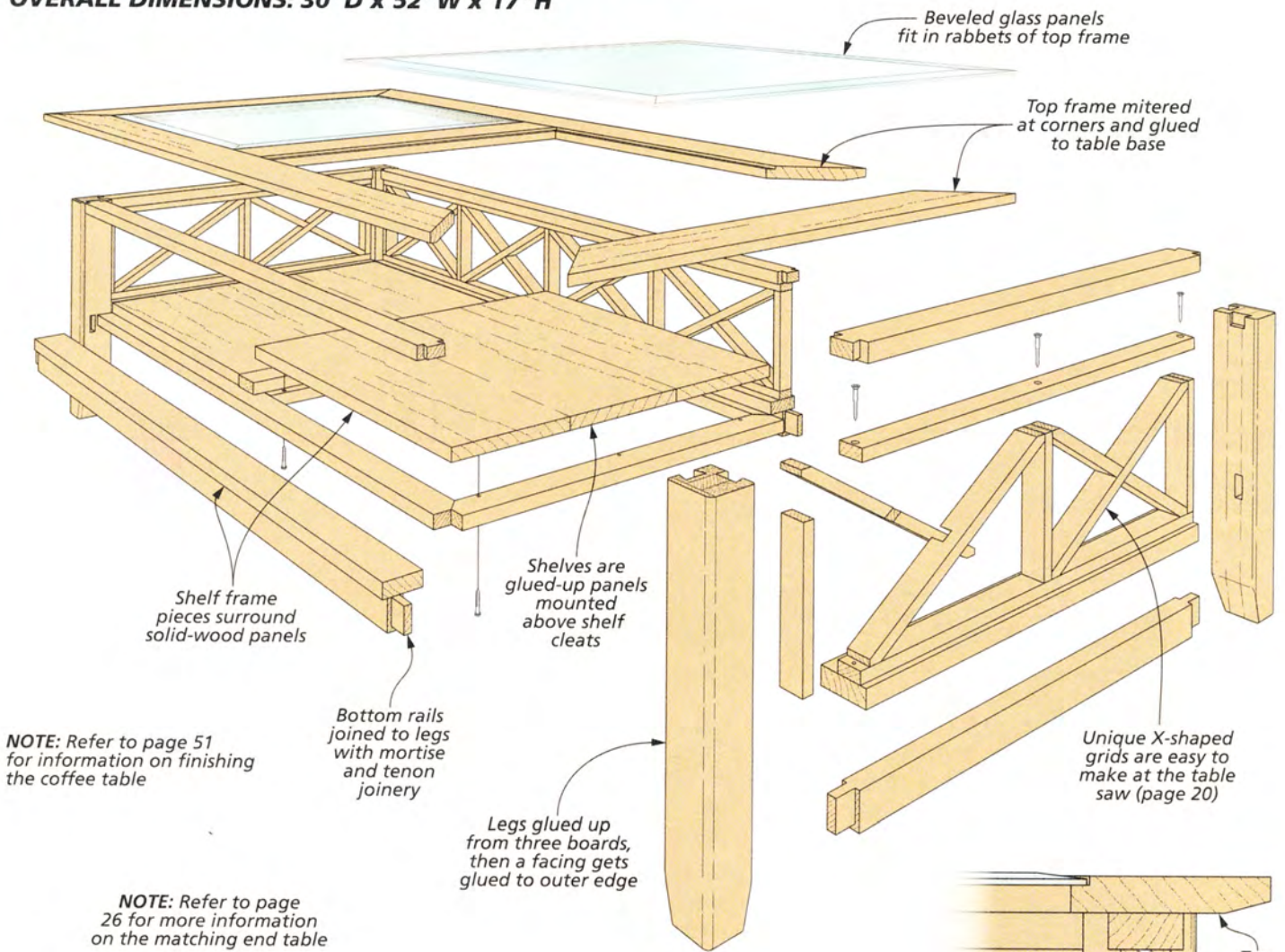
You won't find any plywood here. And the beveled glass panels also add an elegant touch to the top.

The real treat on this table, though, and the one that's the most fun to make, is the X-shaped gridwork that adorns the sides and back. I used a unique table saw technique to make each grid fit perfectly.

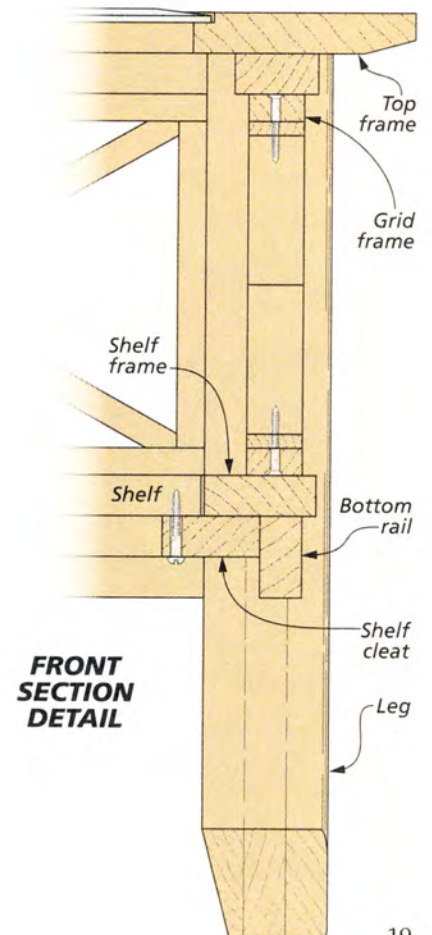
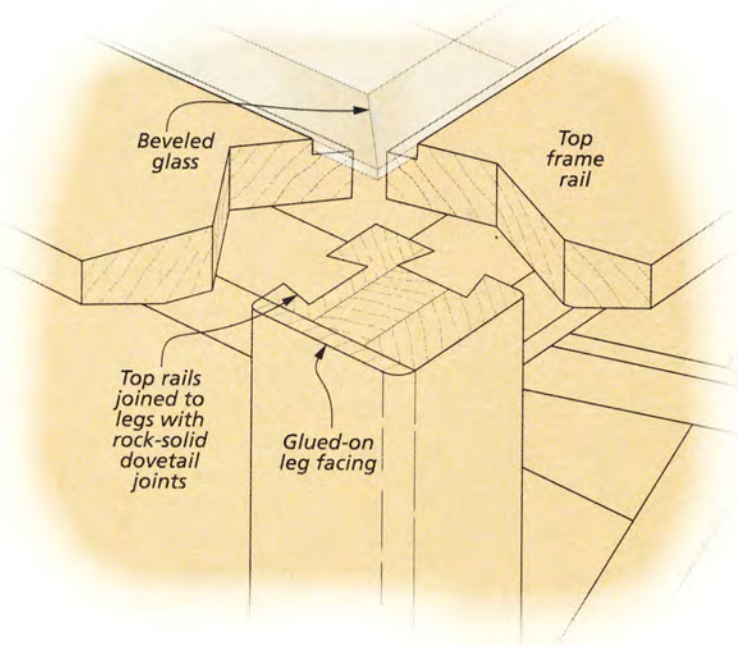
The rest of this project also offers a number of other interesting woodworking challenges. Whether you want to try your hand at mortises, tenons, dovetails, miters, or gluing up panels, you'll find all that and more in this great-looking table. Also, be sure to check out the matching end table shown on page 26.

CONSTRUCTION DETAILS

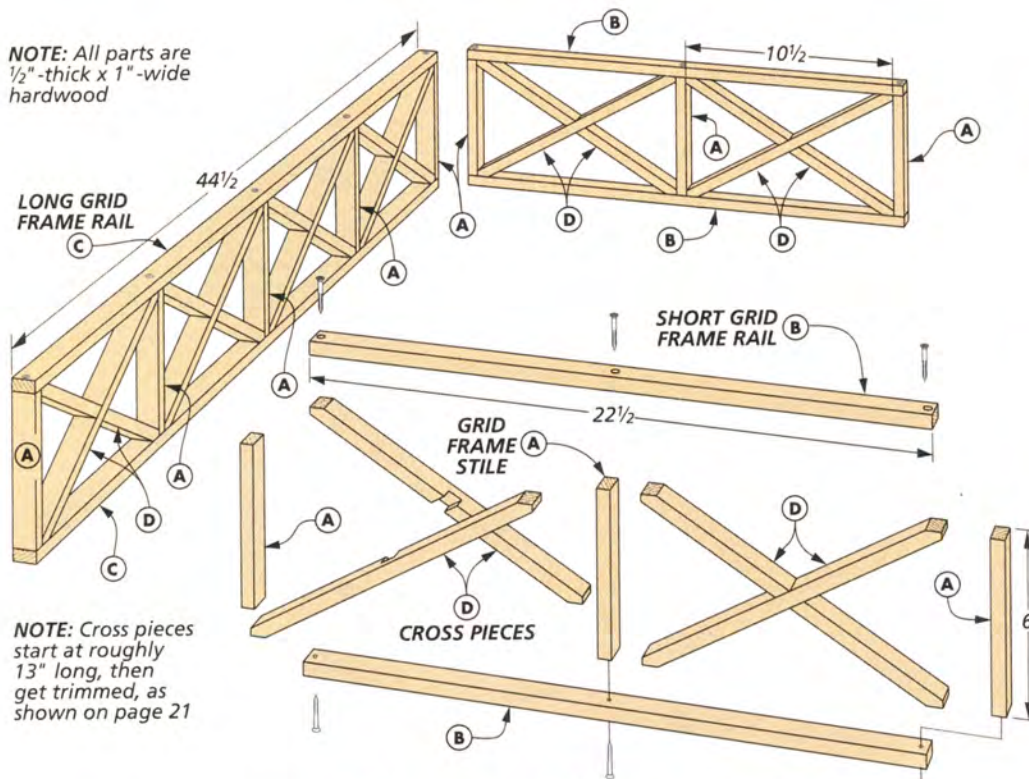
OVERALL DIMENSIONS: 30"D x 52"W x 17"H



DOVETAIL JOINERY DETAIL



NOTE: All parts are 1/2"-thick x 1"-wide hardwood



NOTE: Cross pieces start at roughly 13" long, then get trimmed, as shown on page 21

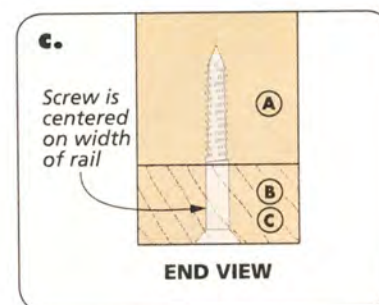
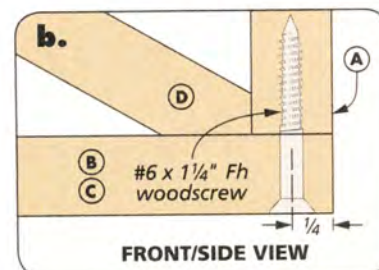
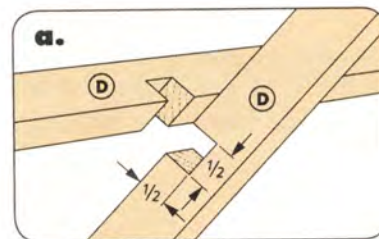
creating the **GRID FRAMES**

Most tables would begin with the assembly of the base. But in this instance, the construction of the grid frames is so pivotal to the rest of the project that I felt it was the best place to start.

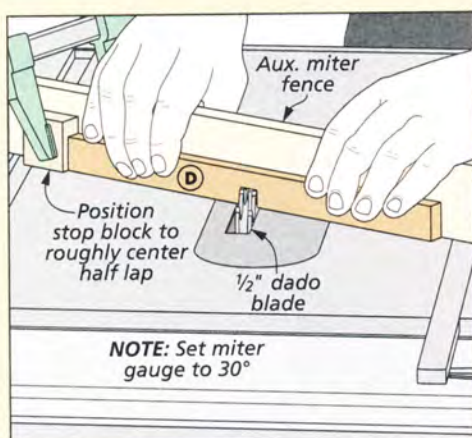
Now don't get me wrong. Making these grid frames may be different, but it isn't difficult. As you'll see here, it's all accomplished at the table saw with a

few simple steps and some interesting techniques.

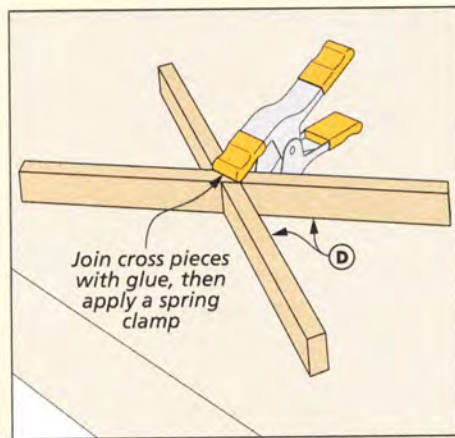
GRID FRAME OVERVIEW. The table features three grid frames in all: Two short ones on the ends and a long one at the back. Each is made up of two rails, a series of stiles, and pairs of cross pieces joined with half laps. These parts are all the same thickness and width, so you can get started by



How-To: Cut & Assemble Cross Pieces



Angled Half Laps. Angle the miter gauge and add an auxiliary fence with a stop block. Then cut a notch in each cross piece.



Cross Piece Assembly. Fit the cross pieces together with glue at the joint, and secure it with a spring clamp while it dries.

ripping a number of extra-long strips to size for the parts.

CROSS PIECES. Now you can set the frame pieces aside and get started on the cross pieces. Trim them all to rough length (around 13"). At this point, the process of joining these cross pieces together can begin.

The first step is to cut angled half laps in all of the strips. As shown in the box at left, this is fairly straightforward. The key is to use a long auxiliary fence on the miter gauge to back up the cut. A stop block ensures that the half lap is cut in the same place on each strip. But after that, it's just a simple matter of fitting the strips together with glue and clamps.

FINAL FITTING. With the cross pieces assembled, you need to trim them to width and length in order to fit inside the frames that you'll assemble later. This sounds difficult, but there's a way to simplify the process. The secret is to use a carrier board to hold each X-shaped assembly as you trim it to size. The steps for doing this are shown in the box on the following page, but I'll also offer

some additional insight to help walk you through the process.

You can get started by cutting the carrier to size out of MDF. It needs to match the exact size of the openings in the frame (6" x 10½").

Before you trim the cross pieces, the "X" should be centered on the carrier. To do this, draw centerlines across the carrier, as shown in Figure 1. Align the cross piece assembly with these lines, and glue in a pair of wedges (see Figure 2).

You're just about ready to cut the cross piece assemblies to width. But first, you need to attach a thin spacer strip to your table saw's rip fence. This positions the carrier away from the fence to create clearance for the overhanging cross pieces.

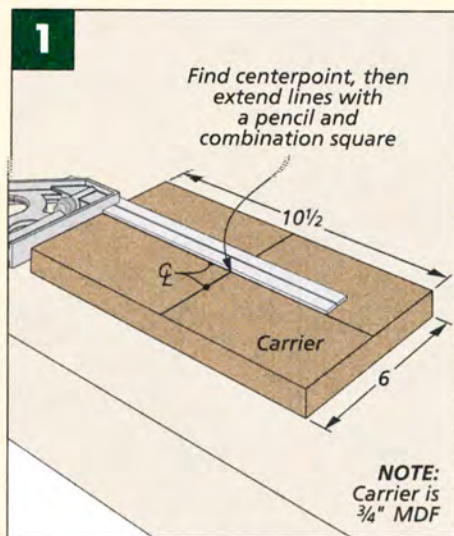
Next put the carrier in place, and adjust the fence so the carrier is riding right alongside the saw blade. Make a pass, as shown in Figure 3, and then rotate the carrier 180° and cut again (Figure 4). Repeat the process for all eight of the cross piece assemblies.

At this point, you just need to trim the cross pieces to final length. For these cuts, simply adjust the rip fence and pass the carrier through the blade as shown in Figure 5. Again, rotate the carrier end for end after the first cut to trim the opposite end, and repeat for each assembly.

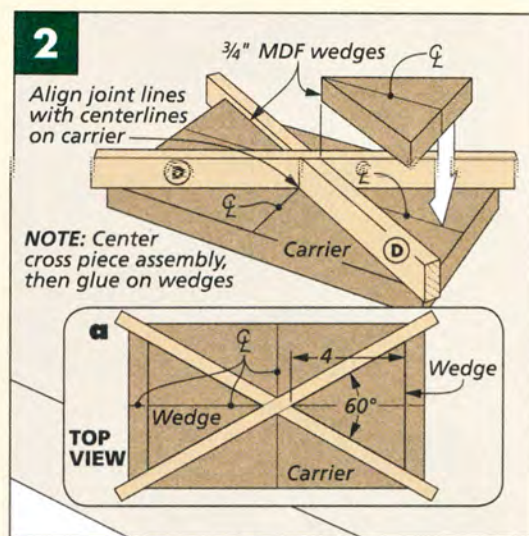
FRAME THE CROSS PIECES. Your cross piece assemblies are now ready to frame. So the next step is to cut all the frame rails and stiles to their final length, as shown in the main drawing on page 20. It's best to do a dry fitting of each frame at this stage to make sure it all fits together properly.

Once you're satisfied with the fit of the frames, it's time to bring in the glue and clamps for assembly, as shown in Figure 6. For an extra measure of strength, I drilled pilot holes and drove some woodscrews through the rails and into the stiles at each joint.

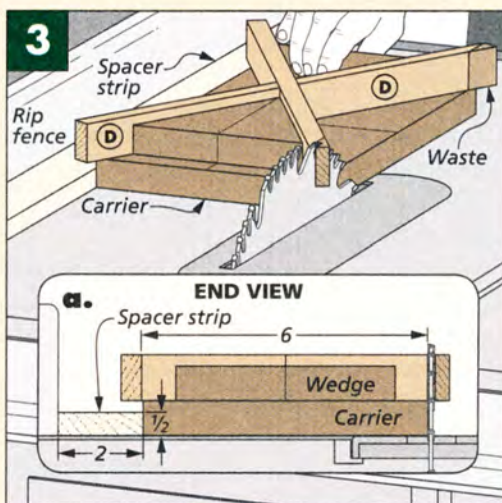
How-To: Complete the Grid Frames



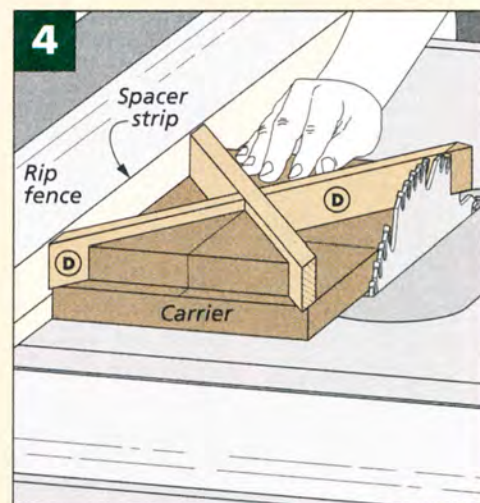
Mark Centerlines. Use a square to find the precise centerpoint on the carrier and extend the lines with a pencil.



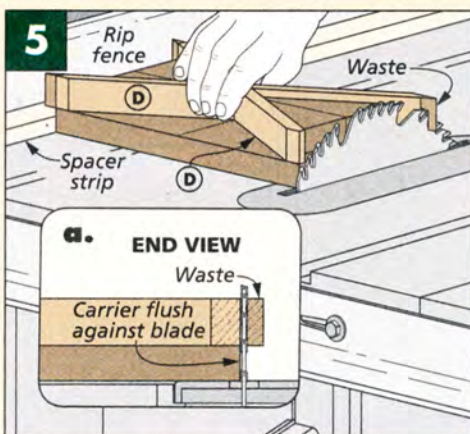
Add Wedges. Place an "X" at the centerpoint and then cut and glue in some wedge-shaped pieces to hold it in position.



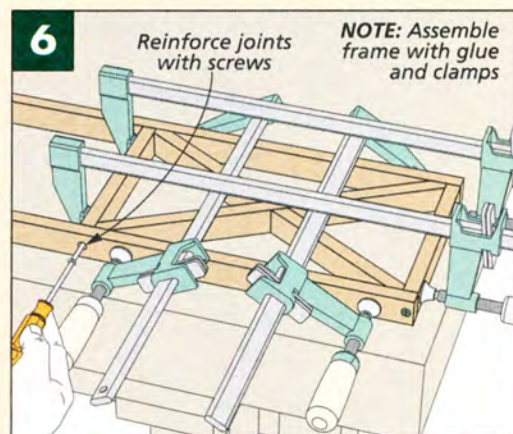
First Cut. Tape a spacer to the rip fence. Now set the fence to align the edge of the carrier with the saw blade.



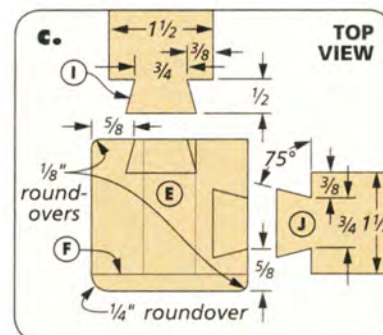
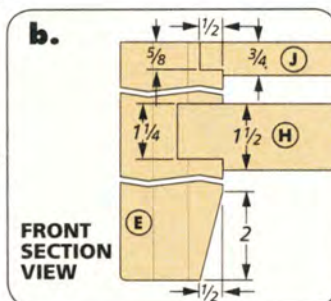
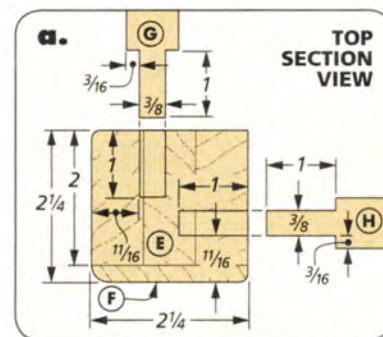
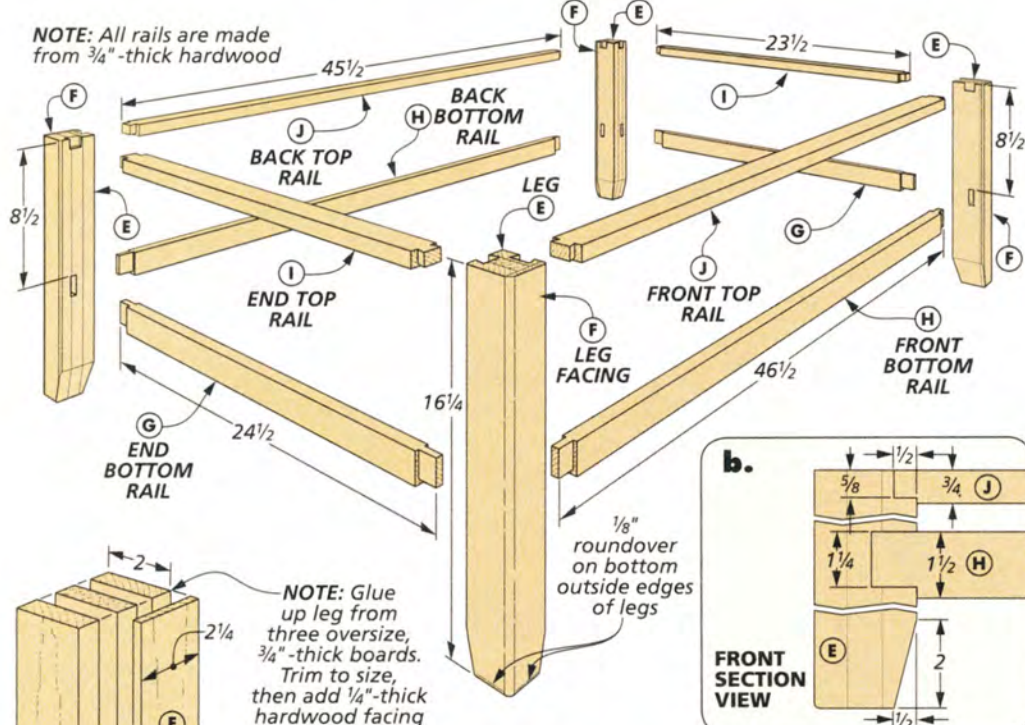
Second Cut. Now you can simply rotate the carrier end for end to make the second pass without changing the fence setting.



Trim to Length. To cut the assemblies to length, simply turn the carrier 90° and adjust the rip fence to trim the ends.



Assemble the Grid Frames. Assemble the grid rails, stiles, and cross pieces with glue and clamps. Reinforce the joints with woodscrews.



building the **BASE**

With the grid frames complete, it's time to set them aside and turn your attention to the table base that wraps around them. The table base consists of four thick legs, four bottom rails, and four top rails. The bottom rails connect to the legs with standard mortise and tenon joinery, while the top rails are joined with rock-solid dovetail joints.

LEGS. The legs are the first order of business. As you can see in the margin drawing on the left, each

one is glued up from three thinner pieces. Then, a facing is glued to the front and back edges of each leg in order to hide the joint lines from view.

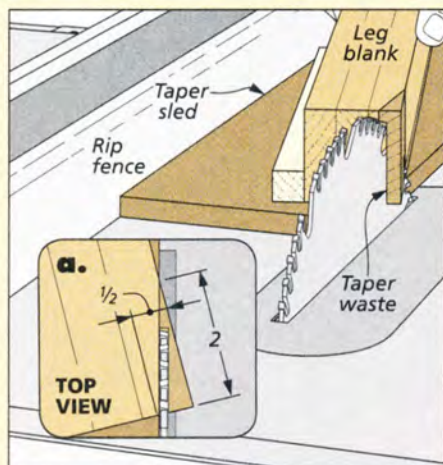
It's best to glue up each leg from slightly oversize pieces. This way, you can trim the legs to final size when the glue dries. After you sand them smooth, the facings get cut to size and glued on.

