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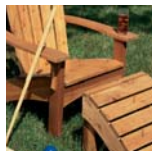
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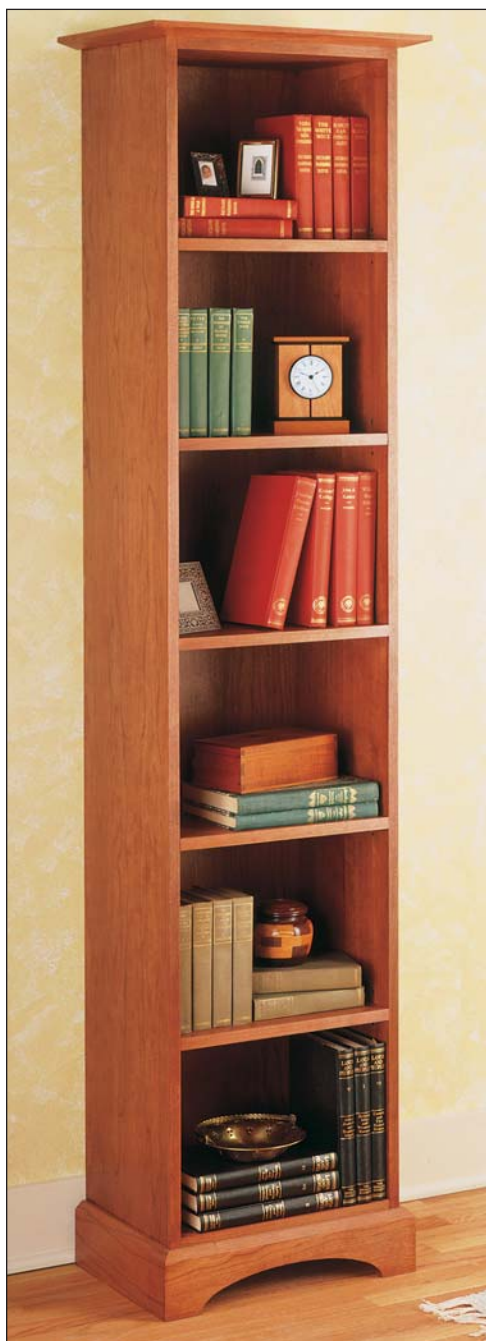


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TOWER BOOKCASE PLAN



Who couldn't use a little more storage space around their home? Especially when you don't have to sacrifice a lot of floor space to get it. That's the idea behind the simple design of this tower bookcase.

It takes up less than two square feet of floor space because everything is stored vertically. Yet the six shelves (four of them adjustable) can store or display a variety of items.

FEATURES. One neat thing about the adjustable shelves is how they're held in the case. Dowel pins fit into grooves on the ends of the shelves. So when the shelves are installed, the dowel pins are completely hidden.

There are a couple of other features I like about this bookcase. First of all, it's mobile. The compact size and light weight make it easy to move the bookcase anywhere extra storage space is needed.

Second, this is an easy project to customize to fit your needs. Need a plant stand or just a shorter bookcase with a solid top? In the Designer's Notebook on pages 7 and 8 you'll learn how to make it shorter and build three different designs for the top.

