Shaker Hanging Cabinet

If you own any books about the Shakers or their furniture, you probably have seen a small storage cabinet like this one hanging in the background behind the more celebrated pieces.

I first spotted a close relative of this cabinet in William F. Winter's "Shaker Furniture" (Dover). After a long and glowing description of the chairs shown in the same photograph, Winter notes only: "This small, pine, wall cupboard (from the North family, New Lebanon) is a typical convenience of the sisters' shops."

When I visited the Shaker Village of Pleasant Hill (shakervillageky.org) in Harrodsburg, Ky., I saw a similar cabinet hanging on a peg in one of the second-floor rooms. While eating sweet-potato casserole in the Trustees' Office Inn that evening, everyone else at the table was raving about the built-in cabinets; I was smitten with the little hanging cabinet (and the casserole).

Then, years later, I noticed that Thomas Moser published a more refined version in his seminal "How to Build Shaker Furniture" (Sterling).

The way I see it, this small cabinet has what few woodworking projects can truly lay claim to. It is both simple to build and exceptionally well-proportioned. For that, it deserves center stage.

PHOTO BY AL PARRISH

Story and project by Christopher Schwarz, executive editor

4 Important Lessons

When building this hanging cabinet there are four important things to pay attention to:

- **Rabbet joinery:** This cabinet – in one way or another – is built using mostly rabbets. Become familiar with this joint before you attempt this project. A good place to begin learning about rabbets is by reading "Cut Accurate and Clean Rabbets," which begins on page 8.
- **Wood selection:** This cabinet will not look right if you choose the wrong boards for the front. The rails and stiles must have the straightest grain possible. Curvy, diagonal or irregular grain will distract from the simple lines of the piece. Save the most dramatic grain patterns, such as a cathedral grain, for the door's panel.

One common mistake many beginners make is that they try to make a project with as few boards as possible. While no one likes to waste wood, the bigger sin is to build a project that could have looked a lot better in the end. So buy some extra wood and save the scraps for the interior pieces that won't show on a future project.

When picking boards for the two side parts, choose pieces that have straight grain at the edges. This grain pattern will match the straight grain on the case stiles, making the sides look pleasing and – if you're lucky – almost seamless.

- **Fitting a door:** Beginners hate fitting doors. Experts know there is a trick to making them right with little fuss. Follow the directions carefully and you'll see how straightforward it can be.
- **Wood movement:** The back is made from a solid-wood panel, so it will expand and contract about ⅛" with changes in humidity. This means you have to attach the back in a special way to prevent it from splitting or wrenching your cabinet apart as it answers nature's call.

Making a Strong Case

Once you select your boards and joint and plane them down to the correct thickness, you should mill all the parts for the carcase. Joint one long edge of each board, rip them to width and then crosscut them to finished length. Leave the door parts and frame stiles long for now – you will cut them to fit the assembled carcase.

The first joints to cut with this project are the three rabbets in each side piece. Set up your table saw to cut a ¾"-wide x ¼"-deep rabbet using the instructions provided in "Cut Accurate and Clean Rabbets." Make a test cut in some scrap that's the same thickness as your sides. Check your work with a square and some care. If this joint does not have a dead-on 90° corner, your carcase won't have one either. If it is square, check the dimension of the rabbet using a dial caliper. This might sound like overkill, but it's not. Here's why: If this joint is just a little off, then all the joints that follow it will have to compensate for this small error – especially when you start building the door and fitting it to the case. Small errors like this tend to add up during the course of a project.

When you're satisfied with the setup of your dado stack and rip fence, lock the height of the arbor. This is important for a couple of reasons. With some less-expensive table saws, you can actually force the arbor to creep downward during a cut with a dado stack. I've seen it happen – your dado will look like a ramp for skateboarders instead of a properly made joint. Also, you will be keeping this exact height for the next two joinery operations, so locking in your setting is a good idea. With your saw set, cut this rabbet on the ends of the two side pieces. This joint holds the top and bottom of the case in place.

Next, cut the rabbet in the sides that will hold the back panel. To create this rabbet, you need only adjust your rip fence to make a ½"-wide x ¼"-deep rabbet and cut that rabbet on the long back edge of each side piece.

After that, cut the dados in the side pieces that will hold the two ½"-thick shelves in place. To make your life easier, make sure you do not change the height of the dado stack you just used to cut the rabbets. Remove the dado stack from the arbor and install the correct number of wings, chippers and shims to produce a perfect ½"-wide dado.

The dados for the shelves are ¼" deep. By leaving the height of the blades alone, you ensure that the shelves, top and bottom will keep your case square. If you change the height of the blades even a tiny bit before cutting the dados, one of two bad things will happen. If your cut is too deep, your shelves won't seat all the way down into the bottoms of the dados without some extraordinary clamping pressure. (If you manage to close this joint, your carcase will end up with an hourglass shape and the rabbets at the top and bottom will be gappy and weak.) If your dado cut is too shallow, the shelves will cause the sides to bulge out in the center and the rabbets at the top and bottom will be gappy, unattractive and weak.

To make the dados in the sides, use your table saw's miter gauge (set to 90°) and a gauge block clamped to your rip fence, as shown in the photo below. Mark on your side pieces the locations of both dados. Sure, it will take an extra minute, but it prevents mistakes. Also mark the top and bottom of each of the sides so you don't get the right and left sides confused – a common mistake that even professionals make.

With the dados cut, you are almost ready to assemble the basic carcase. It's always a good idea to prepare your interior surfaces for finishing before assembly. Finish-sand the inside faces of your pieces (start with #100-grit paper and work up to #220), or plane and scrape the surfaces to your liking.