There are a number of other cuts to be made on each leg, so I like to start by labeling the leg

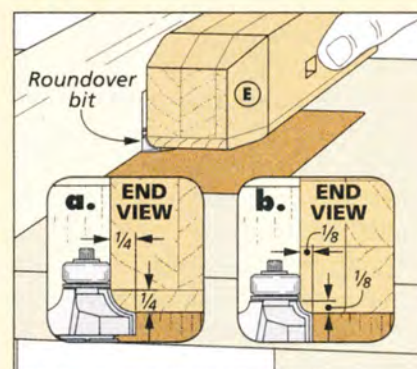
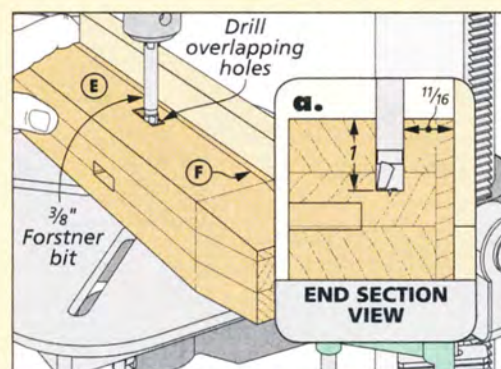
faces carefully. This way, you'll be able to keep all the cuts — and the faces that should be cut — organized as you progress with the construction of the legs.

The first cut is a small taper on the two inside faces of each leg (lower left drawing). To make this cut, I used a table saw taper sled. You can see how to build it in Shop Notebook on page 30.

Next up are the mortises to accept the bottom rails. These are located on the same leg faces as the tapers. Drill out the waste at the drill press, as shown in the middle drawing below, and then clean up the mortises with a chisel



How-To: Shape the Legs



Tapers. A basic table saw taper sled makes quick work of both leg tapers. You can see how it's built on page 30.

Mortises. Use a Forstner bit in the drill press to remove the waste from the mortises. Then clean them up with a chisel.

Rout Roundovers. Three corners of the legs, plus the bottom end, get shaped with roundover bits.

(see page 16 for more information on mortise and tenon joints).

The legs have a variety of different edge profiles. The outside corner has a $\frac{1}{4}$ " roundover, the two adjacent corners feature $\frac{1}{8}$ " roundovers, and the inside edge is left square. In addition, the bottom ends of the legs are also softened with a $\frac{1}{8}$ " roundover. These are easy to knock out at the router table, as shown in the lower right drawing on page 22.

BOTTOM RAILS. You're ready for the bottom rails, which can be sized as shown in the main drawing on the opposite page. Tenons cut on the ends of these rails fit the mortises in the legs, and they're easy to make as shown in Figures 1 and 2 at right.

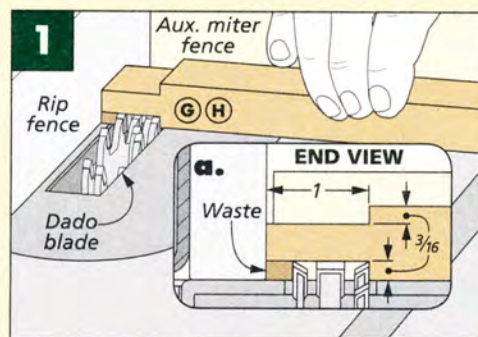
TOP RAILS. Now you're ready to get started on the dovetails on the ends of the top rails. Use the dado blade again to trim the shallow rabbet underneath the dovetail first (Figure 3). Then switch to a standard blade to establish the shoulders as in Figure 4. Finally, you'll need to stand the pieces on end and angle the blade to finish the tails (see Figure 5). You'll find more information on setting up this cut on page 30.

DOVETAIL SOCKETS. To lay out the sockets in the top ends of the legs, use the dovetails you just cut on the ends of the top rails, as shown in Figure 6. Now remove the waste with a Forstner bit and clean up the sockets with a chisel. Figures 7 and 8 show you how.

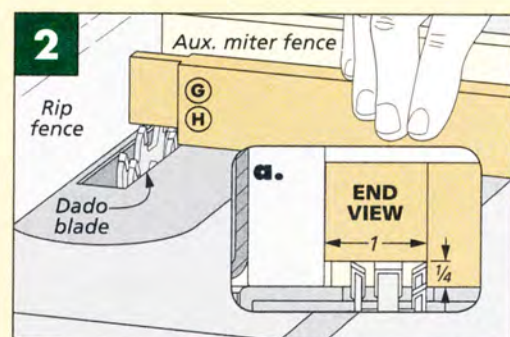
TABLE BASE ASSEMBLY. At this stage, the table base is ready to assemble. Starting at the ends of the table, join the top and bottom end rails to the legs with glue and clamps. Then bring in the front and back rails and draw the whole assembly together with long pipe clamps.

Before you add the grid frames to the assembly, there are still a few more parts that go on the base. I'll show you how to add those parts on page 24.

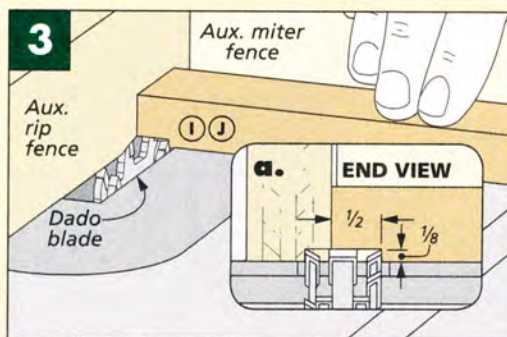
How-To: Cut Tenons & Dovetails



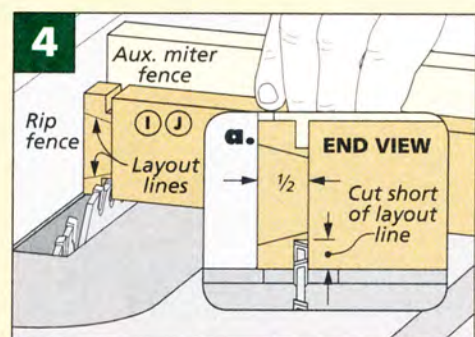
Tenon Shoulders. Using a dado blade, cut the tenon shoulders, then slide the stock away from the fence to remove the waste.



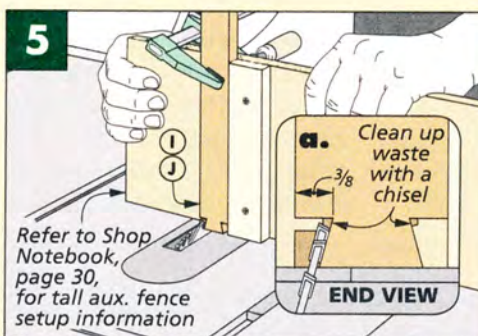
Complete Tenons. Now stand the workpiece on edge to trim away waste from the bottom edge to complete the tenon.



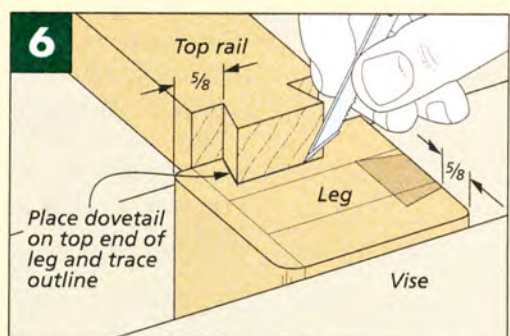
Rabbet. A shallow rabbet at the bottom of the dovetail is easy to cut using a dado blade in the table saw.



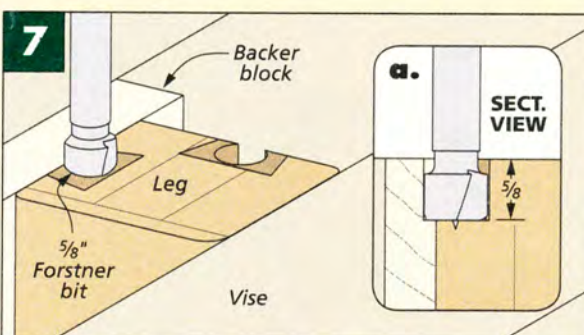
Shoulders. With the workpiece on its edge, you can use a standard saw blade to cut the shoulders of the dovetail.



Complete the Dovetail. Tilt the blade, stand the piece on end, and support it with a tall fence as you complete the dovetail.



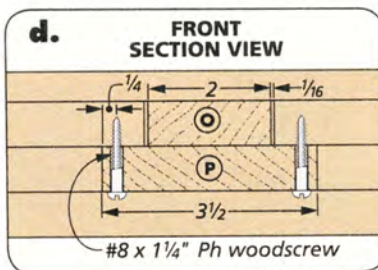
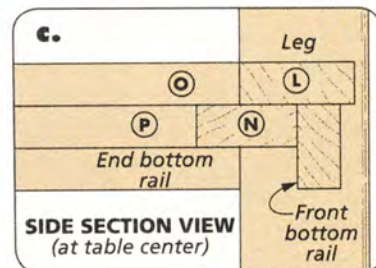
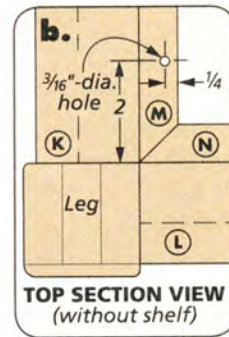
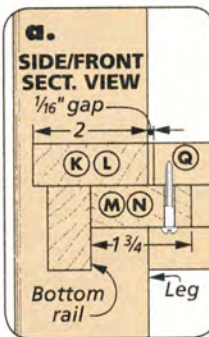
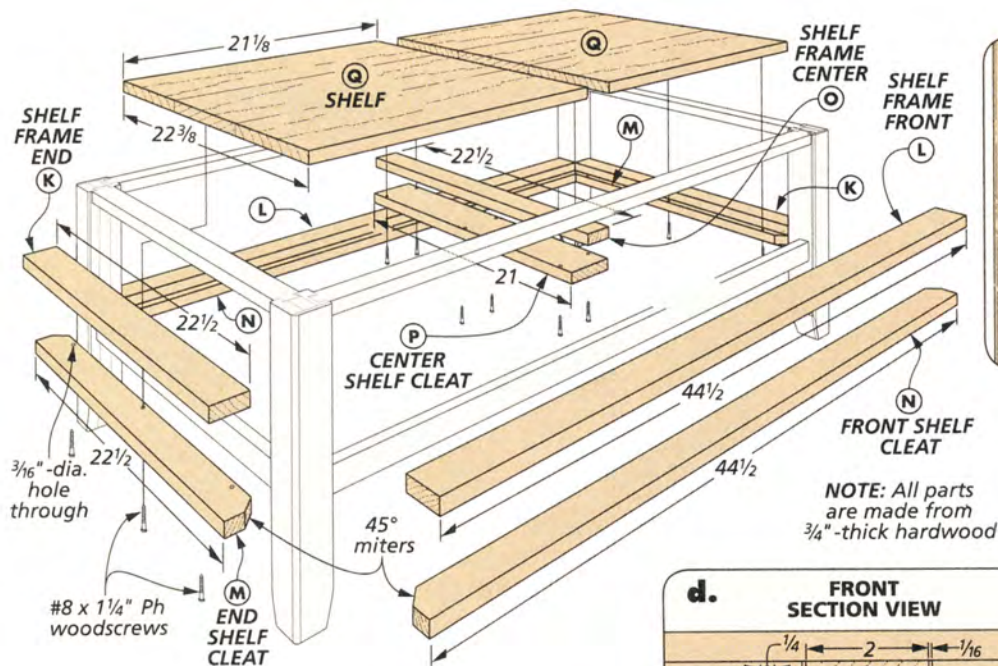
Lay Out the Socket. Set the dovetail on the leg and trace around it to establish the shape and size of the dovetail socket.



Drill Out the Waste. The bulk of the waste in the dovetail socket can be removed using a Forstner bit. Clamp the leg in a vise, and use a hand-held drill.



Complete the Key. All that's left is a little chisel work to clean up the socket and create a snug fit.



NOTE: All parts are made from 3/4" thick hardwood

completing the TABLE

There are just a few more components to add to the table. The next parts to go on are a series of shelf frame pieces and shelf cleats. These pieces support and surround the two shelves, which are glued-up, solid-wood panels. After that, the grid frames you built earlier can go in, and then you'll add the top.

SHELF FRAME. Adding these parts is not difficult. You begin by cutting the shelf frame front,

back, and ends to size. Align their front edges with the inside faces of the legs, and glue and clamp them to the bottom rails (lower left drawing).

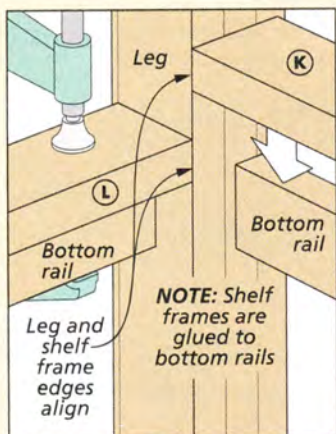
SHELF CLEATS. A set of shelf cleats butt against the bottom face of the shelf frame pieces and inside the bottom rails, as shown in detail 'a' above. So after cutting them to size and trimming the small miter at each corner, you'll want to glue and clamp these

four pieces into the assembly, as well (middle drawings, below).

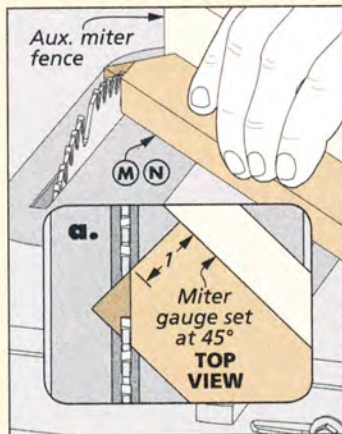
CENTER FRAME & CLEAT. An additional center frame piece and cleat goes into the center of the opening in the table base. You can see these parts in details 'c' and 'd.' The frame piece is narrower and longer, while the cleat is wider and shorter. The best approach here is to glue these parts to each other first, with the frame piece centered on the cleat. Then position them in the table base, and glue them on (lower right drawing).

SHELVES. The two shelves are the next order of business. Each one

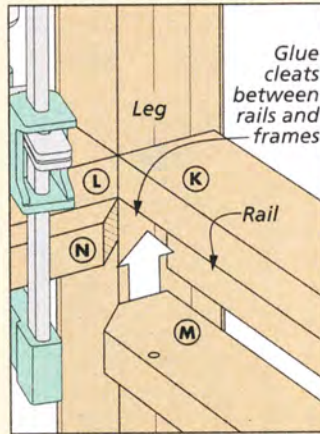
How-To: Install the Shelf Frame & Cleats



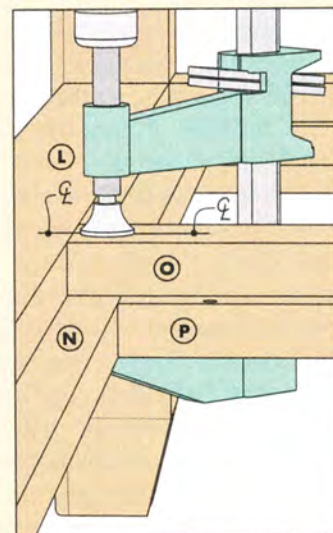
Frame Pieces. Clamp the frame piece in position on the table's bottom rails.



Miters. A table saw makes quick work of the miters on the ends of each shelf cleat.



Cleats. The cleats are glued in place against the frame and bottom rail pieces.



Center Frame & Cleat. Glue up the center frame and cleat, then add them to the frame.

is a panel glued up from three mahogany boards. Then they are trimmed to fit in the openings in the table base, with a $\frac{1}{16}$ " gap all around.

After fitting the shelves, secure them from underneath with woodscrews at the ends. This holds them in place while still allowing for wood movement.

GRIDS. Now you're finally ready to install the grid frames that you built earlier. Align them in the openings as shown in detail 'a' and secure them with brads.

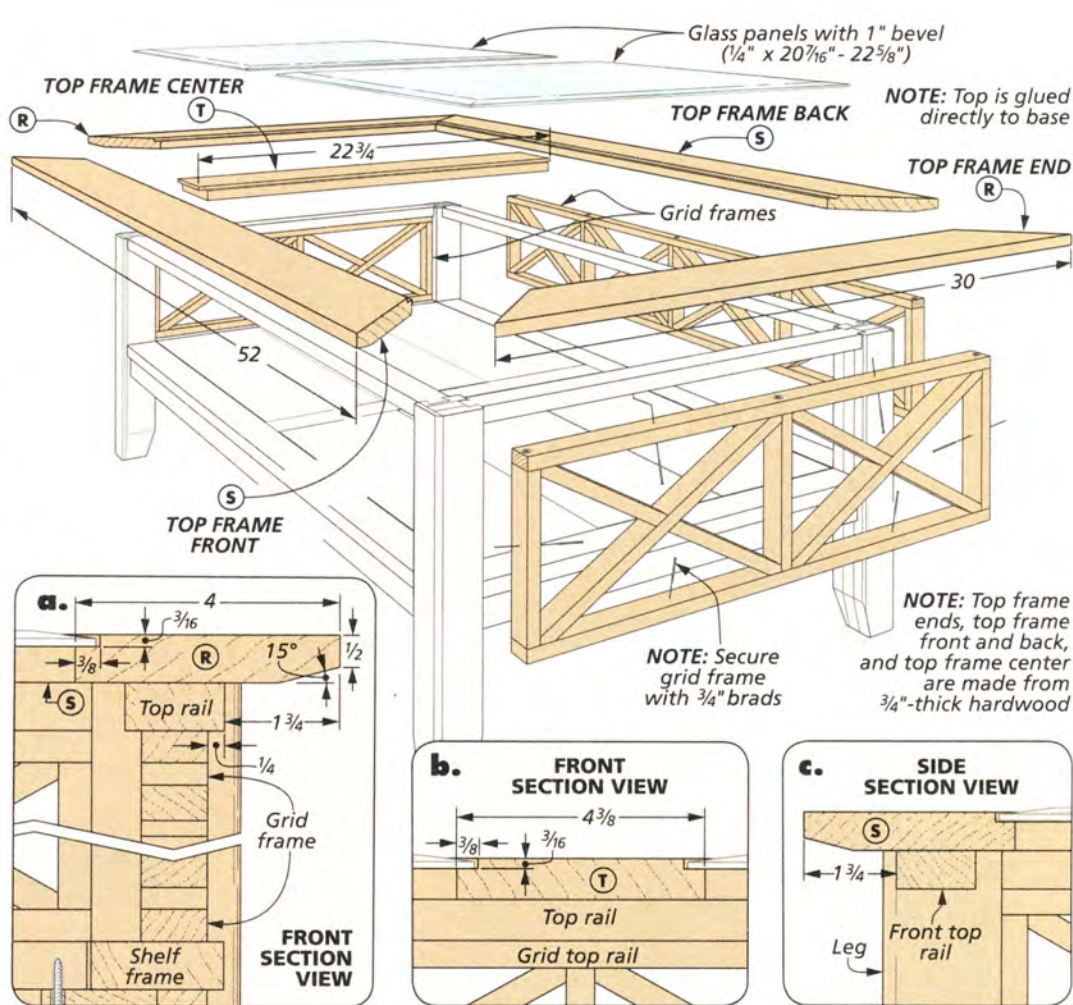
TOP. You're on the home stretch for this coffee table, and adding a top is the last big task. As shown in the main drawing at right, it's a wide mitered frame with a center stile. Beveled glass panels fit the openings in the frame.

After cutting all five parts to size, get started cutting the rabbets in the edges. Figure 1, below right, shows how this is done. Note that the center stile has a rabbet on each edge, as you can see in detail 'b.' Once that's done, adjust the blade height to cut the rabbets on the ends of the center stile. Figure 2 has the details on this cut.

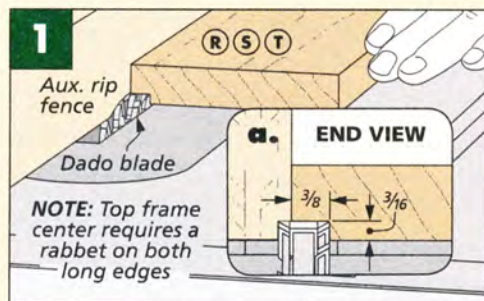
The frame parts have a slight bevel cut on the bottom face, as you can see in Figure 3 below. Then all that's left is to carefully miter the corners (Figure 4).

After checking the fit, pull the frame together with glue and band clamps. Make sure to add the center stile, as well, to help with alignment. Then glue the top directly to the table base, and order glass to fit the openings.

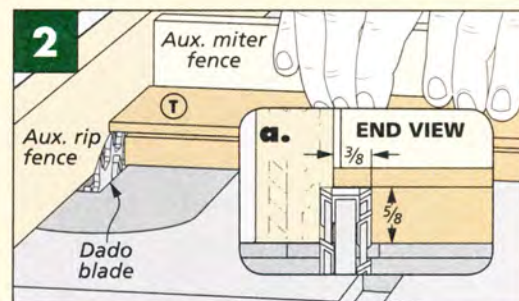
END TABLE. This elegant mahogany coffee table just needs a finish before going in place in your living room. Sources, on page 51, provide the details on applying the stain and finish. And if you enjoyed building it, you may want to consider making the matching end table. There's a sneak peek of the project on page 26. Full plans for the table are available in the "Online Extras" at Woodsmith.com. **W**



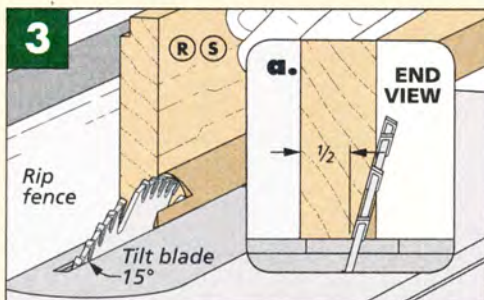
How-To: Top Frame



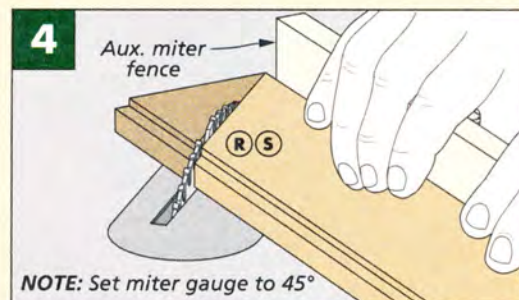
Edge Rabbets. Set up a dado blade and an auxiliary rip fence to rabbet the edges of each of the top frame pieces.



End Rabbets. The top frame center stile receives rabbets on the ends. These form tongues that fit in the frame assembly.



Bevels. To bevel the frame pieces, tilt the blade, and guide the workpieces on edge along the rip fence.



Miters. The final step before assembly is mitering the frame pieces. Use the miter gauge with an auxiliary fence for these cuts.

DESIGNER'S NOTEBOOK

Top panel is solid wood and joined to frame with tongue and groove

Square design features one shelf and one top panel

End table legs are longer than those on coffee table

END TABLE

If you like the look of the coffee table, then you may also be interested in building this matching end table. It shares a number of similarities in design and construction with the coffee table.

There are a few distinctions worth noting, however. One of the main differences is that the end table has longer legs than the coffee table. It is also square rather than rectangular, and it features just one shelf and top panel. Instead of glass, I used solid wood for the end table top and joined it to the frame with tongue and groove joinery.



For detailed plans of the matching end table, visit our website at Woodsmith.com

Materials, Supplies & Cutting Diagram

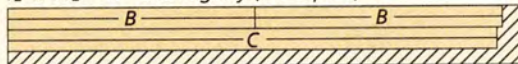
A	Grid Frame Stiles (11)	$\frac{1}{2}$ x 1 - 6
B	Short Grid Frame Rails (4)	$\frac{1}{2}$ x 1 - 22 $\frac{1}{2}$
C	Long Grid Frame Rails (2)	$\frac{1}{2}$ x 1 - 44 $\frac{1}{2}$
D	Grid Cross Pieces (16)	$\frac{1}{2}$ x 1 - 13 rgh.
E	Legs (4)	2 $\frac{1}{4}$ x 2 - 16 $\frac{1}{4}$
F	Leg Facings (4)	$\frac{1}{4}$ x 2 $\frac{1}{4}$ - 16 $\frac{1}{4}$
G	End Bottom Rails (2)	$\frac{3}{4}$ x 1 $\frac{1}{2}$ - 24 $\frac{1}{2}$
H	Front/Back Bottom Rails (2)	$\frac{3}{4}$ x 1 $\frac{1}{2}$ - 46 $\frac{1}{2}$
I	End Top Rails (2)	$\frac{3}{4}$ x 1 $\frac{1}{2}$ - 23 $\frac{1}{2}$
J	Front/Back Top Rails (2)	$\frac{3}{4}$ x 1 $\frac{1}{2}$ - 45 $\frac{1}{2}$
K	Shelf Frame Ends (2)	$\frac{3}{4}$ x 2 - 22 $\frac{1}{2}$
L	Shelf Frame Front/Back (2)	$\frac{3}{4}$ x 2 - 44 $\frac{1}{2}$
M	End Shelf Cleats (2)	$\frac{3}{4}$ x 1 $\frac{3}{4}$ - 22 $\frac{1}{2}$
N	Front/Back Shelf Cleats (2)	$\frac{3}{4}$ x 1 $\frac{3}{4}$ - 44 $\frac{1}{2}$
O	Shelf Frame Center (1)	$\frac{3}{4}$ x 2 - 22 $\frac{1}{2}$
P	Center Shelf Cleat (1)	$\frac{3}{4}$ x 3 $\frac{1}{2}$ - 21
Q	Shelves (2)	$\frac{3}{4}$ x 22 $\frac{3}{8}$ - 21 $\frac{1}{8}$
R	Top Frame Ends (2)	$\frac{3}{4}$ x 4 - 30
S	Top Frame Front/Back (2)	$\frac{3}{4}$ x 4 - 52
T	Top Frame Center (1)	$\frac{3}{4}$ x 4 $\frac{3}{8}$ - 22 $\frac{3}{4}$

- (22) #6 x 1 $\frac{1}{4}$ " Fh Woodscrews
- (12) #8 x 1 $\frac{1}{4}$ " Ph Woodscrews
- (22) $\frac{3}{4}$ " Brads
- (2) Glass Panels w/ 1" Bevel ($\frac{1}{4}$ " x 20 $\frac{7}{16}$ " - 22 $\frac{5}{8}$ ")

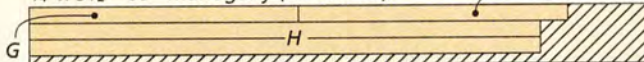
$\frac{1}{2}$ " x 5 $\frac{1}{2}$ " - 72" Mahogany (2.8 Sq. Ft.)



