Woodsmith PLANS

SLANT FRONT DESK

Slant Front Desk

When joining solid wood parts together, you have to allow for expansion and contraction of the pieces. The solution used on this desk is a sliding dovetail joint. It locks the parts together without glue.

Wood movement. It's a real concern with projects that feature solid-wood panels. That's because as solid wood expands and contracts with seasonal changes in humidity, joints can pop and boards may warp or split. Since this desk is built with a number of wide panels made of glued-up cherry, it requires special joinery to deal with the problems of wood movement.

JOINERY. Sliding dovetails are one answer. With this joinery technique, the wide side panels are free to move independently of the frames that hold the panels together. (For more on this, see the Joinery box on the top of page 9. Plus, you'll find a complete description on gluing up wide panels in the technique article starting on page 5.)

But the drop-down door that is such a prominent feature of slant front desks required another answer. To keep this panel flat I used "breadboard" ends.

EXTRAS. Ogee bracket feet complete the case and raise it off the ground. The feet on this desk look just like traditional feet from an early-American craftsman, but they're made with a table saw and a band saw instead of the hand tools of old. I've included separate instructions on how to make them in the technique article starting on page 15.

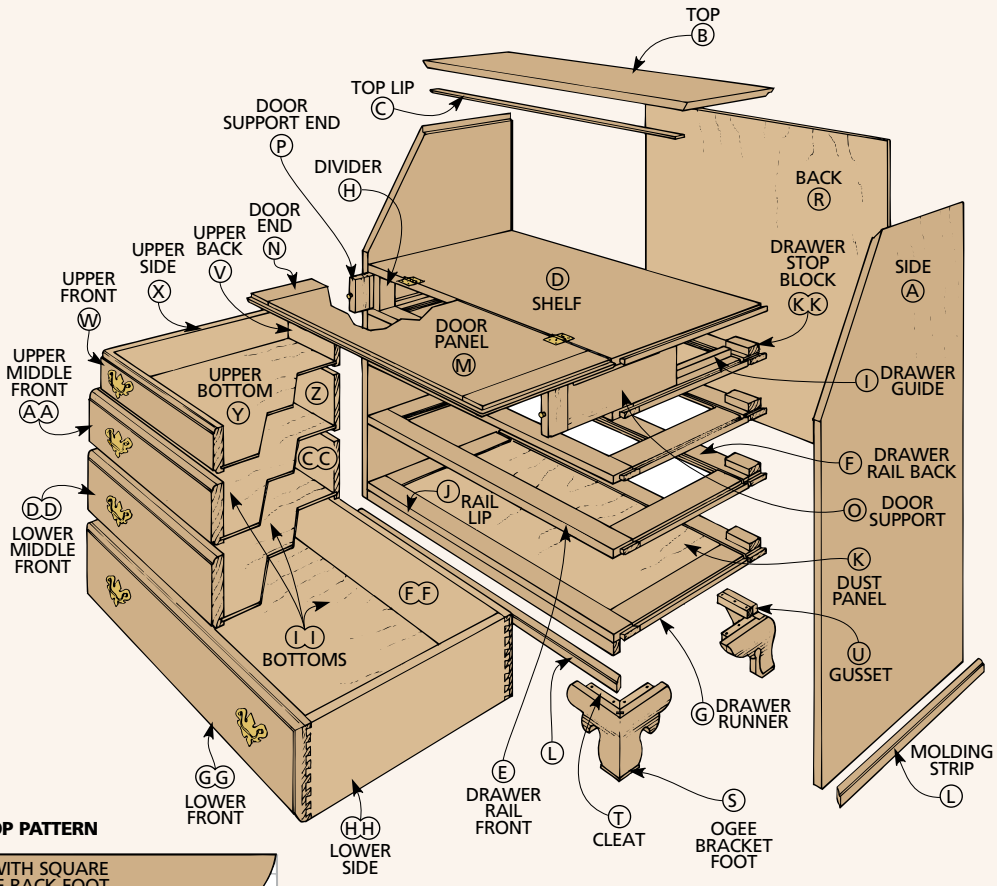
WOOD & FINISH. All the visible parts of this desk are solid, ¾"-thick black cherry. Only the drawer sides — and some other parts that aren't visible — are different. For these I used ½"-thick maple for durability and less expense.

Finally, I went an extra step for the finish — four top coats of satin oil finish to give it that proper look this project deserves.

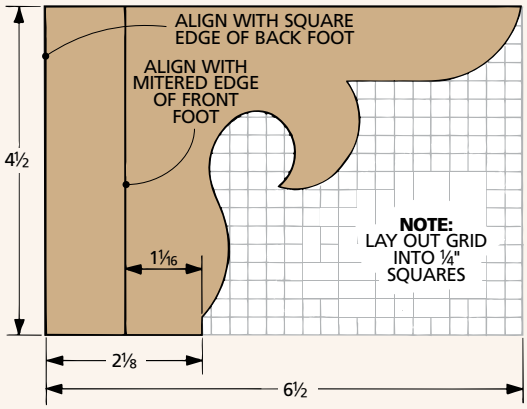
OPTIONS. This desk can really be enhanced by adding an insert behind the door. So you'll find plans for a pigeonhole unit in the Designer's Notebook on page 13. It features an egg-crate system with two areas that have vertical dividers. But the best parts are the drawers — and an easy-to-build hidden compartment.

EXPLODED VIEW

OVERALL DIMENSIONS:
42½W x 22½D x 42H

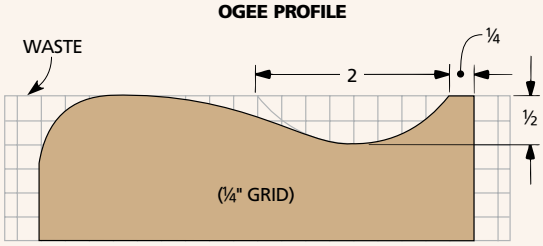


SCALLOP PATTERN



NOTE: CUT TEMPLATES FROM POSTERBOARD

OGEE PROFILE



MATERIALS LIST

CASE

A	Sides (2)	¾ x 21 - 37½
B	Top (1)	¾ x 12 15/16 - 40
C	Top Lip (1)	3/16 x ⅞ - 38½
D	Shelf (1)	¾ x 20¾ - 39¼
E	Drwr. Rail Front (4)	¾ x 2 - 39¼
F	Drwr. Rail Back (4)	¾ x 2 - 39¼
G	Drwr. Runners (8)	¾ x 2¾ - 17½
H	Dividers (2)	¾ x 2 - 4⅛
I	Drawer Guides (2)	¾ x ¾ - 16½
J	Rail Lip (1)	¾ x 1 - 38½
K	Dust Panel (1)	¼ ply - 34¾ x 17½
L	Molding Strip (1)	½ x 1 1/16 - 96 rgh.
M	Door Panel (1)	¾ x 15 - 35⅛
N	Door Ends (2)	¾ x 2½ - 15
O	Door Supports (2)	¾ x 3 9/16 - 18
P	Door Sppt. Ends (2)	¾ x 2 - 3 9/16
Q	Door Sppt. Stops (2)	½ dowel - 1
R	Back (1)	¼ ply - 36⅛ x 39¼
S	Ogee Ft. Blanks (3)	1½ x 5¼ - 16
T	Cleats (8)	¾ x ¾ - 4½
U	Gussets (2)	¾ x 5½ - 5½

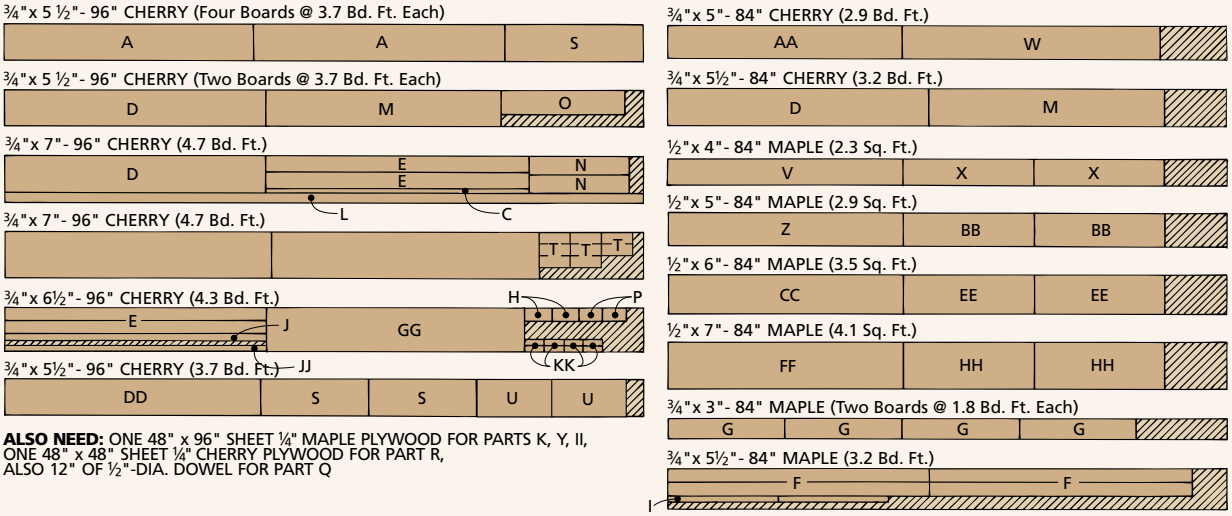
DRAWERS

V	Upper Back (1)	½ x 3½ - 35¼
W	Upper Front (1)	¾ x 3½ - 35¼
X	Upper Sides (2)	½ x 3½ - 19⅜
Y	Upper Bottom (1)	¼ ply - 34¾ x 19¼
Z	Upper Mdl. Back (1)	½ x 4⅜ - 38⅜
AA	Upper Middle Fr. (1)	¾ x 4⅜ - 38⅜
BB	Upper Mdl. Sides (2)	½ x 4⅜ - 19⅜
CC	Lwr. Mdl. Back (1)	½ x 5¼ - 38⅜
DD	Lwr. Middle Fr. (1)	¾ x 5¼ - 38⅜
EE	Lwr. Mdl. Sides (2)	½ x 5¼ - 19⅜
FF	Lower Back (1)	½ x 6⅛ - 38⅜
GG	Lower Front (1)	¾ x 6⅛ - 38⅜
HH	Lower Sides (2)	½ x 6⅛ - 19⅜
II	Bottoms (3)	¼ ply - 37⅞ x 19¼
JJ	Drawer Glides	¾ x 1/16 - 148 ln. in.
KK	Drwr. Stop Blks. (8)	¾ x 1¼ - 3

HARDWARE SUPPLIES

(14) #4 x ¾" Fh Woodscrews
(2) 2" x 3 1/16" Brass Hinges w/ screws
(8) 3⅛" Brass Pulls w/ screws
(1) Brass Escutcheon Plate w/ screws
(3) ½" x ½" Brass Knobs w/ screws

CUTTING DIAGRAM



ALSO NEED: ONE 48" x 96" SHEET ¼" MAPLE PLYWOOD FOR PARTS K, Y, II, ONE 48" x 48" SHEET ¼" CHERRY PLYWOOD FOR PART R, ALSO 12" OF ½"-DIA. DOWEL FOR PART Q

CASE CONSTRUCTION

I started work on the desk by building three solid panels for the outside case (Figure 1). But building a project with solid wood panels calls for some planning. Since each of the panels must be glued up from several boards, it's important to select these boards from stock that looks like it came from the same tree, otherwise it could look funny. (For tips on how to glue up large panels, see the technique on page 5.)

CUT TO ROUGH SIZE. After gluing enough boards together for three oversize blanks (two for the sides and one for the top), cut the sides (A) to finished width and rough length (39") (Figure 1).

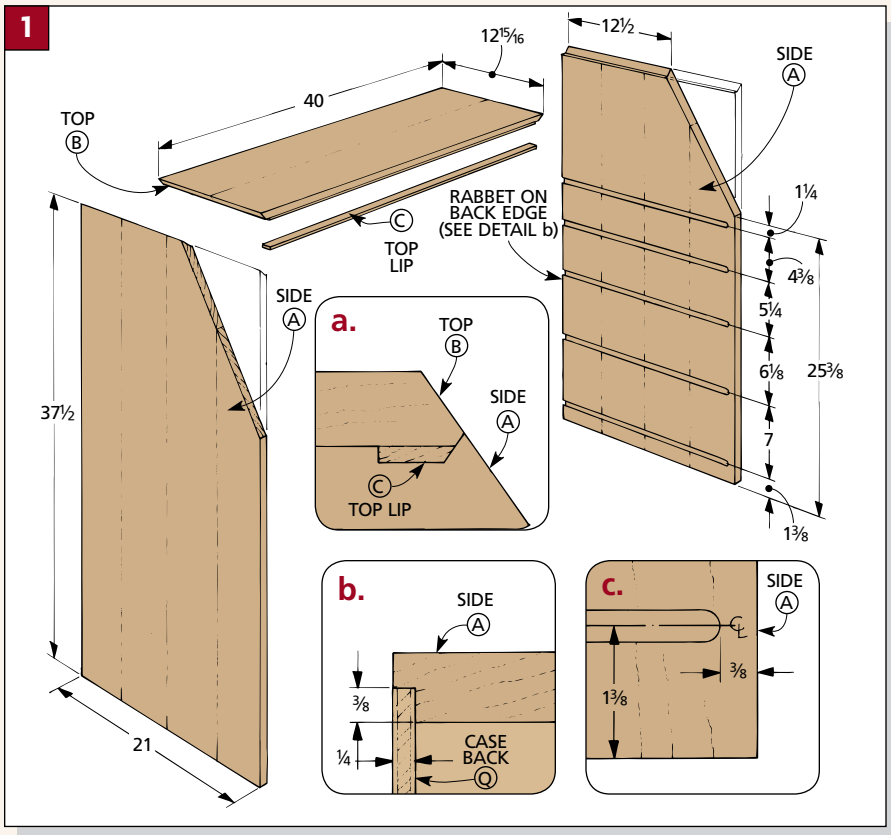
Note: You'll be cutting the sides to finished length later, after the rabbeted miter joint is cut across the top.

