

Building an Arts-and-Crafts Sideboard

Start with a solid, carefully constructed carcass



by Gary Rogowski

When I was asked to build a sideboard that had a Greene and Greene feel to it, I decided to use an original piece as a springboard for my own interpretation. But I wanted to do more than just copy something designed in the early 1900s by these famous brothers.

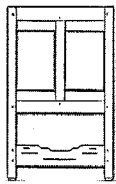
I tried to soak up as much visual information on the style as I could. I pored over designs of the Greene brothers and their

contemporaries. Then I closed all the books and sat down at the drawing board. What I came up with is more contemporary and less ornate than the Greenes' work (see the photo above). This sideboard, made of Honduras mahogany, had to work as a backdrop for my inlay work as well as have the overall grace of a Greene and Greene piece. I didn't want it to dominate a room.

It's mind-boggling how many pieces,

joints and cuts are in this sideboard. The key to successful completion of this project is breaking it down into manageable sections and then figuring out how to splice them together.

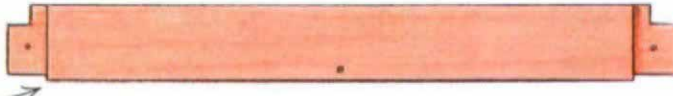
That's how I planned construction of this sideboard, and that's how the articles in this and the next two issues of *Fine Woodworking* are organized. After I worked out an overall design, I concentrated on the



SIDEBOARD END ASSEMBLY

Construction of this sideboard begins with the two end assemblies. Lower side rail tenons are the same as the upper side rail tenons except that they're not haunched.

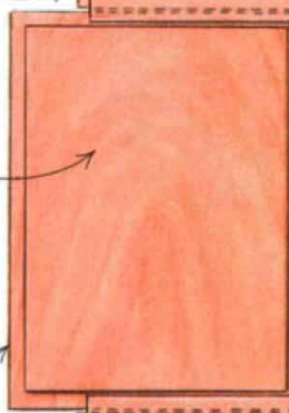
Upper side rail, 1 in. x 2½ in. x 19½ in.



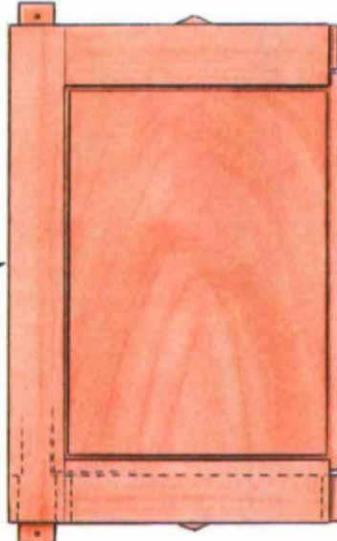
Panel rail, ¾ in. x 2 in. x 8½ in.



Panel, 7/16 in. x 9½ in. x 13¾ in.



Center stile, 7/8 in. x 1¾ in. x 16½ in.

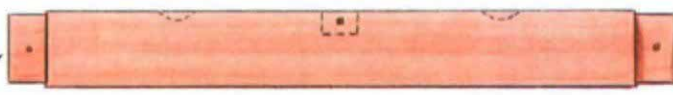


Rabbet, 7/16 in. wide, leaves a ¼ in.-thick tongue.

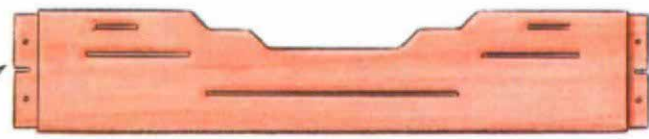
Loose tenon

#20 biscuit

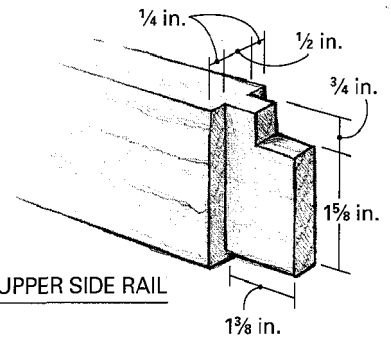
Lower side rail, 1 in. x 2½ in. x 19½ in.