$\frac{1}{2}$ " x 5 $\frac{1}{2}$ " - 48" Mahogany (1.8 Sq. Ft.)



$\frac{3}{4}$ " x 5 $\frac{1}{2}$ " - 60" Mahogany (2.3 Bd. Ft.)



$\frac{3}{4}$ " x 5 $\frac{1}{2}$ " - 72" Mahogany (2 Boards @ 2.8 Bd. Ft. Each)

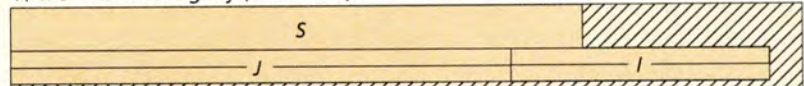


$\frac{3}{4}$ " x 5 $\frac{1}{2}$ " - 72" Mahogany (2.8 Bd. Ft.)

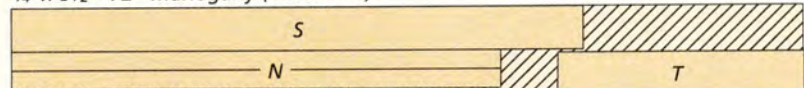
NOTE: Parts 'F' planed to $\frac{1}{4}$ " thick



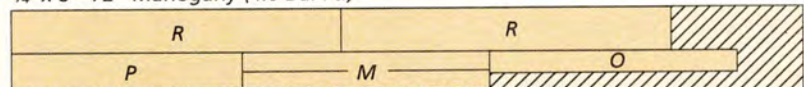
$\frac{3}{4}$ " x 8" - 72" Mahogany (4.0 Bd. Ft.)



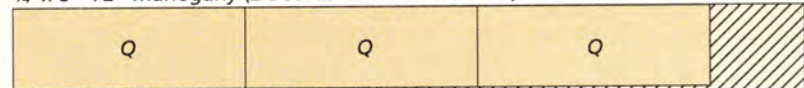
$\frac{3}{4}$ " x 8 $\frac{1}{2}$ " - 72" Mahogany (4.3 Bd. Ft.)



$\frac{3}{4}$ " x 8" - 72" Mahogany (4.0 Bd. Ft.)



$\frac{3}{4}$ " x 8" - 72" Mahogany (2 Boards @ 4.0 Bd. Ft. Each)



bedroom Mirror

A few pieces of wood and a weekend are all it takes to build this heirloom mirror.



Over the past several issues of *Woodsmith*, we've been building a collection of bedroom furniture (inset photo at right). The mirror shown here represents the final piece of the suite. Not only does it match the dresser, bed, and nightstand in appearance, it also shares some of the same construction details. But unlike the other pieces, this is a project that you can easily complete in a weekend.

START WITH A FRAME. Building the mirror starts with making a basic frame. To keep it simple, I used pocket hole screws. This gives

you a strong frame without having to invest a lot of time making mortise and tenon joints.

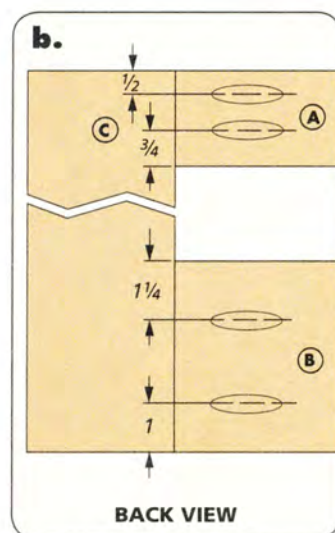
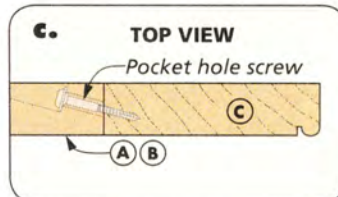
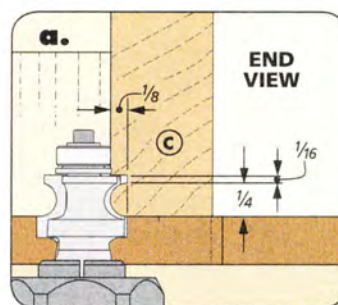
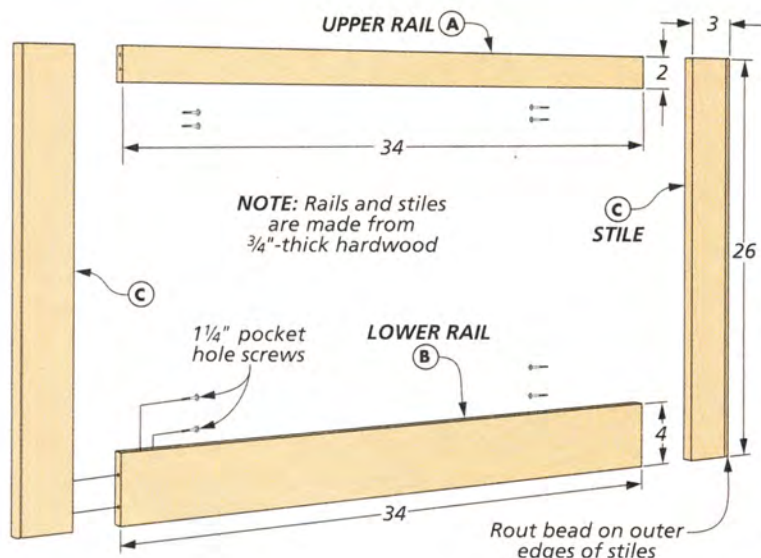
To make the frame, start by cutting the frame pieces to size. You'll need an upper and lower rail, and two stiles. (Note that the rails are different widths.)

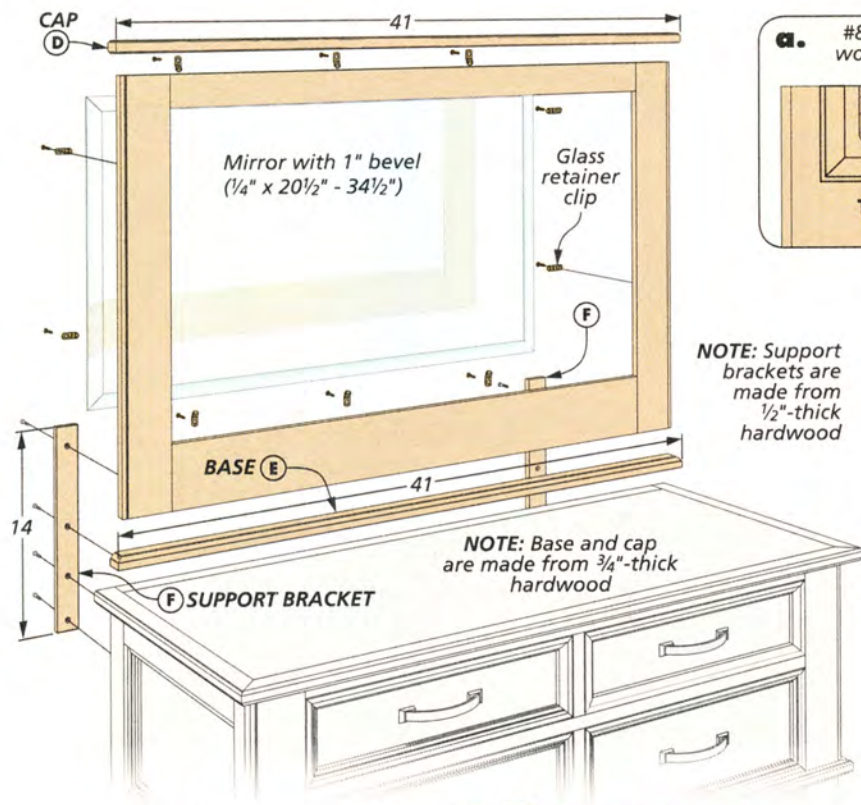
The stiles feature a bead profile along the outer edges to match the stiles of the dresser and nightstand. I created this bead at the router table, using a $\frac{1}{4}$ " edge beading bit (detail 'a').

ASSEMBLY. With the frame pieces ready to go, I dry clamped all



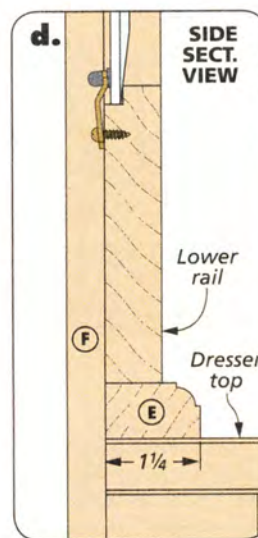
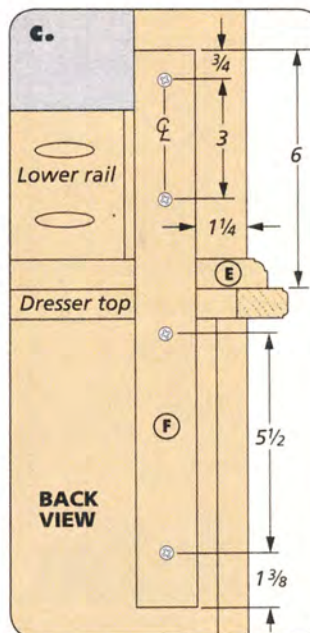
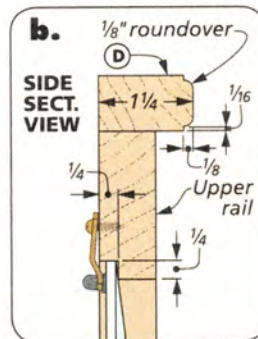
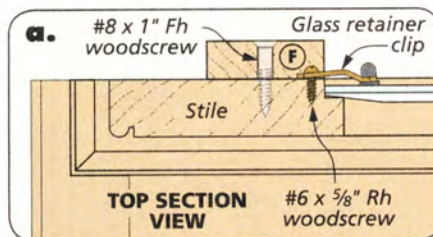
the parts together to make sure the assembly was square. Then I drilled the holes for the pocket hole screws and screwed the frame together. Detail 'b' shows the screw locations.





NOTE: Support brackets are made from 1/2"-thick hardwood

NOTE: Base and cap are made from 3/4"-thick hardwood



completing the MIRROR

At this point, you have a bare-bones frame. In order to turn this frame into a mirror, you need to create a recess in the back to hold the mirror glass. The easiest way to do this is with a rabbeting bit and a hand-held router, as you can see in the first drawing below.

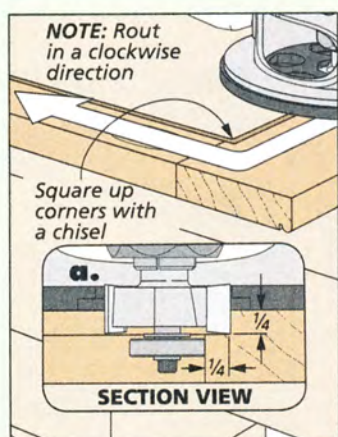
There's just one thing to point out here. The mirror I purchased

to install in the frame has a bevel around the edges. In order to allow as much of the bevel as possible to show, I routed a narrow (1/4") rabbet in the frame. But to rout this rabbet, you may have to swap out the bearing on your rabbeting bit for one that is slightly larger. The router bit will leave rounded corners in the recess,

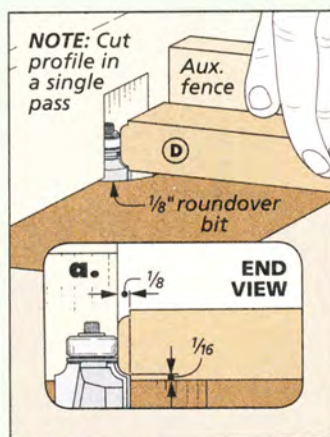
but you can square these up easily with a chisel.

CAP & BASE. A cap and base complete the frame. These pieces are nothing more than a couple of narrow strips of wood with a routed profile. To tie the look of the mirror frame in with the other pieces of the suite, I used the same molding profiles on these

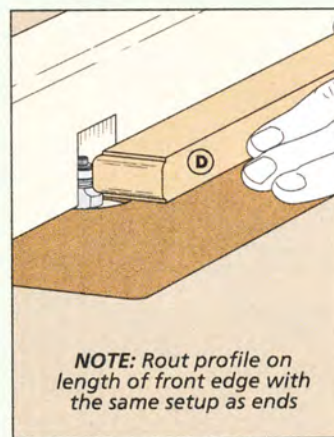
How-To: Rabbet & Trim Routing



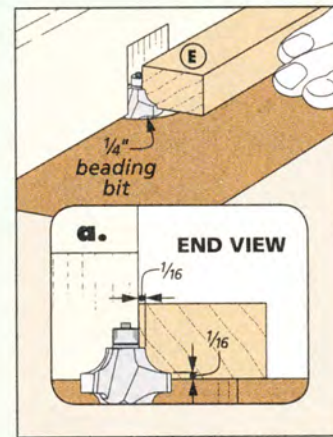
Rout Recess. Use a rabbeting bit to rout a rabbet around the inside edge of the frame.



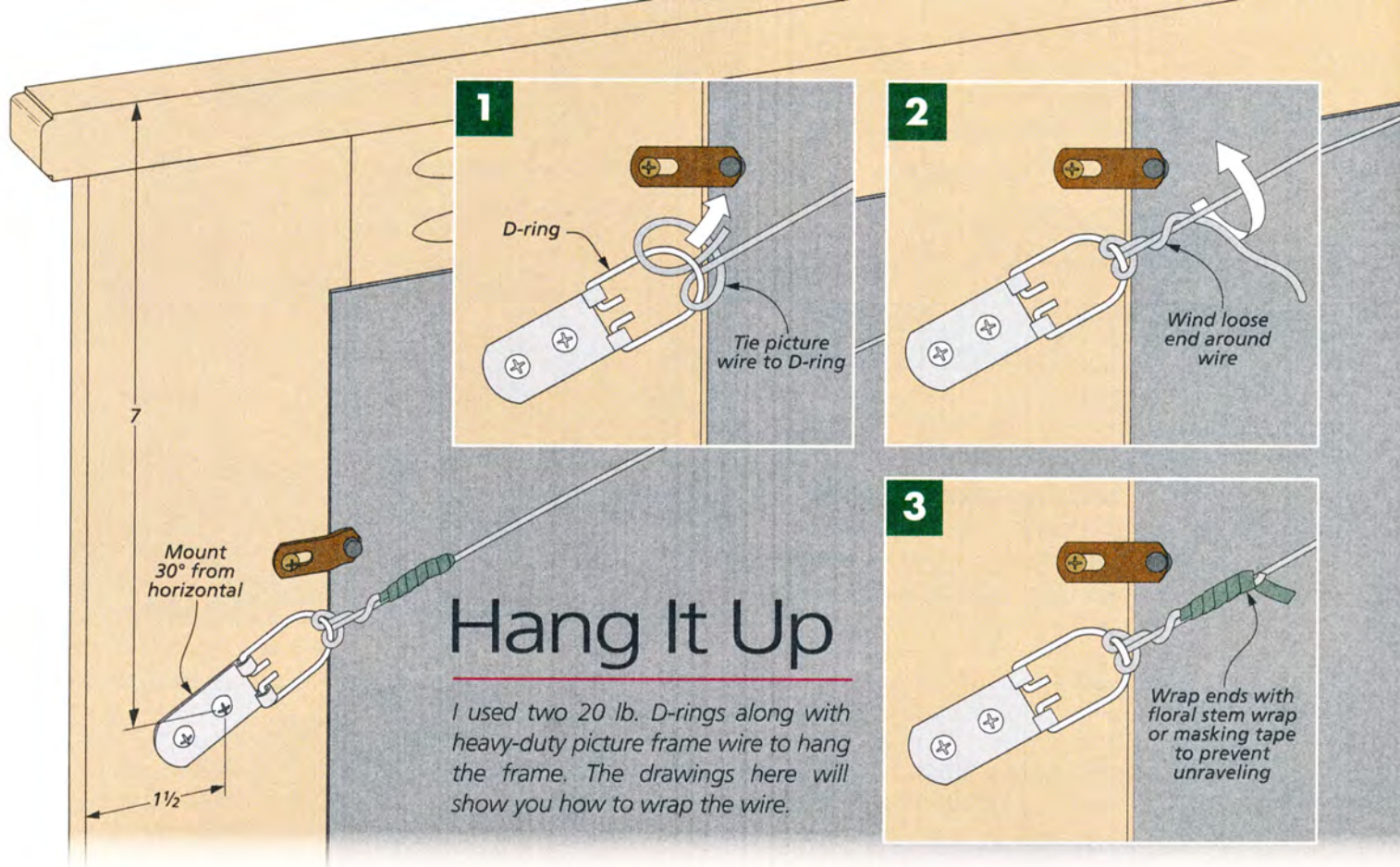
Cap Profile. To make the cap piece, I routed 1/8" roundovers on the ends first.



Complete Profile. To finish up the cap, rout the same profile along the front edge.



Base Profile. A beading bit makes quick work of routing the profile on the base.



pieces as I did on the dresser, bed, and nightstand.

As shown in details 'b' and 'd' and the last three drawings in the box on the bottom of the opposite page, the cap trim features a $\frac{1}{8}$ " roundover with a $\frac{1}{16}$ " fillet on both the top and bottom edges. And the base piece has a $\frac{1}{4}$ " roundover with two shoulders.

Attaching the cap and base pieces is simply a matter of gluing them in place. They should be flush with the back of the frame and centered side to side.

MIRROR. After staining and finishing the frame, you're ready to add the mirror. I ordered a mirror with a 1"-wide bevel on all four edges. The mirror is held in place

with glass retainer clips mounted to the back of the frame.

The next step will depend on how you choose to mount the mirror in your home. You can either attach it to the dresser or simply hang it on the wall. I'll take you through both processes.

SUPPORTS. To attach the mirror to a dresser, all you'll need are a couple of support brackets. These are nothing more than two pieces of wood, cut to the dimensions shown in the drawing on the opposite page. They get screwed to the back of the mirror frame and to the back of the dresser. (Note: When attaching the brackets to the dresser, make sure you drive the screws into the case dividers, not just the back.)

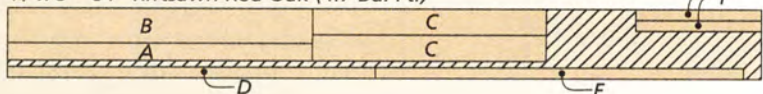
HANGING HARDWARE. If you prefer to hang the mirror directly on the wall, you can do so with a pair of D-rings and some picture frame wire. The drawings above show you the proper way to mount the rings and wrap the wire. Once this is done, you can hang the mirror anywhere on the wall you like. **W**

Materials, Supplies & Cutting Diagram

A	Upper Rail (1)	$\frac{3}{4}$ x 2 - 34
B	Lower Rail (1)	$\frac{3}{4}$ x 4 - 34
C	Stiles (2)	$\frac{3}{4}$ x 3 - 26
D	Cap (1)	$\frac{3}{4}$ x $1\frac{1}{4}$ - 41
E	Base (1)	$\frac{3}{4}$ x $1\frac{1}{4}$ - 41
F	Support Brackets (2)	$\frac{1}{2}$ x $1\frac{1}{2}$ - 14

- (8) $1\frac{1}{4}$ " Pocket Hole Screws
- (1) $\frac{1}{4}$ " x $20\frac{1}{2}$ " - $34\frac{1}{2}$ " Beveled Mirror
- (10) Glass Retainer Clips
- (10) #6 x $\frac{5}{8}$ " Rh Woodscrews
- (8) #8 x 1" Fh Woodscrews (optional)
- (2) D-Rings w/Screws (optional)
- Picture Frame Wire (optional)

$\frac{3}{4}$ " x 8" - 84" Riftsawn Red Oak (4.7 Bd. Ft.)



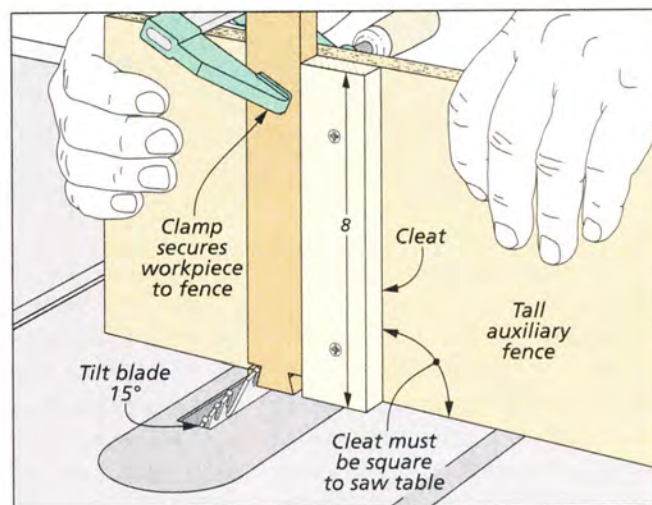
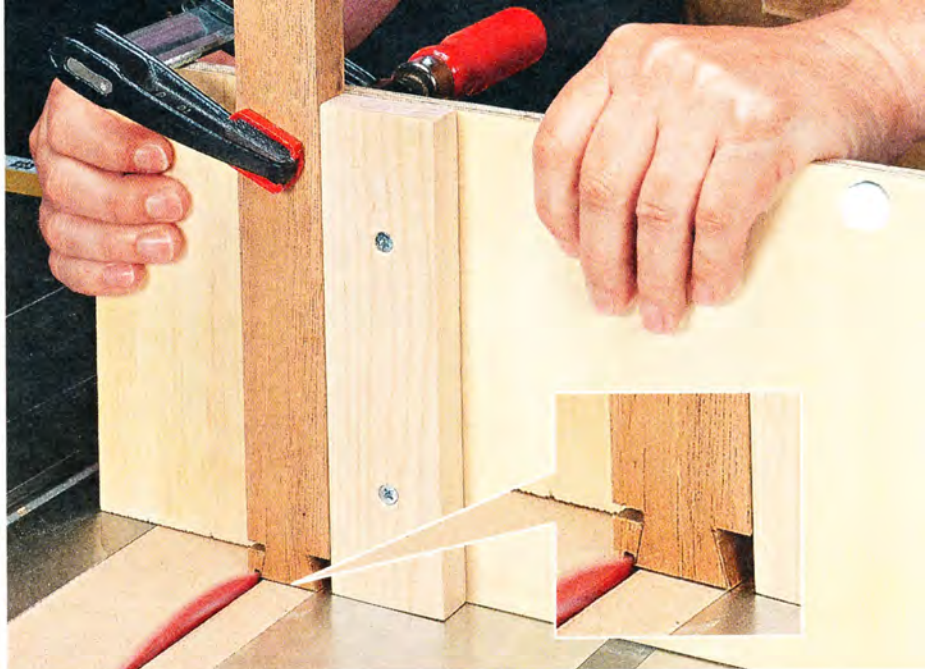
SHOP NOTEBOOK

Tall Auxiliary Fence

The top rails on the mahogany coffee table (page 18) have dovetails on the ends to form a secure connection with sockets in the legs. You can cut these dovetails with a hand saw, but I found a more precise method that involves a slightly unusual table saw technique.

CUTTING THE DOVETAILS. The first step in making these dovetails is to cut the shoulders. This is easy to do by putting the piece on edge and passing it through the blade.

To finish the dovetails, however, you're going to need a little more support for the workpiece. That's why I recommend installing a tall auxiliary fence on the miter gauge. A cleat added to the fence positions the rail properly for the cut (illustration). The cleat not only holds the rail square to the saw table, but it also allows you to easily flip the rail in order to cut both sides of the dovetail (main photo).



Leg Taper Sled

The legs of the coffee table have small tapers cut on each of their two inside faces. You can turn to a band saw for cuts like these, but I suggest crafting a simple taper sled for your

table saw to ensure more precise, repeatable results.

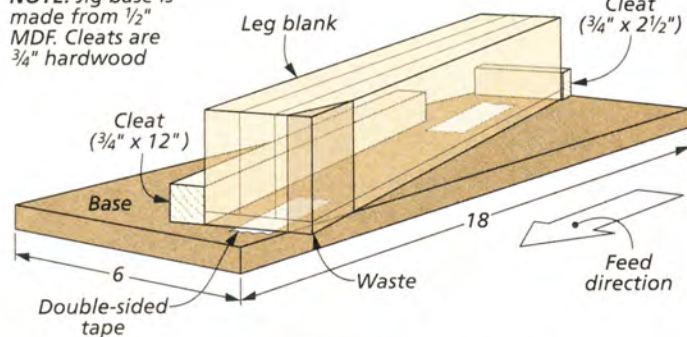
BUILDING THE TAPER SLED. There's not a whole lot to making the taper sled. It's just a base made from MDF with a couple of cleats that

position the leg. Double-sided tape and your hands keep the leg secure throughout the cut as you guide the sled between the rip fence and the saw blade.

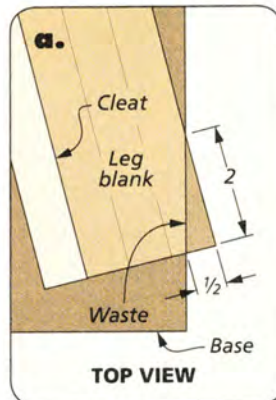
When making a jig like this, I like to lay out the tapers on one of the legs first using a steel rule and a pencil. Then I cut the base to size, and position the leg on the base so that the taper aligns with the edge of the base.

Now all that's left is to bring in the two cleats and glue and clamp them in place beside and behind the leg. Finish up by securing the leg with a few strips of double-sided tape, and then you're ready to head to the table saw to begin cutting.