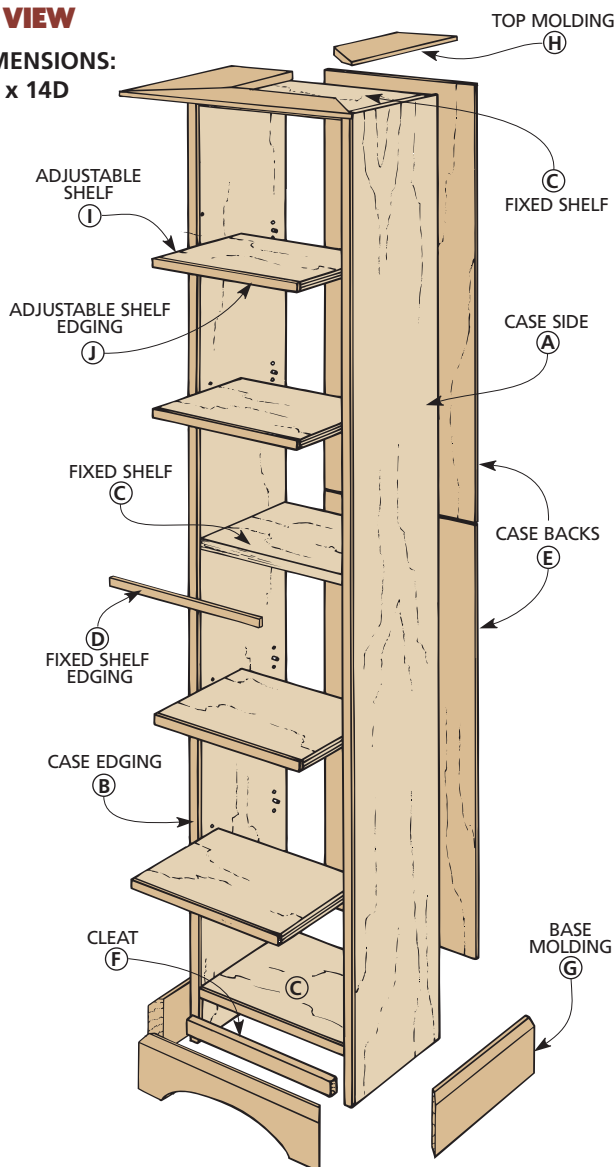
JOINERY. No matter whether you build the tall or the short version of this bookcase, tongue and groove joints are all that are needed to hold the case together. And building the top and bottom molding and attaching them to the case is just as straightforward.

WOOD. I built the sides and shelves of this bookcase from $\frac{3}{4}$ " cherry plywood (one 4x8 sheet is more than enough for these parts). The back of the bookcase is made from a half sheet of $\frac{1}{4}$ " cherry plywood. The sides and shelves are all edged with solid cherry. (See the Shop Tip box with some tips on trimming the edging flush on page 4.)

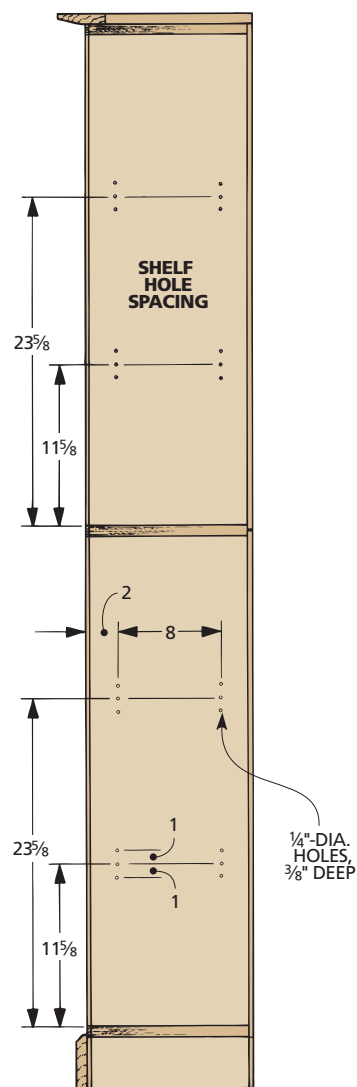
FINISH. I used a deep cherry stain for this project. Once the stain dried, I topped it off with two coats of satin polyurethane.