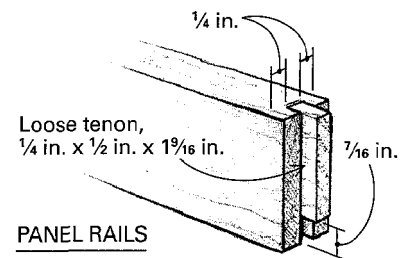
Side stretcher, ¾ in. x 4 in. x 19½ in.



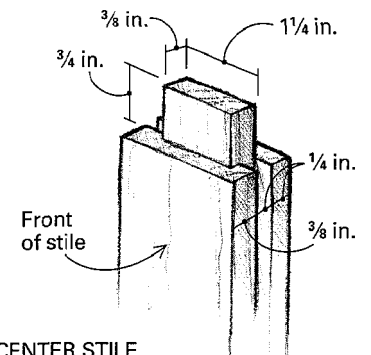
DETAIL: END JOINERY



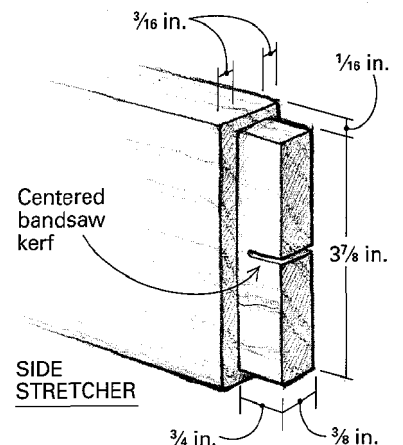
UPPER SIDE RAIL



PANEL RAILS



CENTER STILE



SIDE STRETCHER

structure of the carcass, which is the subject of this article. The next consideration was the interior of the piece—how the drawers would be supported and how the doors would be hung. That's covered in the second article. Finally, there are the details—knobs, pulls, carved inlay and other decoration that make a piece distinctive. You'll find all of that discussed in the third and last article of the series.

The more planning, drawings and design work you do up front, the fewer headaches you'll have later. I find it more than worthwhile to do full-scale joinery drawings; they help me avoid unpleasant surprises.

Millwork lays the foundation

A poorly laid foundation for a house causes problems from framing to finishing. Similarly, if you build a piece of furniture

with stock that's not straight and square, you're bound to run into trouble.

First I rough-mill the stock and let it acclimate to my shop. I cut boards to within 1/2 in. of finished length and joint one face and an edge. I leave stock 1/8 in. over in width and thickness. Then I sticker all the boards for a few days. If any boards cup, bow, twist or check, they're replaced. I take the boards down to their finished dimensions when I need to cut the joinery.

The millwork for the 7/16-in.-thick side panels in each end of the sideboard took some extra thought. I could have planed down 4/4 boards, but half of each board

the center stile tenons to the mortises in the upper and lower side rails. Then, with a 1/4-in. bit in my router table, I routed the grooves for the loose tenons that connect the panel rails to the center stile. Using the same router-table setup, I roughed out the panel grooves in the center stile and panel rails. I did the final routing of these grooves when the sideboard ends were dry-assembled. The stopped grooves for the loose tenons in the legs had to be marked and cut separately on the router table.

With the work on the center stiles done, I glued them between upper and lower side rails. I fitted each panel rail between leg and

ners, I dry-assembled the frame to rout grooves in it with a 1/4-in. slot cutter. To give the router a level platform, I put spacers on the side rails and center stile (see the top photo on the facing page). I also screwed a wooden block to the router subbase so I couldn't tip the router in the cut.

I rabbeted the panels on the router table and then handplaned the backs until they fit perfectly. I sanded and finished the panels with three coats of wiping varnish. I also finished the inside edges of the legs, panel rails and center stiles—all places that would be difficult to finish after the end assemblies were glued up.

Before leaping into a glue-up, I put a 1/2-in.-long 14° bevel on the foot of each leg and drilled holes for the dowel pins and the ebony plugs used to pin the mortise-and-tenon joints (see the drawing on p. 40). I also routed the dovetail slot at the top of the leg for the top front rail and laid out the dovetail in the rail from the slot.