Then cut the top (B) to rough width (13¾") but finished length (40") (Figure 1).

Note: The top end of the sides and the front edge of the top should be finish-quality cuts. That is, they should be flat, smooth, and square to their adjacent edges.

RABBET MITER JOINT. In order to hide the end grain where the case sides meet the top, I used a variation on a miter joint. A common miter joint would work, but by rabbeting the miter, the joint is stronger and assembly is easier. (The workpieces won't shift around when they're glued and clamped together.)

The rabbeted miter joint is cut on both ends of the top and the top end of the sides (see the Joinery box on page 4).



SIDES

After cutting the joint, cut the sides to finished length (Fig. 1). Do this by cutting off the bottom ends square to the edges.

The sides of the case are held together by a shelf and web frames that are built later (refer to Figure 8 on page 7). To hold the shelf and web frames in place (and allow the solid wood sides to move), I used sliding dovetail joints.

This joint involves using a dovetail tongue on the ends of the shelf (and web frames) that locks in a dovetail groove on the insides of the case sides. (Refer to the Joinery box on page 9.)

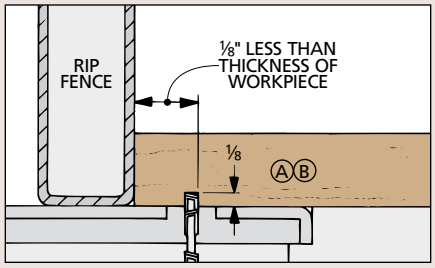
LAY OUT DOVETAIL GROOVES. The frames that fit in the grooves do more than hold the sides of the case together. The web frames also support the drawers inside the case. Since all four drawers are different heights, the grooves need to be spaced at different distances.

So to lay out the position of the dovetail grooves, measure up from the bottom of the case sides *(Fig. 1)*.

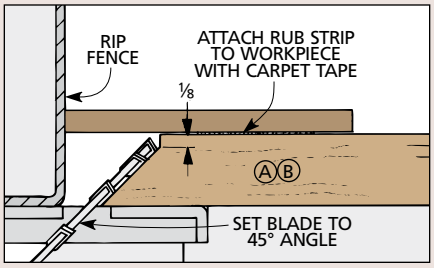
Miters are commonly used to hide the end grain on the ends of two pieces that are being joined. It's a joint that works well for picture frames and small boxes that won't get a lot of handling. But by itself, a miter joint isn't that strong. So I decided to use a variation of a miter joint — a rabbeted miter — to join the side panels of the case to the top.

SMALL KERF. First, a narrow kerf is cut across the inside face of all three pieces (Step 1). Then the miter is cut with the blade aligned with the kerf (Step 2). (A hardboard rub strip helps to align the blade to the top of the kerf.)

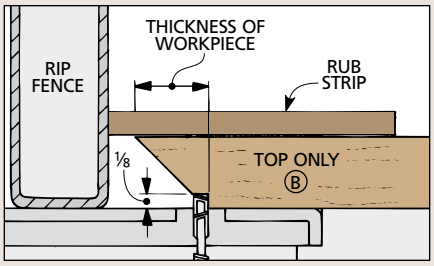
RABBET. Lastly, the rabbet is cut on both ends of the top piece only (Step 3). Again, the rub strip helps line up the cut.



1 *The rabbeted miter joint starts out the same on the top and side panels. First, cut a ⅛"-deep kerf with a regular saw blade across the inside face of all three pieces.*



2 *Now, cut the miter. Be sure the blade is aligned to the kerf. To help, stick a piece of hardboard to the workpiece. Then adjust the fence and sneak up on the cut.*



3 *Finally, the last cut is a rabbet on the top piece only. Again use a hardboard rub strip, but this time to help position the blade in relation to the long point of miter.*

Then draw a line across the inside face of each side to indicate the center of the dovetail grooves.

Note: Since the sliding dovetail joints are to be hidden on the front of the case, these grooves stop ⅜" from the front edge (Figures 1 and 1c).

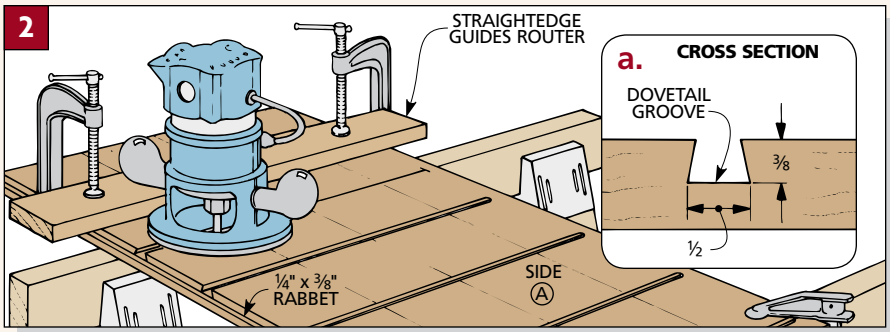
ROUT DOVETAIL GROOVES. Now you can rout the dovetail grooves. To do this, I used a dovetail bit and guided the router along a straightedge clamped to the workpiece (Figures 2 and 2a).

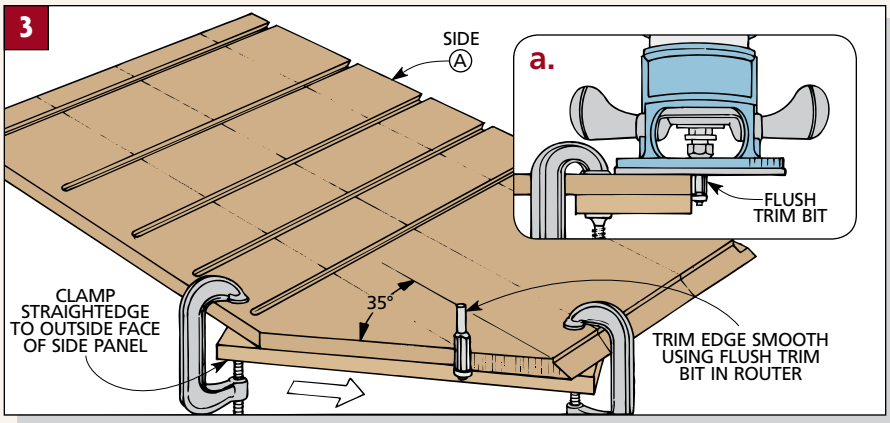
RABBET. Next, cut a rabbet along the back edge of the side panels to accept a plywood back panel (Figures 1b and 2).

ANGLED CORNERS. With the dovetail grooves and the rabbets routed in the case sides, the next thing you'll do is cut off the front corners at a 35° angle to make the slant front (Figure 3).

To do this, first lay out the angle on both of the case sides (Figure 1). Then the angle is cut in two steps. First, cut to within about 1/16" of the line. (Make the cut on both side panels.)

The side panels could be clamped together and hand-planed to the mark to get the same angle on both panels. But I did something different. After the rough cut, I clamped a straightedge on the pencil line (on the right-hand panel) and used a flush trim bit in the router to complete the cut and smooth the edge (Figure 3). To avoid chipout, rout from left to right, starting at the lower corner and finishing at the upper corner. Finally, to cut the second (left-hand) panel identical to the first, I clamped them together so they were flush along the top, back, and bottom edges. Then I ran the bearing of the flush trim bit along the smooth edge of the first panel to trim a matching edge on the second panel.





TECHNIQUE ..... Gluing Up Panels

It's not easy to make a bunch of boards look like a single, flat piece of wood. But when making a solid, edge-glued panel, that's exactly the goal.

The colors should match. The grain of one piece should merge into the grain of the next. The joint lines should be practically invisible. If the panel looks like a bunch of boards slapped together, it will draw attention to itself — detracting from the appearance of the entire project.

And that's only half the battle. While an edge-glued panel should look like one wide piece of wood, it better not act like it. You want to avoid cupping or bowing and warping with changes in humidity. But if the pieces are arranged and prepared properly, this can be avoided.

SELECT & ARRANGE BOARDS

When edge-gluing, the easiest step to rush through is selecting the wood. But choosing and arranging the boards into a panel are essential for good results.

CHOOSING LUMBER. Straight boards make clamping much easier. Some warp is unavoidable and can be corrected. For example, a cupped board can be ripped in two, and a slightly bowed piece can be forced flat while clamping. But a twisted board is difficult to "untwist."

After selecting the lumber, I arrange the boards on the benchtop as they will appear in the panel.

APPEARANCE. First, I match the color. Then I try to fit the pieces together, turning and flipping, until the grain patterns match (see photo above). Your panel will look best if the straight grain is next to straight grain and the curved grain merges with curved grain.

While appearance is the most important consideration, it isn't the only one.

GRAIN DIRECTION. After the panel is glued up, you'll need to smooth it. This usually means planing it by hand or with a power planer. If the grain on the boards runs in varying directions, some pieces will probably chip or tear out.

To determine the grain direction, look at the edge of the board (Figure 1). Grain that's consistently curving the same way makes the job easy. But often, you simply have to pick the direction it curves the most and hope for the best.

Note: I like to draw an arrow on each face to note the direction of the grain (Figure 1). This way it will be easier to arrange the boards later.

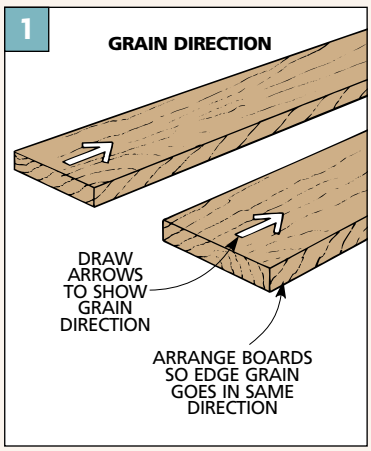
END GRAIN. There's one more thing to consider before you go on — how will the panel cup with changes in humidity?

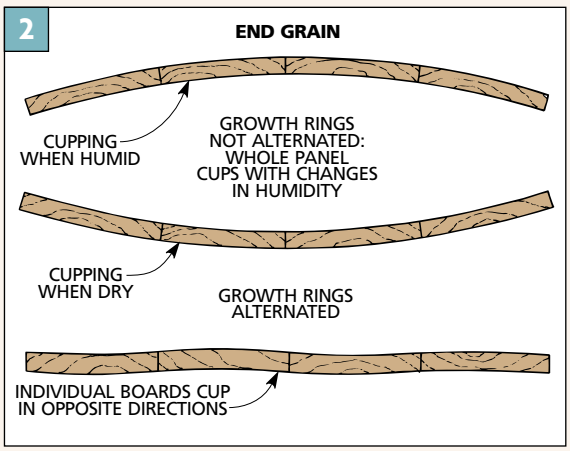
For a large glued-up panel that's anchored (such as a table top screwed to aprons), cupping is rarely a problem. But a panel that's not secured (a chest lid, for example) can cup pretty badly.

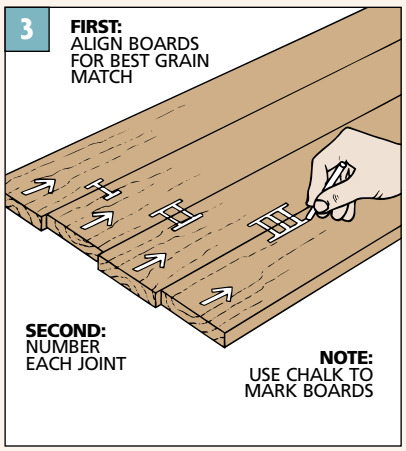
For those panels that won't be anchored, I like to alternate the end grain from board to board (Figure 2). This way, by varying the growth rings, the whole panel won't cup in one direction. This is because each board cups in the opposite direction of the boards on either side of it.

MARK ORDER. Once the boards are arranged into a panel, I chalk Roman numerals (or a cabinetmaker's triangle) across the joints (Figure 3). I prefer the Roman numerals to help prevent the boards from getting mixed up, especially if I'm gluing up a number of panels.

Okay, so which item is most important: appearance, grain direction, or end grain? For me, it's appearance. I usually try to get the grain direction and end grain arranged correctly as well, but often, it's a compromise.







JOINTING EDGES

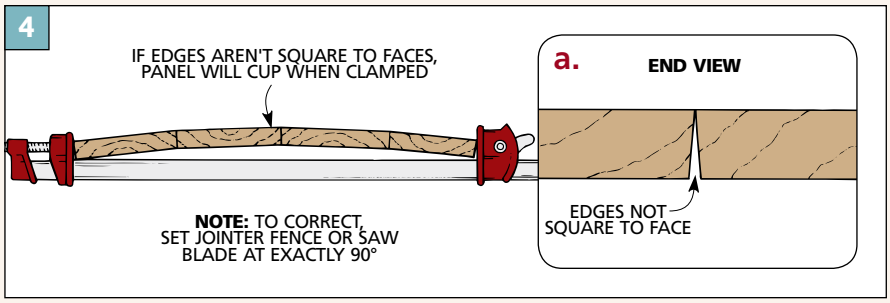
Jointing the edges requires precision. If the edges aren't smooth, straight, and square to the faces, you'll have problems when gluing or clamping. Either the glue won't bond properly, or the whole panel can cup across its width.