EXPLODED VIEW

OVERALL DIMENSIONS:
77³/₈H x 20W x 14D



SIDE VIEW



MATERIALS LIST

WOOD

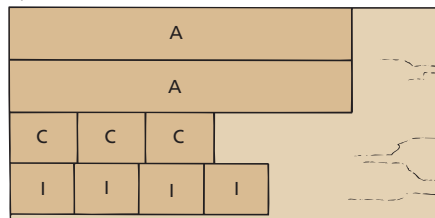
- A Case Sides (2) 3/4 ply - 11 3/4 x 76 5/8
- B Case Edging (2) 3/4 x 1/4 - 76 5/8
- C Fixed Shelves (3) 3/4 ply - 11 1/2 x 15 1/4
- D Shelf Edging (3) 3/4 x 1/4 - 14 1/2
- E Case Backs (2) 1/4 ply - 15 1/2 x 36 3/8
- F Cleat (1) 3/4 x 1 1/4 - 14 1/2
- G Base Molding (1) 3/4 x 4 - 45 rough
- H Top Molding (1) 3/4 x 3 1/2 - 50 rough
- I Adj. Shelves (4) 3/4 ply - 11 1/2 x 14 7/16
- J Shelf Edging (4) 3/4 x 1/4 - 14 7/16

HARDWARE SUPPLIES

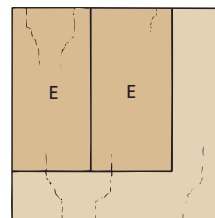
- (36) No. 16 x 5/8" brads
- (6) No. 8 x 1 1/4" Fh woodscrews
- (1) 1/4" x 18" birch/maple dowel
- (6) 3/8" cherry flat-top plugs

CUTTING DIAGRAM

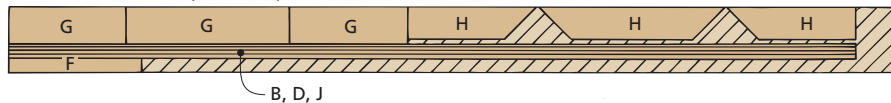
3/4" CHERRY PLYWOOD 48 x 96



1/4" CHERRY PLYWOOD 48 x 48



3/4 x 7 1/4 - 96 CHERRY (5.3 Bd. Ft.)



CASE

The case is the heart of this project. It's just an upright box with three fixed shelves installed between two vertical sides (Fig. 1).

CUT CASE SIDES. The vertical case sides (A) are first cut to size. They're ripped from a sheet of $\frac{3}{4}$ " plywood.

Note: When cutting the pieces to length, it's a good idea to use a plywood blade or a crosscut blade with at least 50 teeth. It will help reduce the amount of chipout on the ends.

CUT DADOES. With the sides cut to size, the next step is to cut $\frac{1}{4}$ "-wide dadoes at both ends and across the middle. Later these dadoes hold the fixed shelves.

To cut the dadoes, I used a $\frac{1}{4}$ " straight bit in a router. I was tempted to use a dado blade in the table saw. But the pieces are just too long to handle easily. Especially when you're trying to cut the dadoes near the ends.

The easiest way to rout the dadoes is to lay the sides edge-to-edge with the inside faces up (like an open book) (Fig. 2). Then rout each set of dadoes in one pass using a straightedge to guide the router.

EDGE PLYWOOD. With all three sets of dadoes cut, the front edge of the plywood sides can now be covered to hide the plies and "stop" the dadoes.