MORTISING THE LEGS

Router jig speeds and simplifies joinery. The author used a Multi-Router to rout all the mortises and tenons on this sideboard. Grooves, dados and dovetail slots were done on a router table or with a hand held router. Dovetails were cut by hand.

Template-routing the stretchers—The last piece for each side assembly was a stretcher. With so many curves and routed grooves in them, templates seemed the best way to shape the stretchers. I made the templates out of 1/4-in. hardboard, roughing them out on the bandsaw and trimming their long edges on the router table. I shaped the curves with a drum sander and some careful file work.

The stretchers were roughed out on the bandsaw, and the templates attached with double-faced tape. Then, with a flush-trimming bit, I cut the profiles. Using the same templates, along with a 3/8-in.-dia. template guide on my router base, I routed the 1/4-in. grooves in the stretchers (see the second photo from top on the facing page). To make the routing easier and to give me clean stopping and starting points, I drilled holes at either end of each groove first.

Panels and legs complete the sideboard ends

All that remained was to slide in the panels and clamp the legs to the rails. To ensure that the spacing around each panel was the same on all four sides, I used 1/8-in.-thick hardboard spacers (see the third photo from top on the facing page). Then I clamped the assemblies together, taking care to apply pressure evenly across the two side rails and the stretcher (see the photo at right).

I checked the legs to be sure their faces remained flat during glue-up. I also kept the top rails just a tad higher than the tops

would have ended up in my dust collector. Instead, I resaw 5/4 stock. Because my bandsaw can resaw boards only up to 8 in. wide, I ripped the 10-in.-wide material in half, resawed these pieces and then glued mating pieces back together. This gave me two book-matched panels about 1/2 in. thick for each side with perfectly matching grain.

Begin the carcass with the ends

Each end assembly consists of a dozen pieces. I routed all the mortises and tenons, using a Multi-Router (see the photo above), although the joinery certainly could be cut in a number of other ways. First I cut and fit

stile and then routed the grooves for the loose tenons that connect the panel rails to the legs. After giving all the rails a quick sanding, I glued the panel rails to the stile with loose tenons and to the upper and lower side rails with one #20 biscuit. If any of the panel-rail shoulders don't line up perfectly with the side-rail shoulders, you can trim them later with a rabbet plane.

Grooving for the side panels—The grooves for the panels have to line up all the way around the frame. Rather than routing each piece separately and hoping that the panel grooves lined up at the cor-

END ASSEMBLY

Rout the panel grooves. The author uses shims and a block on the router base to keep the base flush with the legs. The frame is dry-assembled as he makes the cut.



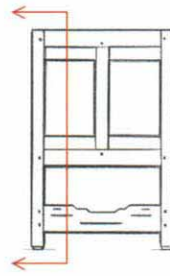
Grooves in the stretchers lighten them visually. A router, template and $\frac{3}{8}$ -in.-dia. template guide make the $\frac{1}{4}$ -in.-wide grooves in all four stretchers the same. Double-faced tape holds the template in place.



Spacers ensure an even reveal. The author uses $\frac{1}{8}$ -in.-thick hard-board spacers to set the reveal on end panels. Short sections of $\frac{1}{8}$ -in.-dia. dowel were later used to pin the panels in place from the inside, at center, top and bottom.