NOTE: Jig base is made from 1/2" MDF. Cleats are 3/4" hardwood



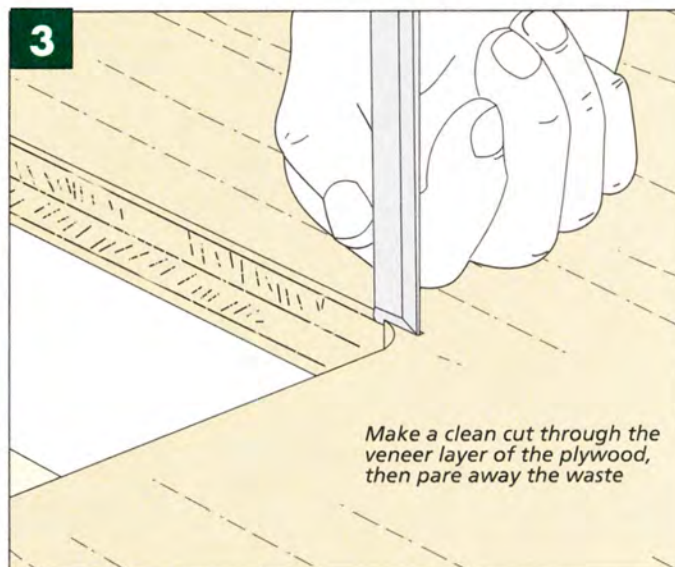
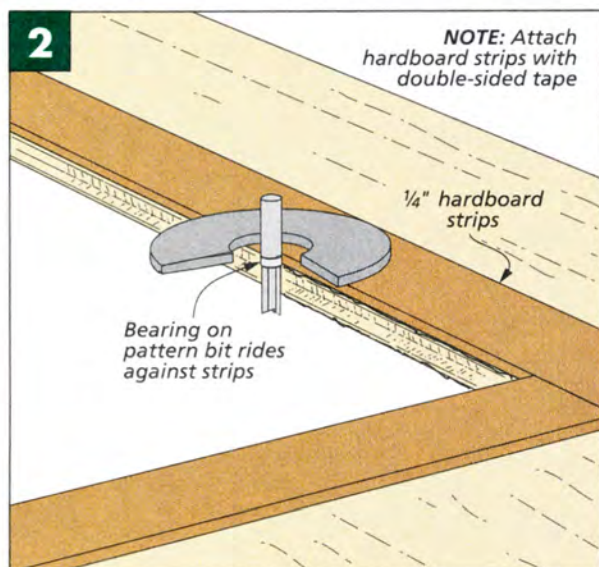
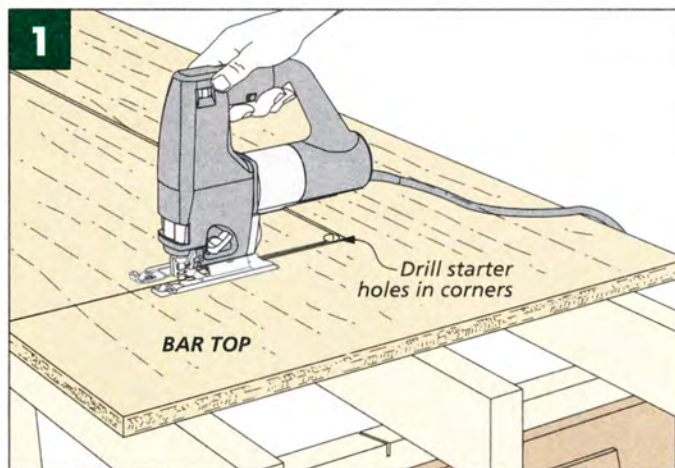
NOTE: Rip fence is used to guide jig while cutting taper



Bar Top

When it came to cutting the U-shaped top for the bar on page 32, I used a couple of different tools and techniques. I started by laying out the shape in pencil, then drilling starter holes for a jig saw in the corners. After that, I cut the rough shape using a jig saw, staying on the waste side of the cut. This works great, but can often result in some tearout, especially on the crosscuts.

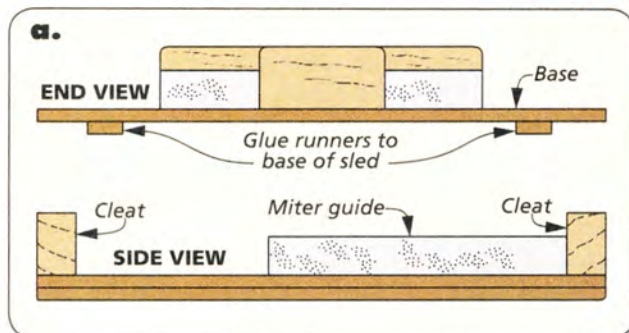
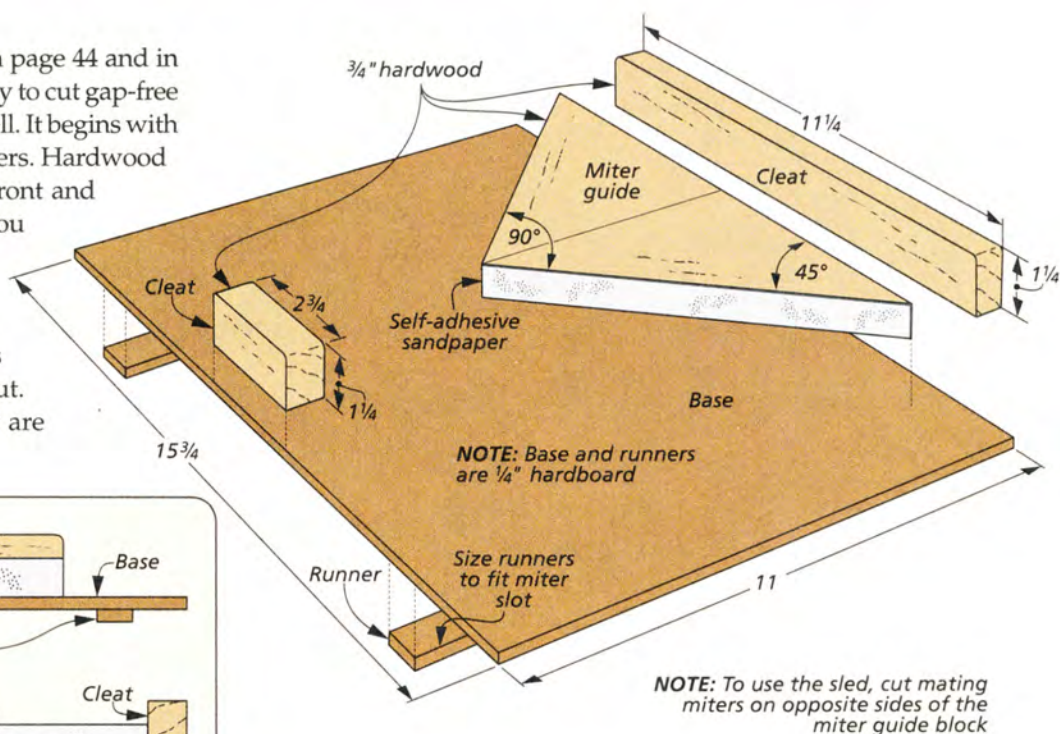
To clean up the edges, I attached hardboard strips to the top with double-sided tape to serve as straight-edges (Figure 2). Then it's a simple matter of using a router with a pattern bit to smooth the rough edges. After that, just square up the corners with a chisel.



Miter Jig

The miter jig shown in the article on page 44 and in the drawing at right is the perfect way to cut gap-free miters. It's pretty easy to build, as well. It begins with a hardboard base and a pair of runners. Hardwood cleats are glued to the base at the front and rear to hold the sled together when you cut through the base.

The miter guide is simply two pieces of hardwood glued together to form a 90° corner that points toward the front and backs up the cut. This gives you two 45° edges that are guaranteed to match. **W**





FRIENDS AND FAMILY GATHER HERE

stylish & inviting Craftsman-Style Bar

Whether it's for a party or a family gathering, you can serve up the refreshments in style with this attractive piece of furniture.

A bar might be the ideal addition to a room that needs a little bit of spicing up. After all, it's a unique piece of furniture. And when the bar looks as good as the one shown above, it becomes the focal point of the room.

But as you'll see, this bar has a lot more going for it than just good looks. Inside you'll find plenty of

storage for bottles, glasses, and other supplies. In addition there's a dry sink for ice, a 12-bottle wine rack (see photo on facing page), and plenty of countertop space for you to pour the refreshments.

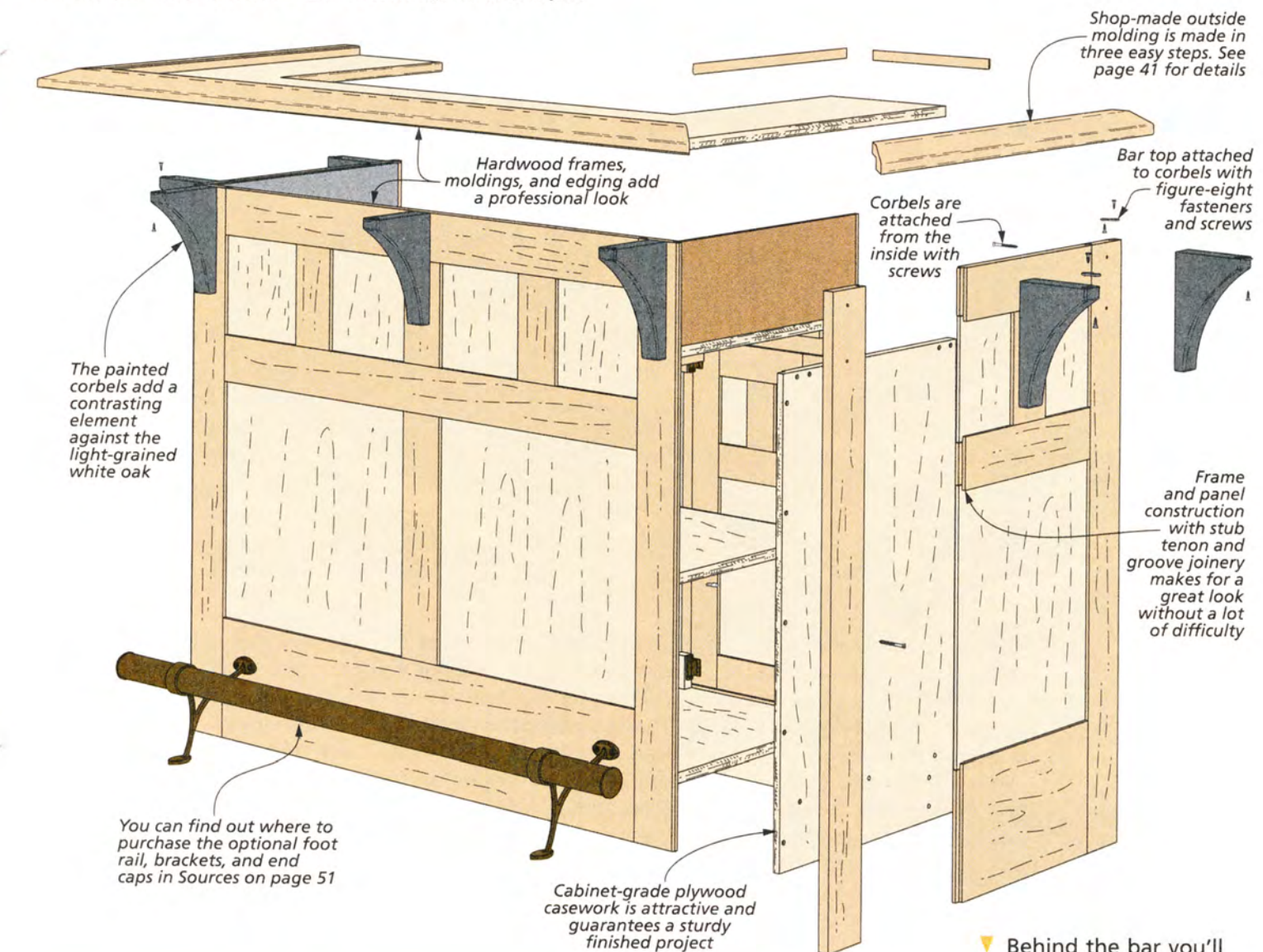
I wanted the bar to match some other pieces in my home, so I chose quartersawn white oak for a Craftsman-style look. But you

can use just about any hardwood and plywood combination and get a great result.

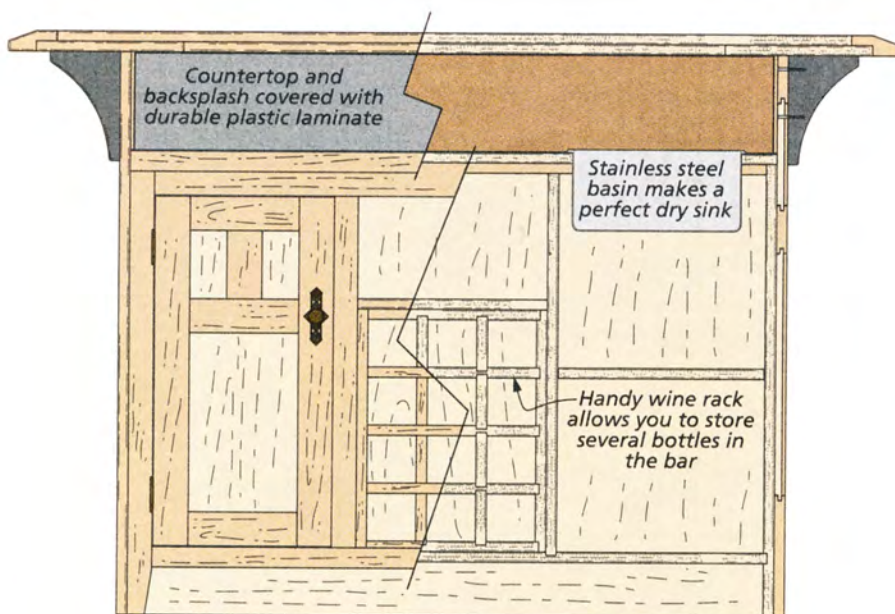
The good news is that the woodworking is pretty straightforward. I used common cabinet construction techniques throughout the project. In short, this is one piece of furniture that's as much fun to make as it is to use.

CONSTRUCTION DETAILS

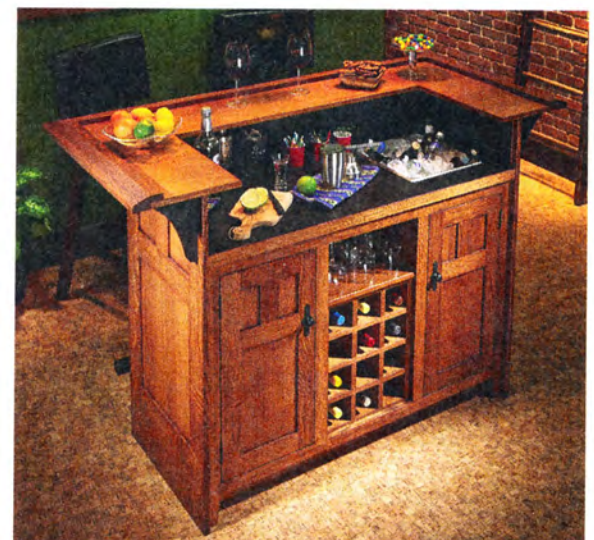
OVERALL DIMENSIONS: 29"D x 63¹/₂"W x 42³/₄"H



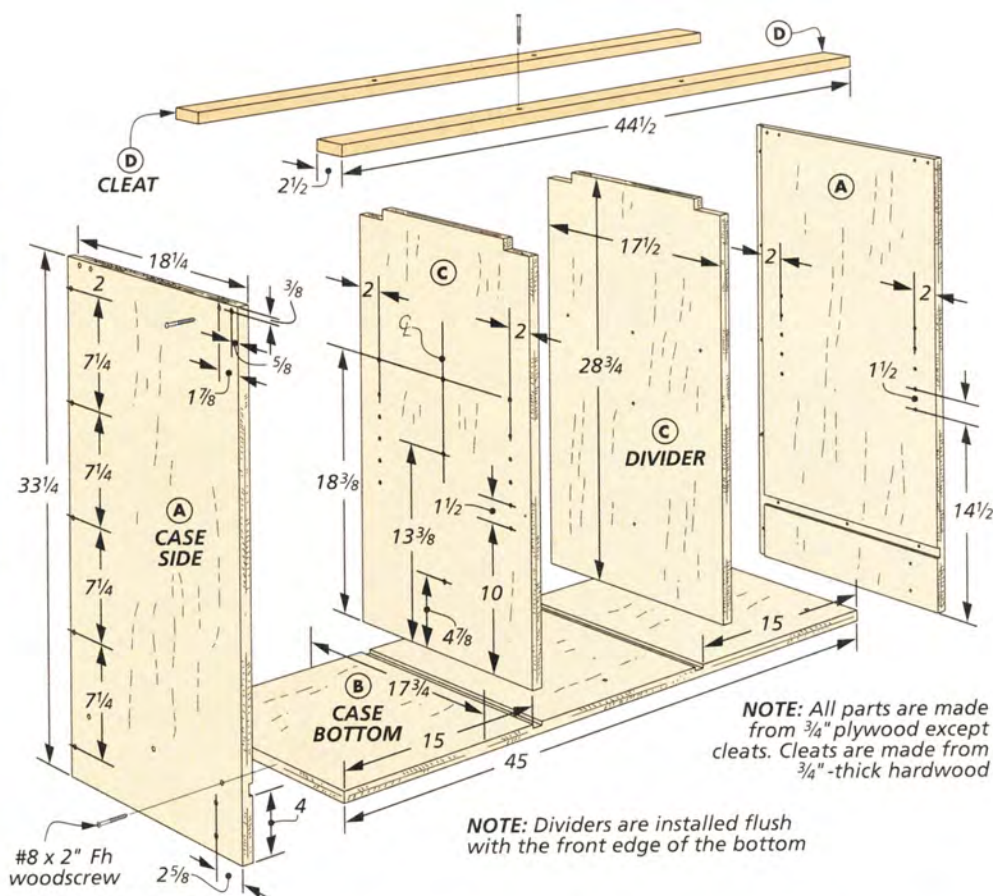
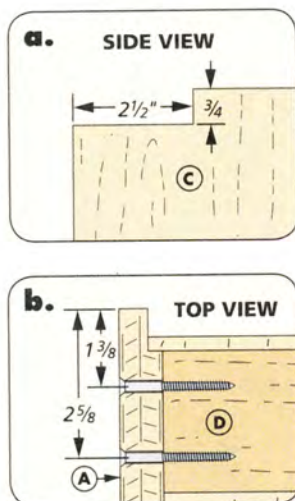
▼ Behind the bar you'll find a wine rack plus all the storage you'll ever need for glasses, mixers, and ice.



FRONT SECTION VIEW



making the CASE



Like many cabinets, the bar starts out as a plywood case. Later, you'll add shelves, a face frame, and doors. But it all begins with the sides of the case.

SIDES. After cutting the two sides to final size, I installed a dado blade set to equal the thickness of the plywood. The box below shows how you can cut the dados for the bottom and the rabbet along the rear edge to hold the plywood back.

Next, you'll need to drill the countersunk screw holes in the locations shown in the main

drawing above. These holes are used for attaching the bottom, the two cleats, and the back.

The shelf pin holes on the inside face of each side give you a bit of flexibility when you set up the finished cabinet. I made a drilling guide out of hardboard that registers against the bottom and the front and back edges to make sure the holes were properly aligned. The right drawing below shows how it works.

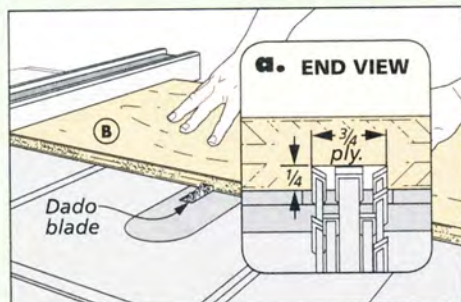
CASE BOTTOM. A long bottom panel spans the distance between the two sides. Start by cutting

the two dados that will hold the dividers. You'll also need to drill screw holes along the front edge for the toe kick.

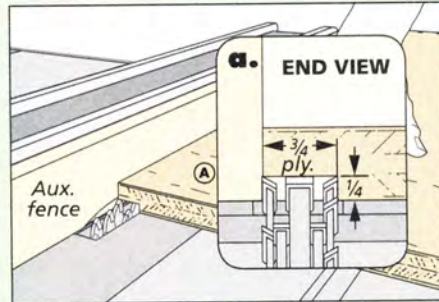
DIVIDERS & CLEATS. To break up the space in the cabinet and add some support to the top, I installed a pair of dividers. By fitting them into the dados on the case bottom, you end up with three handy storage compartments. I also cut a pair of cleats to support the top.

Aside from drilling the screw holes as shown in the drawing above, the only thing to do is cut notches for the cleats on the upper

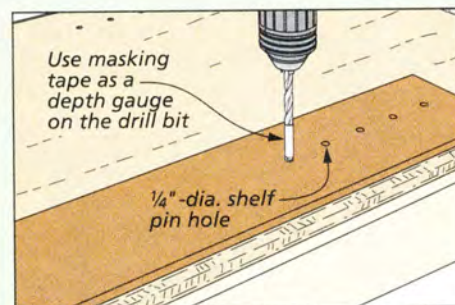
How-To: Case Joinery & Shelf Pin Holes

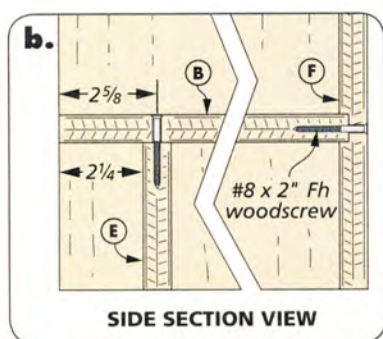
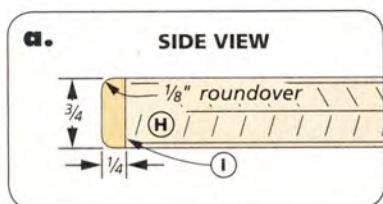


Dadoes. Install a dado blade and set it to match the thickness of the plywood. Test the fit using a scrap piece of plywood.



Rabbet the Back. Burying the dado blade in an auxiliary rip fence is an easy way to cut consistent rabbets.



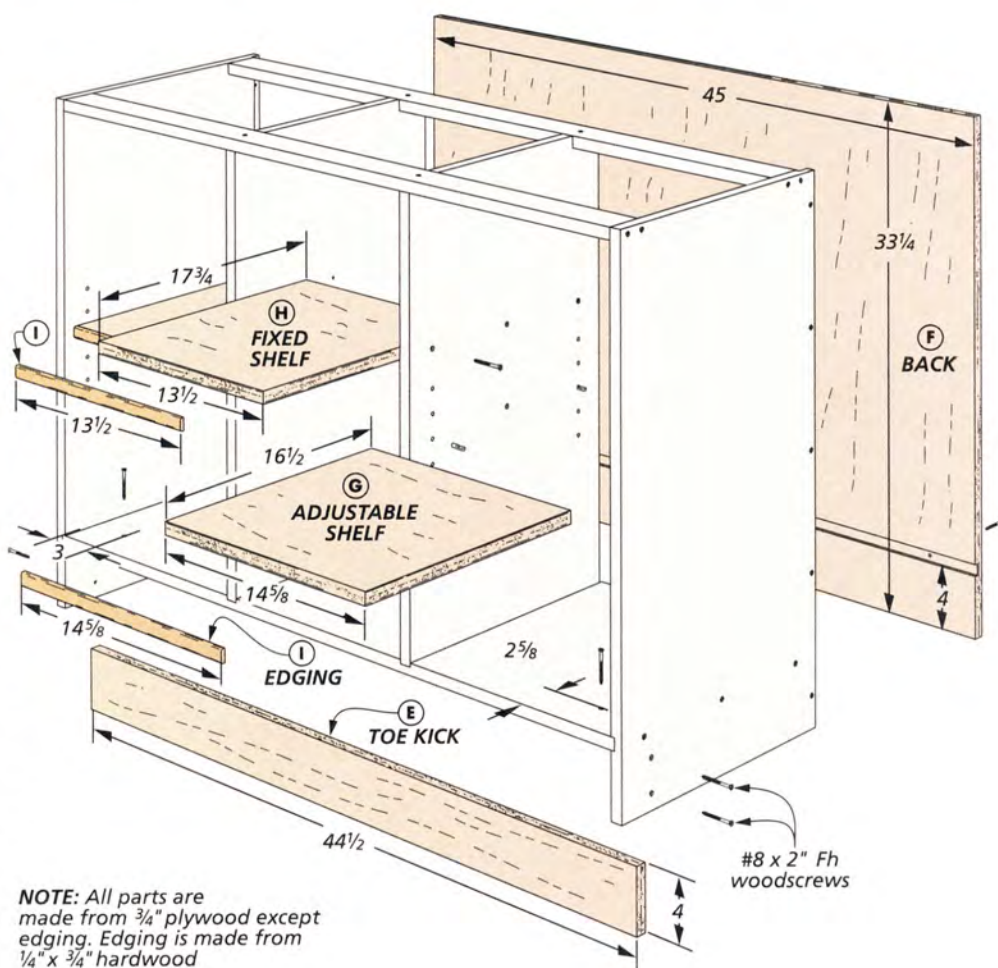


end of each divider. Use the cleats to mark the layout lines for the cuts.

The easiest way to cut the notches is with a hand saw. The left drawing below illustrates how you can use a fine-tooth saw to make clean cuts. Just lay out the notches in pencil and make the cuts.

ASSEMBLY. At this point, you're ready to assemble the case. Since most of the joints are held by glue and screws, the assembly is pretty simple. The screwheads will be covered by the panels you'll add later. For now, you just need to make sure the screws are counter-sunk so the heads are even with or slightly below the surface. Note that the dividers need to be flush with the front edge of the bottom.