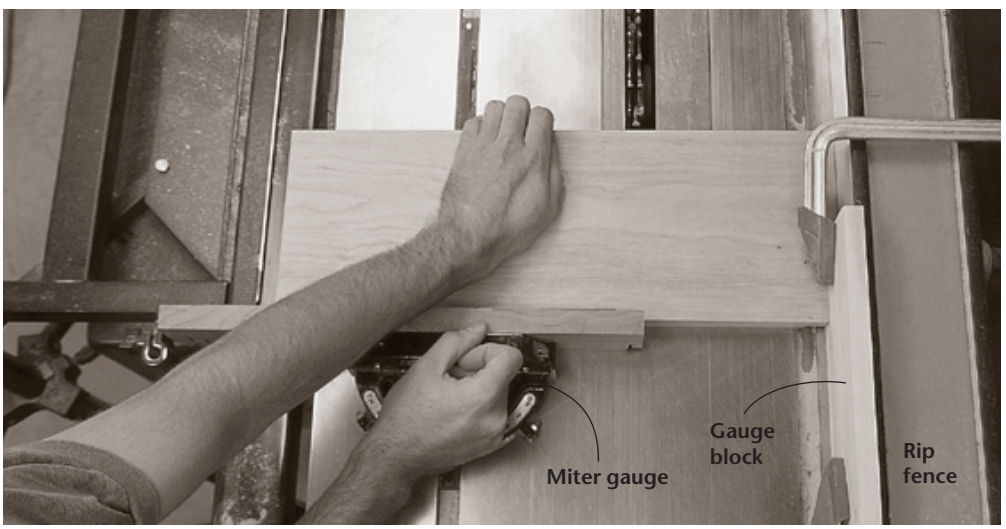
Test the fit of the joints and clamp the case together without any glue. Do not skip this step. A rehearsal is worthwhile for several reasons: You'll figure out exactly how many clamps you need so you don't have to go rushing across the room for more as the glue sets up. You'll also figure out the best procedure for clamping the case without your parts flopping around. And you'll make sure your rabbets and dados fit soundly.

As you make this milk run, make sure you keep the front edges of the top, bottom and shelves perfectly flush with the front edge of the side pieces. The top, bottom and shelves, if you haven't noticed, are ½" narrower than the sides.

Before you take the clamps off, pay particular attention to the squareness of the case. Measure the case from corner to corner and compare the two dimensions. If they're the same, everything's square. If they're not, put a clamp across the two corners that produced the longer measurement and apply the tiniest bit of clamping pressure. Compare the corner-to-corner measurements again. Repeat until everything is perfect. I like to check the squareness now because the cabinet usually behaves the same once you add the glue.

Now add glue in your rabbets and dados. If you are new to woodworking, I recommend a slow-setting glue for casework. There are several varieties, the most common being Titebond Extend. The glue's extra "open time," which is when the glue is wet and your parts can move

I recommend using a dado stack for cutting rabbets because it requires only one setup. The featherboard makes the operation safer and more accurate by keeping your work pressed firmly against the saw's table.

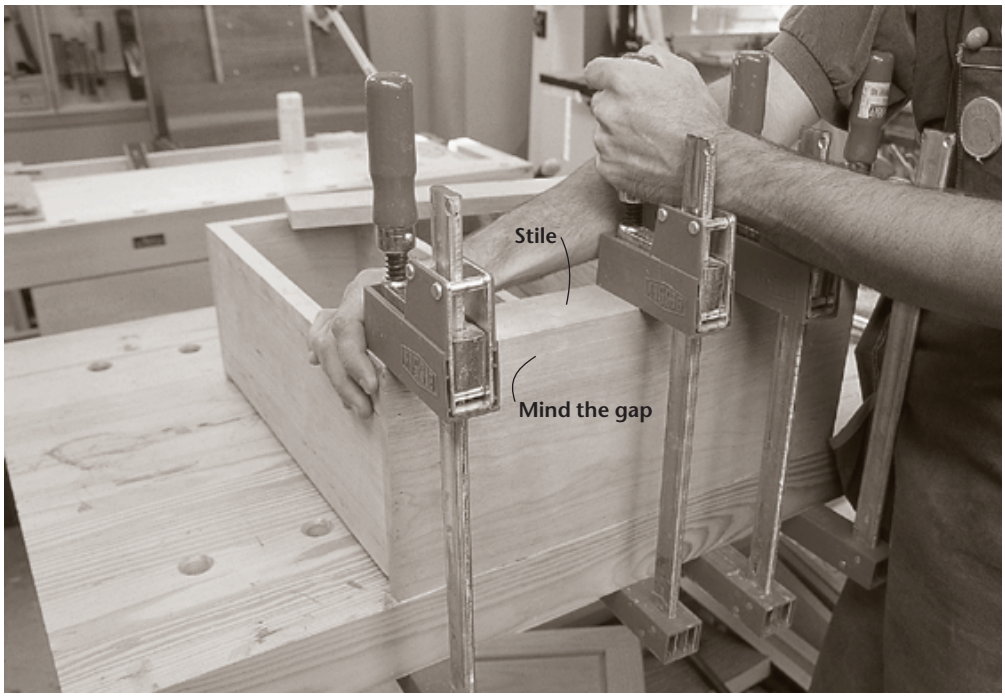


The gauge block, which is clamped to the rip fence, sets the location of the dado on the side pieces. But because the gauge block sits in front of the saw blade, there's no danger of trapping your side piece between the rip fence and the blade while making this cut – a major source of kickback. If you have a stock miter gauge, this would be an excellent time to add a piece of adhesive sandpaper (I prefer #100-grit) to its smooth metal face to improve grip during this operation.

Nails are not an act of the devil. Someday the glue will fail, and it's the nails that will hold everything together. Make sure you angle your nails (18-gauge brads are good) as shown so that the fasteners wedge the side piece against its mates.

around, will allow you to tweak the position of your parts. When applying the glue, a thin but consistent film will bond your joints without making a big mess. When you apply the clamps, a little glue squeeze-out is good – it means you haven't starved your joints of glue.

After 45 minutes, take the case out of the clamps and nail the sides to the top and bottom pieces, using the above photo as a guide.



This is a highly visible joint, so make extra sure you watch out for gaps between the stiles and the sides.

World's Simplest Face Frame

Traditionally, face frames are built using both vertical pieces (stiles) and horizontal pieces (rails). Not so with this project, which has only stiles. This makes things a lot easier.

Cut your stiles to finished width and length, and finish-sand or plane them. If you're handy with a block plane, it's wise to cut your stiles about 1/32" long and trim them flush to the case at the top and bottom after affixing them to the carcase. If you're not so confident, just take extra care in cutting your stiles to length.

Attach the stiles to the carcase using glue and clamps. Nails aren't necessary here. Make an effort to ensure the long edge of each stile is perfectly flush with its mating side piece; otherwise the opening for your door will not be square.