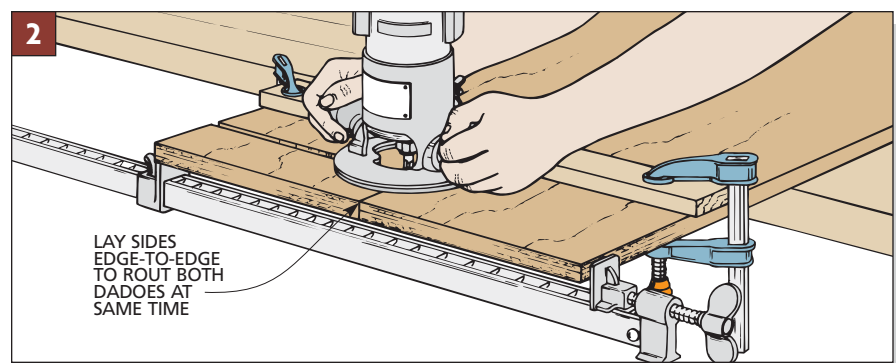
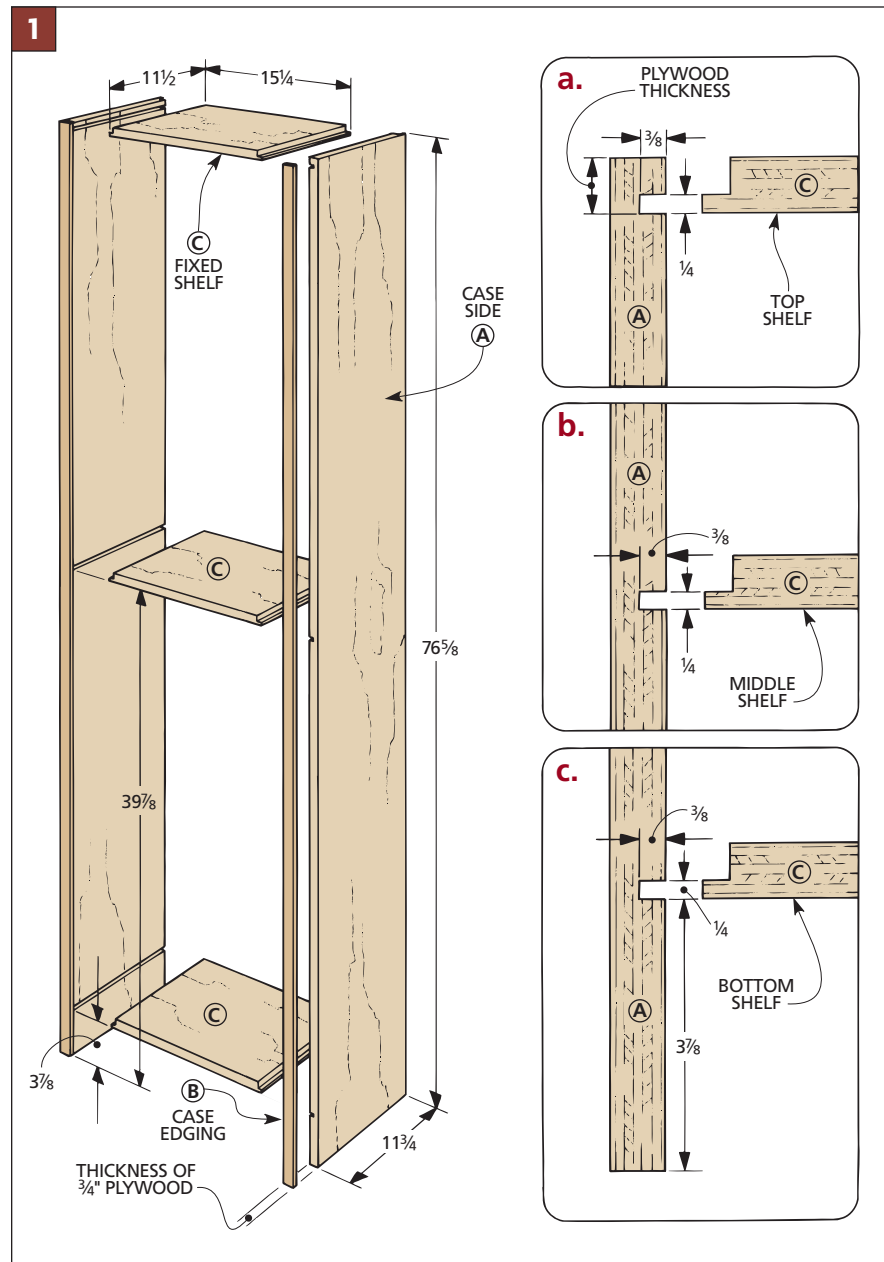
To do this, I ripped two long strips of $\frac{1}{4}$ "-thick case edging (B) from a piece of $\frac{13}{16}$ "-thick hardwood stock.