TOE KICK. Like any base cabinet, I added a simple toe kick. A toe kick gives the finished bar a more



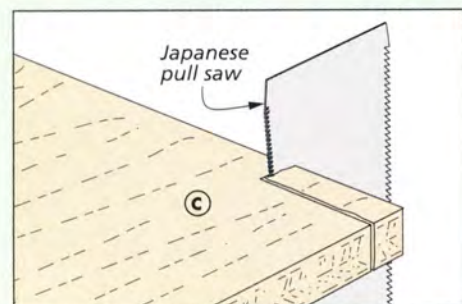
professional look. Just cut it to final size and screw it in place.

BACK. It's very important that the bar be stable. One way to help out in this department is to use a 3/4-inch-thick back. All you need to do is cut a dado near the lower edge to fit over the case bottom.

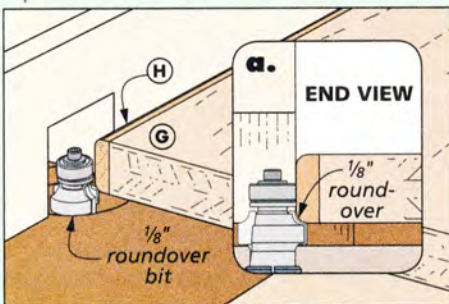
SHELVES. Last up are the shelves. As you can see in the main drawing above, the fixed and adjustable

shelves are different sizes. Detail 'a' shows how I covered the front edges of the plywood with strips of hardwood edging. After that, you can head to the router table and add the small roundover on the top and bottom edges (middle drawing below). Finally, clamp a pair of cleats to the dividers and add the fixed shelf with screws as shown in the right drawing below.

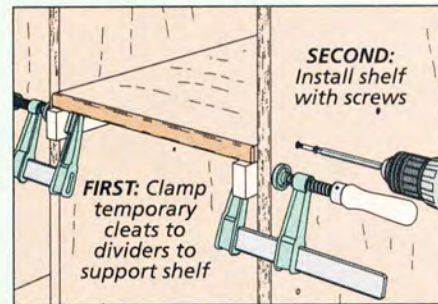
Cleat Notch, Edging & Shelves



Notch with Hand Saw. A hand saw is the perfect tool for cutting the notches on the upper ends of the dividers.

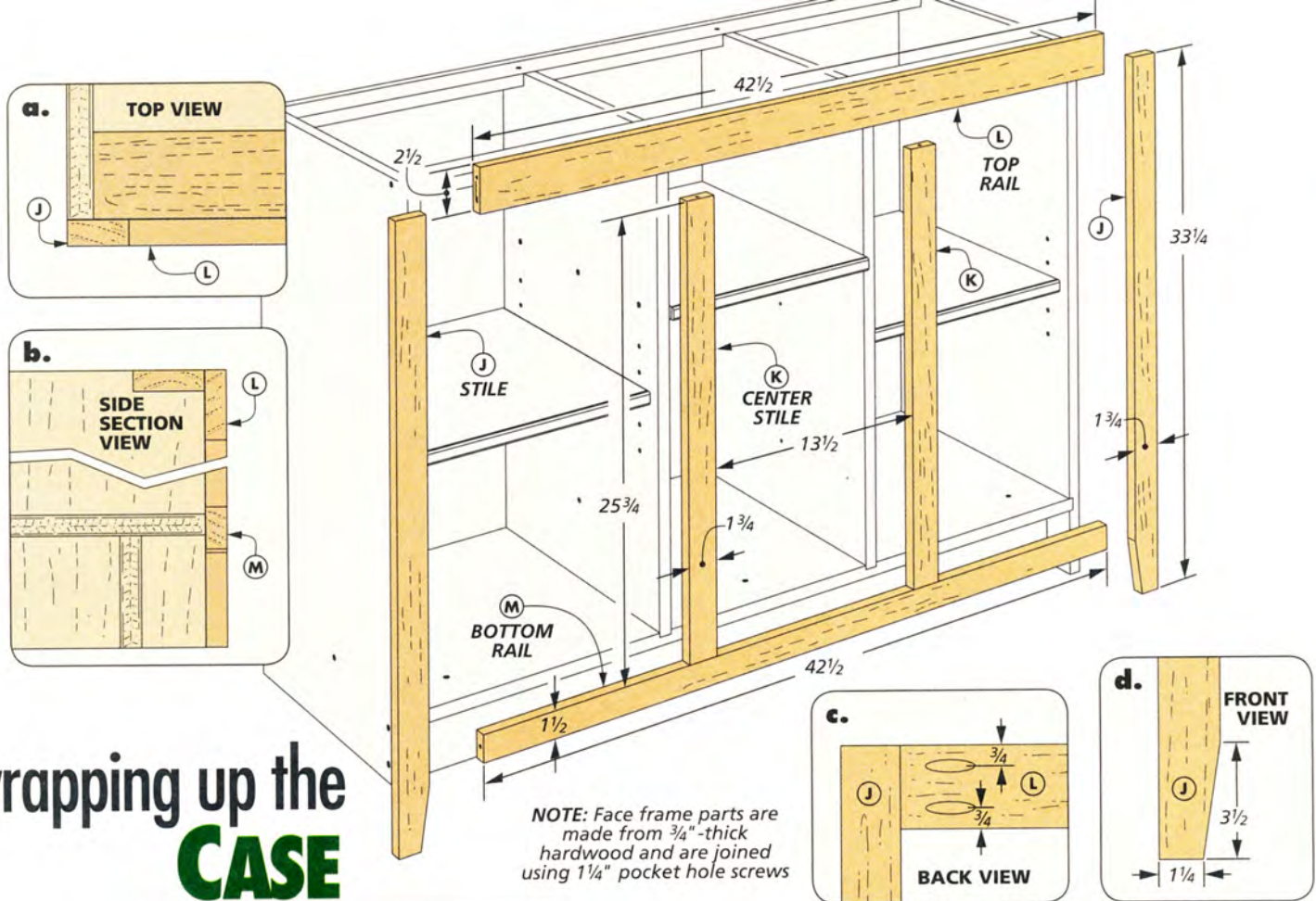


Route Edging. After installing the edging on the shelves, head to the router table and rout the roundover on both edges.



Fixed Shelf. Using a pair of cleats clamped to the dividers to hold it in place, attach the shelf with screws.

wrapping up the CASE



From here on out, you'll be adding features to the basic case. In fact, you won't be able to see much of the case when the bar is completed. The first addition is the hardwood face frame to cover the plywood edges.

FACE FRAME. One of the best woodworking innovations in the last thirty years has been the advent of pocket hole joinery. It can be used for a variety of tasks, but joining face frame

parts is where it really shines. The result is a strong frame that easily attaches to the cabinet. But before you can move on to the joinery, you need to cut the frame pieces to final size.

Next, you'll need to cut the small taper on the bottoms of the stiles using the dimensions in detail 'd.' If you have a tapering jig, then you can use the table saw, as shown in the left drawing below. If not, just mark the taper

and cut it with a hand saw. You can then clean up the cut with a hand plane or sanding block.

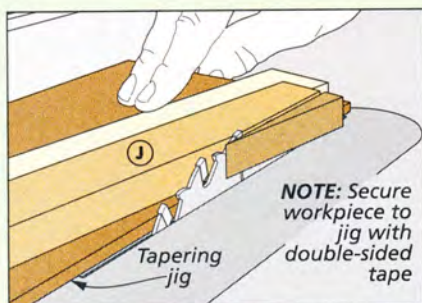
POCKET HOLES. I like to mark the locations for the pocket holes on each workpiece. Even though drilling them is a simple operation, it only takes a moment's distraction to drill on the wrong face if the pieces aren't marked.

I also take a few precautions when assembling the pieces. One problem with pocket hole joinery is that the pieces tend to creep when you drive the screws. Keeping the frame members square is crucial since you're going to add a pair of inset doors later.

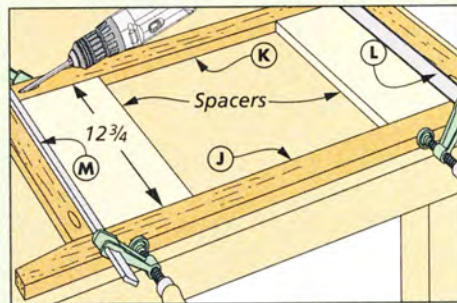
One sure way to do so is to cut a couple of spacer blocks, one for the top and one for the bottom, for use during the assembly. The right drawing in the box shows you how to do it. This makes for an easy assembly. When you're done, glue the face frame to the case.

DOORS. Two frame and panel doors cover the shelves in the two end compartments. These doors are pretty straightforward

How-To: Make the Face Frame



Taper. A shop-made tapering jig (a hardboard carrier with an angled fence) makes tapering the stiles a breeze.



Spacers. A pair of spacers hold the center stiles squarely in position while you add the pocket hole screws.

to make using stub tenon and groove joinery. I used $\frac{1}{4}$ " plywood panels to keep it simple.

FRAMES. Since all the frame pieces are the same width, you can start by cutting them first. Select straight-grained stock for these pieces and mark the tenon and groove locations to avoid any mixups at the table saw.

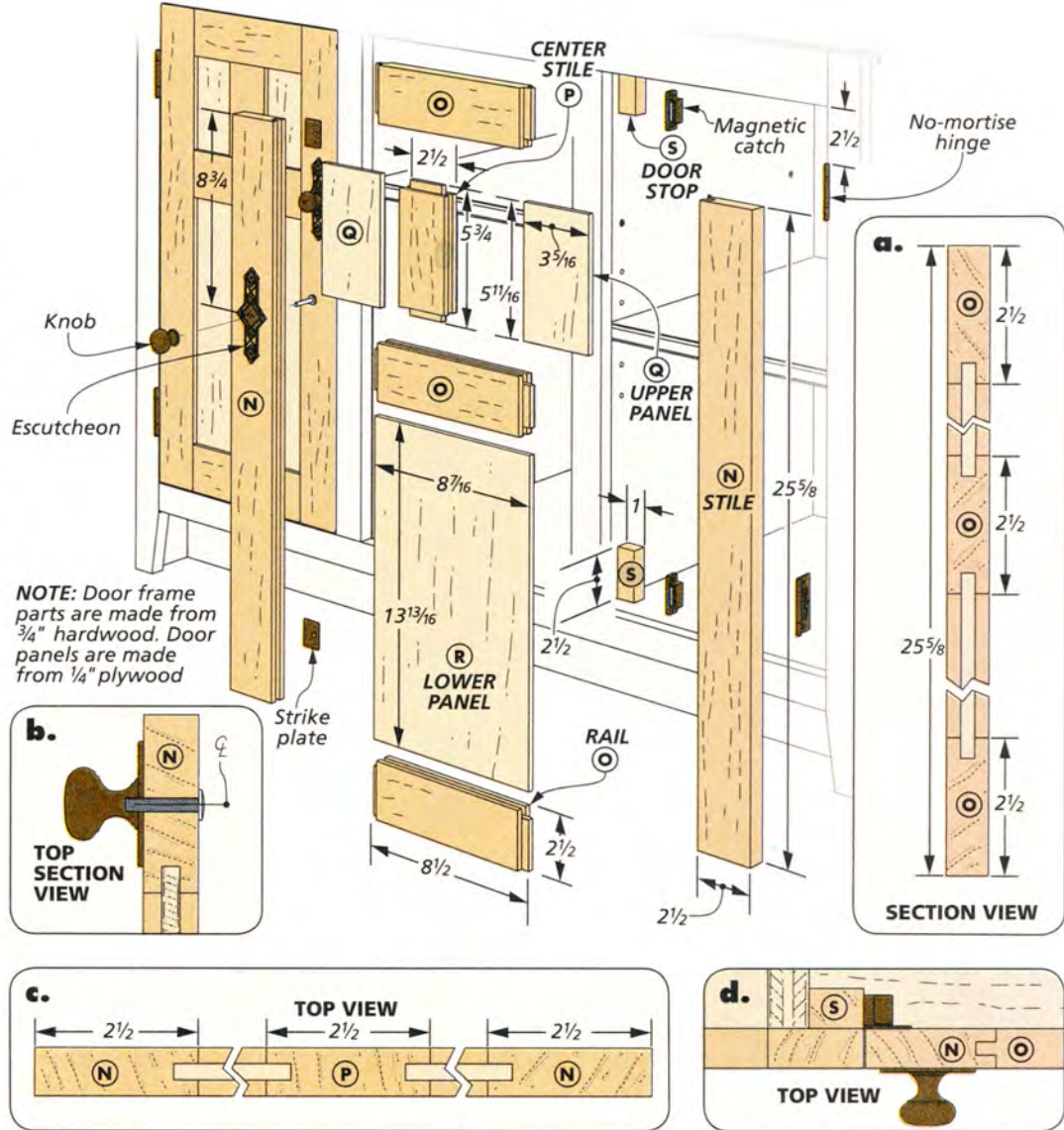
I like to start by cutting the centered groove in each piece. (Don't forget that you need to cut a groove on both sides of the center rails and stiles.) The top drawing in the box below shows how I used a combination blade to cut the centered grooves in each piece by making two passes. Start with a piece of scrap and set the rip fence so you're cutting just off center. Then just flip the workpiece and make a second cut. Use a piece of plywood to test the fit and sneak up on a snug fit.

Now install a dado blade and cut the tenons on the rails and center stile (bottom drawing in the box below). Once again, a test piece is very helpful when you're zeroing in on a snug fit.

PANELS. As I said before, I used plywood for the panels in the doors. This is easier than planing and gluing up hardwood panels. And since the plywood panels won't expand and contract with the seasons like hardwood, you can glue them in place.

After cutting the panels to size, I did a dry-fit of the doors before final assembly. This gives you a chance to double check your work, making sure everything's square and free of gaps at the joint lines. After the dry-fit, add glue and clamps to complete the doors.

INSTALL THE DOORS. You'll have noticed by now that the completed doors are the exact same size as the opening left in the cabinet's face frame. This is so you can trim them for a perfect fit with a uniform gap on the sides, top, and bottom edges. For the door width, I trimmed the doors at the jointer,

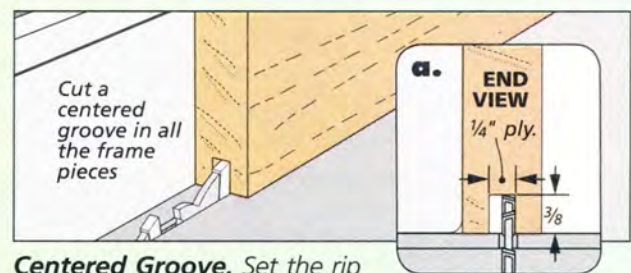


taking very shallow cuts in the long-grain stiles. For the top and bottom, I used my crosscut sled to make small skim cuts at the table saw. An easy way to keep the gap even is to place one of the no-mortise hinges in each side and another under the door bottom. Once you have a good fit, you can install the hinges.

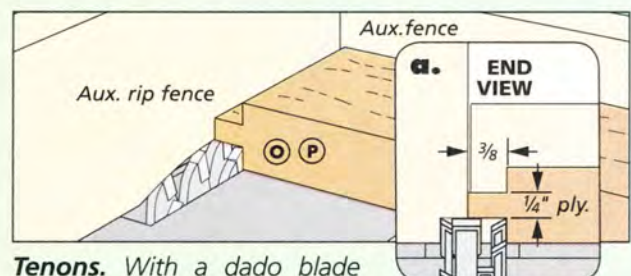
DOOR STOPS & HARDWARE. You can see in the main drawing and in detail 'd' that I made a pair of small, hardwood door stops for each door. I attached the magnetic catches to the blocks with screws before installing them in the case with glue. The matching strike plates are attached to the doors with screws.

All that remains is to install the escutcheons and the knobs. The instructions and the screws for these pieces of hardware are included in the package.

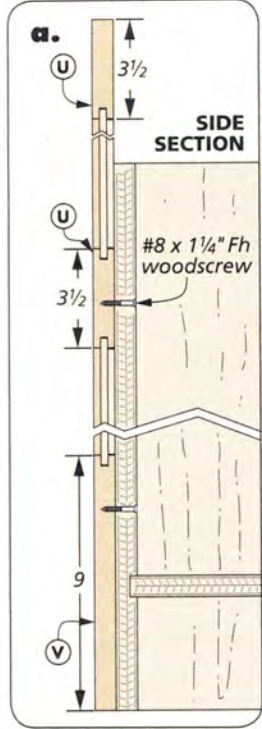
How-To: Door Joinery



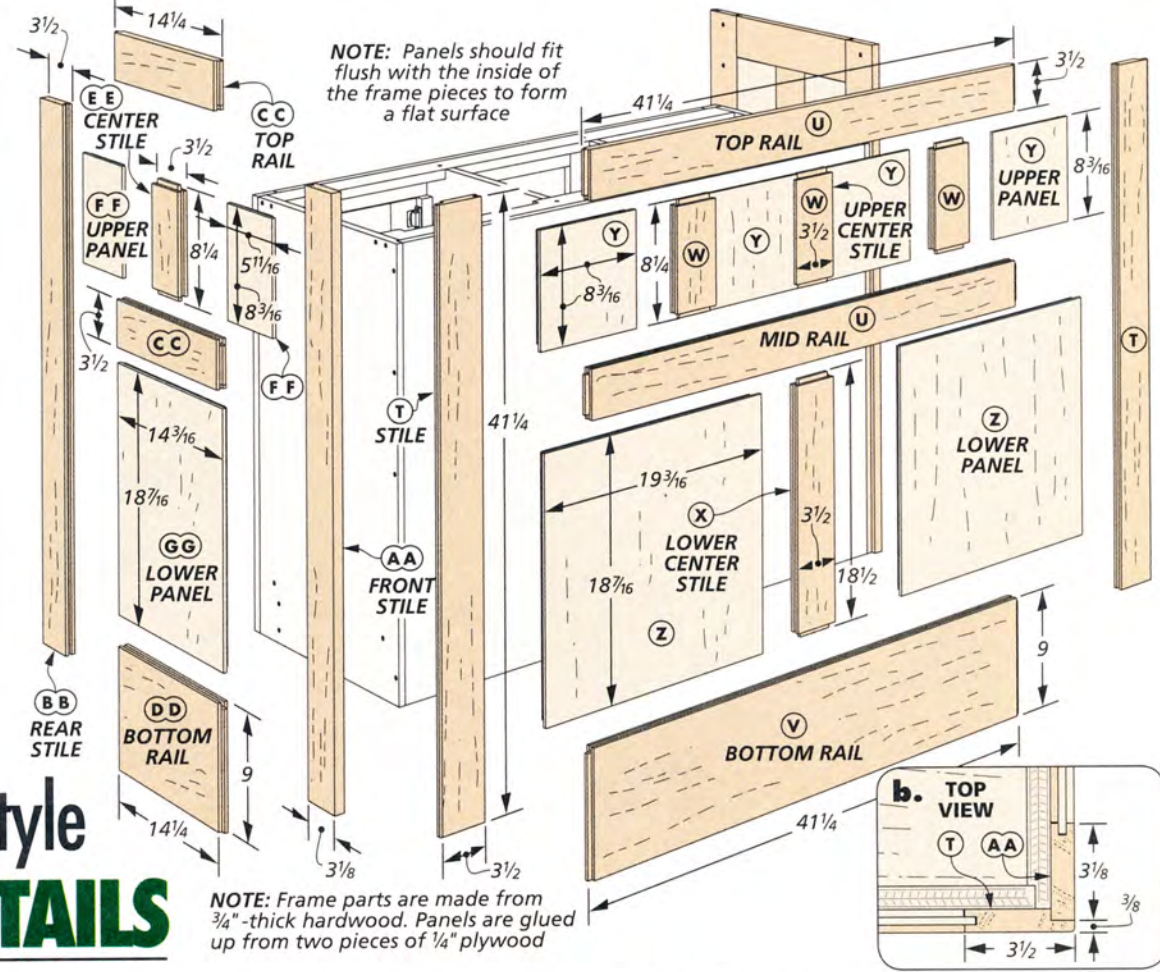
Centered Groove. Set the rip fence slightly off center and make the first cut. Then, flip the workpiece end-for-end and make a second pass.



Tenons. With a dado blade installed and partially buried in an auxiliary rip fence, use the miter gauge to cut the tenons.



craftsman-style DETAILS



To give the bar a Craftsman-style look, I made frame and panel assemblies to cover the plywood case. As you can see in the illustration above, they're built using the same type of joinery as the doors — stub tenons and grooves. The only real difference is the size of the pieces.

FRONT ASSEMBLY. First up is the front assembly. The reason for building it first can be found on the ends. The stiles each have a

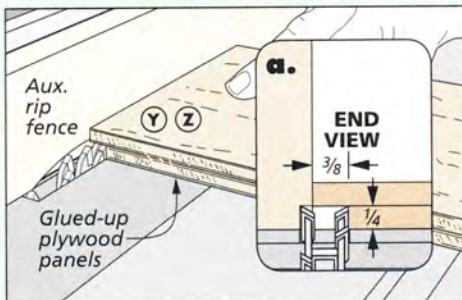
rabbet on the outside edge that houses the front edge of the end assembly. By making this assembly first, you can fine-tune the fit for a seamless-looking joint at each of the corners.

MAKING THE ASSEMBLIES. You can get started by cutting all the frame pieces and then cutting the grooves. For the outside panels, I opted to glue up two layers of 1/4" plywood. There are two reasons for this choice. First, it's often

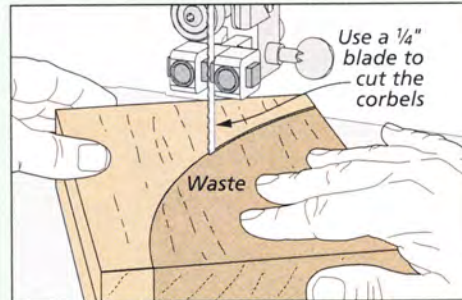
hard to find quartersawn white oak plywood in 1/2" thickness. Second, by making the panel 1/2" thick, the panel ends up flush with the face frame on the inside. This provides a flat, uninterrupted glue surface for attaching the assemblies to the case.

To get this result, you'll need to rabbet the edges of the panels as shown in the left drawing below. Then the tongue will fit nicely into the grooves on the frames.

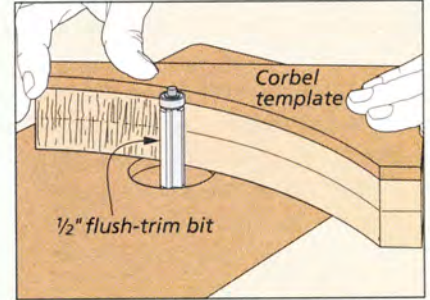
How-To: Make the Panels & Corbels



Rabbet the Panels. After gluing up the plywood panels, rabbet each one to form a tongue on all four edges.



Cut the Corbels. Cut out the shape of the corbels at the band saw. Stay on the waste side as you make the cut.



Clean Up with a Router. Attach the template to the rough-sawn blanks and flush-trim the corbels.

After completing the front assembly, set it aside while you make the matching end assemblies.

END ASSEMBLIES. There's not much more to making the end assemblies. The dimensions in the drawing on the opposite page tell the story. The thing to keep in mind is that the front and rear stiles are different widths. The narrower front stiles must fit into the rabbets on the front panel for a uniform look. After completing the ends, you're ready to move on to the installation of the assemblies.

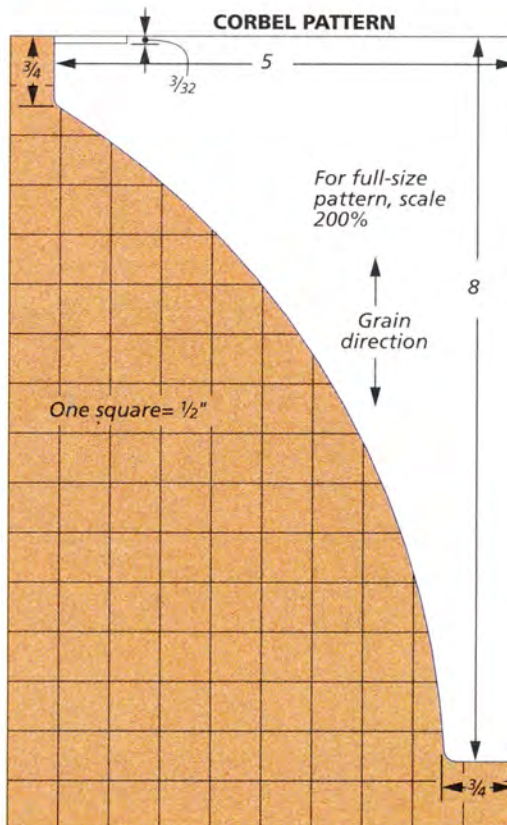
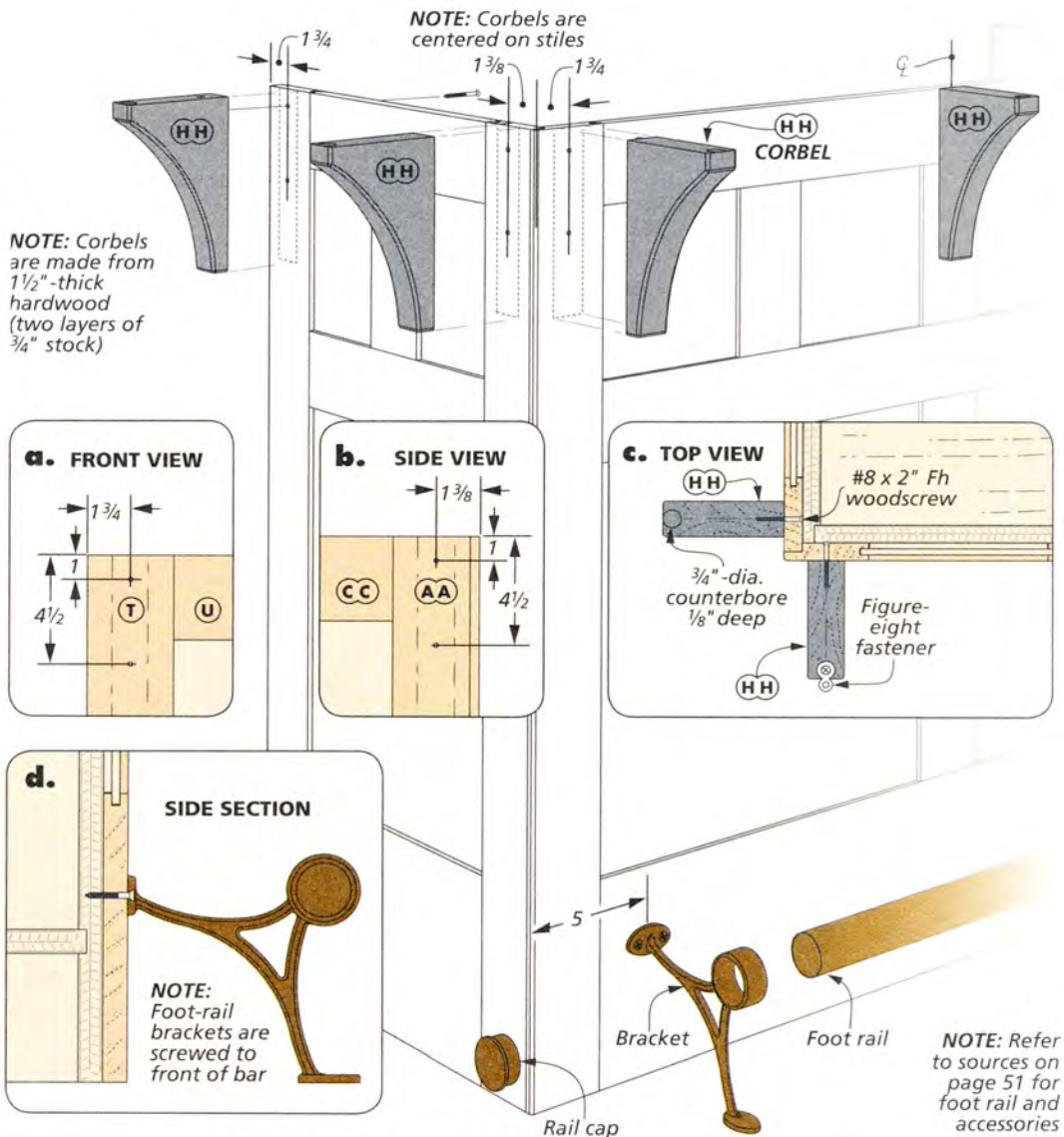
INSTALLATION. To install the assemblies, I started by applying glue to the inside of the front assembly and clamping it in position. By spreading the glue evenly and keeping it a few inches from the edges, you can avoid squeeze-out. Plus, this allows you time to make sure the position is correct.