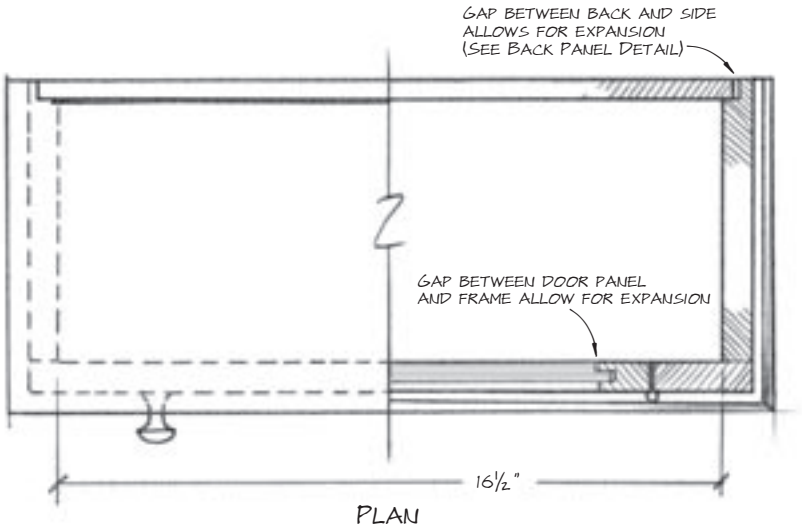
To complete the opening for the cabinet's door, you need to attach the additional ½"-thick top and bottom pieces that have the decorative cove cut milled on them, which is easy to do.

As you study the cutting list below, you'll notice that the outside top and bottom are different widths – the top is ½" wider than the bottom. That's not a mistake. It's actually a clever way to create a notch in the back edge of the outside top piece (cutting stopped notches is no fun). Let me tell you what you're going to do to that top piece:

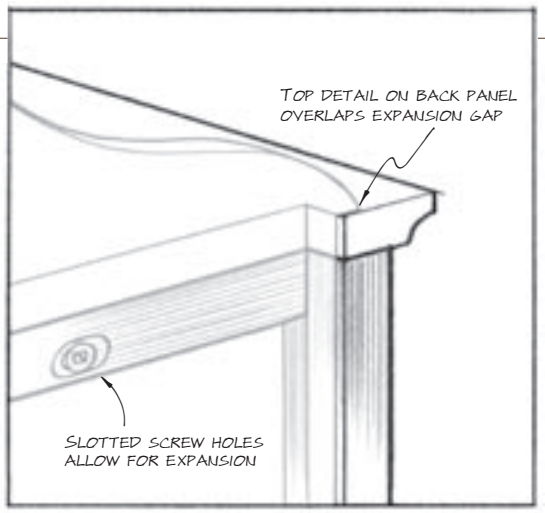
Shaker Hanging Cabinet

	NO.	PART	SIZES (INCHES) T	W	L	MATERIAL	NOTES
Carcase							
o	2	Sides	¾	7	19	Cherry	¾"-wide x ¼"-deep rabbets on ends
o	2	Inside top & bottom	¾	6½	17	Cherry	
o	2	Shelves	½	6½	17	Cherry	In ½"-wide x ¼"-deep dados
o	2	Stiles	¾	2½	19	Cherry	Glued to carcase
o	1	Notched outside top	½	8¾*	19	Cherry	
o	1	Outside bottom	½	8¼	19	Cherry	
o	1	Back	½	18*	24½	Cherry	
Door							
o	2	Door stiles	¾	1½*	20*	Cherry	¼"-wide x ½"-deep groove on one edge
o	2	Door rails	¾	1½*	11¼	Cherry	¼"-wide x ½"-deep groove on one edge, ½" TBE
o	1	Door panel	½	11	17	Cherry	½"-wide x ¼"-deep rabbet on four back edges

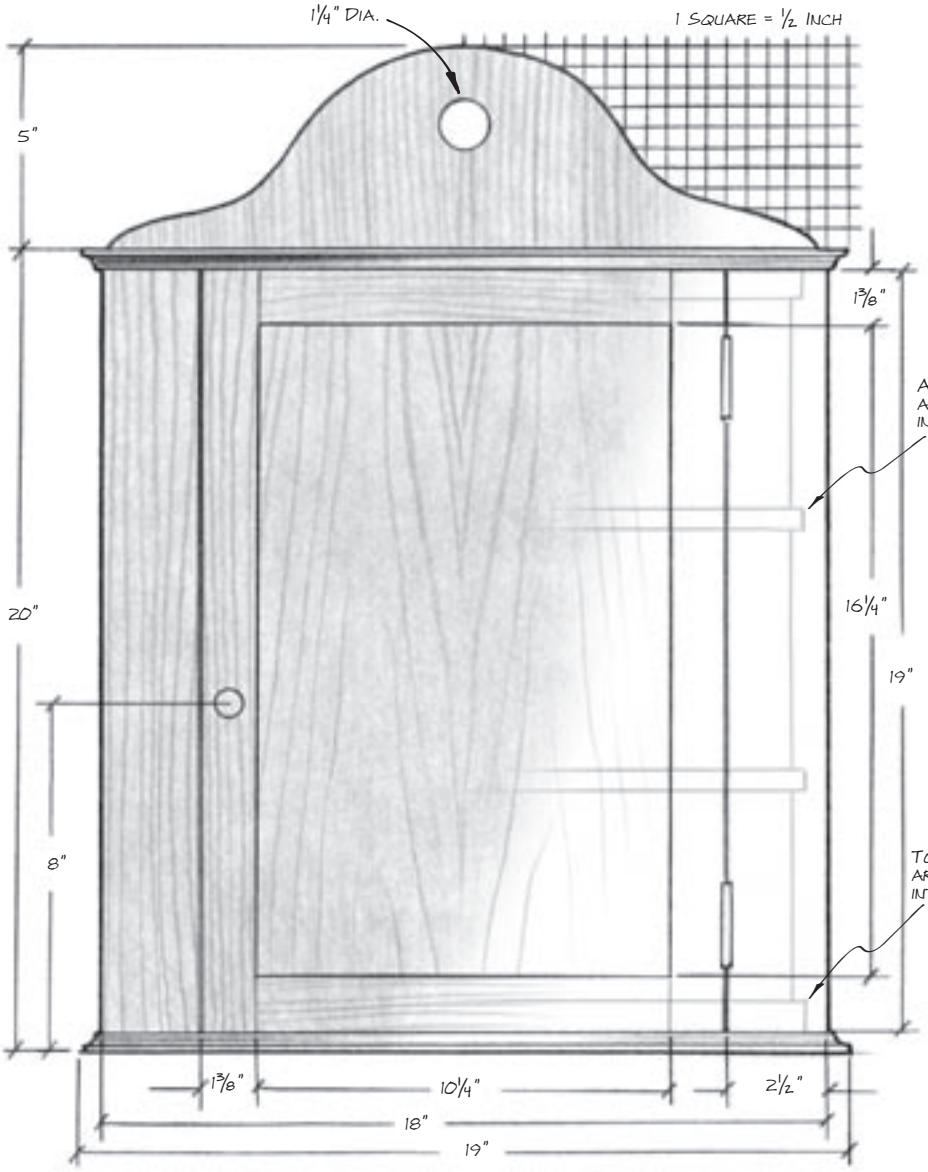
* Dimensions listed are oversized. See the text for details. TBE = tenon both ends