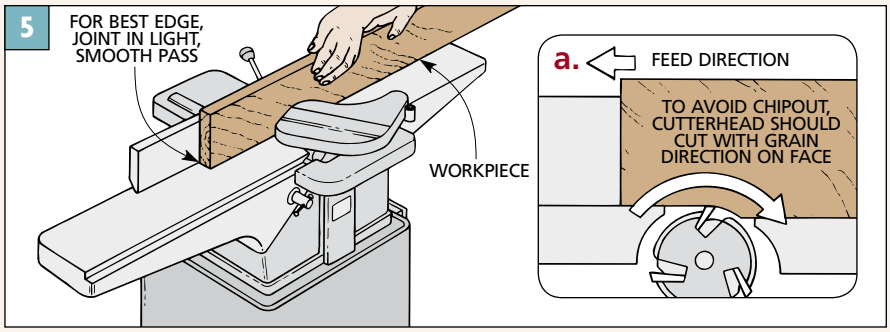
CUPPED PANELS. A strong joint is as easy as cutting smooth, straight edges. But if the edges aren't square to the face of the board, the panel will cup as it's clamped together (Figure 4 and 4a). To prevent this, make sure your machine is set up correctly. With a jointer, set the fence exactly 90° to the table. And with a table saw, set the blade 90° to the table.

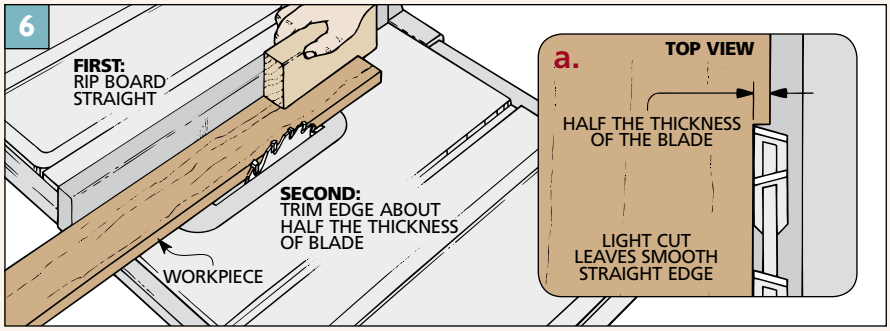
JOINTER. A jointer takes a uniform amount off each board, and you don't have to adjust the fence with every pass (Figure 5). I slowly feed the workpiece with the grain (Figure 5a). After a few light passes, the board has a smooth edge that's ready to be glued.

TABLE SAW. If you don't have a jointer, you can joint edges with a table saw and a good combination blade (Figure 6).

I use a double-cut method. Begin by ripping the boards straight. Then repeat the cut, this time only removing about half the thickness of the saw blade (Figure 6a). This second, lighter cut results in a smooth surface with virtually no saw marks or burning.







GLUING

I don't like to take chances when I'm gluing, so to make sure there aren't any surprises, I always dry-assemble a panel before glue-up. And then when adding glue, I make sure there's enough on both edges for a good bond.

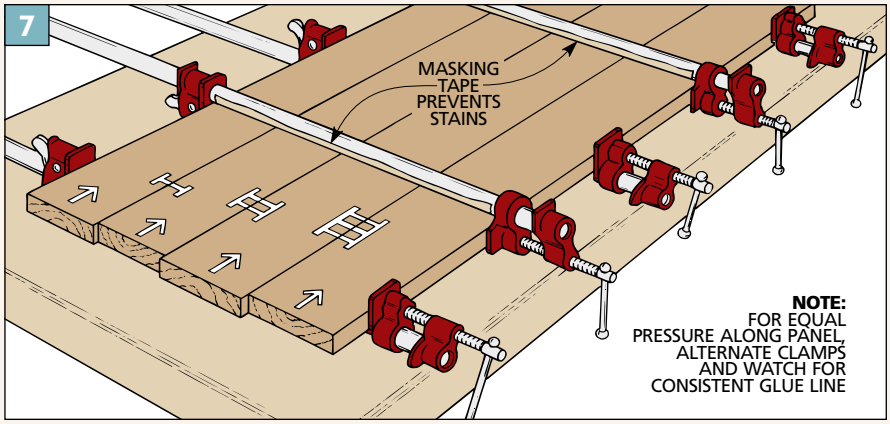
APPLYING GLUE. Some woodworkers put glue on only one edge of each board and don't bother to spread it out. This does have some advantages. It's quick, and the glue doesn't set up quite so fast. But I want to know that there's a thin, even film on both edges, so I spread the glue on with a brush (see photo below).

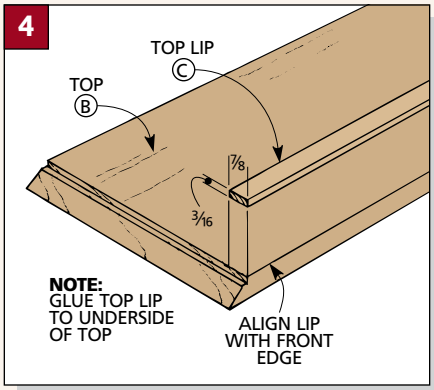
CLAMPING

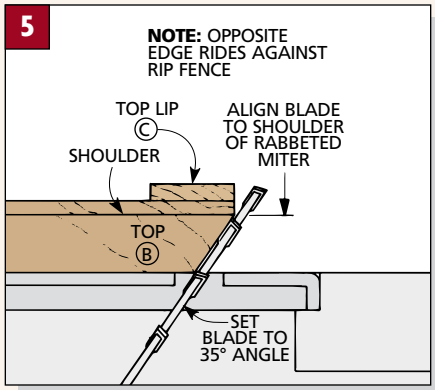
When I'm ready to assemble the panel, I like to use ¾" pipe clamps. I space them 6" to 8" apart and alternate them above and below the panel to equalize the pressure and prevent cupping (Figure 7).

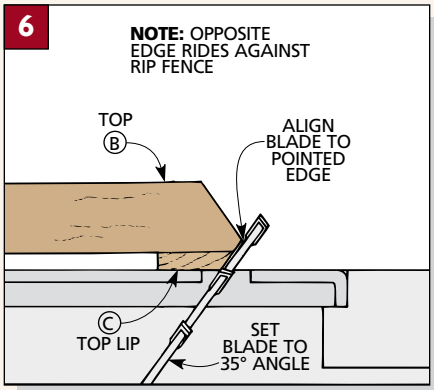
CLAMPING PRESSURE. After the boards are flush, tighten the clamps until tiny beads of glue appear along each joint line. The clamps should be tight, but the important thing is to equalize the pressure along the joint line — not "cranking" down on the clamps as hard as you can. Then add more clamps to the sections where there isn't any glue oozing out.

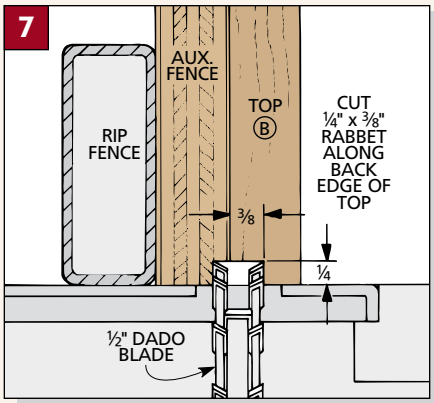
Glue Joint Strength. *A strong joint requires a thin, consistent layer of glue. For a good bond, apply it to both edges and spread with a brush.*











TOP

After flush trimming the angle on both of the side panels and cutting the rabbet for the back, go ahead and set the panels aside for now so you can continue working on the case top (B).

ATTACH LIP. Before cutting the case top to finished width, I first glued a top lip piece (C) to the underside of the front edge (refer to Figure 1a on page 3 and Figure 4). This top lip serves two purposes. First, it provides a little more heft to the case top where it meets the door. And if you decide to build the Slant Front Desk with the pigeonhole insert, the lip acts as a stop when the insert is installed inside the assembled case.

RIP TWO BEVELS. After attaching the top lip, rip a 35° bevel along the front edge of the case top (Figure 5).

Note: The angle of this bevel must be exactly the same as the angle on the two side panels so the door will fit tight to the case when it's closed.

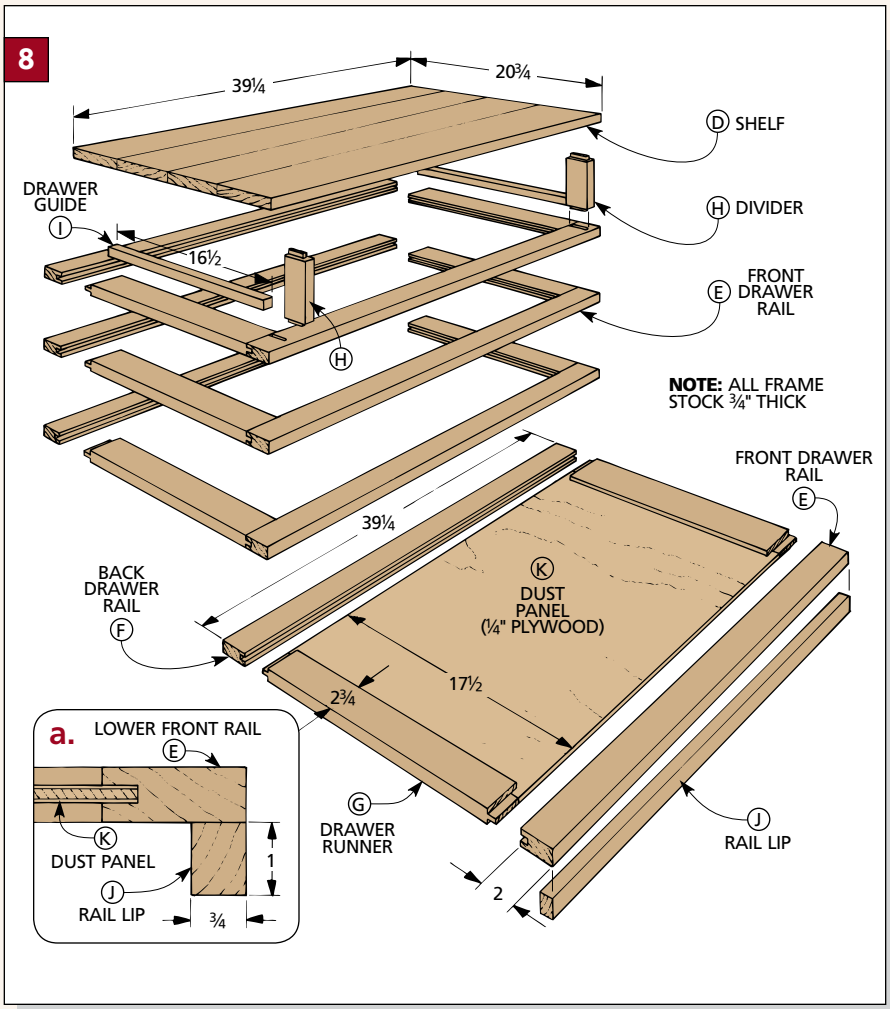
Cut this bevel with the top face down against the table (Figure 5).

Next, rip an intersecting bevel along the front edge, this time with the bottom face against the table (Figure 6).

Note: Because of the lip on the front edge, the workpiece won't lie flat on the table for this second cut. That's probably okay — because only the first bevel angle is critical. But, you could use carpet tape to temporarily stick a thin spacer on the other end of the workpiece. Just be sure to remove it after you've ripped the bevel.

RIP TOP TO WIDTH. Now the case top can be ripped to finished width (once again, with the beveled edge against the fence). Be sure to sneak up on the finished width until the top aligns with the sides at the front and back edges (refer to Figures 1a and 1b on page 3).

To accept a plywood panel for the back of the case, cut a rabbet along the lower back edge of the top piece (Figure 7).



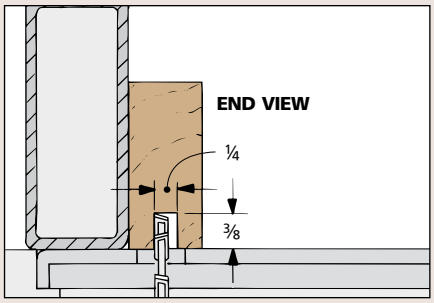
SHELF & FRAMES

When I finished building the case sides and top, I began work on the shelf and the web frames that hold the sides together.

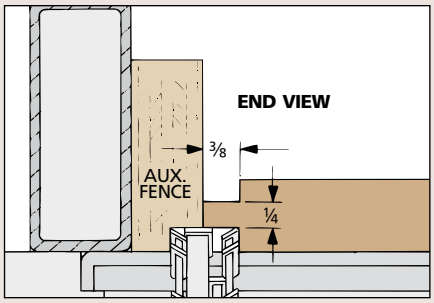
SHELF. The shelf (D) is built from glued-up hardwood stock just like the case sides and top. Then it's ripped to finished width to match the width of the case sides (less the width of the rabbet for the back panel) (Figure 8). To determine the finished

You don't have to cut mortises and tenons to hold a frame together. In fact, a quick and easy way to build a web frame like those used in the desk is with a stub tenon and groove joint. If the frames include a panel (like the dust panel), then the grooves are cut on all four pieces *(Step 1)*. And then stub tenons are cut on the ends of the web frame sides *(Step 2)*. (If all the frames are open, then the grooves are cut on the rails only.)