When you have the front panel in position and clamped in place, drive one screw into it from the inside of the case. Then verify that the panel didn't shift and drive a few more screws. Attach the end assemblies in the same manner, with glue and screws.

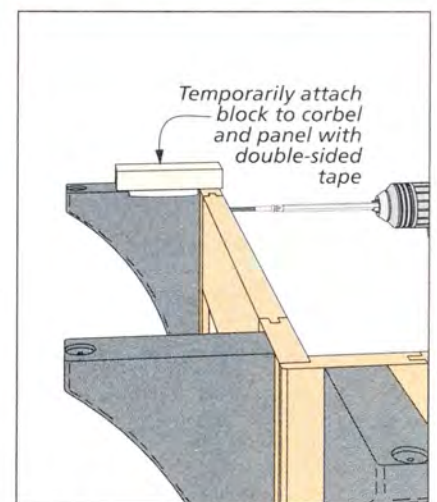
CORBELS. Corbels complete the Craftsman-style look. Start by gluing up some 5" x 8" hardwood blanks to get the 1½" thickness needed. (I used inexpensive poplar.) Before cutting them to shape, drill the shallow counterbores for the figure-eight fasteners used to attach the bar top (detail 'c').

You can use the pattern shown at right to make a template for flush-trimming the corbels to final shape (right drawing at the bottom of the facing page). I rounded over the front edges at the router table. Then I painted them black and attached them to the panels as shown in the far right box.

FOOT RAILS. The metal foot rail isn't required, but it adds a unique, signature design element to the bar. You can find the details of the components I used in Sources on page 51. Attaching it is pretty straightforward.

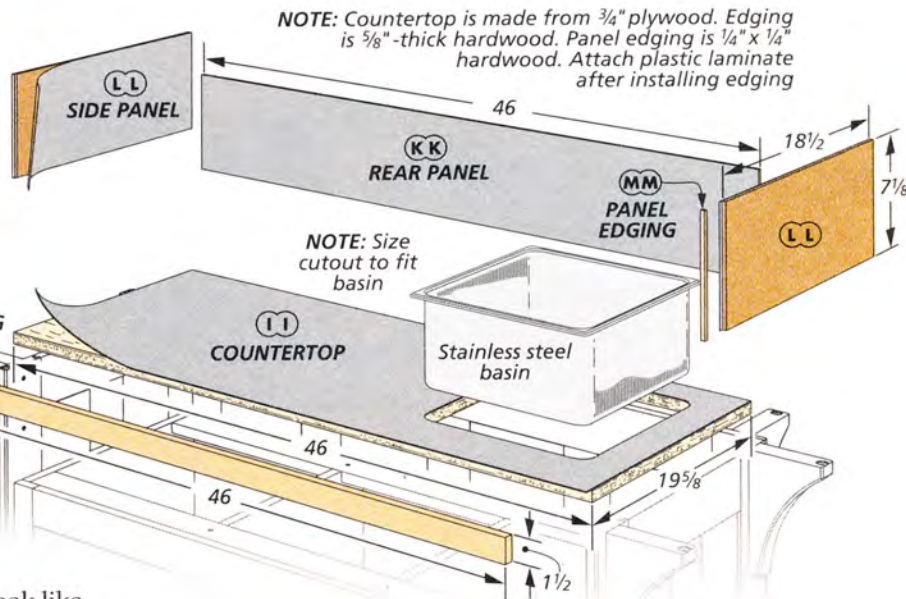
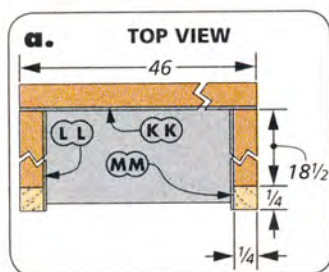


Shop Tip: Install Corbel



Flush Fit. In order to make sure you get a seamless fit between the corbels and the bar top, use a scrap block as shown when you drive the screws.

countertop & BAR TOP



The cabinet is starting to look like a bar now, but it still needs some counter space and a bar top. The countertop is where drinks are mixed (and spilled), so it needs a tough surface that's resistant to stains and other damage.

For this reason, I chose to use plastic laminate over a plywood substrate. The advantages are many. You can choose a color that matches your decor, it's easy to clean up, and it has plenty of long-term durability.

COUNTERTOP. I began by cutting the plywood blank. You'll want to attach the edging on the front before you add the laminate. This way, you can cover the entire surface of both pieces.

I kept the edging for this piece pretty simple. All you need to do is cut it to length and attach it with glue. When it dries, you're ready to install the laminate.

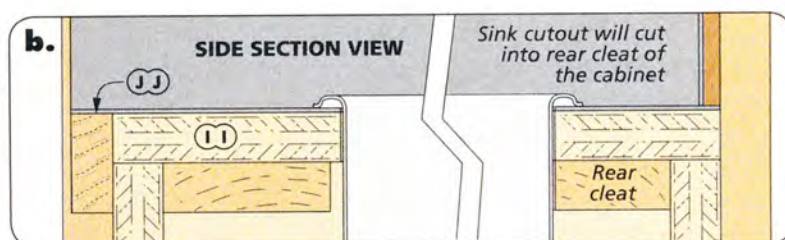
It's a good idea to cut the laminate slightly oversize to make sure it covers the entire surface. (You'll trim it flush later.) For now, your main concern is to cover both the laminate and the countertop blank with contact cement.

When the contact cement has set up, place several thin strips of wood on the plywood blank. Then position the laminate on the strips (left drawing below). With the laminate in place, remove the strips in the center and press the

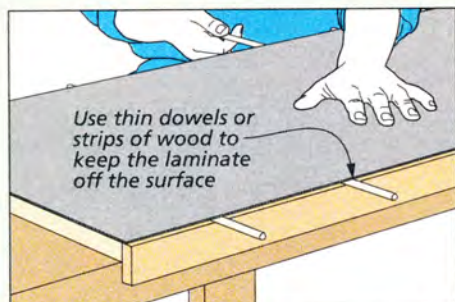
laminate into the substrate. Work your way outward, using a roller to remove air bubbles as you go. A router with a flush-trim bit cleans up the edges in no time.

Now you can install the countertop. All it takes is a little glue and a few screws in the cleats.

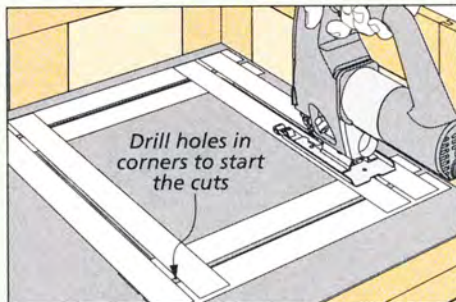
CUTOUT. One of the features I wanted to incorporate into this bar was a dry sink. This is a handy way to keep ice on hand for your beverages. The easiest way to cut out the opening for



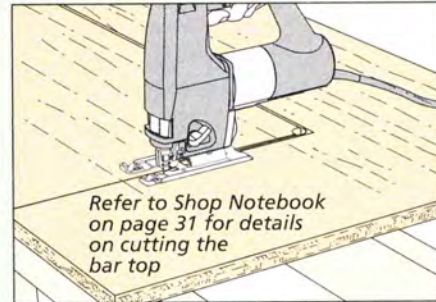
How-To: Laminate, Sink Cutout & Bar Top



Laminate. After covering both surfaces with contact cement, press the laminate down in the center and move outward.



Sink Cutout. Before starting up the jig saw, put down a few strips of tape to avoid marring the laminate.



Cutting the Bar Top. Place the blank for the bar top on a pair of saw horses and then rough cut it to shape.

the dry sink is by laying out the shape and drilling starter holes in each corner. Then you can use a jig saw to cut out the shape. The center drawing at the bottom of the facing page shows you how.

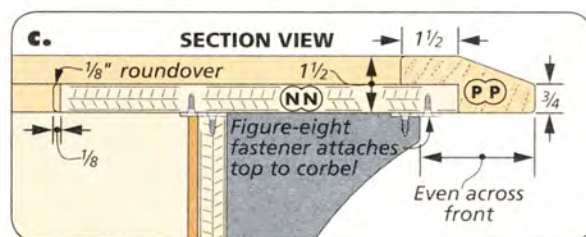
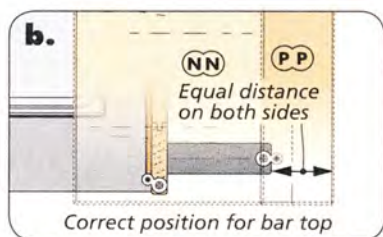
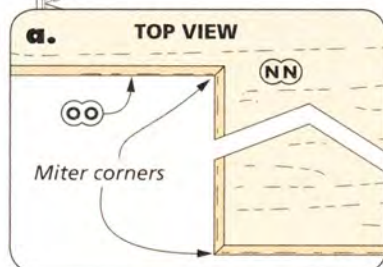
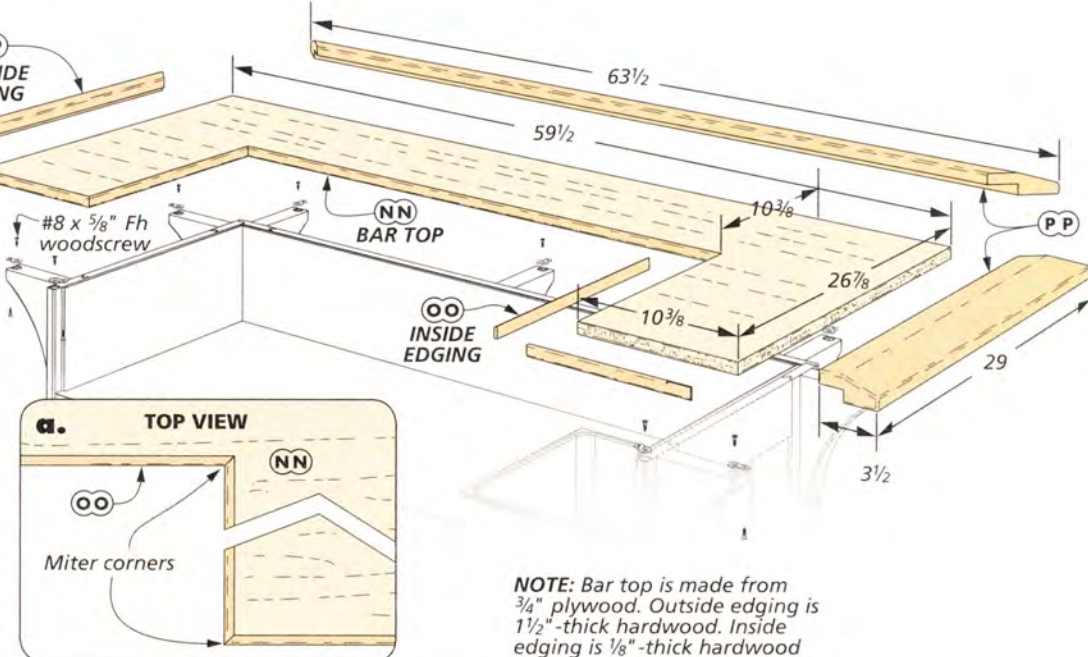
It's important that you have the sink in hand before you do so, however, to make sure the opening is the correct size. The opening will cut into a bit of the top cleat. Don't worry, it's okay.

When you're done, you can mount the countertop using glue on the plywood case and screws from below through the cleats.

BACKSPASH. A backsplash is another needed addition. In this case, it's made from three hardboard panels covered with plastic laminate. Start by cutting three panels to final size. Then cut a couple of strips of hardwood edging for the two side panels and glue them in place.

As you did earlier, use contact cement to adhere the laminate to the hardboard panels. Then flush trim the laminate and glue the backsplash to the front and sides around the countertop as shown in detail 'a' on the opposite page.

BAR TOP. The "business end" of a bar is the bar top. It's not a very large surface, but it's perfect for setting a drink on and maybe a bowl of snacks. As you can see,



it's just a plywood cutout covered with beveled edging on the outside and a simpler, thin edging on the inside.

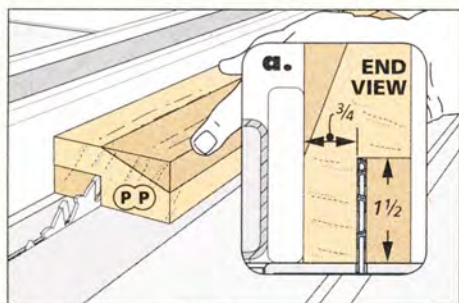
Shop Notebook on page 31 has the details of how I cut the U-shaped bar top. When you're done, you can turn your attention to the inside edging.

INSIDE EDGING. The inside edging couldn't be simpler. I cut thin hardwood strips and mitered them to fit the inside edges. After gluing the edging in place,

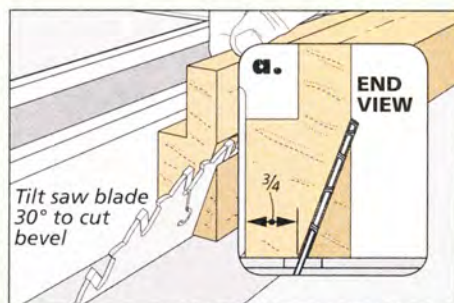
I just broke the sharp edges with a little hand sanding.

OUTSIDE EDGING. I made a large, beveled molding to fit around the outside edges. You'll need some 8/4 stock for the molding, but it's easy to make the profile. The box below shows the process. Then it's just a matter of mitering the pieces to fit around the bar top and installing them with glue. Finally, install the bar top with screws and figure-eight fasteners.

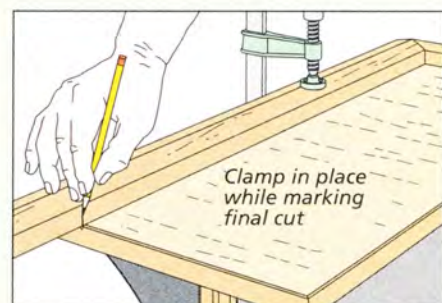
Outside Edging



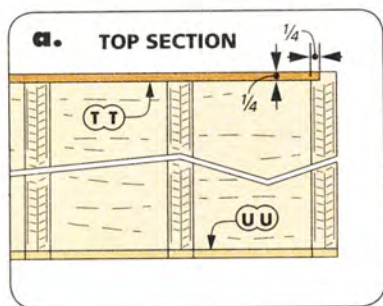
Rabbet. Make the first cut to define the depth, then turn the blank on its side and raise the blade to complete the rabbet.



Beveling the Edge. Angle the blade and set the rip fence to guide the cut. Use a push block to complete the cut.



Fitting the Edging. Clamp the edging in place on the bar top as you mark the piece to final length.



NOTE: All parts of the wine rack are made from $\frac{3}{4}$ " plywood except the edging. Edging is made from $\frac{1}{4}$ " x $\frac{3}{4}$ " hardwood

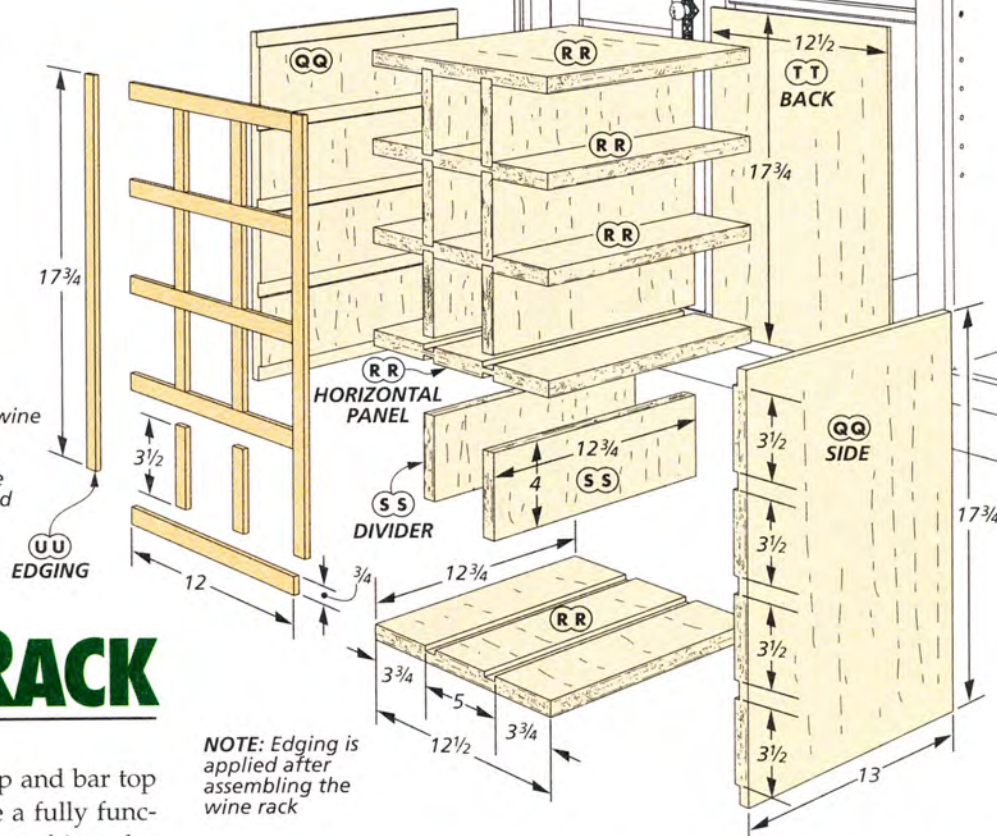
finish with the WINE RACK

With the countertop and bar top installed, you have a fully functional bar. There's nothing else required to begin enjoying it. But if you're like me, you might believe that a bar just isn't complete without a wine rack.

This wine rack is designed to fit in the center compartment of the cabinet and hold a dozen bottles. And while it looks complex, it's actually pretty easy to make. It's just a matter of dialing in your dado blade to match the thickness of the plywood and making a few simple dados and rabbets.

DADOES & RABBETS. The first step is cutting out all the parts. Then you can install the dado blade. The drawing above gives you the

NOTE: Edging is applied after assembling the wine rack



information for cutting the dados and grooves, and the box below shows how to make each cut.

I found that starting with the sides made it easy to keep things in order and dry assemble the wine rack as I progressed. After completing the horizontal panels, all you need to do is cut the dividers to final size.

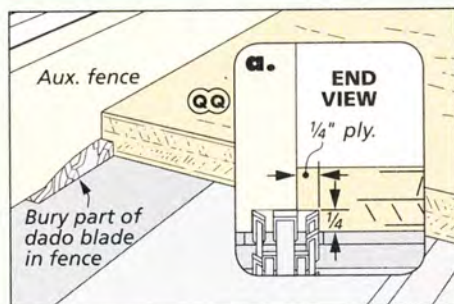
FINISH. It's a good idea to mask the glue surfaces with tape and finish the parts before assembly. It will be difficult to reach inside later. You can find the finish information as well as details on hardware in Sources on page 51.

After that, all it takes is a little glue in the joints and maybe a brad or two to hold things in place while you assemble the wine rack. I used strips of shop-made hardwood edging to cover the plywood. It's best to cut and fit each piece individually.

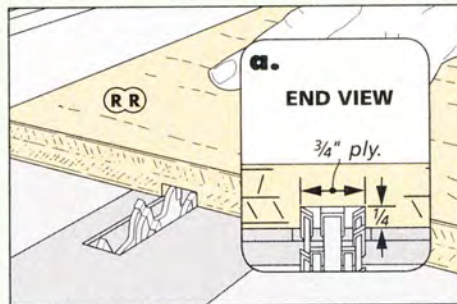
BACK. When the finish has dried, attach the plywood back with a few brads. Then you can slip the wine rack in place in the bar.

By now, I'm sure you have a perfect spot in mind for the bar, so round up a friend to help you move it. You can promise him a drink for the trouble. **W**

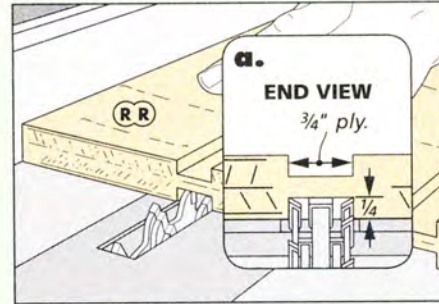
How-To: Wine Rack Joinery



Rabbet the Sides. The sides start with a rabbet on the inside of the back edge that houses the back.



Dadoes. Set the rip fence accurately and you can just cut and flip the workpieces for perfectly spaced dados.



More Dadoes. You can flip the workpieces over and cut the matching dados for the internal horizontal panels.