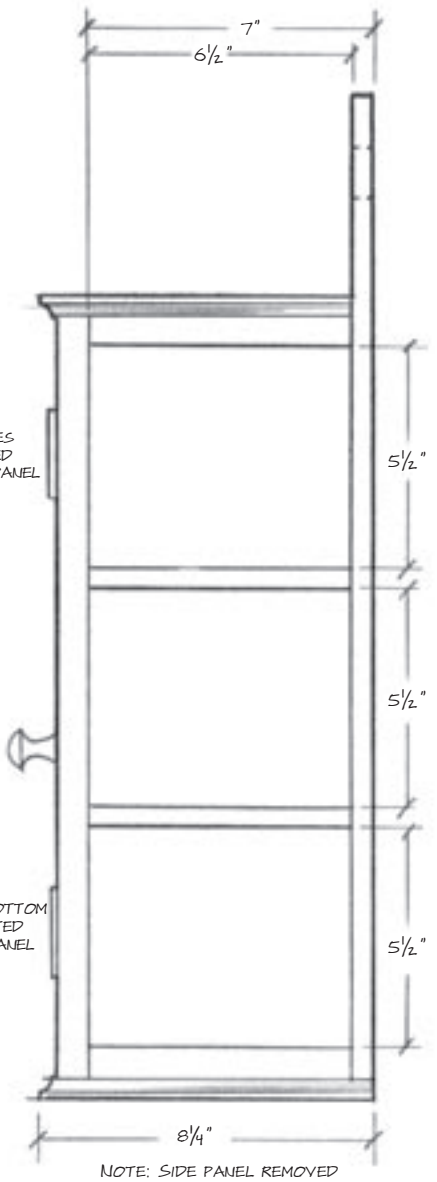
PLAN



BACK PANEL DETAIL



ELEVATION



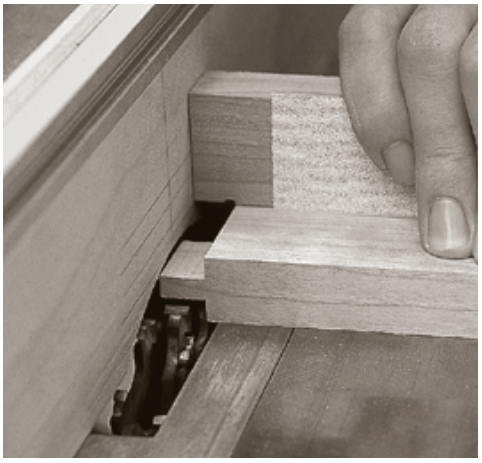
NOTE: SIDE PANEL REMOVED
FOR CLARITY

PROFILE

SHAKER HANGING CABINET

Cutting an accurate stopped notch like this is a pain. By ripping the oversized top down and regluing smaller blocks on the ends of the top, you create the perfect notch for the back piece.

Centering grooves on your work is child's play if you cut them in two passes. Here you can see that I milled one half of the groove and have turned the piece around to mill the other half.



Make the tenons by cutting a rabbet on both sides of the rails. Use your miter gauge and fence to make this cut. It's a safe operation because you can't trap your work between the blade and fence.

First you're going to rout the cove detail on three edges of both the top and bottom.

The best way to do this operation is on a router table that's set up with a ⅝" cove bit, though you can do it hand-held in a pinch. Either way, make sure you rout the detail on the ends first, then come back and rout the long edge. This will clean up a good deal of splintering that occurs when you exit the cuts on the ends.

Next take only the top piece to the table saw and rip the back edge off the board so it's 7¾" wide. Take the fall-off strip and rip it so it's ½" wide. Crosscut 1" off each end of that falloff piece and reglue each end to the back edge of the top piece, making sure the cove detail matches. Voilà! You have an instant stopped notch in your top.

Attaching the top and bottom pieces to the carcase is easy if your case is square and your joints are flush. Before you attach the top and bottom, check their fit against the carcase itself. You want a tight joint at the front and the sides. If you don't get a seamless fit with only hand pressure, you'll need to tweak the carcase until you do. Relying on your clamps to close an imperfect joint is asking for trouble.

Sometimes this process takes a bit of detective work to figure out what's wrong. For example, the top of my carcase had an inexplicable but slight bulge in the center, so the top piece would rock back and forth on it. A sharp block plane made short work of the problem. As you remove material, try to stay away from the edges of the carcase. That's where you can create problems that will show in the finished piece.

When satisfied with the fit of the top and bottom pieces, apply a liberal amount of glue to the carcase and position the top and bottom in place. When you've got them where you want them, nail them in place through the inside of the cabinet. Use only a couple of nails in each; their job is to hold the top in place as you clamp it. Apply clamps around the cabinet to secure the top and bottom to the carcase and check for gaps.

"Skill without imagination is craftsmanship and gives us many useful objects such as wickerwork picnic baskets. Imagination without skill gives us modern art."

— Tom Stoppard (1937 –)
"Artist Descending a Staircase"

The Stub-tenon Door

Because this is a light-duty door, we can build what's called a "stub-tenon" door. Essentially, it's a traditional mortise-and-tenon door that uses short (some would say "stubby") tenons that are only ½" long. A bigger traditional door would use tenons at least 1" long. We've included a tutorial on this style of door starting on page 12.

The advantage to these short tenons is they allow you to build the door without having to cut mortises in the stiles. The ¼"-wide x ½"-deep groove you cut for the door's panel also serves as the mortise for the tenons on the rails.

While stub-tenon doors are a good trick, the real trick to making perfect doors is to learn about "horns." What are horns? Again, take a look at the cutting list and you'll notice that the stiles are 1" longer than they need to be to fit in the door's opening. And both the rails and stiles are ⅛" wider than called for in the drawing.

This extra length and width create what look like horns on the assembled door. These horns allow you to make a door that is slightly oversized when compared to the hole in the cabinet. Once the door is assembled, rip and crosscut it square to fit perfectly in the door opening. There is no easier way to fit a door.