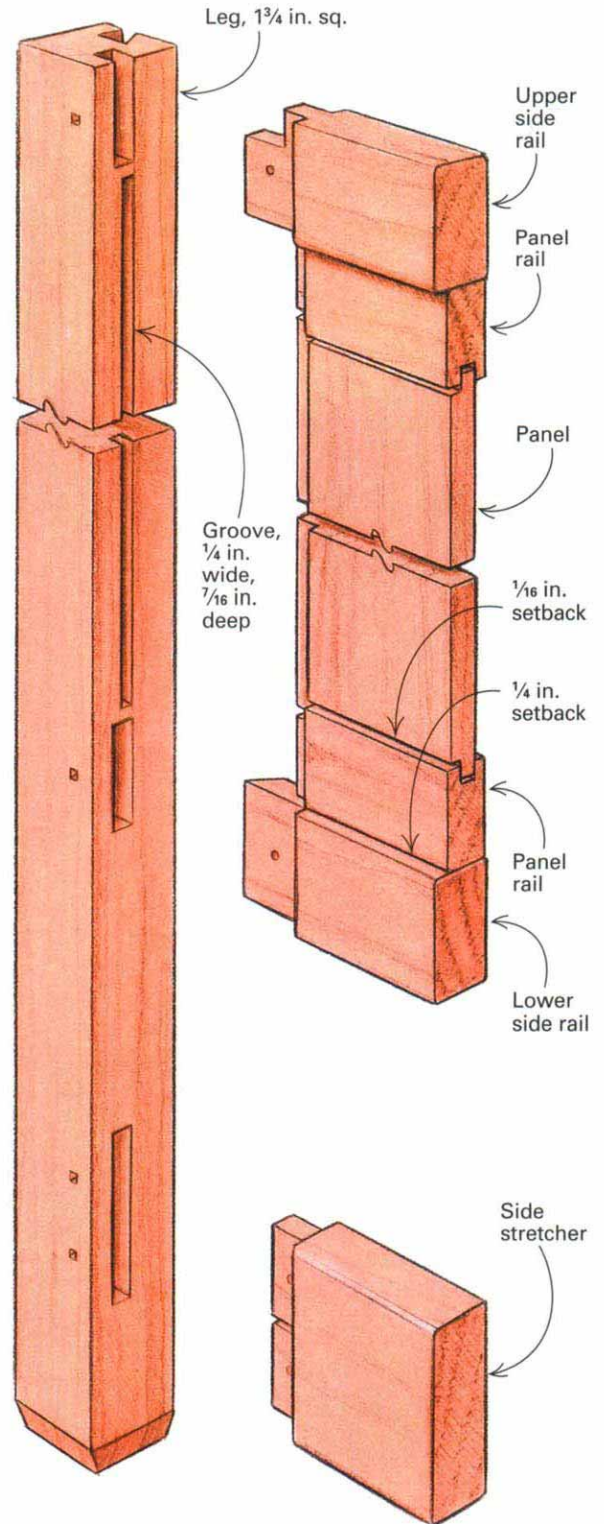


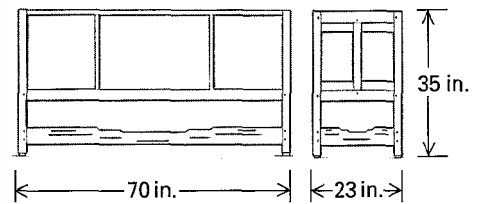
Completing the side assemblies. The last glue-up for the sides mates the four rail tenons and two stretcher tenons with the six leg mortises. Be sure the legs remain flat under clamping pressure.



SECTION THROUGH END ASSEMBLY WITH FRONT LEG

Pieces of varying thicknesses in the end assemblies create shadow lines where the parts meet, giving the ends a sense of depth. The side rails are set back from the face of the legs by $\frac{1}{8}$ in. The center stile (not shown) sets back from upper and lower side rails another $\frac{1}{8}$ in., and panel rails step back from the center stile another $\frac{1}{8}$ in. The panels are $\frac{1}{16}$ in. back from the panel rails.





■ This drawing shows how the major parts of the carcass are joined. The kickers, the front rail and the plywood divider panels should not be glued into the case until dividers have been grooved for the drawer runners. That's covered in the next issue of *Fine Woodworking*.

With the top front rail fitted, the basic structure is complete. The rail is not glued in place yet. Dovetailed slots still need to be cut for kickers, and knife-hinge mortises must be routed before the rail can be permanently attached.

of the legs. Planing the long grain of the side rails is easier than planing the end grain at the top of the leg.

Connecting end assemblies with rails and stretchers

I tenoned all but one of the rails connecting the two ends, using the same Multi-Router setup I'd used for the mortises and tenons holding the ends together; the one exception was the dovetailed top front rail (see the photo above).

Preparing for glue-up—It was tempting at this point to smear on some glue, throw on the clamps and see how the piece looked. Experience has taught me, however, that preparation is everything.

For starters, my bench was too small and too high. So I built a staging area. I connected four short sawhorses with braces and C-clamps. Then I put a sheet of particleboard on top and shimmed it until it was flat, checking with a pair of large winding sticks.