Note: Whenever possible, I'll use edging strips trimmed off the edge of a piece of $\frac{13}{16}$ "-thick stock. Since that's a little thicker than the $\frac{3}{4}$ " plywood, alignment with the plywood isn't critical (refer to Fig. 3a on page 4). It can be trimmed flush later.

Another tip to make installing the edging a little easier is to use spacers (strips of $\frac{1}{4}$ "-thick hardboard) under the plywood when gluing (Fig. 3). They raise the plywood off the clamps so you can keep the edging centered (Fig. 3a).

The spacers also help create more direct pressure when clamping. Raising the plywood pieces puts them in line with the screw on the clamp.

I also like to use a pressure block between the clamp head and the edging. It helps distribute the clamping pressure, so fewer clamps are needed (Fig. 3). In addition it also protects the edging from getting dents and scratches from



the clamp jaw.

TRIM EDGING. After the glue dries, the edging can be trimmed flush. To do this I used a router with a flush trim bit. For

more on this, see the Shop Tip box on the opposite page.

CUT BACK RABBET. With the edging trimmed on the front edges of the case

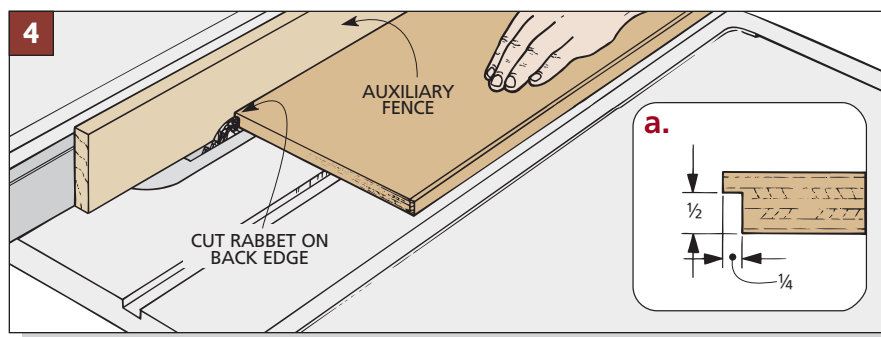
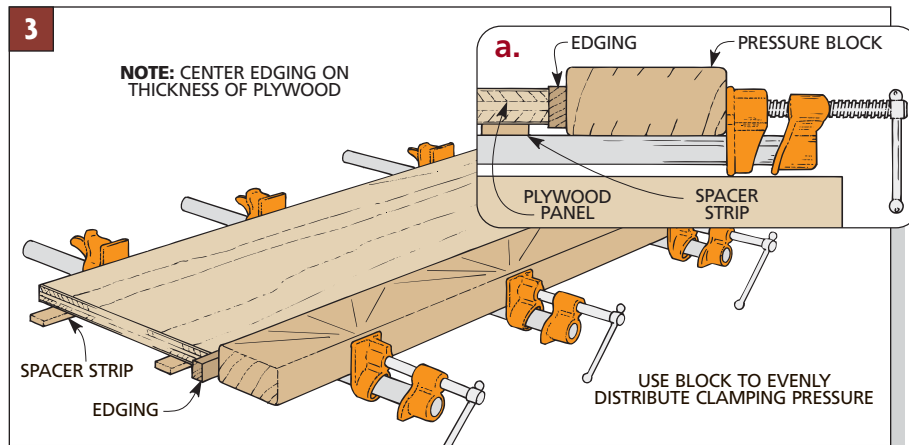
sides, a rabbet can be cut on the back edges (*Figs. 4 and 4a*). This creates a recess for a plywood back that's installed later.

CUT FIXED SHELVES. To join the sides together, three fixed shelves (C) are glued near the top, middle, and bottom of the case (*Fig. 1 on page 3*).

I started by cutting the shelves to finished size from $\frac{3}{4}$ " plywood. Next, $\frac{1}{4}$ " tongues are cut on both ends (*Figs. 1a, b, c*). These tongues are sized to fit in the dados cut in the side pieces.