So let's build the door. Cut your stiles, rails and panel to the sizes listed in the cutting list. Now mill the ¼"-wide x ½"-deep groove in one long edge of the rails and stiles. The best way to do this is with a rip blade set to make a ½"-deep cut. A rip blade is best because the top of its teeth are flat, so the bottom of your groove also will be flat. Crosscut teeth will leave "V"-shaped channels in the bottom of the groove. Position your saw's rip fence so there's a ¼"-wide gap between the teeth and the rip fence.

Cut the groove first with one face of your work against the fence, then turn it around and make the cut with the other face against the fence. This method ensures that the groove is perfectly centered on your rails and stiles. If there happens to be a thin scrap hanging in the middle (as shown in the photo above center), you can adjust the fence and make a third pass to eliminate it.

Next get your rails and prepare to cut the tenons on the ends. These tenons are made by cutting a rabbet on both faces of the board. Two rabbets make a tenon, as shown in the photo above right.

Set up your dado stack with an accessory fence just like you did when you cut the rabbets on the side pieces. Bury the dado stack in the accessory fence so that you're making a cut that is exactly ½" wide x ¼" deep.

Use your miter gauge to guide your rails across the spinning dado stack. Make a couple of test cuts on scrap that is the same thickness as your door stock. Test the fit of your scrap tenon in the grooves you cut in the rails. Fine-tune your fence setup and cut the tenons on the ends of both rails.

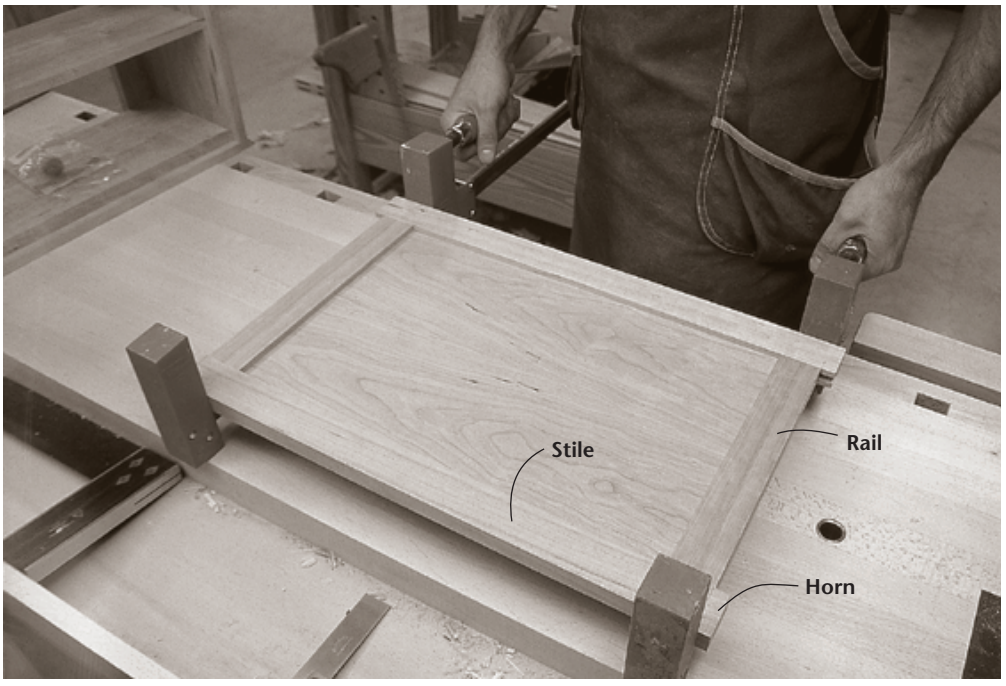
Now fetch your ½"-thick panel. To fit this panel in the grooves in the rails and stiles you must first cut a rabbet that is ½" wide x ¼" deep

on the panel's four back edges. Coincidentally (OK, it's not really a coincidence), this is the same setup you just used to make your tenons.

Now finish-sand your door parts and dry-fit the door. You'll notice how the stiles extend past the rails. These are the horns I told you about earlier. The tenons must close tightly with only minimal clamping pressure. If you are straining to close the joint you are almost certainly twisting your door so it's not flat. Take the joint apart and investigate the problem. Usually there's gunk that's preventing a good fit, or the tenon is too long for the depth of the groove.

Once you have a seamless door frame clamped up, take the whole thing apart and glue the tenons in the grooves. (Never glue a solid-wood panel in place in a door. It has to expand and contract with changes in humidity.)

After about 45 minutes, remove the clamps from the door. Measure your door opening and temporarily screw the hinges to the carcase. Now true one stile of your assembled door by running it over the jointer. Rip the door to its finished width on your table saw, trimming evenly from the left and right stile. Then crosscut it to the

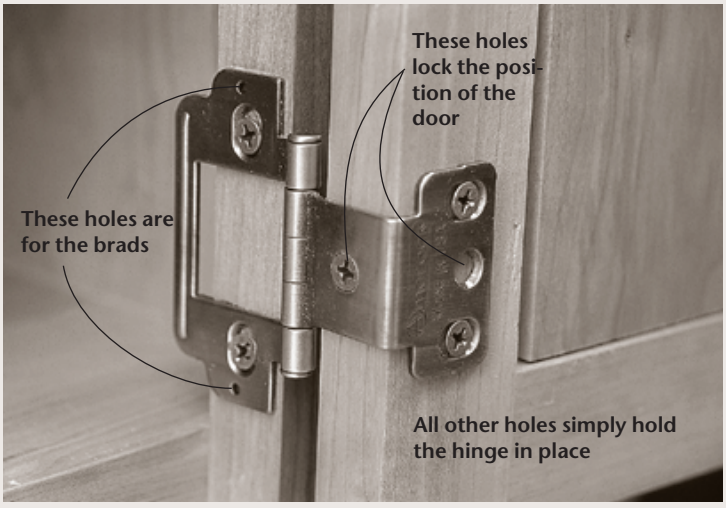


You can see here how the stiles stick out past the rails of the door. These are the so-called "horns," which you then trim off to make the door the perfect size.

A Better Hinge

Installing hinges for an inset door can be a brutal lesson in precision. Inset doors, as their name implies, sit inside the cabinet or the cabinet's face frame. The space between the door and the cabinet – called the "reveal" – has to be perfectly equal all the way around the door or it won't look right. Overlay doors, on the other hand, are much more forgiving to install because a rabbeted lip on the door covers up the gap between the cabinet and the door. If you're a little off – or sometimes even a lot – no one will ever notice. But overlay doors don't generally have the look of a fine and refined piece of furniture. They say "kitchen cabinet" instead of "prized possession."