To get the best fit, center the grooves and tenons by cutting them in multiple passes (flipping between passes).



1 *A centered groove is cut in two passes. The first pass is roughly centered. Then for the second pass, the workpiece is flipped end for end.*



2 *Stub tenons are also cut in multiple passes with a dado blade. Sneak up on the height of the blade until the tenon fits snug in the groove.*

length of the shelf, measure the underside of the top, from shoulder to shoulder. To this dimension add the combined depth of the opposing dovetail grooves (¾"). Now cut the shelf to this length.

FRAMES. All four web frames are built the same way. Two side drawer runners fit between a front and back rail with stub tenon and groove joints (Figures 8 and 9).

Note: Since the back rails and drawer runners will be hidden, I used a less expensive wood (maple). But for the visible front rails, I used cherry.

Start by ripping all the frame pieces to finished width (Figure 8, previous page).

Next, cut the front and back drawer rails (E, F) to finished length to match the length of the shelf (D).

To determine the length of the drawer runners (G), first measure from the front edge of the case side to the shoulder of the rabbet at the rear. Then subtract the width of both drawer rails. To this number add 1" (for the ½"-long tenon on each end of the runners), then subtract ¼" (for an expansion gap where the runners meet the backrail).

GROOVES & TENONS. The next step is to cut a groove centered on the inside edges of all the frame pieces (Figure 9).

Note: Cut these grooves to match the thickness of the ¼" plywood dust panel (K) to be used as a dust (and pest) barrier for the lower panel.

Now cut stub tenons on both ends of all the drawer runners (Figures 8 and 9).

SLOT MORTISES. A pair of vertical dividers separate the top drawer from the two sliding door supports (Figures 8 and 11). These dividers have ¼"-long stub tenons centered on the ends that fit into slot mortises (Figures 10 and 11).

TOP DIVIDERS. After routing the mortises, rip the two dividers (H) to finished width to match the front rails (Figure 11).

To determine the length of the dividers, measure between the centers of the top two dovetail grooves and subtract ¼".

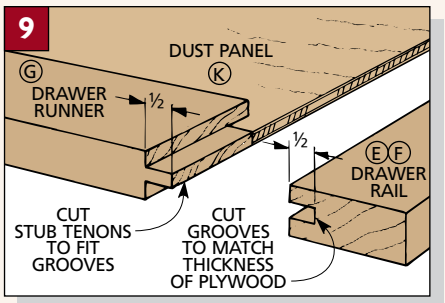
After cutting the dividers to length, cut the stub tenons on the ends (Figure 11).

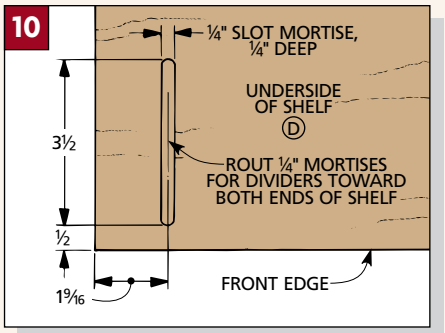
DRAWER GUIDES. Next, I cut a pair of drawer guides (I) for the top drawer to ride against (Figures 8 and 11).

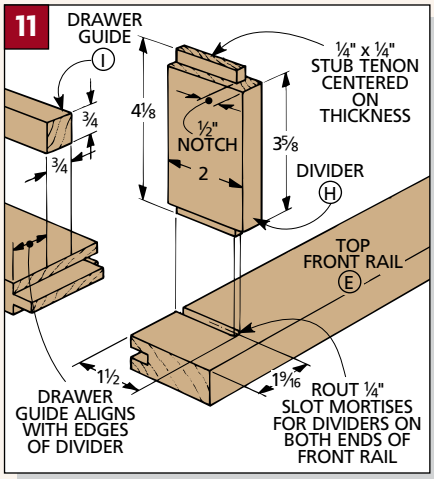
DOVETAIL TONGUES. Then I routed the dovetail tongues that fit the grooves in the case sides (see the Joinery box on page 9). They're routed on the ends of all eight web frame rails (E), the edges of the drawer runners (G) and on both ends of the shelf (D) (Figure 12).

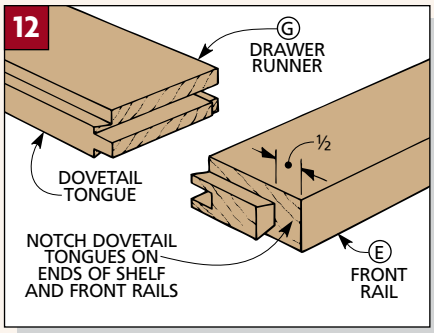
NOTCHES. Before the front rails and shelf can be glued in place, notches must be cut from the ends of the dovetail tongues (Figure 12). Also notch the front edge of the tongues on both dividers (Figure 11). This way they'll fit in the stopped groove you already cut in the sides and the front edge of each workpiece will also end up being flush with the front edge of the case sides.

RAIL LIP. Next, cut a narrow rail lip (J) to fit between the shoulders of the front rail of the bottom dust frame (Figures 8 and 8a). (This supports molding that gets attached later.)







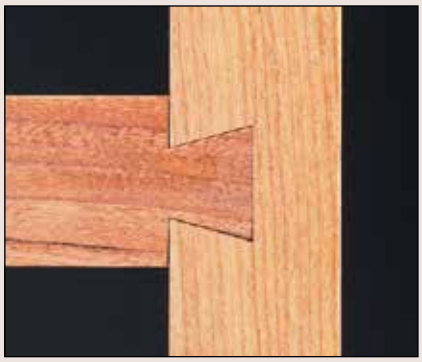


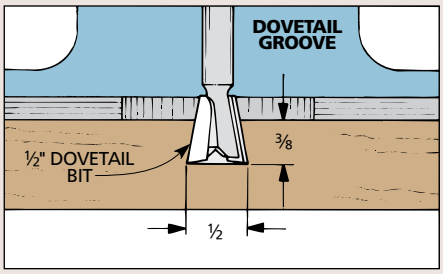
Sliding dovetails are a two-part joint. Even without glue, the angled sides of the tongue fit the angled walls of the groove exactly. It's an extremely strong way to join two pieces of wood. Another benefit is that they allow the wide side panels on the desk to float free of the frames during seasonal changes in humidity.

BE PRECISE. Routing both parts of the joint requires precision — a tight fit holds the project together. But the joint shouldn't be *too* tight. (You must be able to assemble the parts.)

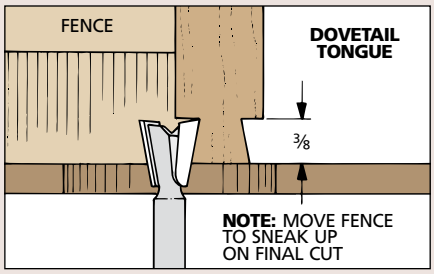
SNEAK UP TO TIGHT FIT. The secret to the best fit is sneaking up on the final cut until the tongue just fits the groove. To help, I built a tall fence to hold the tall pieces on edge while routing (see the Shop Jig article on the next page).

GROOVES & TONGUES. First, rout the grooves with a hand-held router, running it against a straightedge (Step 1). Then rout the tongues on the router table, sneaking up on a perfect fit (Step 2).





1 *Rout dovetail grooves with a hand-held router. Set depth of cut and then run router against a straightedge.*



2 *Dovetail tongues are routed on the router table. The height of the bit matches depth of the dovetail groove.*

CASE ASSEMBLY

Here's where all the parts get joined to create the carcase of the desk.

Note: Because the solid wood sides must be allowed to expand and contract with changes in humidity, the case is assembled with glue only in certain spots (Figure 14). Don't put glue on the tongue of the front rail. (It will scrape off in the dovetail groove.) Instead, apply glue to the front end of the groove. Also, do not apply glue to the tongues on the edges of the drawer runners.

ASSEMBLY. Start assembling the case by sliding the shelf (D) in place in the upper dovetail groove (Figure 13). (Because the dovetail groove is stopped, you'll have to slide the shelf in place from the back edge.) The shelf holds the sides while the web frames are installed. There's a sequence that needs to be followed for installing the frames.

With the shelf in place, continue by sliding in the front drawer rail (E) until the front edges are flush. Next, slide in both drawer runners (G) so the tongues at the front fit into the grooved edge of the front rail (Figure 14).

PLYWOOD PANEL. Now cut a dust panel (K) the same length as the drawer runner to fit inside the web frame.

Note: I installed a panel only in the lower web frame. But since the other frames have grooves to accept a panel, you could install a panel in these as well. (Extra panels add weight and cost.)

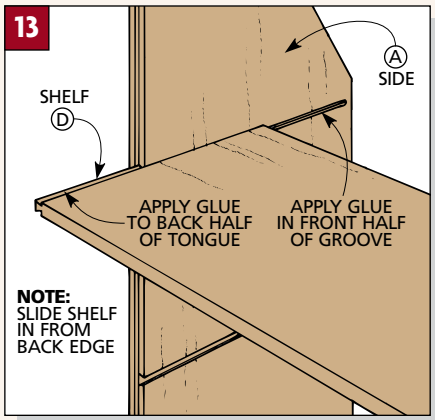
Finally, slide in the back rail (F). This should fit flush to the shoulder of the rabbet for the back panel.

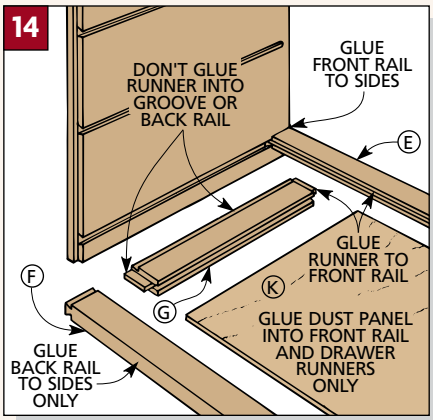
Note: There should be a ¼" gap between the back of each runner and the front edge of this rail. This lets the case sides move without splitting the frames.

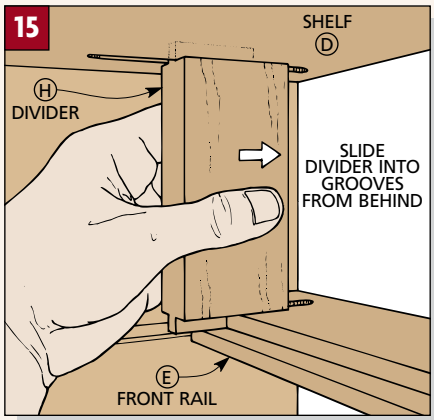
TOP WEB FRAME. The assembly sequence for the top web frame is a little different than for the lower frames. That's because the dividers (H) are glued in the mortises between the shelf and front rail before the drawer runners are installed (Figure 15). Here, the extra-long mortises (on the underside of the shelf) permit the tenons to slide in even though the rail and shelf are in place.

Now the remaining sections of the top web frame can be installed just as you did the lower frames. Then install the top (B) between the sides.

COMPLETE ASSEMBLY. Finish building the case by gluing the drawer guides onto the upper frame runner (refer to Figures 8 and 11 on pages 7 and 8). Also, glue on the rail lip (Figures 8 and 8a).



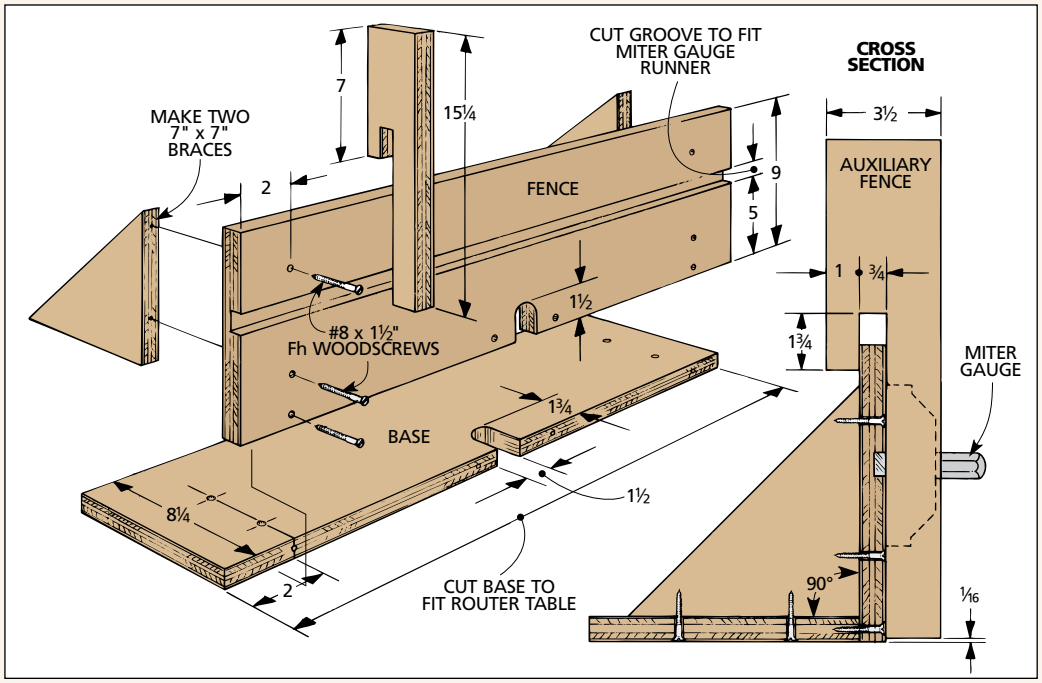




SHOP JIG . . . . . Tall Router Table Fence

When I started making the joinery for the Slant Front Desk, I wanted to use sliding dovetails on some parts of the desk. But then a problem arose.