ASSEMBLE CASE. Once the tongues on the shelves fit snugly in the sides, the case can be assembled. To do this, slide in the shelves until the front edges of the tongues butt up against the edging strips at the front of the case. At the same time the shelves should sit flush with the shoulders of the rabbets on the back of the case. (If needed, trim the shelf's back edge until it's flush.)

Finally, glue and clamp the fixed shelves between the side pieces. Check that everything is square after the clamps are tight.



SHOP TIP

Once the edging was glued on the sides of the tower bookcase, it needed to be trimmed flush. To do this, I used a router with a flush trim bit.

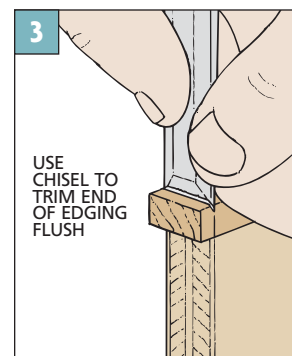
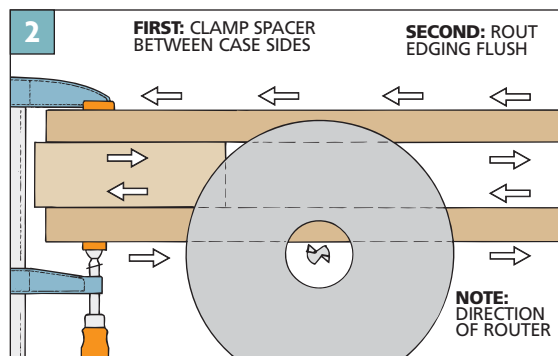
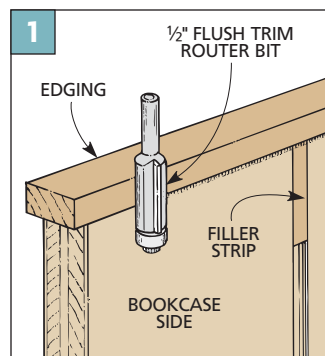
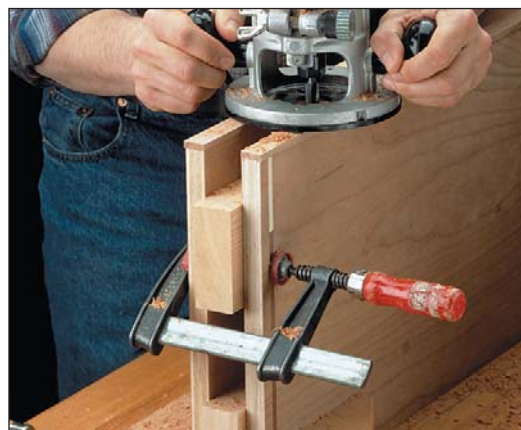
To prevent the bearing from dropping in the dados in the sides, I filled in each dado with a filler strip that was just thick enough to fit flush with the face of the plywood (*Fig. 1*).

The trick to keeping the router from tipping when working on the thin edges is to clamp both side pieces

together. It gives a wider surface for the router to sit on. And it lets you rout the edging on both pieces at the same time.

To make this work, you'll have to separate the case sides to make room for the router bit. I clamped 2x4 spacers between the sides to hold them apart and make a wide platform for the router (see photo at right and *Fig. 2*).

Finally, I trimmed the edging to length with a sharp chisel (*Fig. 3*).



EDGING, BACK, AND CLEAT

With the case assembled and glued together, I wanted to hide the plies on the fixed shelves the same way the side pieces were covered. To do that, strips of shelf edging (D) are glued to the top, bottom, and middle fixed shelves (*Fig. 5*). Also see the Shop Tip box below.