So if you want to install inset doors, you're going to have to wrestle with mortising a butt hinge into both your cabinet and door, right? Wrong. During the last five years we have become huge fans of a hinge made by Amerock that is remarkable for three reasons: One, it lets you install the hinge without cutting a mortise. Two, once you install the hinge you can tweak its position until the door is perfect and then lock in your final setting. And three, these hinges look great on traditional cabinets.



If you struggle with installing hinges for inset doors, this can make it easier.

The secret to these remarkable hinges is that they have oval-shaped holes for screws that allow you to shift the door slightly up and down in its opening and even cock it deliberately out of square to match a door opening that's not perfect. Once you get the door just right, you secure the hinge permanently with either a final screw or a brad – depending if the hinge is designed for a face-frame cabinet (which uses what Amerock calls a "full back-to-back wrap-around hinge") or a frameless cabinet (which uses a "partial wrap-around hinge").

In the hinge pictured at left, you can see the holes for the brads in the leaf that attaches to the case. Curiously, you have to supply your own brads to lock this leaf in place; my only gripe with this hinge is that they aren't included.

On the leaf that attaches to the door you can see the two screw holes that lock in that setting. (One of the holes has a screw in it; the other does not.)

The Amerock hinges are available in a variety of finishes, including wrought iron, brushed nickel, dark antique brass, antique brass and polished brass. Plus they are available in a variety of styles that match many styles of furniture with a finial tip, a ball tip or just a plain button. These hinges aren't cheap – about $6 per pair no matter where you go. But that price includes high-quality screws for installing them. Once you try these hinges, we don't think you'll go back to traditional mortise hinges unless you have to. WM

– Christopher Schwarz

Amerock Corporation
4000 Auburn Street, P.O.Box 7018,
Rockford, IL 61125-7018,
800-435-6959 or amerock.com

correct length. Test the fit in the door's opening and fine-tune things until the door has a perfectly consistent gap all around. You can use a table saw to do this, but I prefer a hand plane because I mess things up in a much slower fashion than with a power tool. Once your door fits, you can tweak its position in its opening if you use the hinges we recommend in the Supplies box below. Add the knob of your choice and a catch (the magnetic ones are the easiest to install).

More Notches in Your Back

As I designed this project, I tried different ways to make it so the back was not one piece of 17½"-wide solid wood. The solutions were more complex than I liked or they didn't look right, so I decided to stick with the original wide back.

To make this work, I first had to calculate how much the back would expand and contract in a typical Midwestern environment (which has some pretty radical humidity fluctuations, I can tell you). Using the formulas in R. Bruce Hoadley's "Understanding Wood" (Taunton Press), I figured out how much movement to expect. According to Hoadley's formulas, the panel will expand about ⅛" when the humidity fluctuates between 8 percent and 14 percent. This is a reasonable range to expect in our climate.

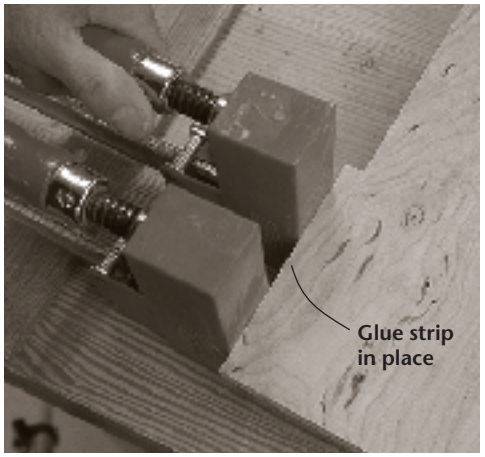
So now you need to measure the space between the two rabbets on the backside of your assembled carcase. It should measure 17". So the lower part of the back piece should measure 16⅞" wide. That's simple enough. The real difficulty comes when dealing with the curvy top part of the back. It's 17½" wide. That extra width overhangs the top of the cabinet. Once again this means you have to create a stopped notch on the two long edges of the back.

The simplest procedure is to use the same trick you used for creating the notch on the top piece: Gluing small pieces on the back to make a notch. And that's a fine way to do it as long as you pay close attention to matching the grain. This is a very visible part of the cabinet.

Make your back piece a bit wider to start with: 18" is about right. Rip two strips off each long edge so the back ends up 16⅞" wide. Keep track of which edge each strip came from because that will make it easier to match the grain when regluing the blocks in place. Now take those narrow strips and crosscut 5" off the top of each. Reglue these blocks to the back.

After the glue dries, mark the curvy shape on the back and cut to that line. A band saw, scroll saw or coping saw will do. Just make sure it's a fine-tooth blade. Clean up the rough saw-cut edges with sandpaper, files or a spokeshave. Then drill the 1¼"-diameter hanging hole in the location shown in the drawing. Finish-sand your back.

Attaching the back is easy if you pay attention to the issue of wood movement. The back is attached by screwing through it into the top and bottom pieces. You want to secure the back in the center of the cabinet so it expands equally on either side. Here's how to do that: Drill six screw holes in the back, three along the top and three along the bottom. The middle hole should be a standard round clearance hole. But the holes to the left and right should be elongated left-to-right. It's these elongated holes that allow the back to expand and contract with changes in humidity.



To make this notching operation go smoothly, make sure you rip the narrow strips from the back using a sharp rip blade. This will ensure that you'll get a clean cut and the blocks will be easier to reglue and get a seamless joint.

I've seen people make a template to rout perfect elongated ovals. Then they make the countersink using a template and a chamfer bit. This is not necessary. All you really need to worry about is allowing the shaft of the screw to pivot as the back moves. The screw's head can remain basically in the same place.

Here's how I make elongated holes: Drill a standard clearance hole for your screw that allows the screw's shaft and threads to pass through without biting into the wood. Next, angle your drill 45° one way and drill out a bit of one side of your clearance hole. Then angle the drill 45° the other way and drill out the other side of your hole. Finally, come back with your countersinking bit and countersink your clearance hole. Once done, then you can screw the back to the case using some #8 x 1"-long screws.

Finishing Cherry

Before you apply a finish to this project, take a few minutes to break the sharp edges with #120-grit sandpaper. This will make your project more enjoyable to touch and less likely to get damaged. Now remove the back and door.

Because cherry darkens nicely with age, I prefer not to add much coloring. In any case, staining cherry can be difficult because it blotches.