I dry-assembled the piece exactly as I would glue it up. I figured out where I needed to place all my clamps and cauls and laid them in place. Then, after checking my carcass for square across its faces, I disassembled the piece.

Marking and mortising knife hinges—Before gluing up the carcass, I cut the mor-

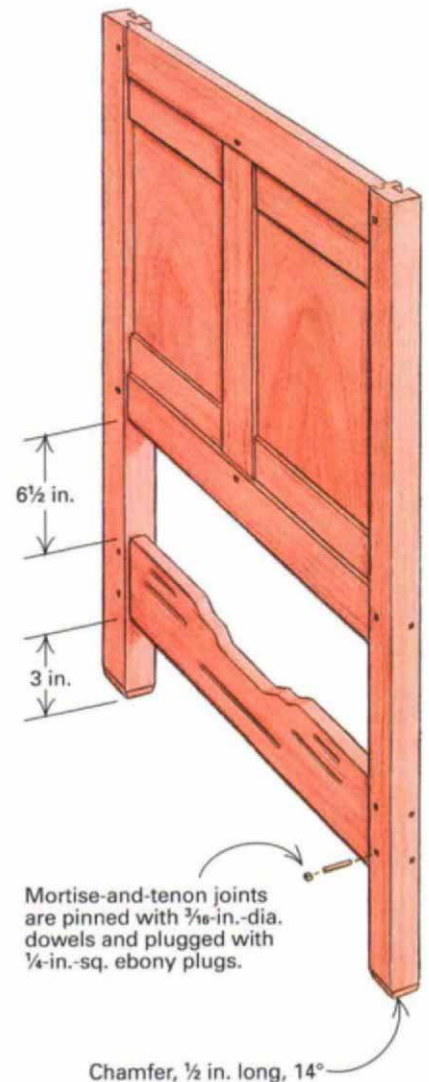
tises for the knife hinges at either end of the bottom front rail. These mortises can be cut after the carcass has been glued up, but if you wait until then, I guarantee it will become work designed to test your patience and cursing vocabulary.

I also took the opportunity to mortise the hinges at either end of the top front rail at this time. It's a good idea to wait on the mortises for the inner doors (the ones on either side of the center bay) until after the divider panels are in.

I used L-shaped Brusso knife hinges (available from many woodworking suppliers and from Larry and Faye Brusso Co.; 810-674-8458). I spaced them precisely $\frac{3}{4}$ in. from the legs, using a piece of laminate as a shim. This created a reveal along the hinge stile for the door. I finished marking out the hinges and then disassembled the case.