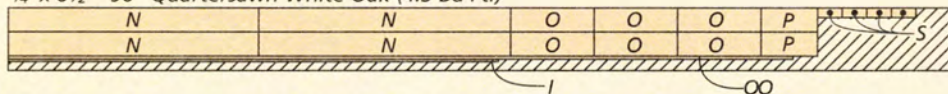
Materials, Supplies & Cutting Diagram

A Case Sides (2)	$\frac{3}{4}$ ply. - $18\frac{1}{4} \times 33\frac{1}{4}$	U Top/Mid Rails (2)	$\frac{3}{4} \times 3\frac{1}{2} - 41\frac{1}{4}$
B Case Bottom (1)	$\frac{3}{4}$ ply. - $17\frac{3}{4} \times 45$	V Bottom Rail (1)	$\frac{3}{4} \times 9 - 41\frac{1}{4}$
C Dividers (2)	$\frac{3}{4}$ ply. - $17\frac{1}{2} \times 28\frac{3}{4}$	W Upper Center Stiles (3)	$\frac{3}{4} \times 3\frac{1}{2} - 8\frac{1}{4}$
D Top Cleats (2)	$\frac{3}{4}$ ply. - $2\frac{1}{2} \times 44\frac{1}{2}$	X Lower Center Stile (1)	$\frac{3}{4} \times 3\frac{1}{2} - 18\frac{1}{2}$
E Toe Kick (1)	$\frac{3}{4}$ ply. - $4 \times 44\frac{1}{2}$	Y Upper Panels (4)	$\frac{1}{2}$ ply. - $8\frac{3}{16} \times 8\frac{3}{16}$
F Back (1)	$\frac{3}{4}$ ply. - $45 \times 33\frac{1}{4}$	Z Lower Panels (2)	$\frac{1}{2}$ ply. - $19\frac{3}{16} \times 18\frac{7}{16}$
G Adj. Shelves (2)	$\frac{3}{4}$ ply. - $16\frac{1}{2} \times 14\frac{5}{8}$	End Panels	
H Fixed Shelf (1)	$\frac{3}{4}$ ply. - $17\frac{3}{4} \times 13\frac{1}{2}$	AA Front Stiles (2)	$\frac{3}{4} \times 3\frac{1}{8} - 41\frac{1}{4}$
I Edging (2)	$\frac{1}{4} \times \frac{3}{4} - 50$ rgh.	BB Rear Stiles (2)	$\frac{3}{4} \times 3\frac{1}{2} - 41\frac{1}{4}$
J End Stiles (2)	$\frac{3}{4} \times 1\frac{3}{4} - 33\frac{1}{4}$	CC Top/Mid Rails (4)	$\frac{3}{4} \times 3\frac{1}{2} - 14\frac{1}{4}$
K Center Stiles (2)	$\frac{3}{4} \times 1\frac{3}{4} - 25\frac{3}{4}$	DD Bottom Rails (2)	$\frac{3}{4} \times 9 - 14\frac{1}{4}$
L Top Rail (1)	$\frac{3}{4} \times 2\frac{1}{2} - 42\frac{1}{2}$	EE Center Stiles (2)	$\frac{3}{4} \times 3\frac{1}{2} - 8\frac{1}{4}$
M Bottom Rail (1)	$\frac{3}{4} \times 1\frac{1}{2} - 42\frac{1}{2}$	FF Upper Panels (4)	$\frac{1}{2}$ ply. - $5\frac{11}{16} \times 8\frac{3}{16}$
Doors		GG Lower Panels (2)	$\frac{1}{2}$ ply. - $14\frac{3}{16} \times 18\frac{7}{16}$
N Stiles (4)	$\frac{3}{4} \times 2\frac{1}{2} - 25\frac{5}{8}$	HH Corbels (7)	$1\frac{1}{2} \times 5 - 8$
O Rails (6)	$\frac{3}{4} \times 2\frac{1}{2} - 8\frac{1}{2}$	Countertop & Backsplash	
P Center Stiles (2)	$\frac{3}{4} \times 2\frac{1}{2} - 5\frac{3}{4}$	II Countertop (1)	$\frac{3}{4}$ ply. - $19\frac{5}{8} \times 46$
Q Upper Panels (4)	$\frac{1}{4}$ ply. - $3\frac{5}{16} \times 5\frac{11}{16}$	JJ Countertop Edging (1)	$\frac{5}{8} \times 1\frac{1}{2} - 46$
R Lower Panels (2)	$\frac{1}{4}$ ply. - $8\frac{7}{16} \times 13\frac{13}{16}$	KK Rear Panel (1)	$\frac{1}{4}$ hdbd. - $7\frac{1}{8} \times 46$
S Door Stops (4)	$\frac{3}{4} \times 1 - 2\frac{1}{2}$	LL Side Panels (2)	$\frac{1}{4}$ hdbd. - $7\frac{1}{8} \times 18\frac{1}{2}$
Front Panel		MM Panel Edging (2)	$\frac{1}{4} \times \frac{1}{4} - 7\frac{1}{8}$
T Stiles (2)	$\frac{3}{4} \times 3\frac{1}{2} - 41\frac{1}{4}$	NN Bar Top (1)	$\frac{3}{4}$ ply. - $26\frac{7}{8} \times 59\frac{1}{2}$

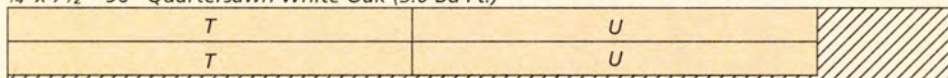
OO Inside Edging (1)	$\frac{1}{8} \times \frac{3}{4} - 80$ rgh.
PP Outside Edging (1)	$1\frac{1}{2} \times 3\frac{1}{2} - 135$ rgh.
Wine Rack	
QQ Sides (2)	$\frac{3}{4}$ ply. - $13 \times 17\frac{3}{4}$
RR Horizontal Panels (5)	$\frac{3}{4}$ ply. - $12\frac{3}{4} \times 12\frac{1}{2}$
SS Dividers (8)	$\frac{3}{4}$ ply. - $12\frac{3}{4} \times 4$
TT Back (1)	$\frac{1}{4}$ ply. - $12\frac{1}{2} \times 17\frac{3}{4}$
UU Edging (2)	$\frac{1}{4} \times \frac{3}{4} - 130$ rgh.

- (2 pr.) $2\frac{1}{2}$ " No-Mortise Hinges w/Screws
- (2) Door Pulls w/Escutcheons
- (1) 13" x 14" Stainless Steel Basin
- (8) $\frac{1}{4}$ " Shelf Pins
- (1 Sheet) 30" x 60" Plastic Laminate
- (1 pk.) Figure-Eight Fasteners
- (4) Magnetic Catches w/Strike plates
- (50) #8 x 2" Fh Woodscrews
- (16) #8 x $1\frac{1}{4}$ " Fh Woodscrews
- (18) #8 x $\frac{5}{8}$ " Fh Woodscrews
- (10) $1\frac{1}{4}$ " Pocket Hole Screws
- (1) 2" - dia. x 4' Bar Rail (Tubing)
- (2) 2" - dia. Bar Rail End Caps
- (2) Bar Rail Brackets

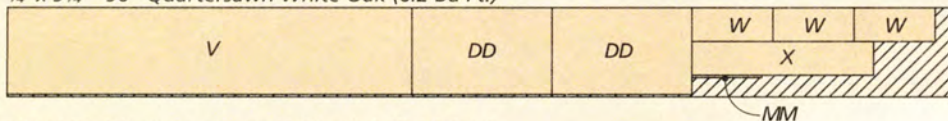
$\frac{3}{4}$ " x $6\frac{1}{2}$ " - 96" Quartersawn White Oak (4.3 Bd Ft.)



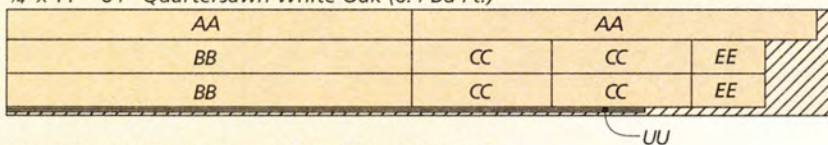
$\frac{3}{4}$ " x $7\frac{1}{2}$ " - 96" Quartersawn White Oak (5.0 Bd Ft.)



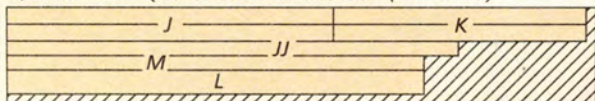
$\frac{3}{4}$ " x $9\frac{1}{4}$ " - 96" Quartersawn White Oak (6.2 Bd Ft.)



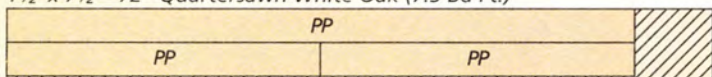
$\frac{3}{4}$ " x 11" - 84" Quartersawn White Oak (6.4 Bd Ft.)



$\frac{3}{4}$ " x 10" - 60" Quartersawn White Oak (4.2 Bd Ft.)



$1\frac{1}{2}$ " x $7\frac{1}{2}$ " - 72" Quartersawn White Oak (7.5 Bd Ft.)



$\frac{3}{4}$ " x $5\frac{1}{2}$ " - 72" Poplar (2.8 Bd. Ft.)



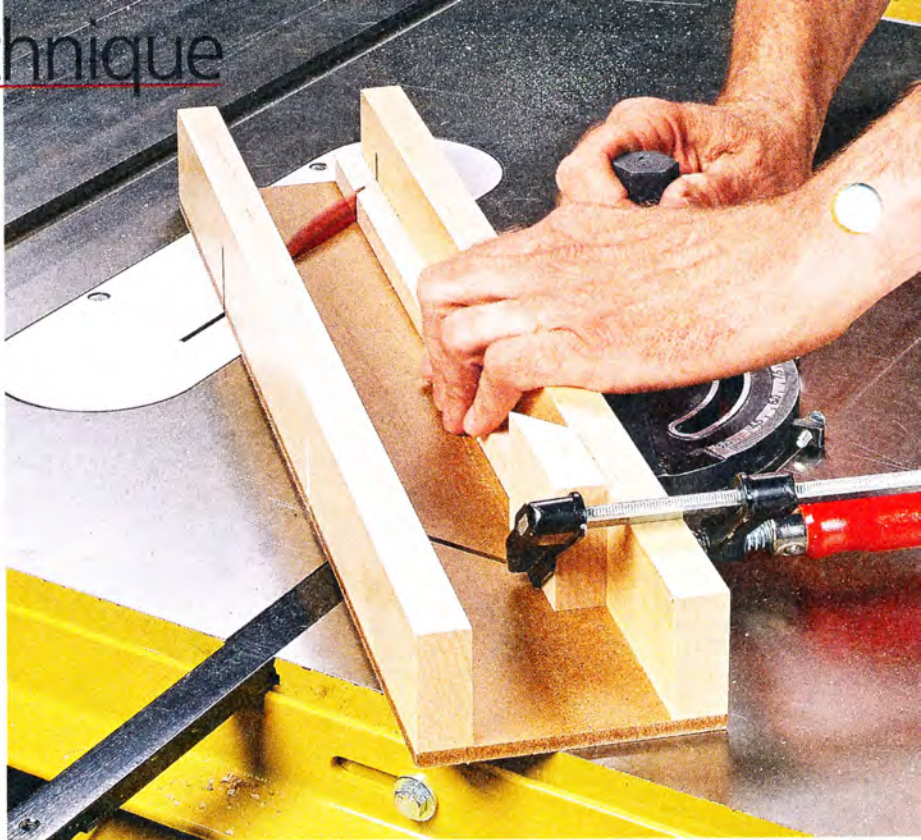
$\frac{3}{4}$ " x $5\frac{1}{2}$ " - 96" Poplar (3.7 Bd. Ft.)



ALSO NEEDED:

Two 48" x 96" Sheets of $\frac{3}{4}$ " Quartersawn White Oak Plywood,
One 48" x 48" Sheet of $\frac{3}{4}$ " Quartersawn White Oak Plywood,
One 48" x 96" Sheet of $\frac{1}{4}$ " Quartersawn White Oak Plywood,
One 24" x 48" Sheet of $\frac{1}{4}$ " Quartersawn White Oak Plywood,
One 24" x 48" Sheet of $\frac{1}{4}$ " Tempered Hardboard

tips for **Mitering Small Pieces**



Gap-free miter joints can be tough to get right. And when you're working at a small scale, you might need some extra help.

It's not unusual for a project to call for a small, mitered part like a piece of molding for a return. Cutting these parts can be difficult. If you turn to a miter saw, it will often send pieces flying across the shop like high speed projectiles. Even cutting them on the table saw can be tricky without some special precautions. Thankfully, there are options. Here are a few techniques for making accurate miter cuts for small projects.

FINISHING BLADE. I normally cut miters at the table saw. So I know

how tough it can be to get good results without first installing the right blade. The combination blade I usually keep on my saw just isn't a good choice for smooth cuts in small pieces. Since miters are crosscuts, I want a blade with lots of teeth.

The larger blade in the margin photo is a good choice. These blades are often referred to as finishing blades, and they usually have 60 or more teeth on a 10" plate. They do a great job for conventional crosscutting.

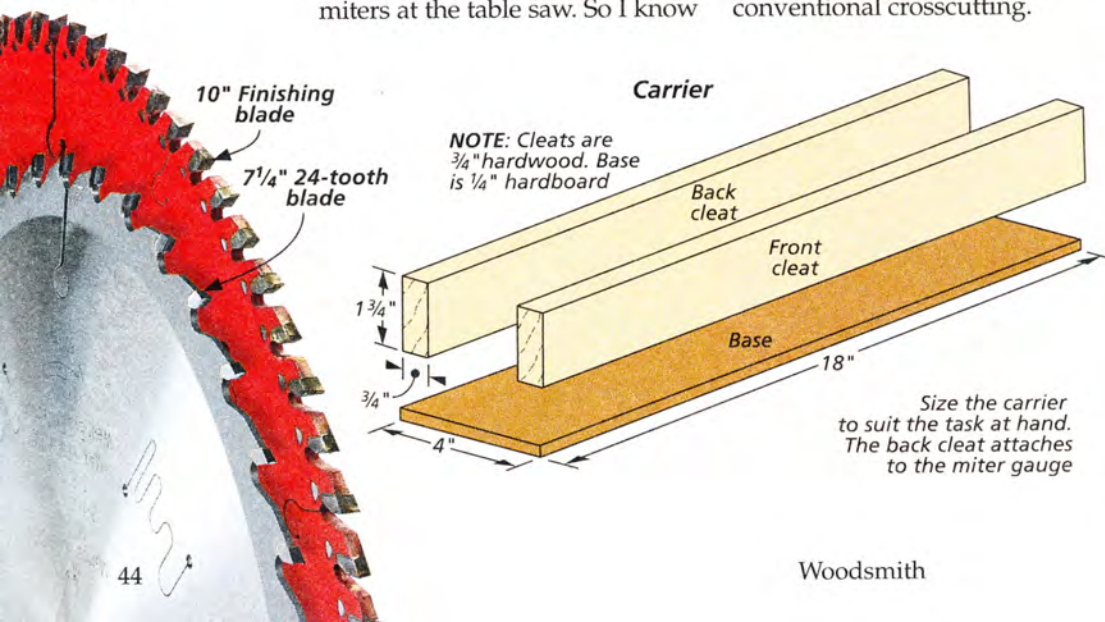
ALTERNATIVE BLADE. But small doesn't just mean short workpieces. I often use thin strips of shop-made molding and glass stop that need to be mitered for a good fit. These pieces tend to tear out and splinter when cut with conventional blades and jigs. To help prevent this, I install a smaller-diameter blade in the saw.

The smaller blade in the photo at left is a 7 $\frac{1}{4}$ " circular saw blade that leaves a glass smooth edge on the workpiece. Fortunately, these blades are inexpensive. And since I don't use it on a regular basis, I've been using the same one for over ten years.

I look for a high-quality blade with at least 24 carbide teeth. This blade fits the $\frac{5}{8}$ " arbor of most table saws. It's a great choice when you're cutting really thin pieces. It has far fewer teeth, but it has a super-thin kerf ($\frac{1}{16}$ ").

THE MITER GAUGE. The standard method for cutting miters at the table saw is to set up the miter gauge and install an auxiliary fence. With the auxiliary fence,

▼ Choosing the right blade is the first step in successful miters.



you can attach a stop block to make sure the pieces are cut to the exact length you need. This setup also provides a backer for the cut to help prevent tearout.

You can use this technique for cutting small parts, but you'll want to install a zero-clearance insert. Without it, the workpiece might become trapped in the throat.

CARRIER. But for small pieces, I prefer to take the auxiliary fence one step further and add a carrier board, as well. You can see what I mean in the main photo and in the drawing at the bottom of the facing page. It's just a piece of hardboard with hardwood cleats to hold it together. The back cleat attaches to the miter gauge and serves as a fence.

MITER SLED. You can improve on this method even further by making a simple miter sled. Many woodworkers rely on a modified crosscut sled for their full-size work. It's the perfect solution for picture frames, mitered box sides, and other projects. Both ends of the joint are cut on the jig, and the result is a repeatable, accurate cut and a tight joint.

But using a full-size sled for small pieces gets a bit tricky. The problem is controlling the small piece after the cut. You need to look at the whole process, from start to finish. On a full-size sled you'll need to add hold-down clamps and make sure you can maintain positive control.



If you have a lot of small pieces to cut, however, it's worth the time to make a scaled-down sled. You'll find plans for the one in the photo above on page 31.

The sled has runners to fit into the miter gauge track, so the path of the sled will always be consistent. This makes it more accurate and reliable than using the fence. A fixed, 45° fence backs up the cut to help prevent splitting, as well. With a little sandpaper on the fences to prevent the workpiece from moving, you can hold it safely through the cut. It's well worth the small amount of time it takes to make.

HAND SAW & MITER BOX. For some small pieces, no matter how careful you are, a power tool can still chip your workpiece. That's why I tend to cut many of the smallest pieces by hand. The scaled-down miter box and

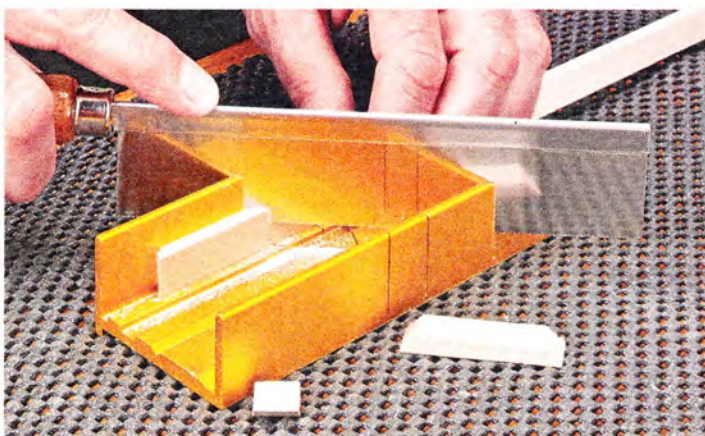
pull saw shown in the left photo below are quite inexpensive and perform very well.

The miter box is set up for cutting perfect 30°, 45°, and 90° miters so you're just about guaranteed a seamless joint. And the very fine teeth (42 teeth per inch) on the saw leave an extremely smooth, chip-free cut. It also has the advantage of being quiet to operate.

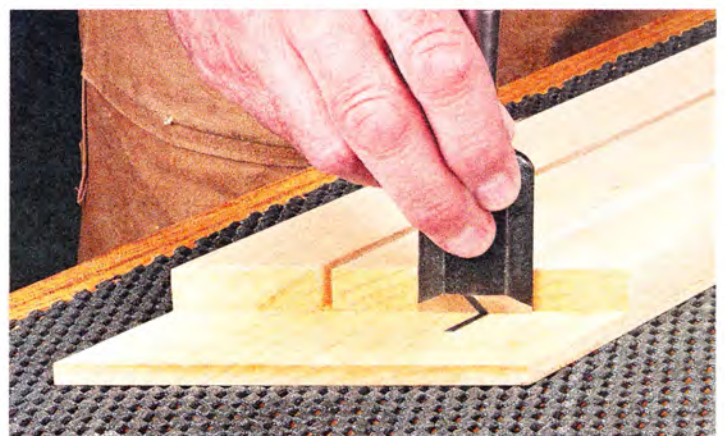
CHISEL & GUIDE BLOCK. Finally, for cutting the smallest workpieces, like string inlay or banding, a sharp chisel is the perfect tool. All you need to do is make a guide block to define the angle. You can see what I mean in the right photo below.

After mitering a piece of scrap to the proper angle, simply cut a groove sized to hold the workpiece tightly in place. Then it's just a matter of slicing the piece with a paring cut. **W**

▲ This miter sled makes cutting small parts foolproof. Find out how to make one in Shop Notebook on page 31.



▲ The extruded aluminum miter box provides dead-on accuracy. The matching pull saw makes cutting small pieces quick and easy. See Sources on page 51 for details.



▲ A shop-made guide is the perfect solution for mitering thin banding or inlay. A chisel cuts these extremely thin pieces quickly and leaves a cleaner edge than a saw.



trouble-free

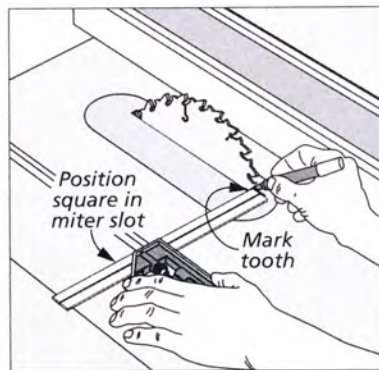
Ripping at the Table Saw

From setting up your saw to using the proper techniques, learning the fundamentals of ripping will improve the quality of your work.

Ripping stock, or cutting with the grain direction to a specified width, is one of the first table saw skills you need to master. Virtually every project you'll ever build will require pieces ripped to consistent widths. It's such a fundamental skill that it's often taken for granted and dismissed as a topic for deeper discussion.

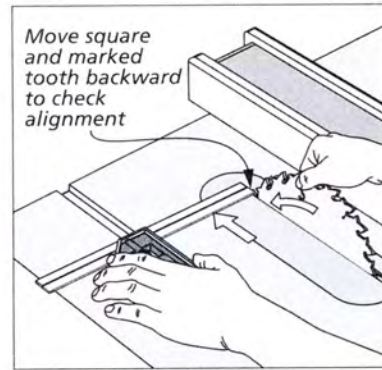
But there's a lot more going on when you rip a workpiece than just pushing it through the blade. And knowing the details can save you a lot of mistakes or even prevent an accident.

SAW SETUP. Before picking up the workpiece, it's always a good idea to make sure your saw is set up properly. By that I mean checking that the blade is parallel to the miter slot and that



the fence, when locked in position, is also parallel. If you don't start with a tuned-up saw, you're asking for problems like binding, burning, or kickback.

Fortunately, it's not hard to check. Just use a combination square, as shown in the drawings above. The owner's manual for your saw will tell you how to make the necessary corrections.



BLADES. Now that you know the saw is ready for action, the next step is to install a rip blade. If you're used to using a combination blade, that's okay for ripping 4/4 hardwood. But a dedicated rip blade will almost always give you a better result, and for thicker stock, a rip blade is a must. The photo of the rip blade in the margin shows a "glue line" rip blade.





Riving knives are now required equipment for new table saws



A splitter is an easy thing to add to a shop-made throat insert

The name says it all. It leaves a very smooth edge that's ready to be glued up. Most rip blades have flat-top teeth and deep gullets to remove waste efficiently. This is one of the keys to accurate, burn-free cuts.

Another thing to consider is the power of your saw. Unless you have a heavy-duty cabinet saw, a thin-kerf blade will be a big help for ripping thick (1½"-thick or more) stock. The reason for this is simple. The difference between

the regular blade (⅛" thick) and a thin kerf blade (⅜" thick) doesn't sound like much (⅛"). But it's 25% thinner. That difference is very noticeable in the reduced workload it puts on the motor.

RIVING KNIFE OR SPLITTER. Ripping a workpiece can often release the internal tensions that have been in the wood since it was cut and dried at the sawmill. Sometimes this can result in the kerf opening up or closing after passing through the saw blade.

If it closes up, it can pinch the blade and even cause the motor to bog down. A splitter or riving knife solves the problem. By installing a splitter after the blade, you can be assured that the workpiece will slide through the cut without trapping the blade or burning. Keeping the guard installed ensures this is not a problem.



▲ A magnetic featherboard is easy to set up. Just put it in place and twist the knobs to engage the magnets.



▲ Outfeed support is crucial when ripping long workpieces. One way to support the workpiece is to make your bench or other worktable the same height as your table saw.

The left photo above shows a factory-installed riving knife. These are now required by law on new table saws. The advantage of a riving knife is that it moves with the blade when you raise or lower it and even when you change the angle.

The shop-made splitter in the right photo above is an easy fix for older saws. It isn't as versatile as the riving knife, but it still works well when ripping.

PUSH BLOCKS. The primary rule of working at the table saw is pretty obvious: Keep your hands away from the blade. One good way of doing that is to use push blocks. There are several types of commercial push blocks available (top and bottom photos at right), but it's pretty easy to make your own out of scraps (center photo at right).

FEATHERBOARD. One of the keys to successful ripping is keeping the workpiece tight against the fence as you guide the workpiece through the cut. A featherboard guarantees this. There are several different styles of commercially made featherboards. My favorite has strong, switched magnets to hold it in position (top photo at left).

OUTFEED SUPPORT. Finally, there's one more thing you must do before ripping long stock — set up some sort of outfeed support. Trying to support a long workpiece without help is inviting an accident. The bottom photo at left shows one option. The main photo on the opposite page shows how I use a roller stand. Either method works well.

▲ A riving knife (left) or a splitter (above) prevents the kerf from closing up and causing kickback.



▲ A push block, whether shop-made or purchased, is a must-have item for safe ripping.

FINAL PREPARATIONS

With your saw set up and ready to cut, there are still a few things to keep in mind when you rip a workpiece. By developing a routine that includes the following information, you can be sure of getting good results every time.

STOCK PREPARATION. While it's true that your table saw is a workhorse and can rip pretty hard and thick boards, you need to make sure the stock is prepared for the saw before jumping in. To start with, your lumber must have one flat face and one jointed edge.

If you try to cut a board with a bowed edge or a twist in the body, it will often shift position slightly during the cut. Any movement like this can lead to kickback, one of the most dangerous things that can happen at the table saw. The box on the opposite page tells you how it happens and how to avoid it.

All it takes to prevent this type of movement is to joint one edge and face. Then keep the jointed edge against the fence, and the jointed face down on the table as you make the cut.

BLADE HEIGHT. You're likely to hear lots of conflicting advice when it comes to setting the height of the blade. You can decide for yourself



▲ Jointing one edge and one face of a workpiece is an important first step in safe ripping. Whenever possible, you want a flat surface on the table and a straight edge against the rip fence.

when you take a closer look at what's happening during a cut.

When you cut through a piece of hardwood, the teeth on the blade are creating considerable friction. It stands to reason that you want to minimize the friction (and often the associated burning) by setting the blade height so as few teeth as possible are embedded in the workpiece.

My rule of thumb is to keep two full teeth above the surface. Detail 'a' in the drawing below shows

you what I mean. This allows for plenty of cutting power without raising the blade so high it creates a safety issue.

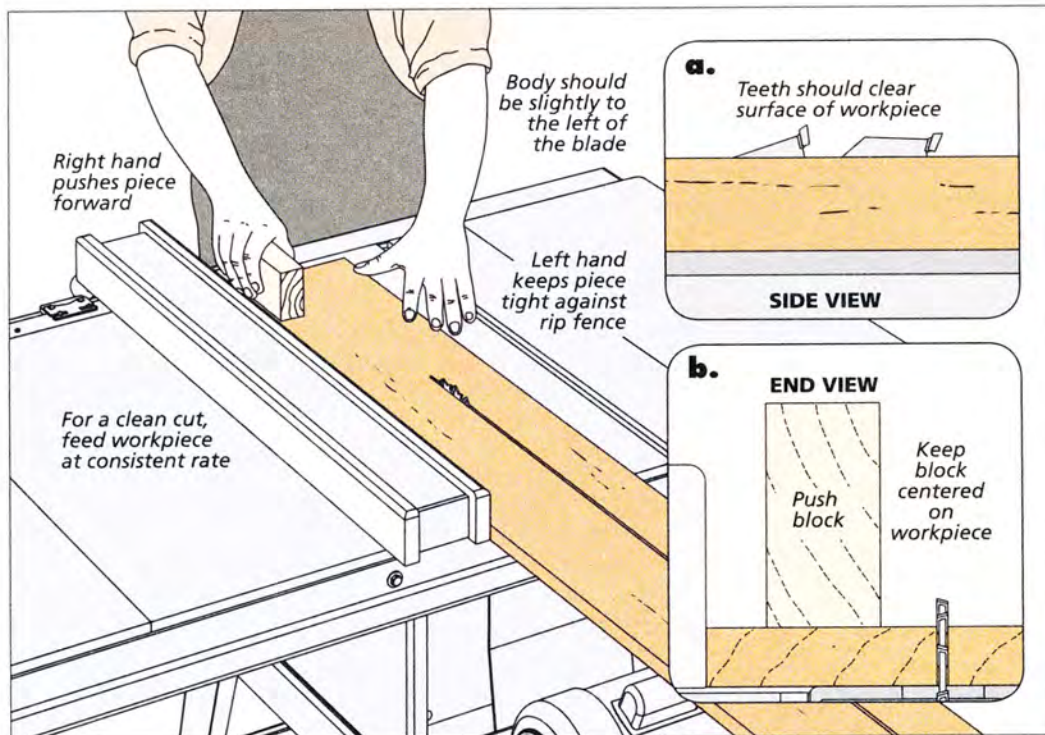
TECHNIQUE

After all this preparation, you're ready to get busy ripping your stock. The drawing at left shows a few of the key techniques.