To rout a dovetailed tongue on the router table, the workpieces must stand on edge (see photo below left). But my router table fence was too short to easily support a large panel while routing. And I ran into the same problem when I tried to rout the ends of the tall, narrow rails.



To solve this, I built a tall fence that clamps to the top of my router table (see photos below). The tall fence offers a lot of support when routing the edges of large panels. And when used with a miter gauge, it works great for routing the ends of long pieces like the drawer rails or even holding pieces at an angle.

BASE & FENCE. To build the fence, begin by cutting a base from ¾"-thick plywood. The length of the base should equal the top of your router table. Then cut a 9"-high fence to the same length as the base (see drawing).

BIT NOTCH. Both the base and fence need a notch for the router bit. To cut the notches, I used a jig saw and then cleaned them up with a drum sander.

MITER GAUGE GROOVE. Next, cut a groove along the fence to guide your miter gauge. (The width of this groove should match the width of the runner on your miter gauge.)

Note: The position of the miter gauge groove is critical — be sure not to cut it too low. As its pushed past the bit, the miter gauge should easily clear even your largest diameter router bit when the bit is set at its *highest* point.

AUXILIARY FENCE. I added an auxiliary fence to hold the miter gauge in a vertical position. This fence is screwed to the miter gauge and hooks behind the tall router table fence. This way, the miter gauge can't fall out of the groove.

Note: When screwing the auxiliary fence to the miter gauge, positon it 1/16" above the surface of the router table. This allows the miter gauge to be tilted in either direction to support angled pieces (see photo below right).

BRACES. Now cut two 7" x 7" triangular braces to support the fence and keep it square to the table top (see drawing). **Note:** One corner of each triangle must be exactly 90°.

Finally, glue and screw all the pieces for the fence together. After the glue has completely set up, I wipe a coat of wax on the face of the fence the miter gauge groove to get a slick surface. Now you are able to safely rout the dovetail joints.

Large Panels. *Routing a dovetail tongue on the ends of a panel can be difficult with a short fence. This tall fence keeps the panel exactly 90° to the router bit.*

Long Pieces. *Long narrow pieces need even more support than panels. Adding a miter gauge with an auxiliary fence keeps the piece from tipping forward or back.*

Angled Pieces. *The miter gauge and an auxiliary fence are able to tilt forward or backward, which really helps when you're routing grooves for splined miters.*

OGEE FEET & MOLDING

The desk is considered a piece of Chippendale-style furniture. It's distinguished by its short, sculptured feet (called ogee bracket feet). In the technique article starting on page 15, I've detailed the steps needed to build the feet (S), cleats (T), and gussets (U).

MOLDING STRIP. After installing the feet, cut a blank for the molding (L) to finished width and rough length (Figure 16). Then rout a profile along the edge with a ⅜" roundover bit (Figure 16a).

Now miter the molding to fit around the front and sides of the case. Glue on the front strip, but for the side strips apply glue to the mitered corner only. Anchor the back part of the strips with screws from inside the case through a pair of slotted shank holes (Figure 16).

DOOR & DOOR SUPPORTS

The drop-down door is made up of three pieces — a glued-up panel and two "breadboard" ends (Figure 17).

DOOR ENDS. After the door panel (M) is trimmed to finished size, cut a pair of door ends (N) to length (to match the width of the panel).

JOINERY. Now the breadboard door ends are fastened to the door panel with stub tenon and groove joints (Figures 17 and 17b). (For more on cutting these joints, refer to page 8.)

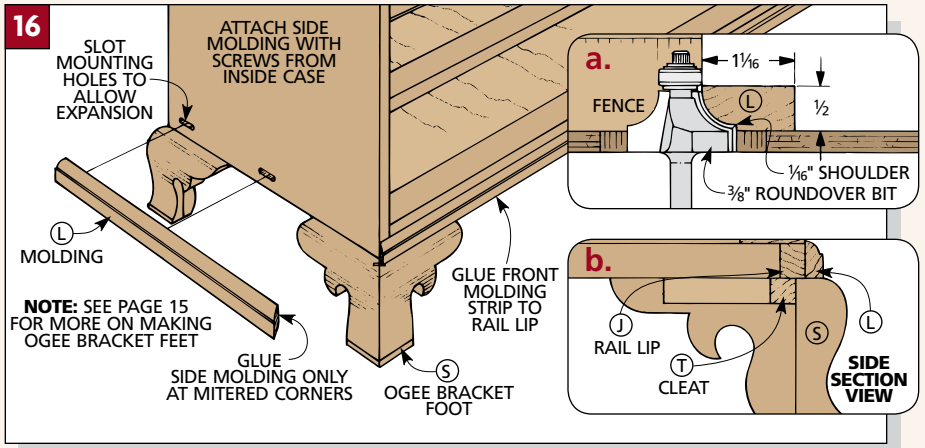
To allow the wide panel to expand and contract, the ends are glued only along the middle third of the tongues (Figure 17).

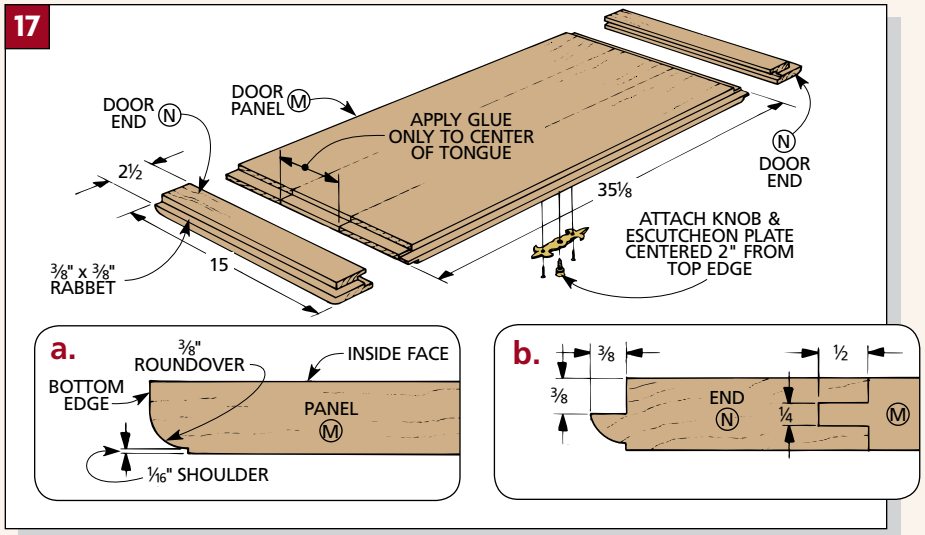
Once you've finished building the fold-down door unit, rout a roundover (with a small shoulder) around all four edges on the outside face (Figures 17 and 17a).

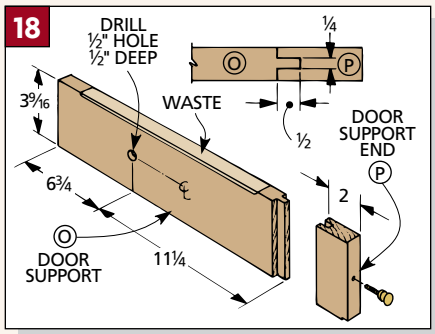
Then, to allow the door to fit inside the door opening, rout a rabbet on the inside face of three edges (Figure 17b). (Don't rabbet the bottom edge.)

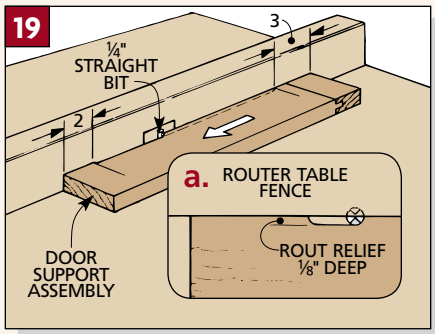
DOOR SUPPORTS. Now rip a pair of door supports (O) to width 1/16" less than the height of the opening to fit between the case and dividers. Then cut the door supports to finished length (Figure 18).

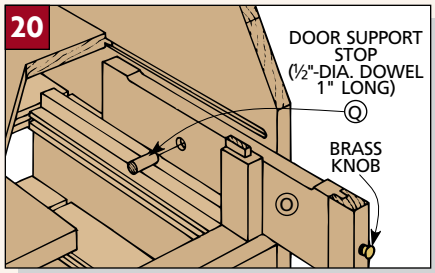
Next, cut a pair of support ends (P) to length to match the width of the supports (Figure 18). Then rip the support ends to finished width, and attach them to the supports with tongue and groove joints.

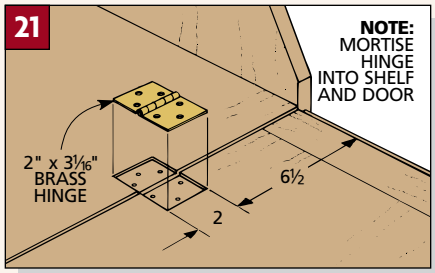












RELIEF NOTCH. Next I routed a shallow notch along the top edge of each door support (Figure 19). This allows the support to slide with minimal binding.

DOWEL PIN & BRASS KNOB. Now glue a dowel pin into each door support as a stop (Figure 20). Then a small brass knob is attached to the front support end.

INSTALL DOOR. I installed the door with a pair of brass hinges mounted flush to the surface of both the door and the shelf (Figure 21).

DRAWERS

At this point the project becomes more like an ordinary cabinet with dovetail-joined drawers.

There's one small difference. On most chests of drawers, all the drawers are the same width. On this desk, the drawers are the same width except the top drawer (because of the door supports).

DRAWER PARTS. I began the drawers by cutting the drawer backs (V, Z, CC, FF) ⅛" smaller in each dimension than the drawer openings (Figure 22).

Note: I used ½"-thick maple for all the drawer backs and sides.

Next, cut the drawer fronts (W, AA, DD, GG) the same size as each drawer back. (I used ¾"-thick cherry.)

After that, cut eight drawer sides (X, BB, EE, HH) to the same height as the fronts and backs.

Note: Cut the sides 1⅝" shorter than the depth of the drawer openings. This allows for the stop blocks, plus ⅛" for the drawer backs (Figure 22a). It also allows for a ⅜" overhang on the front when the drawers are closed (Figure 22b).

DOVETAIL JOINTS. After cutting all the drawer parts to finished size, rout half-blind dovetails on the ends of each. (To do this, I used a dovetail jig with a router and a ½" dovetail bit.)

Before assembling the drawers, rout a ¼"-deep groove around the lower inside face of each drawer part to accept a ¼" plywood bottom (Figure 22).

Note: Measure your plywood and cut the groove to this size — ¼" plywood is usually less than ¼" thick.

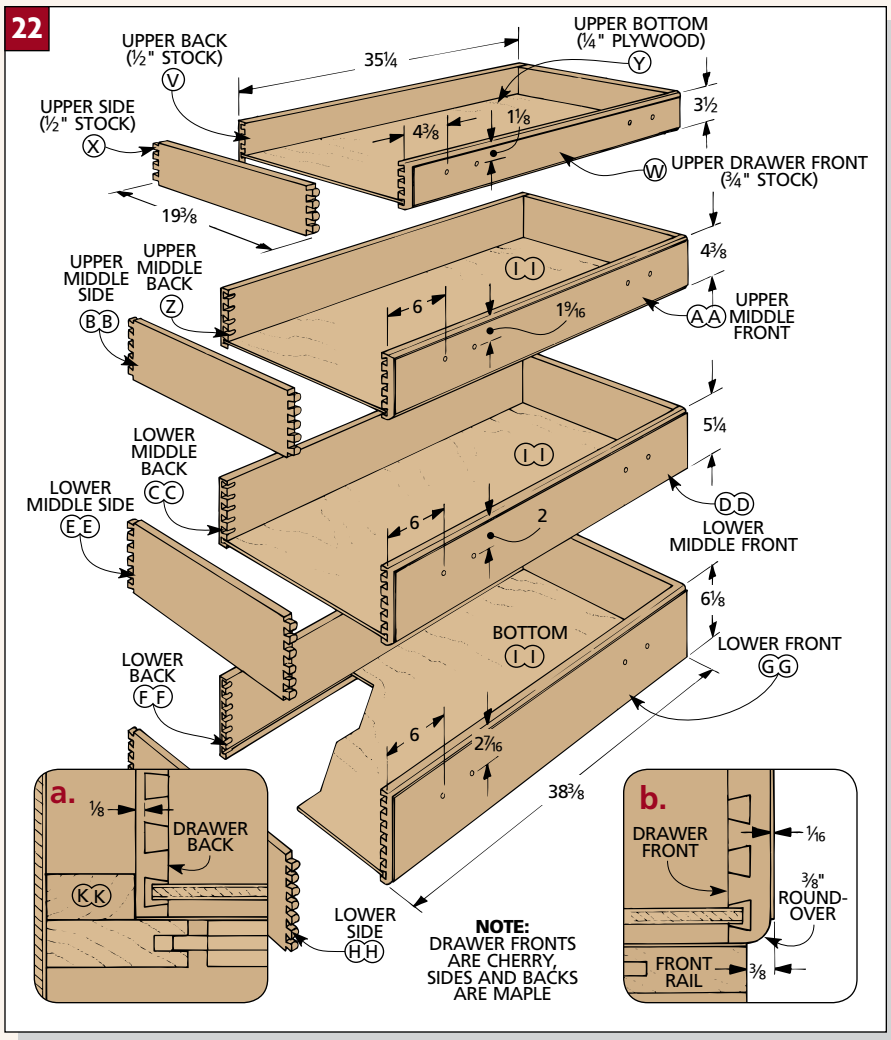
ROUNDOVERS. Now rout a roundover around the face of each drawer front (Figure 22b). This profile should match the profile around the door (Figure 17a).