But new cherry with a clear finish looks a bit anemic until it gets a couple of years of coloring, so I like to help the process along. Begin by wiping on a coat of boiled linseed oil that's thinned down to a water-like consistency with paint thinner. Wait about 30 minutes and wipe off the excess. Then take your project outside and let it bask in the warm sun for an afternoon or two. This will jump-start the coloring process.

This elongated hole allows the back to expand and contract and still stay tightly secured under the screw. I make these holes by wiggling my drill bit. The other option is to drill a round hole and elongate it with a small rat-tail file.

After a couple of days of letting the oil cure, you can add a protective top coat. The simplest finish for this is a wiping varnish – essentially a thinned-down off-the-shelf varnish. For more details on mixing and using this finish, check out "Understanding Wipe-on Finishes" on page 30.

If you want to hang this project like the Shakers did, you'll need to build and hang a board with Shaker-style pegs. The length of the board is up to you and the scale of your room. We've included a supplier of cherry Shaker pegs below.

The last trick is to find a place in your home that really shows off the proportions and workmanship of this fine piece. You don't want this project to ever languish in the background. WM

Contact the author at 513-531-2690 ext. 1407 or chris.schwarz@fwpubs.com.

Supplies

Rockler
800-279-4441 or rockler.com

- 2 Amerock ball-tip, full wrap-around hinges in antique brass, #31300, $5.99/pair
- 1 Cherry Shaker ⅞" knob, ⅜" tenon, #78493, $2.59/pair. (Also available in oak, walnut and maple.)
- 1 Narrow magnetic catch, #26559, $1.49 each
- Cherry classic Shaker pegs, #23382, package of eight/$6.48 (Also available in oak and maple.)

Prices correct at time of publication.

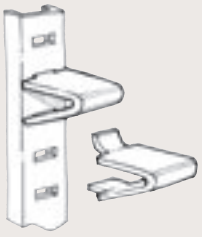
Shelf Support Basics

Storage doesn't do you much good if you can't divide it to suit your needs. That's what shelving is all about and there are a number of ways to put your shelves in just the right position. We've gathered the best of the pack here with quick explanations of their best applications.

Though there are a number of good choices listed, the most common support with the best price and function is the spoon pin, with or without the sleeve. We also appreciate the invisible application found with either the low-profile pin or the hidden shelf wire. When using any of the supports that require carefully located holes in your cabinet sides, we recommend cutting a piece of ¼" hardboard or plywood to about 3" wide and nearly the height of your opening. Drill a single line of shelf holes in this piece and use it as a template for all the holes. WM

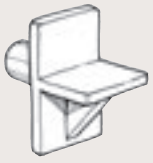
– David Thiel

Standard with Clip



One of the most common, inexpensive, versatile and ugliest shelf supports ever manufactured. While you can easily adjust shelf locations in 1" increments, the metal track is always visible and requires a groove machined in the sides. This support looks best in office furniture – not a project you spent hours building. Available in ugly nickel or zinc plate, ugly white and uglier brown.

Reinforced Support



An economical option, this plastic support slips into a hole (or multiple holes to allow for adjustment) that you drill in the cabinet sides. Like the metal track above, these are also common in office furniture and are not attractive. They also hold the shelf away from the side by as much as ⅛".

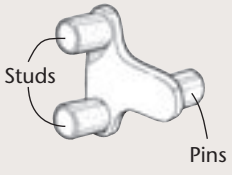
Locking Support

This support also fits into holes drilled in the cabinet sides. As an added feature, it locks the shelf in place from above, avoiding accidental tipping. Economical, but still rather unsightly, it also holds the shelf away from the cabinet sides. Use this for commercial furniture or for shop cabinets where you don't want a shelf to ever come crashing down – not for that Queen Anne highboy.

Right-angle Support

Slightly less unsightly, this support is almost invisible (with the shelf in place). The optional rubber pad keeps the shelf from sliding off, but it still leaves an unattractive gap between the cabinet side and each shelf. This is a good choice for furniture in a child's room or in a rumpus room.

Adjustable Support

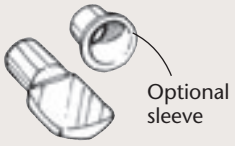


This support compensates for sloppy drilling. By trapping the shelf between the studs, the pin can rotate in the hole to find a balance between the four holes. A nice feature, but the ugly gap is still there, and now you've got a stud showing above the shelf. Save this support as a last option if (or when) you've messed things up.

Straight Pin

This is a true pin. Although low visibility, it has some problems. If the hole is slightly oversized, the pin can work loose, dumping the shelf. If the holes are not drilled perfectly, the shelf will wobble. On the other hand, if small notches are cut on the underside of the shelf, the pin can nestle in the notch, holding the shelf firmly.

Spoon Pin



A refined version of the straight pin, this pin can be used with or without the sleeve. It's then slipped into a hole or holes drilled in the cabinet side. The pin allows the shelf to fit all the way against the cabinet side without any visible gap, but still has a shoulder to hold the shelf in place.

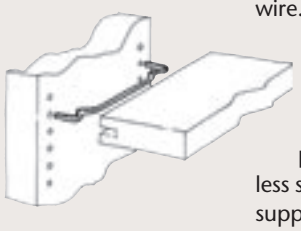
Screw-in Spoon Pin

Taking the pin and sleeve concept a bit further, this pin screws into its sleeve. It's a nice idea, but ultimately a little like gilding the lily, and best reserved for high-end glass casework. These pins are pretty darn expensive because you have to buy a threaded sleeve for every shelf-pin hole.

Low-profile Pin

The most invisible and still very economical, this support requires a little extra machining. The plastic pins are still slipped into holes drilled in the cabinet sides, but the shelves themselves have stopped saw kerfs along the ends that accept the blade of the pin. The shelf fits around the pins (in place) and the support disappears.

Hidden Shelf Wire



Another invisible variation is a hidden shelf wire. Rather than using two independent pins that slip into grooves in the shelves, this system uses a wire support. Essentially requiring the same amount of machining and drilling, this actually provides a more stable support and puts less stress on the shelf. The wire spreads the support over the depth of the shelf rather than focusing it on two bearing points.

Smart Ways to Hang Cabinets

Once you've completed the Shaker Hanging Cabinet, you can sit back and enjoy it. Well, almost. You still need to hang the cabinet – and it's been our experience that this final step can take minutes or hours, depending on your planning.