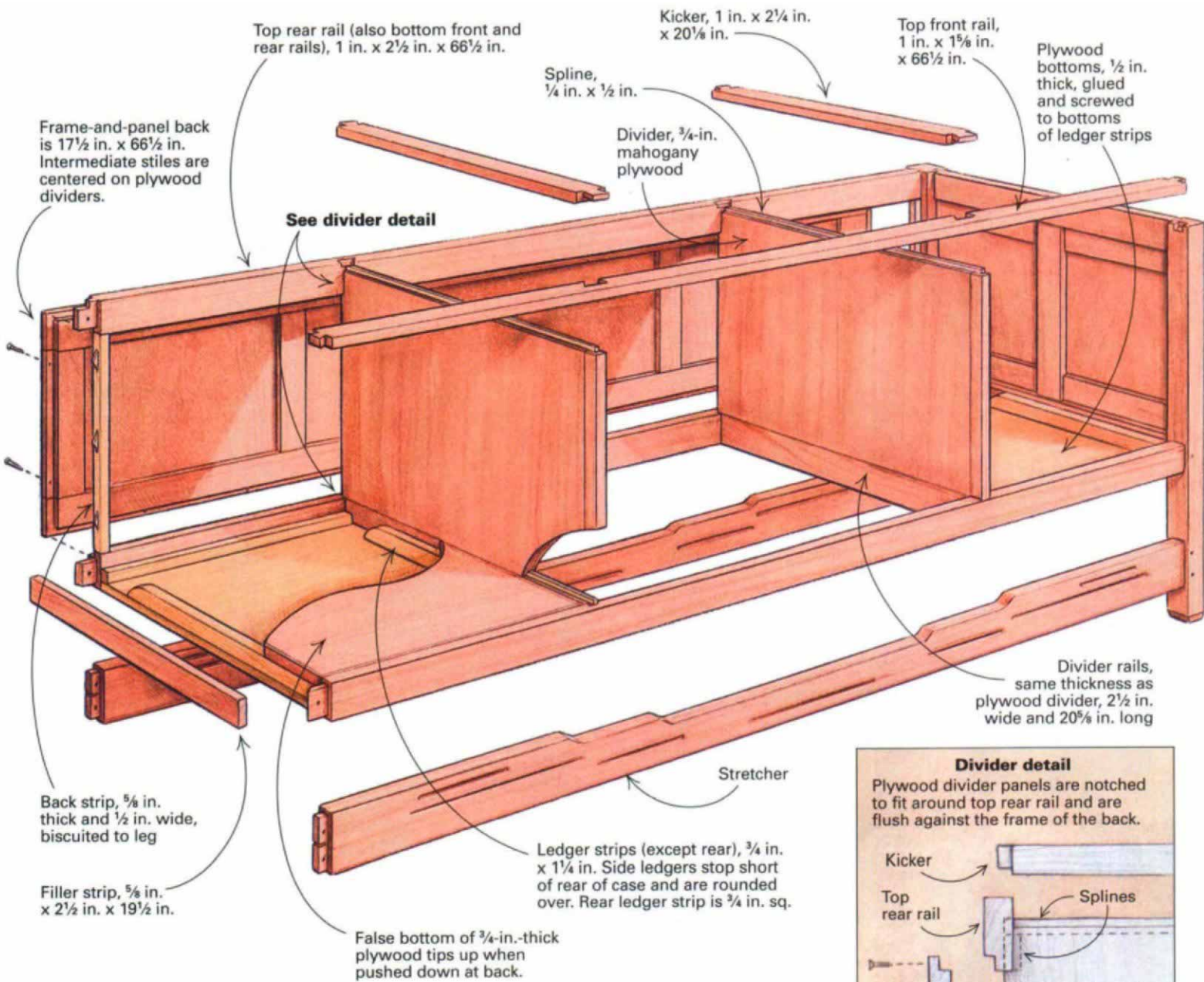
I routed the hinge mortises to depth with a $\frac{3}{16}$ -in. straight bit, taking care to stay just a little back from the layout lines. I chopped out the front edge and ends of the hinge, laid the hinge in place at a slight angle and marked its back side again with a knife. I carefully pared to this line, checking the fit and paring again until the hinge fit perfectly. (For more about installing knife hinges, see *FWW*#111, pp. 48-51)

With these hinge mortises completed, I glued up the carcass. I installed the top front rail without glue, just to keep the front