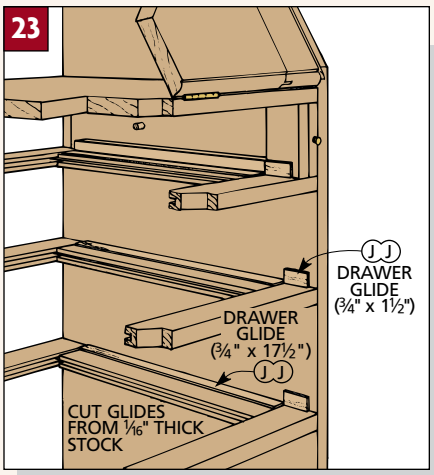
ADD DRAWER BOTTOMS. Now cut the drawer bottoms (Y, II) to size and glue them up. (I used ¼" maple plywood with the grain direction running from front to back. Cutting them with the grain running right to left it will take more plywood.)

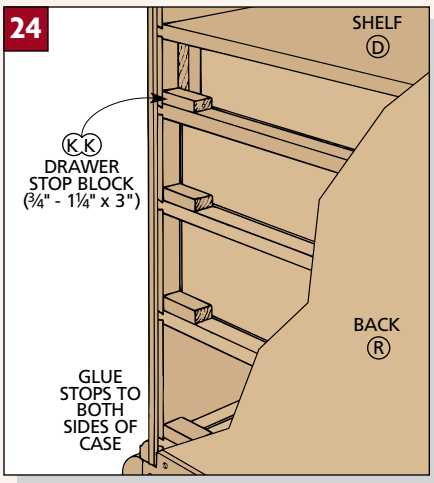
Half-blind dovetails are customary on a well-built drawer. I routed the joints using a hand-held router and dovetail jig.

GUIDES, STOPS, & BACK. To keep each drawer centered in its opening, glue 1/16"-thick hardwood drawer glides (JJ) to the case sides and on the tops of the runners (Figure 23). Finally, add two ¾"-thick drawer stop blocks (KK) to the back rail for each of the drawers (Figure 24), and screw the back (R) in place.

Note: If you build the pigeonhole unit described in the Designer's Notebook on page 13, you'll want to complete it first before adding the back panel.





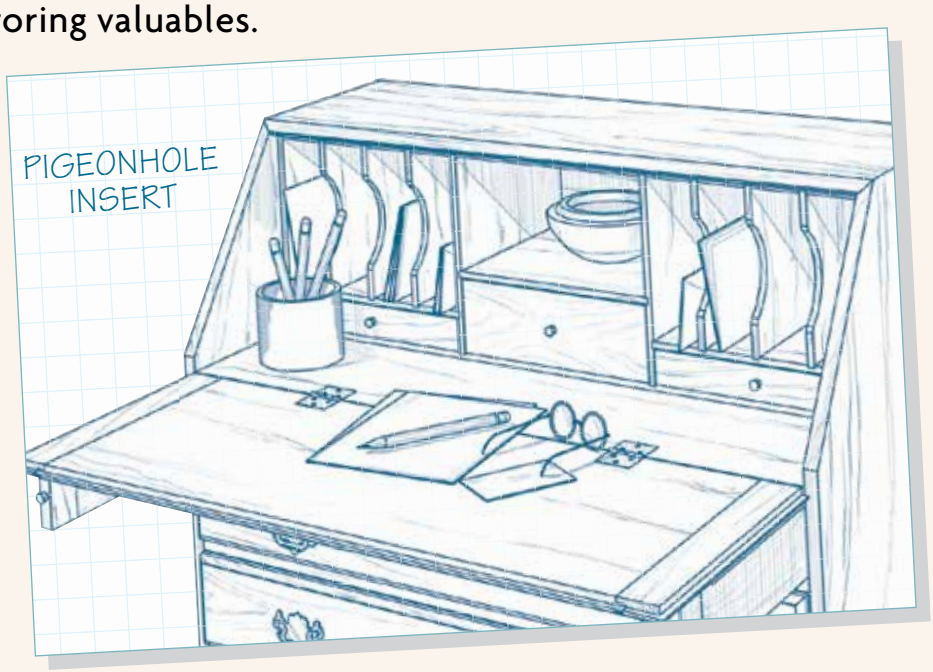


DESIGNER'S NOTEBOOK

Fight clutter on the top of your desk with this pigeonhole insert. It's a helpful way to organize all the things you want to keep inside — and you can add a hidden compartment for storing valuables.

CONSTRUCTION NOTES:

- Start by building the insert to fit the opening behind the drop-down door. First, measure from the back edge of the door lip (C) to the shoulder of the rabbet at the back of the case. Then rip all the case parts to this width ($11\frac{3}{4}$").
- Next, I cut the case top and bottom to length. (They are actually $\frac{1}{16}$" less than the length of openings so they will slide inside but still be fairly tight.)
- To determine the length of the sides (MM) and dividers (MM), measure the height of the desk opening and subtract $\frac{1}{2}$" (since they fit in dado joints). Then, for ease of installation, I subtracted another $\frac{1}{16}$" to come up with the final length.
- The joinery for the pigeonhole insert consists of rabbets and dadoes (Figure 2). I cut opposing pieces on the table saw at the same time. This way, all the joints will be aligned opposite each other.
- With the dadoes and rabbets complete, dry-assemble the case. Now the middle shelf (NN), and outside shelves (OO) can be cut to length to fit in the case.
- Next, work on the storage dividers (PP). They're sized to fit between the case top and outside shelves (Figure 3).
- And to make it easier to pull files from the compartments, I cut an arc on the front of each divider (Figure 3).



MATERIALS LIST

PIGEONHOLE CASE

LL	Top/Bottom (2)	$\frac{3}{8}$ x $11\frac{3}{4}$ - $38\frac{7}{16}$
MM	Sides/Dividers (4)	$\frac{3}{8}$ x $11\frac{3}{4}$ - $11\frac{11}{16}$
NN	Middle Shelf (1)	$\frac{3}{8}$ x $11\frac{3}{4}$ - $12\frac{7}{16}$
OO	Outside Shelves (2)	$\frac{3}{8}$ x $11\frac{3}{4}$ - $12\frac{5}{8}$
PP	Storage Dvdr. (6)	$\frac{3}{8}$ x $11\frac{3}{4}$ - $9\frac{5}{16}$

PIGEONHOLE DRAWERS

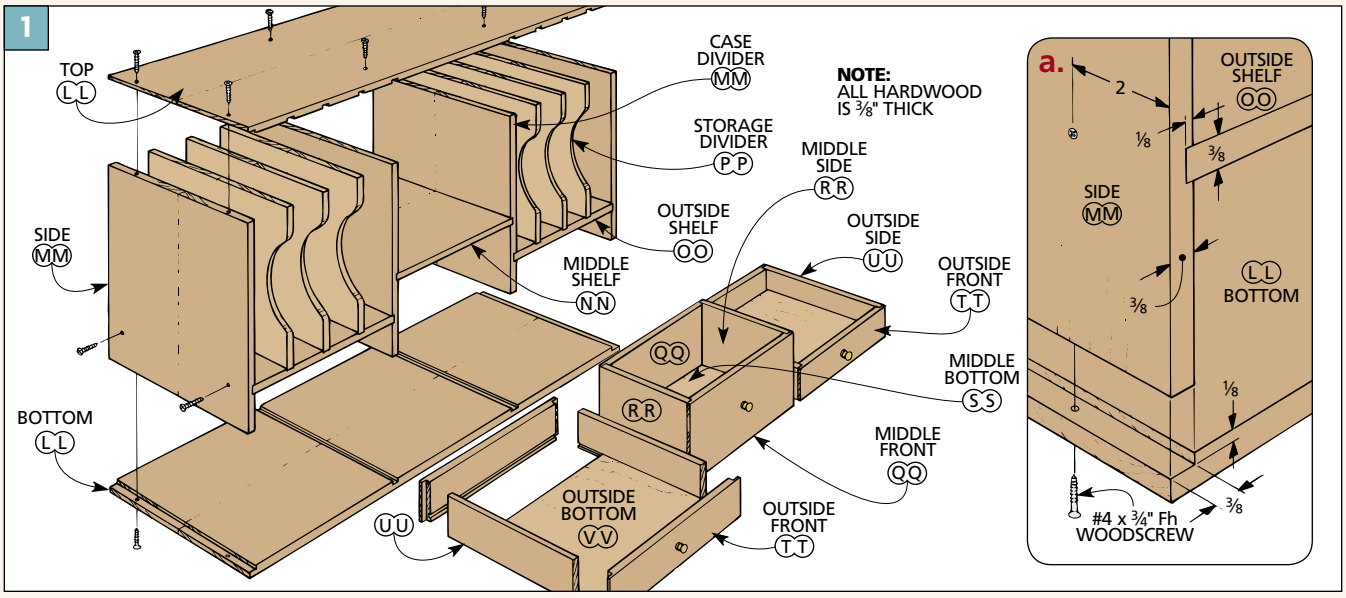
QQ	Middle Front/Bk. (2)	$\frac{3}{8}$ x $4\frac{5}{16}$ - $12\frac{1}{8}$
RR	Middle Sides (2)	$\frac{3}{8}$ x $4\frac{5}{16}$ - $9\frac{3}{4}$
SS	Middle Bottom (1)	$\frac{1}{4}$ x $11\frac{5}{8}$ - $9\frac{1}{2}$
TT	Outside Front/Bk. (4)	$\frac{3}{8}$ x $1\frac{15}{16}$ - $12\frac{5}{16}$
UU	Outside Sides (4)	$\frac{3}{8}$ x $1\frac{15}{16}$ - $11\frac{1}{2}$
VV	Outside Bottom (2)	$\frac{1}{4}$ x $11\frac{13}{16}$ - $11\frac{1}{4}$

HIDDEN COMPARTMENT

WW	Front (1)	$\frac{3}{8}$ x $4\frac{5}{16}$ - $12\frac{1}{8}$
XX	Back (1)	$\frac{3}{8}$ x $4\frac{5}{16}$ - $10\frac{1}{8}$
YY	Sides (2)	$\frac{3}{8}$ x $4\frac{5}{16}$ - $1\frac{3}{8}$
ZZ	Bottom (1)	$\frac{1}{4}$ ply - $1\frac{3}{8}$ x $9\frac{3}{4}$

HARDWARE SUPPLIES

(20) No. 4 x $\frac{3}{4}$" Fh Woodscrews
(3) $\frac{1}{2}$" x $\frac{1}{2}$" Brass Knobs w/ screws

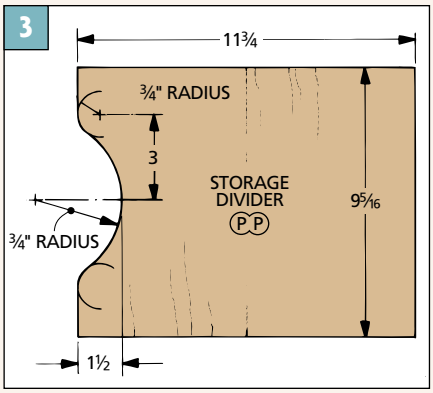


■ Now the case can be assembled with glue and screws (Figure 1).

■ The next thing you'll do is build the drawers. The drawers are made using ⅜"-thick stock. First, cut the fronts and backs (QQ, TT) 1/16" less than the height and width of the openings (Figure 4). Then rip the sides (RR, UU) to the same height as the front and back pieces (Figure 4).

■ Next, cut a rabbet joint at both ends of each drawer front and back (Figure 4a). Now the sides can be cut to length so that when the drawers are closed, the fronts fit flush with the case.

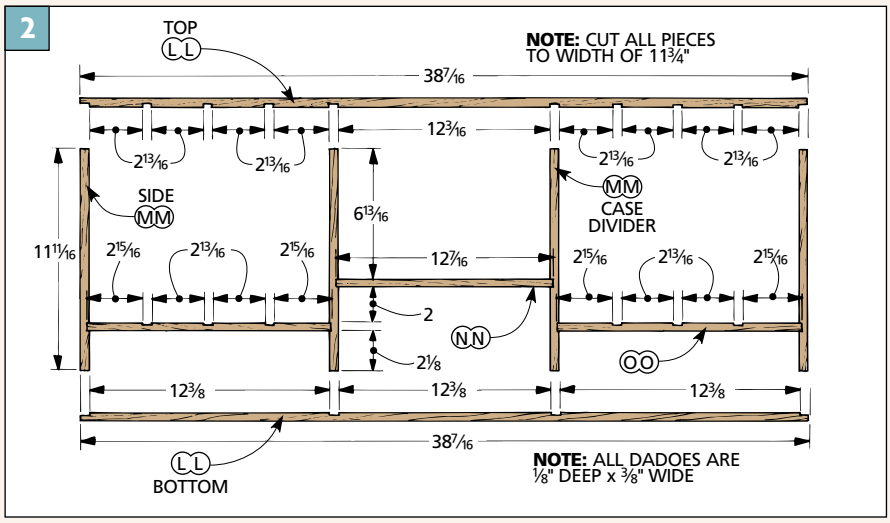
■ To hold the ¼" plywood I used for the drawer bottoms (SS, VV), I cut a groove around the inside of the drawer parts (Figure 4). Finally, assemble the drawers with glue in the joints and in the grooves.