BODY POSITION. First, your body position is important, both for safety and effectiveness. By standing slightly to the left of the workpiece, you remove yourself from the path of a workpiece that could be kicked back. This also puts your right hand in the perfect position to push, or feed, the workpiece into the blade.

Your left hand can be used to hold the workpiece against the rip fence. But you should always keep this hand in front of the leading edge of the blade. You should never place your hand far enough forward to push the stock into the side of the blade. The same is true if you're using a featherboard. Always install it so it's in front of the blade.

FEED RATE. The next thing to focus on is the rate at which you push the workpiece through the cut — known as the feed rate. Never force the workpiece into the blade, but let the saw blade



do the work and move the stock at the rate the blade will cut. On the other hand, don't feed the workpiece too slowly, or the stock can burn.

Finding the correct feed rate is easier to feel than to describe, and you'll quickly develop a sense of the optimum feed rate for a given piece of wood. Of course, this will vary depending on the species and thickness of the wood, the sharpness of the blade, and the power of your saw's motor.

Once you determine the right feed rate, maintain a steady speed. When you come close to the end of the cut, grab a push block to complete the cut.

STRATEGY. You'll find it pays to have a plan before you begin cutting. This way, you can rip all the pieces of a particular width using the same setup. I don't mean that you should go through the plan and cut every project part, but all related pieces such as door rails and stiles should be cut before moving on. Then you're ensured of consistent results.



PLYWOOD. So far, everything I've talked about pertains to solid wood stock. But there are also potential problems associated with ripping sheet goods, like plywood. You can see the most troubling in the photo above. A 4' x 8' sheet of plywood is heavy and unwieldy. Trying to manage it on your own can be a nightmare.

The key is to position yourself at the corner. This allows you to support the plywood and simultaneously keep it against the rip fence. As you progress through the cut, keep the feed rate steady as you complete the cut.

There's a better technique, though, and I'll be happy to share it. Most places that sell plywood will also cut it for you using a panel saw. My advice is to take advantage of this service and have your plywood rough cut into manageable pieces. You can do the final cuts in your shop without all the hassle.

I have one more bit of advice: Never ignore your instincts. If something feels wrong, stop and think. With that in mind, you're ready to tackle a project. And by developing good ripping habits, you're sure to find success. **W**

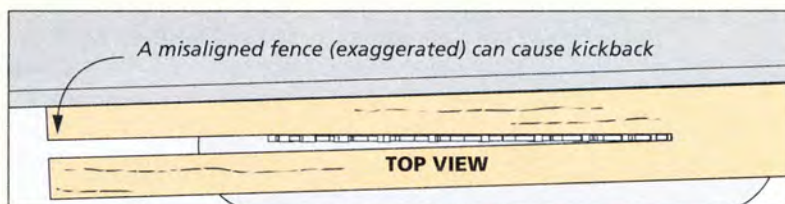
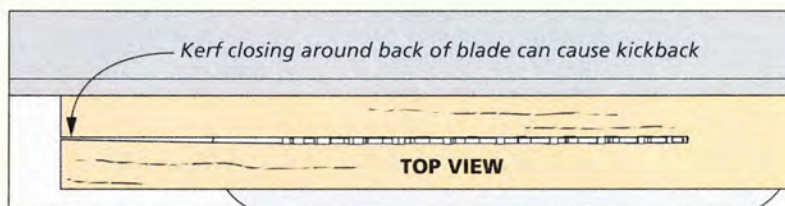
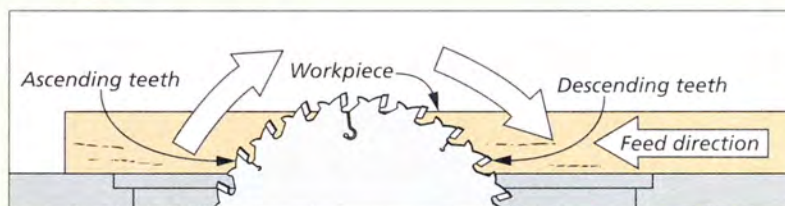
▲ Correct body position is key when cutting a large sheet of plywood.

Safety Tips: Know the Danger Zones

It's pretty obvious that a fast-moving saw blade is dangerous. And there's more to watch out for than sharp teeth. To avoid injury, I think of the blade in terms of two zones — the front and back. It all has to do with the direction of motion (top drawing at right).

FRONT ZONE. First, the teeth at the front edge of the blade are the ones that get all the attention. And it's true that the last thing you want to do is get your fingers caught in them. The teeth at the front of the blade are moving forward and down. The good thing about this zone is that the motion of the blade pushes the workpiece down onto the flat table, adding stability to the cut.

BACK ZONE. But just as dangerous is the back edge of the blade. This is where kickback begins. The teeth at the rear are moving upward. If these teeth catch any part of the workpiece, kickback is the result. It happens quickly and without warning, and it can send a workpiece toward your head or body. This is why I talked about the need for flat and square stock earlier. A splitter or riving knife is the first line of defense, but your attention during all phases of the cut are the only sure way to avoid an accident.



Danger Zones. Under certain circumstances (see the examples above), the ascending teeth on the back of the blade can catch and lift the workpiece, propelling it back toward the operator without warning.

Questions & Answers

Bans on Exotic Woods



Exotic hardwoods, like this beautiful piece of cocobolo, are protected from extinction by CITES.

Q I've heard news reports that many African and South American hardwoods are being banned and that some companies are even being fined for using old stock. What's going on with bans on exotic woods?

Richard Burleson
Reno, Nevada

A You're referring to the impact of the CITES treaty, or the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Signed in 1973, the aim of the treaty is to ensure that international trade in specimens of wild animals or plants does not threaten survival of the species in the wild.

PROTECTED SPECIES. There are over 34,000 species of animals and plants protected by CITES. The most well-known of the species being protected are endangered animals. Species like gorillas and cheetahs and animal by-products such as ivory are protected by CITES.

But animals account for only 6,000 of the protected species. The vast

majority of restricted species are plants and trees. The individual plants and animals are listed in three appendices to the treaty which contain guidance and restrictions on importing and exporting.

There are roughly 1,200 species that are threatened with extinction in Appendix I. Probably the most well-known example for woodworkers is Brazilian rosewood (*Dalbergia nigra*). This particular type of rosewood has been a favorite of furniture builders and musical instrument makers for hundreds of years. The strong demand caused such a high degree of damage to the trees in Brazil that there is very little available today.

Like the other species in Appendix I, a trade ban is in place for this type of wood, although some exceptions are made to allow for the trade in existing stock (already harvested wood, for example). These require government-approved export and import permits.

Appendix II, the largest of the three, lists species that are not immediately

threatened with extinction but may become so if trade is not regulated. Lignum vitae (*Guaiaecum* all species), pernambuco (*Caesalpinia echinata*), and African teak (*Pericopsis elata*) are found in Appendix II. Trade in these species requires an export permit and a certificate of origin from the listing country.

There are about 170 species listed in Appendix III. This appendix contains species that only one country has asked to include. The species might not be threatened globally, but only in one country. Cocobolo (*Dalbergia retusa*) and Honduran rosewood (*Dalbergia stevensonii*) are found in appendix III. These require only a valid export permit from the country in question.

CONSEQUENCES. Even wood harvested years ago is protected by CITES. The biggest reason this has been in the news recently is the controversy surrounding some ebony from Madagascar used by the Gibson guitar company.

The unfortunate consequence of the treaty is that the burden of proof

is on the consumer to prove a piece of furniture or an instrument was either made from wood harvested prior to CITES or is a different species. And if an object is confiscated, regardless of its value, it will not be returned to the owner.

US LAW. Like any international law or treaty, CITES relies on the laws of individual countries to govern the action in those countries. In the US, it's the Endangered Species Act (also known as the Lacey Act). US Fish & Wildlife Service enforces the restrictions and can provide assistance documenting an old, legal piece of furniture or instrument.

Complete listings (appendices) can be found at: fws.gov/international/plants/current-cites-listings-of-tree-species.html.

The good news is that we have a great supply of American hardwoods that are perfect for most of our woodworking projects. But the endangered species listed in CITES can stand as a reminder of the importance of good stewardship of our resources. **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.

The *Woodsmith Store*, in Des Moines, Iowa, is an authorized Rockler dealer. They carry many of the hardware items used in our projects. And they ship nationwide. Their customer service representatives are available for your calls from 8am – 5pm Central Time, Monday through Friday.

HANDSCREWS (p.10)

- **Amazon.com**
HandscrewsVaries

COMPACT ROUTER TABLES (p.12)

- **Rockler**
Trim Router Table 43550
Dust Port 21528
Bench Dog ProTop 20253

- **Kreg Tool**
Benchtop Router Table ... PRS2100

EDGE-BANDING BITS (p.14)

- **MLCS**
90° Edge-Banding Bit Set ... 7732
60° Edge-Banding Bit Set ... 7733

MORTISE & TENON JOINTS (p.16)

Most of the online retailers carry a fine selection of bench chisels.

- **Lie-Nielsen**
Medium Shoulder Plane 042

COFFEE TABLE (p.18)

No special hardware is required for the coffee table. The beveled glass panels were purchased at a local glass store. The table was stained with *General Finishes' Candlelight* oil stain and then sprayed with two coats of lacquer.

MIRROR (p.27)

- **Home Depot**
D-Ring Hangers 153012
 - **Rockler**
Glass Retainer Clips 26884
- The mirror was stained with *Varathane's Gunstock Oil Stain* and then sprayed with two coats of semi-gloss lacquer.

BAR (p.32)

- **Rockler**
Magnetic Catch 26559
Figure-Eight Fasteners ... 21650
 - **Horton Brasses**
Pulls VT-21 Dark Antique
Hinges NM-7 Dark Antique
 - **Big Tray**
Dry Sink ABC7236
 - **Kegworks**
Tubing ORB-990-04
End Caps ORB-76940-2
Brackets ORB-76912-2
- The bar was stained with a mixture of equal parts *General Finishes' Candlelight* and *Brown Mahogany* oil stains and then sprayed with two coats of lacquer.

SMALL MITERS (p.44)

- **Rockler**
Miter Box & Saw 22481

RIPPING (p.46)

You can find rip blades, push blocks, and other table saw accessories at most hardware stores. If you can't find them, then the online retailers at right will be able to help you out.

- **Rockler**
Magswitch Featherboard .. 39194

MAIL ORDER SOURCES

Project supplies may be ordered from the following companies:

Woodsmith Store
800-444-7527

Rockler
800-279-4441
rockler.com

Amazon.com

Big Tray
800-244-8729
bigtray.com

General Finishes
800-783-6050
generalfinishes.com

Home Depot
800-466-3337
homedepot.com

Horton Brasses
800-754-9127
horton-brasses.com

Kegworks
877-636-3673
kegworks.com

Kreg Tool
800-447-8638
kregtool.com

Lie-Nielsen Toolworks
800-327-2520
lie-nielsen.com

MLCS
800-533-9298
mlcswoodworking.com

Varathane
rustoleum.com



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mahogany End Table

This elegant solid-wood end table makes a great complement to the coffee table.

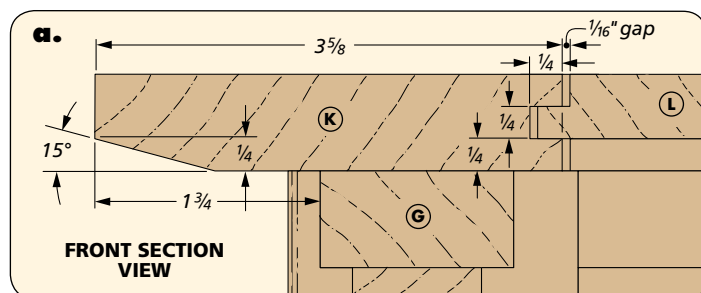
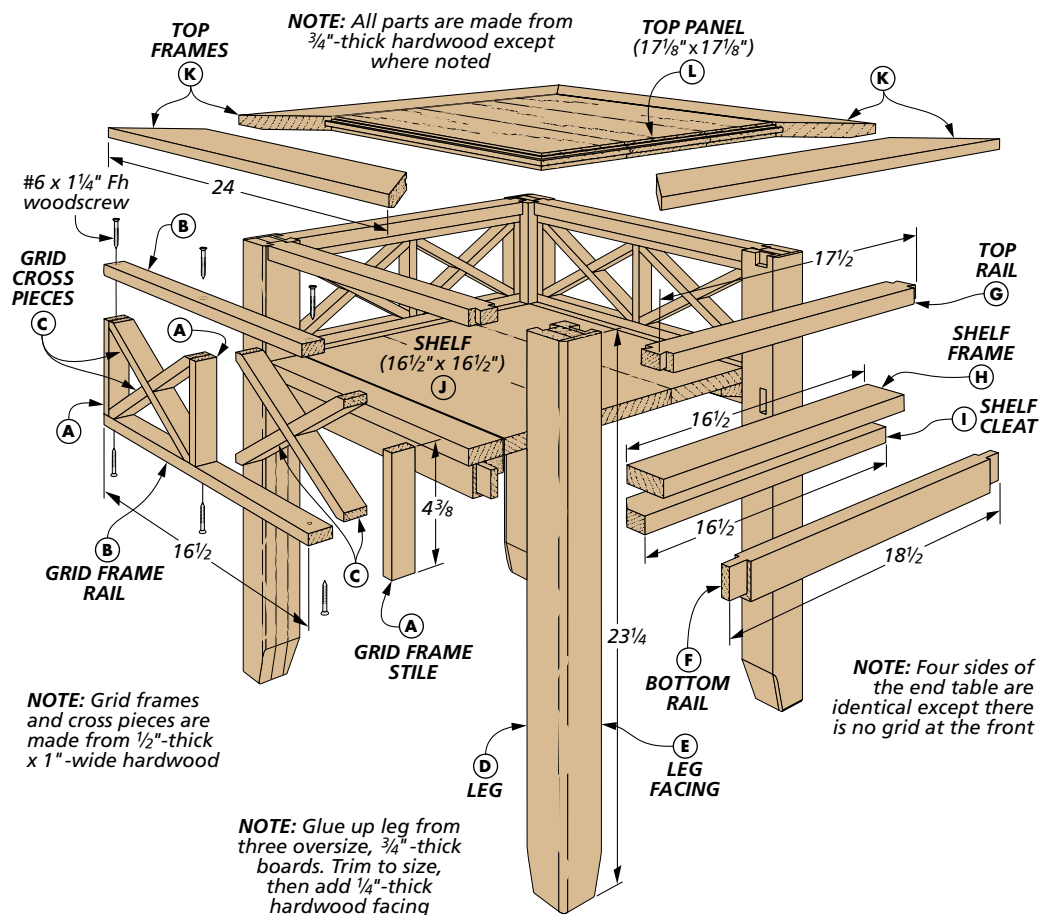
If you liked the mahogany coffee table project in issue No. 209 of *Woodsmith*, then you'll probably want an end table or two to fill out your new living room set. And this table is the perfect companion piece.

It shares many of the same construction details and techniques with the coffee table, but in a taller, square package. Here, I'll walk you through a few of the differences in the construction of the end table. You can refer to the coffee table article for the details on the techniques.

LONGER LEGS. One difference that's easy to see is that the end table is taller than the coffee table, so the legs are longer. Other than that, they're made exactly like the legs on the coffee table.

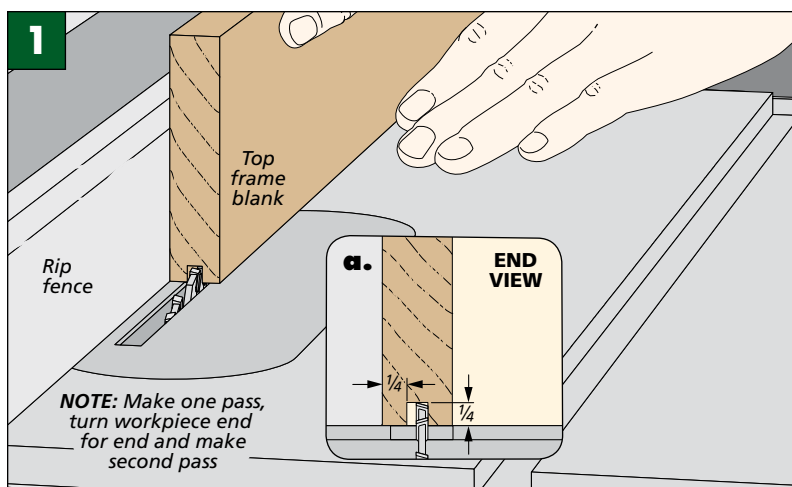
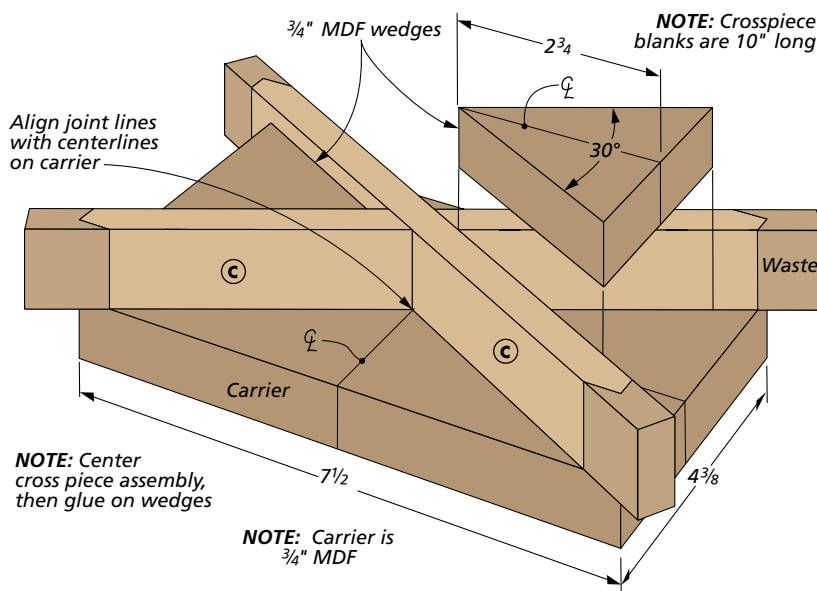
SQUARE DESIGN. Also, this end table is square rather than rectangular. So while the rectangular coffee table had a number of front and back parts that were longer than the end parts, many of the parts on this table are identical lengths, as shown in the drawing at right. They're machined and assembled the same way as before.

GRIDS & TOP. As for the grid frames and end table top, they also have some differences worth noting. The top features tongue and groove joints between the frame pieces and the panel (detail 'a'). You'll find more information on these parts on the next page.

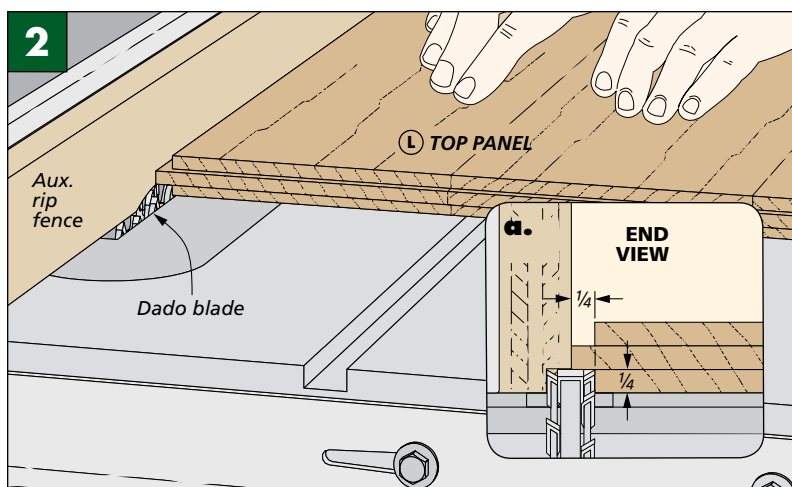


One of the unique features of the coffee table is the X-shaped grid panels that enclose the back and sides of the table. The end table also has these panels, but there are a few differences to these panels that are worth noting.

CUTTING THE CROSS PIECES. The process for assembling the cross pieces and cutting them to size remains the same, except the final size of the cross piece assemblies is different. As a result, the MDF carrier board used for many of the table saw cuts is also different. The dimensions you'll need for the end table carrier are shown at right.



Cut a Centered Groove. With the saw equipped with a standard table saw blade, set the rip fence to cut a groove just off-center on the frame piece. After making the first cut, flip it end for end to center the groove.



Make the Mating Tongue. Bury a dado blade in an auxiliary rip fence, and cut along both faces of the panel to make a centered tongue. Sneak up on the depth of the cut, and check the fit in a groove in a frame piece.

Probably the biggest difference between the mahogany coffee table and the end table is the top. On the coffee table, rabbeted and mitered frame pieces accept beveled glass panels. But the end table features a solid-wood top panel with tongues around the edges that fit in mating grooves in the frame pieces.

PART PREPARATION. Fortunately, this change is a pretty easy one to make. You can get started by cutting out three narrow boards to make up the top panel, and then gluing them edge to edge. When the glue dries, sand the panel smooth, and cut it to final size.

As for the the top frame pieces, you can simply cut all four parts to width and a bit longer than needed for now. Don't miter the ends just yet.

CUT THE GROOVES FIRST. Now you can get started on the grooves in the edges of the top frame pieces. This can be done with a standard table saw blade, as shown in Figure 1. Start with the blade slightly off-center on the thickness of the piece. That way, you'll end up with a centered groove when you flip the piece end for end to make the second cut.

TONGUES ON THE TOP PANEL. Next up is the centered tongue on the top panel. This is best accomplished by outfitting your table saw with a dado blade and a wood auxiliary rip fence, as shown in Figure 2. The key here is to “sneak up” on the thickness of the tongue, and check its fit in the groove until it’s just right.

REVEAL. After mitering the frame pieces, you're ready to assemble the top. If you refer back to detail 'a' on page 1, you'll see the top panel is $\frac{1}{8}$ " narrower and shorter than the opening in the frame pieces that it fits into. This creates a $\frac{1}{16}$ " "reveal" around the tabletop and allows the panel to expand and contract. As you assemble the top, spot-glue the center of the tongues on the panel, and then position the panel in the grooves to create an even reveal between it and the frame. **W**

A	Grid Frame Stiles (9)	$\frac{1}{2} \times 1 - 4\frac{3}{8}$	I	Shelf Cleats (4)	$\frac{3}{4} \times 1\frac{3}{4} - 16\frac{1}{2}$
B	Grid Frame Rails (6)	$\frac{1}{2} \times 1 - 16\frac{1}{2}$	J	Shelf (1)	$\frac{3}{4} \times 16\frac{1}{2} - 16\frac{1}{2}$
C	Grid Cross Pieces (12)	$\frac{1}{2} \times 1 - 10$ rgh.	K	Top Frames (4)	$\frac{3}{4} \times 3\frac{5}{8} - 24$
D	Legs (4)	$2 \times 2\frac{1}{4} - 23\frac{1}{4}$	L	Top Panel (1)	$\frac{3}{4} \times 17\frac{1}{8} - 17\frac{1}{8}$
E	Leg Facings (4)	$\frac{1}{4} \times 2\frac{1}{4} - 23\frac{1}{4}$			
F	Bottom Rails (4)	$\frac{3}{4} \times 1\frac{1}{2} - 18\frac{1}{2}$		(18) #6 x $1\frac{1}{4}$ " Fh Woodscrews	
G	Top Rails (4)	$\frac{3}{4} \times 1\frac{1}{2} - 17\frac{1}{2}$		(6) #8 x $1\frac{1}{4}$ " Ph Woodscrews	
H	Shelf Frames (4)	$\frac{3}{4} \times 2 - 16\frac{1}{2}$		(18) $\frac{3}{4}$ " Brads	

(18) #6 x 1 $\frac{1}{4}$ " Fh Woodscrews
(6) #8 x 1 $\frac{1}{4}$ " Ph Woodscrews
(18) $\frac{3}{4}$ " Brads

Diagram of a beam cross-section showing a rectangular section with width $2K$ and height $2I$. The section is divided into two parts of width K each. The top part is labeled K and the bottom part is labeled I . The bottom part is shaded with diagonal lines.

D	D	D	
D	D	D	

J	J	J	H	H	
			H	H	

Diagram of a beam with three segments of length L . The beam is supported by a pin support at the left end and a roller support at the right end. The beam is subjected to a uniformly distributed load G over its entire length. The reaction forces at the supports are labeled F .

looking inside Final Details



- **Coffee Table.** A beveled glass top and grid panels on the sides and back give this coffee table a light, open feel. But the construction is as solid as can be. Turn to page 18 for complete plans.



- ▲ **Mirror.** A simple frame adorned with a couple of moldings gives this mirror an understated elegance. Best of all, it's a project you can build in a weekend. Plans start on page 27.

- ◀ **Home Bar.** Whether you're mixing drinks or just enjoying the company of a few friends, this attractive bar makes a great gathering place. You'll find step-by-step directions on page 32.