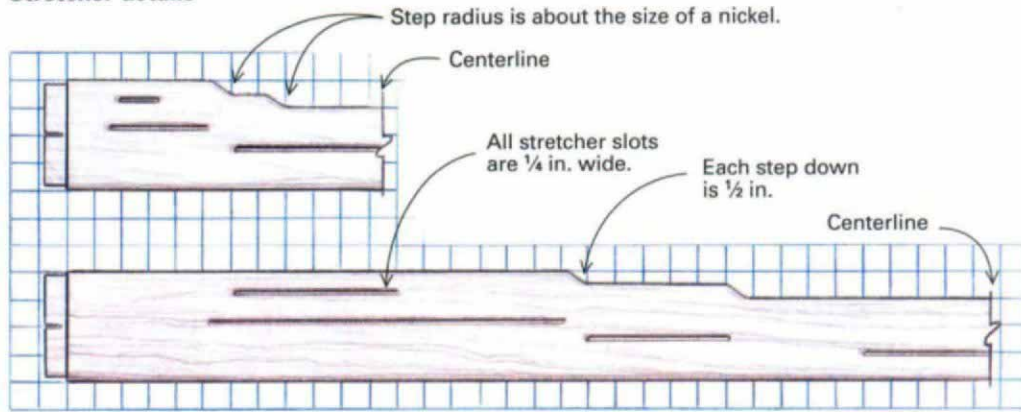


CARCASE CONSTRUCTION

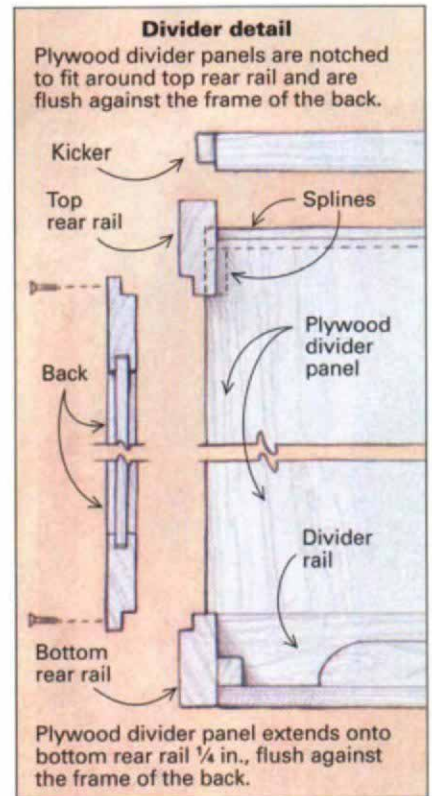
Dimensions do not include tenon or dovetail lengths.



Stretcher details



1 sq. = 1 sq. in.



legs parallel during glue-up. This piece had to come out as I worked on the case.

Dividing the carcass for doors and drawers

Despite all precautions and diligence, glue-ups can still be a little crazed, and the results aren't always dead-on. For that reason, I wait to do any interior work in a case piece until after it's glued together. This sideboard is divided into three sections: a center section with web frames for three drawers and two outer sections, each of which has a pair of doors. Separating these sections are two walls, each consisting of a plywood divider panel splined to a solid divider rail below it. Kickers centered on the two divider panels lock them in place.

Melamine spacer simplifies joinery

Stopped-sliding dovetails connect the divider rails, which are parallel to the ends of the carcass, to the bottom rails. To index these cuts for my router, I made a spacer that butted up to the legs and was supported by the bottom rail and stretcher. As it turned out, this spacer proved useful again and again in building the carcass. To determine the width of the spacer (15 in., as it turned out), I took the intended opening for the doors and subtracted the distance between the edge of the router subbase and the center of the bit. Then, to rout the

sliding dovetails, I laid the carcass on its face, clamped the spacer in place and routed away. I made two passes for each slot, one with a straight bit to eliminate most of the waste and one with the dovetail bit. Because the carcass is laid out symmetrically, I could use the spacer at both ends.

To size the divider rails, I measured between the front and rear bottom rails right up against the legs, where there was no possibility of bowing. I added $\frac{3}{4}$ in. for the two dovetails and cut the divider rails to this length. I cut the dovetails on the router table using the same $\frac{1}{2}$ -in. dovetail bit I had used to rout the slots. When I was sure the shoulder-to-shoulder length of the divider rail was right, I took a shaving or two off the end of each dovetail with a low-angle block plane so the joints would slide home more easily. Then I glued the divider rails in place, making sure that they were flush with or just slightly above the front and rear bottom rails.

After planing the top and bottom edges of the divider rails flush with the long rails, I concentrated on the divider panels. I made these out of $\frac{3}{4}$ -in. mahogany plywood to avoid shrinkage problems, so my first task was to glue banding on the front edge of each. I made this mahogany strip just as wide as my front rail was thick.

Then the issue was how to attach these panels to the rails. I figured a spline joint

was my best bet in terms of strength and ease. I used the same spacer I had used for the dovetails to put a $\frac{1}{4}$ -in. groove dead center into the divider rails (see the photo below). For the corresponding groove in the edge of the plywood divider panel, I used a hand-held plunge router with a secondary fence clamped to its base to keep the cut true.

A spline cut in the top rear rail helps locate the divider panel even before the kicker is installed at the top of the case (see the divider detail on p. 41). I routed this little stopped groove in the top rear rail using the same spacer board, notched the divider panels to fit around the rear rail and routed a groove in the notched section to receive the spline.

Ledger strips support bottom pieces and false bottoms

Ledger strips attached to the front, rear, side and divider rails support the $\frac{1}{2}$ -in.-thick-plywood bottom panels. I used biscuits to attach the strips to the rails. Then I glued and screwed the bottom panels to the ledger strips from below. The screw holes were plugged later and then sanded flush.