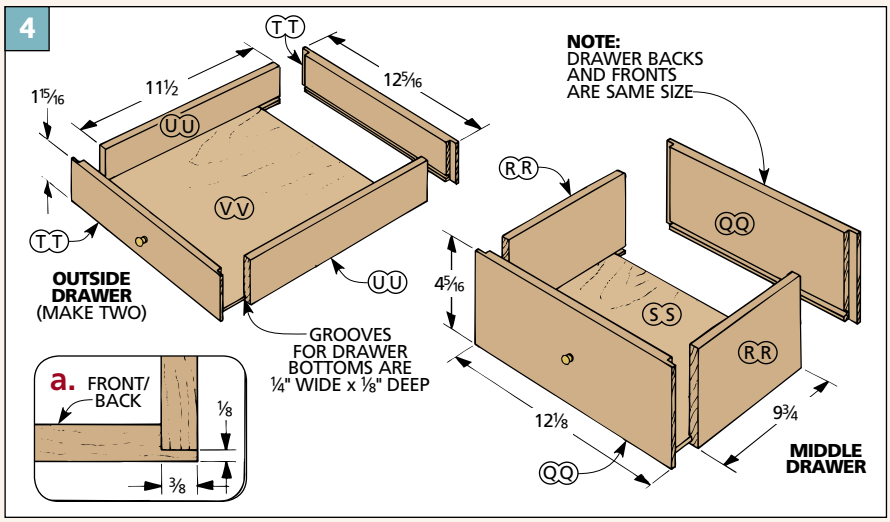


■ Next, I built the hidden compartment behind the middle drawer. I started with the front piece (WW). The height and width of this piece must be exactly the same as the drawer opening.

■ When the front is completed it should fit the drawer opening perfectly. Then you can build the back (XX) (Figure 5).

■ Now cut a dado on the side of the front piece and a rabbet on each end of the back piece (Figure 5). Then the sides (YY) can be cut to fit between the rabbets and dadoes.



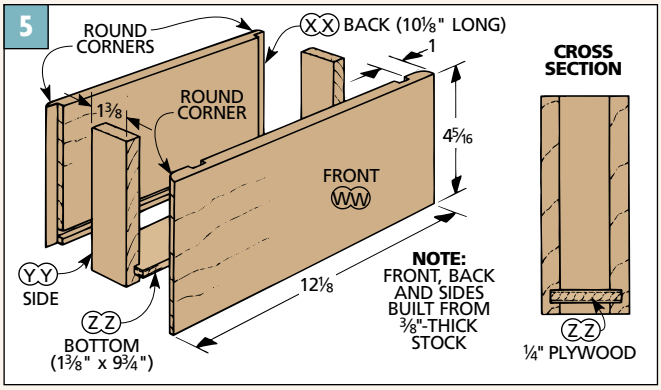


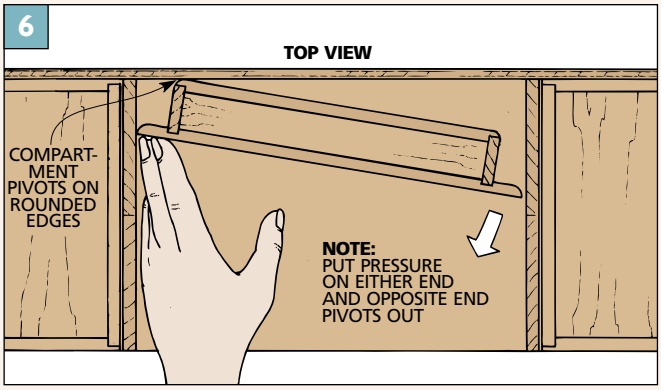
■ Finally, cut a groove for the bottom around the inside of all four pieces. Then dry-assemble the drawer to measure for the bottom piece (ZZ) and cut it to size.

■ Before assembling the box, sand a roundover on the back corners of the front and back, creating pivot points.

Then, to open the compartment, the "sweet spots" at the sides can be pushed in so the opposite side pivots forward allowing you to pull it out (Figure 6).

Secret Nook. *To open this secret compartment you have to know exactly where the "sweet spots" are at the sides. Push either one and the opposite side pivots open.*





TECHNIQUE . . . . . Ogee Bracket Feet

Even though the ogee bracket feet used for the Slant Front Desk look like traditional hand-made ogee feet from two hundred years ago, they're actually much easier to make. Back then, these feet would have been shaped with hand tools — I used a table saw and a band saw.

But as you can see, the final results are the same — great looks and plenty of strength — without all the hard work.

SPLINED MITER JOINT. When you first look at a foot like this, it may be hard to figure how it's made. It's not one big block of wood as you might expect. Instead it's two thick pieces of wood joined with a splined miter joint.

PROFILES. Also, each leg piece has two distinct profiles. There's a large S-shaped ogee (cove) profile cut in the face, and a scalloped (or scrollsawn) cutout to form a support bracket.

POWER TOOLS. In the early days, the S-shaped profile was usually shaped with a big plane that had a huge cutter. But the problem was pushing this tool through the workpiece. It was hard work that required a lot of effort.

Today, most of the hard, physical work can be done in your home workshop with the table saw, a regular saw blade, and a stacked dado set. (I'll have to admit though, I did use a couple of "modern" hand tools for some final shaping.)

Originally the scallop cutout would be cut with a coping saw. Here, I used the band saw with a ⅛"-wide blade.

CUTTING A COVE

These ogee feet start out as long, thick blanks. You'll need three blanks — one for the back feet and two for the front.

GLUING UP BLANKS. The blanks are made from two pieces of ¾"-thick stock glued face-to-face. Once the glue has set up, the blanks are cut to rough size (5¼" x 16" for the desk or 4½" x 16" for the chest) (refer to Step 3).

CUTTING A COVE. Now work can begin on roughing out the profile. To do this, first set up the table saw to cut a cove on the front of each blank. (The cove is the concave area of the S-shaped profile.) The blade is actually going to plow through the workpiece at an angle.

SAW SETUP. To set up the table saw, a fence has to be positioned at an angle to the saw blade. The problem is determining that angle to get a certain width cove. (The cove is 2" wide for the desk.)

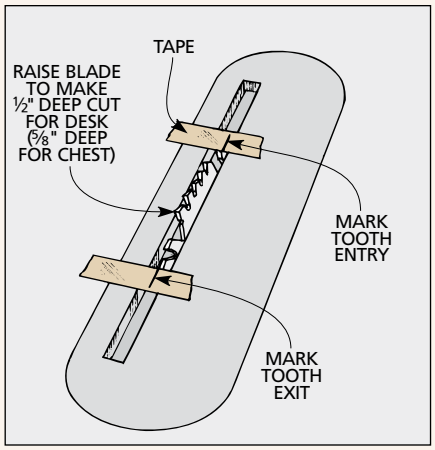
The best method I've found for setting up the fence to the correct angle is to use a posterboard template that looks like a little window (Step 2).

But before you can use the template, you need to raise the blade to match the depth of the cove. Then mark on strips of masking tape where the teeth of the blade enter and exit the saw table (Step 1).

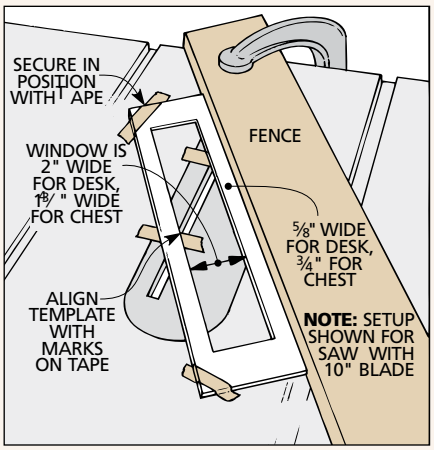
Now take the template and angle it until it touches the entry and exit points (Step 2). Then clamp a straightedge (fence) against the template (Step 2).

With the fence clamped in place, cut the cove in multiple passes, resetting the blade height after each pass (Step 3).

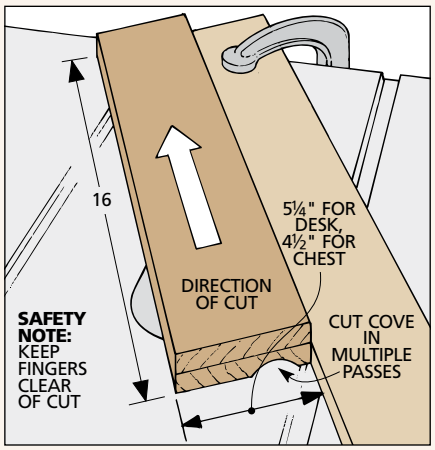
Note: The angle of the fence to the blade changes with an 8"-dia. saw blade. To cut the cove with a benchtop table saw, the angle of the fence will be steeper.



1 *To begin, raise the saw blade to the final depth of the cove. Then mark on strips of masking tape where the teeth of the blade enter and exit the saw.*



2 *Next, make a template with an inside dimension equal to the width of the cove. Angle the template so the inside edges of the template touch the marks.*



3 *Clamp the fence in place and raise saw blade to a height of 1/16". Raise blade in 1/16" increments between passes until the full depth of the cove is reached.*

ROUGH OUT PROFILE

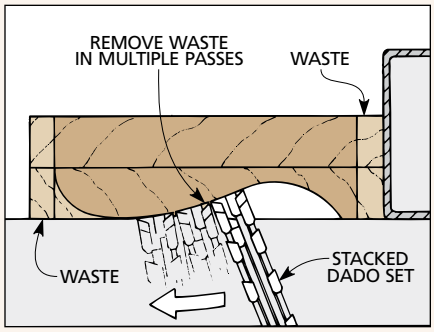
With the coves cut, the next area of the S-shaped profile to work on is the convex shape near the top outside corner. To complete this part of the profile, two things have to happen. First, the cove must be elongated at one end so there's a smooth transition between it and the face of the blank. And secondly, the top outside corner (above the scalloped area) has to be rounded over.

TRACE PROFILE. Before you start removing any waste, though, it's a good idea to mark what's waste and what's not. To do this, I drew the S-shaped ogee pattern onto a piece of posterboard and cut it to shape (refer to page 15 for the desk). Then I traced the template onto the ends of each blank. This will give you a general idea as to what the S-shaped profile will look like once the waste is hogged out.

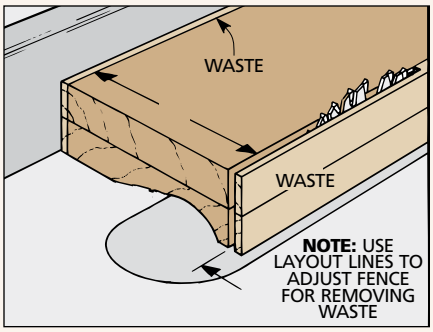
DADO SET. To elongate the cove, I used a ½"-wide stacked dado set. A rasp or file would work here, but the dado set makes it a lot easier to take out the majority of the waste (Step 4).

FINISHED WIDTH. At this point the blanks could be cut to finished width. But because they started out wider than necessary, the lip below the cove might be too wide. So before ripping them to finished width, I first ripped the bottom edge of the blanks to leave a small lip (Step 5). Then you can rip the blanks to finished width from the opposite edge.

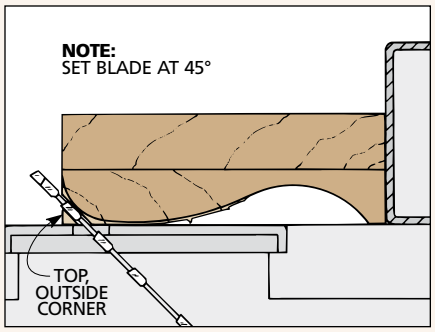
ROUNDOVER. After the blanks are ripped to width, the roundover located on the top outside corner can be roughed out. Once again I used the table saw to remove most of the waste on this edge (Step 6). (You could also remove the waste with a ¾" roundover bit if you prefer.) Either way, this will leave a rough profile that will have to be smoothed out in the next few steps.



4 *Lay out the pattern on the ends. Then elongate the cove with a dado blade. Sneak up on the layout line by adjusting the rip fence, and the blade height and angle between passes.*



5 *Now adjust the fence to rip a strip off the blank, leaving the lip along the bottom edge. Cut each blank to final width by ripping the remaining waste from the opposite edge.*



6 *The final step in roughing out the S-shaped profile is to trim off the top outside corner of each blank. Tilt the saw blade to 45°. Then sneak up on layout line, making several passes.*

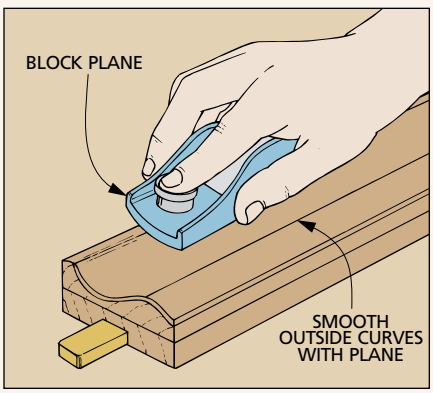
FACE PROFILE CLEANUP

Up to this point, all the work you've completed at the table saw has been to get the face of the blanks to rough shape. Now it's time to clean up all the unwanted shoulder lines and saw marks left by the saw blade so that you end up with a smooth curve on the face profile.