The hanging process should actually begin with the design phase of the project. With the cabinet shown here, we've followed the Shaker tradition and mounted a peg board to the wall, with the cabinet hung from a peg.

Other methods (more common today) are to mount the cabinet to the wall through the back of the cabinet (either with just the back or with a hanging strip) or to use a French cleat, which is invisible and convenient.

Screwing Through the Back

Depending on the size of your cabinet, you may have used a ¼"-thick back or thicker (½" or ¾"). With a thicker back, mounting the hanging cabinet to the wall is simply a matter of finding a stud and marking that stud location on the inside of the cabinet. Then you drill a clearance hole for the screw (usually 3⁄16" diameter), hold the cabinet in place and level on the wall, and screw the cabinet to the stud with a #10 x 3"-long screw. If the cabinet is wider than 16", you'll be able to put a second screw through the back and into a second stud. This should be enough to support most cabinets that aren't going to be holding your grandmother's fine China.

If your cabinet is less than 16" wide, you'll need a drywall "molly" to reinforce the second screw. Mollys are sold in the picture-hanging section of your local hardware store and allow you to put a screw almost anywhere in a wall. There are half a dozen different kinds of mollys that are suited to hold different weights. Check with your local hardware store for a good selection.

If you're hanging a large cabinet and want to use a ¼"-thick back (to make it less expensive and lighter in weight), a hanging strip will make mounting the cabinet easier. This strip (shown below left) can be built into the design of the cabinet or simply applied to the back. It goes inside the cabinet and below the top. Actually building the strip into the sides adds some strength, but it also adds an extra step or two to the project.

Screwing through this strip instead of just the thin back will give you more strength and reduces the chance of tearing through the thin back material with the screw.

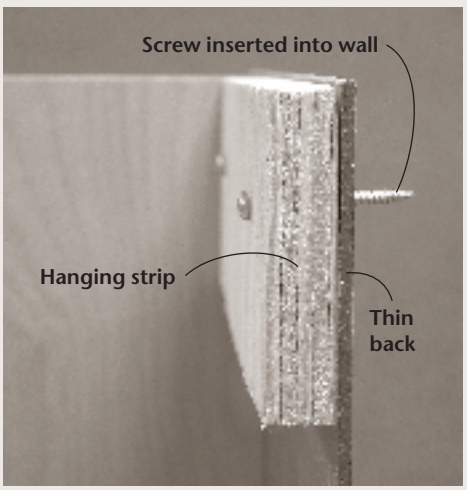
Using a French Cleat

French cleats offer invisibility and incredible strength, but they do steal some storage space from the inside of the cabinet. These cleats can be purchased (made from aluminum or steel) for the truly lazy, or made from simple ¾"- or ½"-thick scrap. The cleat is in two pieces, each with a 45° bevel on one long edge. One goes on the back of the cabinet; the other attaches to the wall. When you nest the 45° bevels together, the cabinet hangs firmly on the wall. You should be able to do pull-ups on your cabinet if it is properly installed this way – no kidding.

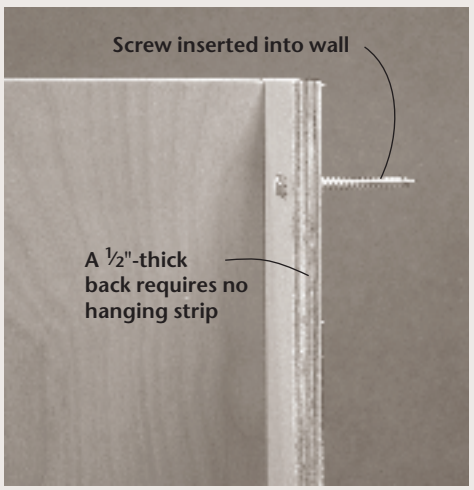
To use a French cleat, you have to design a gap behind the back of the cabinet to house it. Essentially the cabinet is built with the back recessed into the cabinet, so the top, sides and bottom still touch the wall.

Beyond the strength gained by using a cleat (as long as you catch a stud or use mollys), cleats are easy to level. The wall section of the cleat is attached with one screw and that section is leveled and fixed in place. Then the cabinet is simply slipped in place over the wall cleat. It's pretty cool. WM

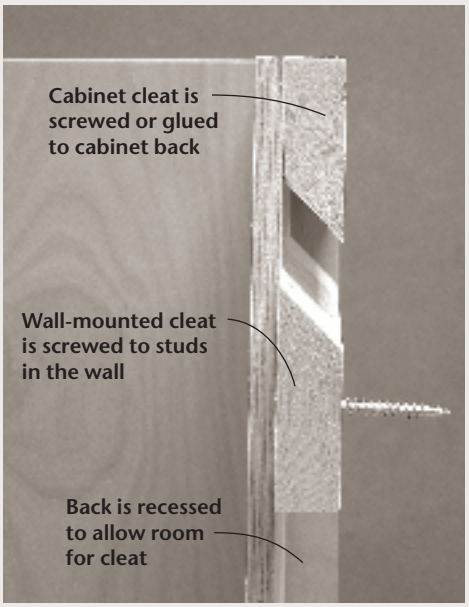
– David Thiel



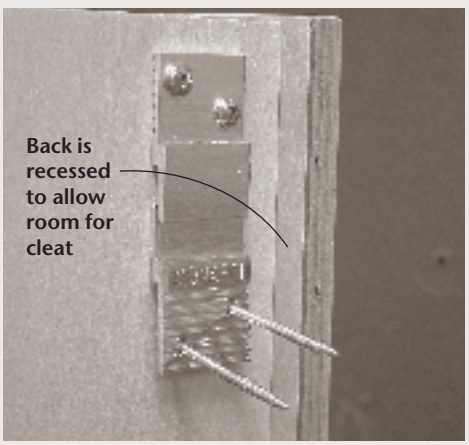
With a larger cabinet, a thin back makes more sense but will not be sufficient to secure the cabinet to the wall. By adding a hanging strip, the weight of the cabinet is more evenly transferred to the cabinet box.



With smaller cabinets, a thicker back (usually ½" or more) can be used without any major weight concern. This thicker back also allows you to simply screw through the back of the cabinet directly into the wall and stud.



The shop-made French cleat in action. This French cleat is made for a board ripped at a 45° angle, but the cleat also could be made with interlocking rabbets. Either way, you get some amazing strength and convenience.



This store-bought version of a French cleat takes up less room behind the cabinet and is priced at about $13 for 10 sets. Place one hanger every foot to hold heavy cabinets.