I included a few hidden compartments as a little surprise for the client (see the top right photo on the facing page). When you push down on the rear of the bottom panel, it pivots up and reveals the hidden compartment. I beveled the rear edge of the bottom panel just like a door so it wouldn't bind. At the same time, I kept the fit of the panel very snug so it wouldn't be obvious. Just in case it was a little too snug, I drilled a small access hole through the front ledger strip, so a short length of $\frac{1}{8}$ -in.-dia. rod could be used to push the false bottom up from below.

Kickers tie case together and prevent top drawer from dropping

The kickers had to be cut before I could cut the divider panels to their finished height. I attached the kickers to the top rails with large dovetails. I cut the slots with a router, using a pair of spacers (one for each side of the slot) similar to the one I'd used for the divider rails. Because the top front rail is flush with the back of the front leg, there's no leg edge for the spacer. To get around this, I just set a $\frac{5}{8}$ -in.-thick block against the inside of the frame instead.

I cut the kickers to length, notched their shoulder locations on the tablesaw and checked to see that the length was right. Then I transferred the dovetail layout from

A JIG FOR CENTERING GROOVES AND DOVETAILS



Divider rails are grooved for splines. Splines connect the rails to plywood dividers. The same spacer used to rout the dovetails for the divider rails is used here.



The case is built. With the two end assemblies connected and the case divided into its three main sections, the carcass is ready for doors and drawers (left). The case includes two hidden compartments (below).



the slots in the top rails, cut the dovetails by hand and fitted them to the slots.

Divider panels fit between divider rails and kickers—I measured and cut the divider panels to fit between the kickers and divider rails. The kicker and the top of the panel were grooved for the same 1/4-in.-wide spline I used on the panel bottom. My first spacer centers the groove in line with the panel and divider rail. But because the router base runs into the rear top rail, I couldn't finish this cut with the kicker in the carcass. So I used the router table.

I clamped the divider panels in place vertically to the kickers and divider rails to check the drawer openings. I made sure they were parallel from front to back. Any slight adjusting can be done by cutting the grooves in the panel a bit wider so the plywood can be moved, shimming the spline to one side or the other. Once I'd positioned the dividers exactly where I wanted them, I clamped them in place and pencil-marked their positions. Then I laid out the remaining knife-hinge mortises.

Unfortunately, I had glued in the rail splines to make it easier to fit the dividers. This prevented the router base from riding the rails to rout the mortises for the knife hinges. After shrieking with disgust over

my lack of foresight, I realized there was a simple way to correct this problem that was actually an improvement. I made a little platform out of some 1/4-in.-thick medium-density fiberboard (MDF), clamping it in place around each mortise location. These boards were just higher than the spline and provided the router base with solid support.

Making and fitting the back

The back of this sideboard was fitted with a frame-and-panel back. The top and bottom rear rails were rabbeted to receive the panel. Rather than rabbeting the legs and weakening them, I glued strips to the rear legs to provide support for the back. If by some fluke of nature, the opening for the back is not perfectly square, cut your rails and stiles to the largest dimension and trim the frame after it's glued up.

For ease of construction, I used stub tenons for this frame. I made the mortises for these tenons slightly deeper than the panel grooves, though, so the center stiles wouldn't be hard to locate during glue-up. Be sure when gluing up that the end stiles line up flush or are just proud of the rail ends. Again, it's easier to plane long grain than end grain. The panels were sanded and finished before gluing. After the glue

had cured, I pinned all the joints with 1/4-in. dowels and drilled countersunk holes for the screws that hold the back in place.

Then I fit the frame to its opening and rabbeted it so it would be flush with the top and bottom rails. Once fit, the back was set aside in a safe place. □

Gary Rogowski designs and builds furniture in Portland, Ore., and is a contributing editor to Fine Woodworking. Router Joinery (The Taunton Press), the companion book to his videotape Router Joinery with Gary Rogowski, will be published in August.

Next issue: doors and drawer supports



In the October issue, Gary Rogowski builds, fits and hangs the doors. He also builds the web frames that support the drawers. In the December issue, he completes the sideboard.