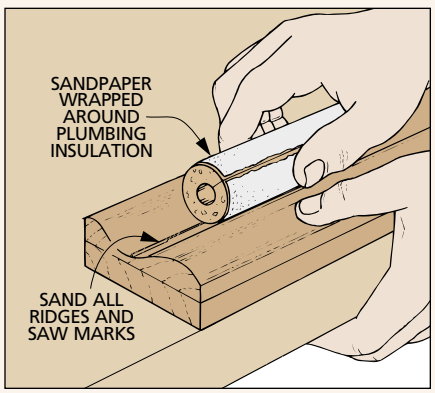
HANDWORK. This is where the handwork of making bracket feet comes in. And you'll find there's really not much to it. Each blank only has a little material left to remove, and the profiles drawn on the ends will guide you. But don't be too critical. The bracket feet end up far enough apart so that no one will notice if the profiles aren't exactly identical.

OUTSIDE CURVES. The areas that need the most shaping are the outside (convex) curves at the top and bottom of the feet. First, I shaped them with a block plane set to take a thin shaving (Step 7). (A rasp or a Surform-type plane, which looks like a block plane but works like a rasp, will also do the trick.) Start this step by smoothing out the noticeable shoulders. Then simply keep taking thin shavings, following the profile drawn on the end of the blank.

INSIDE CURVES. The inside curves on the feet are even easier to shape. All you need to do is sand them (Step 8). I wrapped sandpaper around plumbing insulation. I found it provides just enough support and flexibility to sand the curve efficiently. Continue sanding until all marks are gone.



7 *On the blank's outside curves, plane any hard lines, removing enough waste to create a gentle curve matching the layout line on the ends.*



8 *Once the ridges have been planed away, smooth the curve using sandpaper wrapped around a short length of plumbing insulation.*

MITER & SPLINE JOINT

Now that the cove profile of each blank is complete, they can be cut into individual pieces. Then one end of each front piece can be mitered.

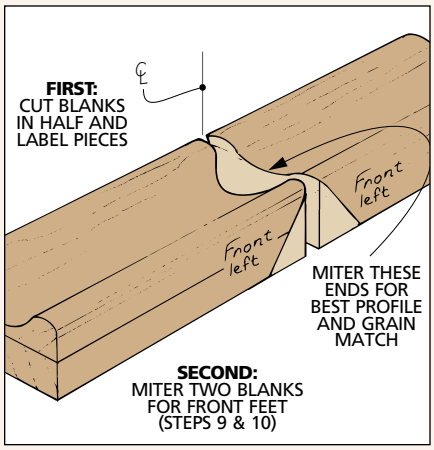
LABEL BLANKS. But before starting, label the workpieces (see drawing). For each front foot, you want to glue the ends you cut apart back together. (I joined them with splined miters.)

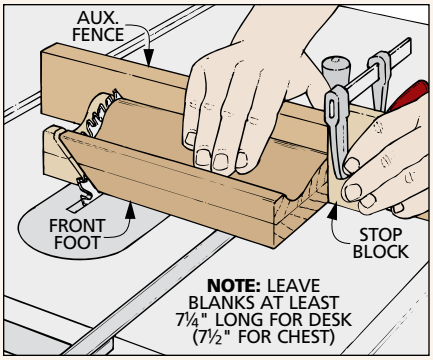
This way, the grain on the faces of the halves will match up and "wrap around" the foot. Plus, since you've already done the final shaping, this ensures the profiles of the pieces match as closely as possible. (You may still need to do some light sanding after they're glued together.)

MITER FRONT PIECES. With the parts labeled and cut apart, the next step is to miter one end of each front foot piece (Step 9). The nice thing here is you don't have to worry about an exact length. That will be taken care of when you create the scallop profile later. But I still added a stop block to the auxiliary miter gauge fence so the piece wouldn't shift as it was being pushed across the blade.

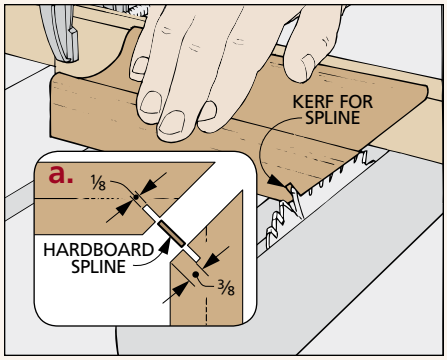
After mitering the pieces, lower the blade and reposition the stop block to cut a kerf for a spline (Step 10). The splines are added mostly to keep the pieces aligned when gluing them together.

BACK FEET. Because these projects are usually placed against a wall, only the front feet are mitered. The back feet are simply supported with a gusset in back (see Steps 17 and 19 on the next page).





9 *With the cove profile complete, cut all the blanks in half. Then miter the four pieces that will be used for front feet.*



10 *Cut a kerf in each mitered end for a spline to help align the pieces. Then cut a hardboard spline to fit in the kerf.*

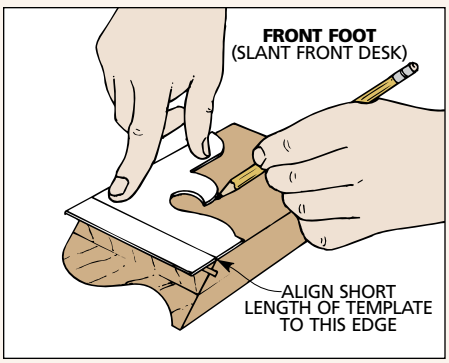
SCALLOPED PROFILES

Now the foot blanks are ready to have the scalloped profile cut out on them. This fancy cutout makes each foot look like it has a large, overhanging bracket attached to it. The work for each is done at the band saw and drill press.

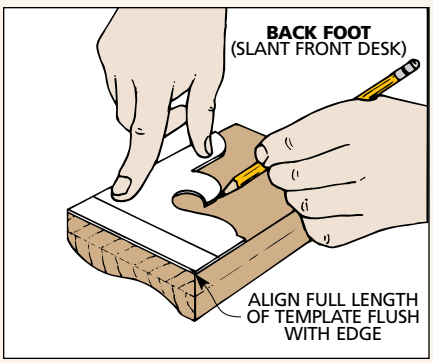
DESK SCALLOPED PATTERN. Because the ogee profile is shaped on the front face of each blank, you will probably find that it's easier to lay out the scalloped pattern on the back of each blank (refer to Step 11 below). When tracing out the pattern, make sure you're using the correct reference line on the template for the front and back feet (Steps 12 and 13).

SHAPE PROFILE. The scalloped profiles are easier to create than the face (cove) profiles. First, I roughed out the profile at the band saw. Then I sanded as much as possible with a drum sander before finishing them with a little hand sanding.

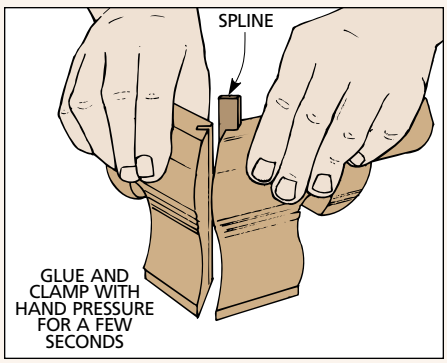
Note: Since I used a ½"-dia. drum sander chucked in the drill press to sand out the scalloped profiles, I found it easier to do this before the feet were glued up into an L-shaped bracket. Of course, you could also use a table-mounted spindle sander to complete this step, too, if you happen to have one in your shop.



11 *Transfer the scalloped pattern onto the back side of the mitered pieces. Then cut out the shape. Remove the saw blade marks with a ½"-dia. drum sander.*



12 *Next, transfer the pattern onto the back feet. Make sure template is aligned with edge of workpiece. Then cut to shape and sand out saw marks.*



13 *After the scallop is sanded, glue up the L-shaped blanks for the front feet. After the glue is dry, trim the spline flush with the top and bottom of the foot.*

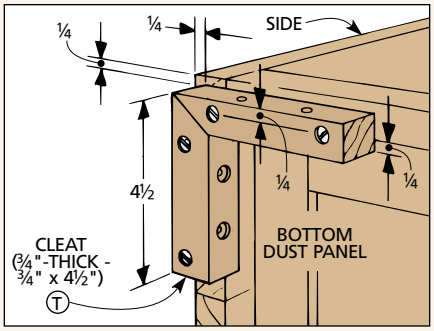
MOUNTING THE FEET

Now mount the feet to the bottom of the desk. First lay the desk down on its back.

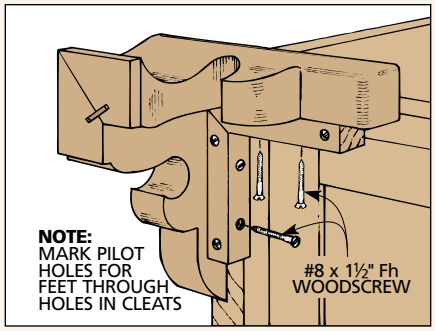
FRONT FEET. To provide a frame for mounting the front feet, I used two support cleats (T) for each foot (Step 14). First screw the cleats to the desk, then screw the cleats to the feet (Step 15). (You will later cover the exposed splines in the miter joints with a strip of molding.)

BACK FEET. Since the back feet are only viewed from one side, I used a gusset to help hold each foot in place and offer additional support (Steps 16 and 17). First, lay out and cut the gusset (U) to size (Step 16). Then cut a rabbet on the back inside edge of each back foot, drill pilot holes and screw the gusset in place.

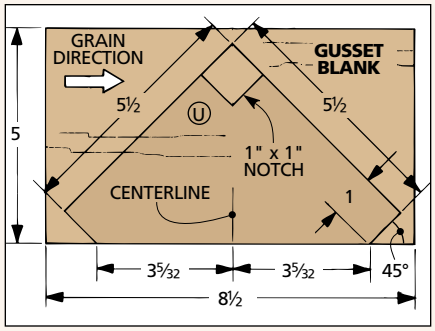
The cleats used to attach the back feet are offset from one another (Step 18).Once the back cleats are screwed on, mount the back feet in place (Step 19).



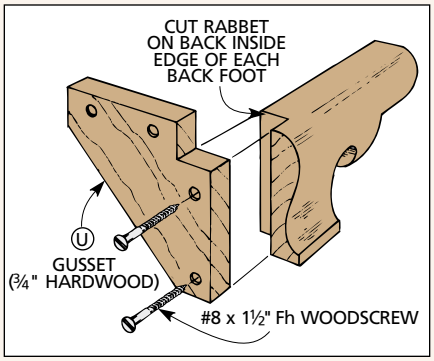
14 *The front feet are held in place by two mitered cleats. After the cleats are cut, drill shank holes for mounting to both the desk and the feet.*



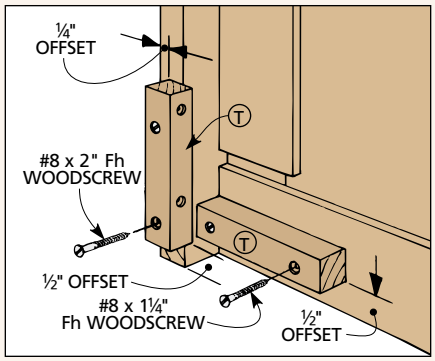
15 *Before screwing front feet in place, first position them on the cleats. Then mark and drill pilot holes in feet so the screws don't split the wood.*



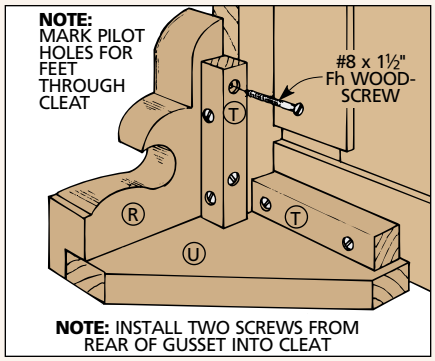
16 *The back feet are supported by two ¾"-thick gussets. When laying out the gussets on the workpiece, make sure the grain is oriented for maximum strength.*



17 *First cut a rabbet on the back inside edge of each back foot. Before screwing gussets (T) to feet, mark and drill pilot holes, then screw the gusset in place.*



18 *Now cut ¾"-square cleats for the back feet and gusset assemblies. Back cleats are positioned so gussets create ¼"-wide ledge for the back panel.*



19 *Before screwing the back feet in place, position each foot against the cleats. Then mark and drill holes in the feet so the screws don't split the wood.*

MAIL ORDER SOURCES

Woodsmith Store
800-444-7527

Lee Valley
800-871-8158
leevalley.com

Hardware Source
877-944-6437
hardwaresource.com

General Finishes
800-783-6050
generalfinishes.com

Pulls Direct
800-470-1505
pullsdirect.com

Project Sources

SLANT FRONT DESK

- **Lee Valley**
  Knob Escutcheons 00W8807
  ½" x ⅜" Plain Knob 00A3902
- **Hardware Source**
  Brass Butt Hinges 504260
- **Pulls Direct**
  3" Cabinet Pulls BCI1651332

The slant front desk was finished with three coats of *General Finishes Arm-R-Seal Oil & Urethane Topcoat.*