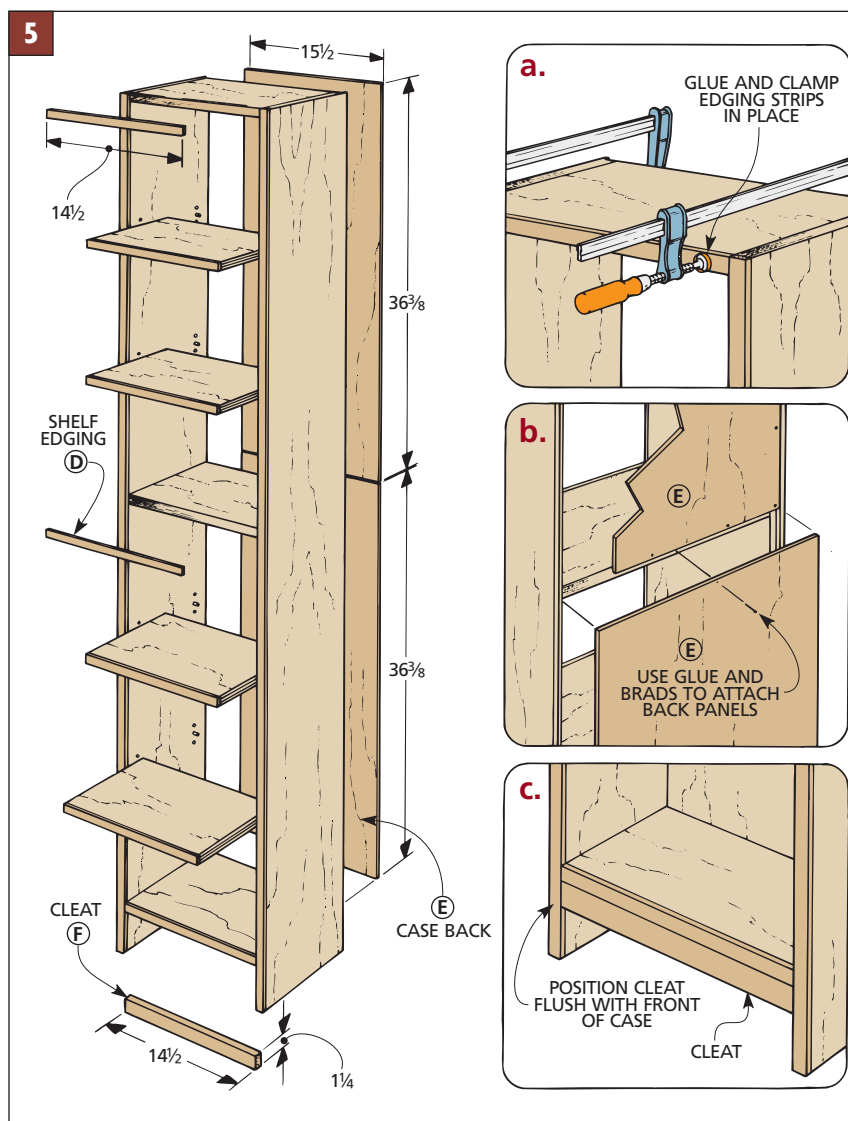
BACK. Now is a good time to enclose the back of the case. Normally, it's about the last thing I do. But on a tall narrow project like the bookcase, it's easy to rack the sides just moving it around the shop. Adding back pieces now strengthens the case.

The two case backs (E) are cut from a half sheet of $\frac{1}{4}$ "-thick plywood (*Fig. 5*). You may wonder why I used two pieces instead of just one. It's economics. By using two pieces, I could cut both from a half sheet of plywood instead of having to buy a full sheet.

Note: Don't worry about the "seam" where the two back pieces meet. It'll be hidden behind the middle fixed shelf (*Fig. 5b*).

Now install the case backs in the rabbets cut in the case sides. To do that, I used glue and brads.

CLEAT. To complete construction of the case, a cleat (F) is attached to the bottom fixed shelf (*Fig. 5c*). This cleat is a $\frac{3}{4}$ "-thick piece of stock glued and clamped flush with the front. It's added to create more glue surface for attaching the front piece of base molding (added next).



SHOP TIP

Aligning and Clamping Edging

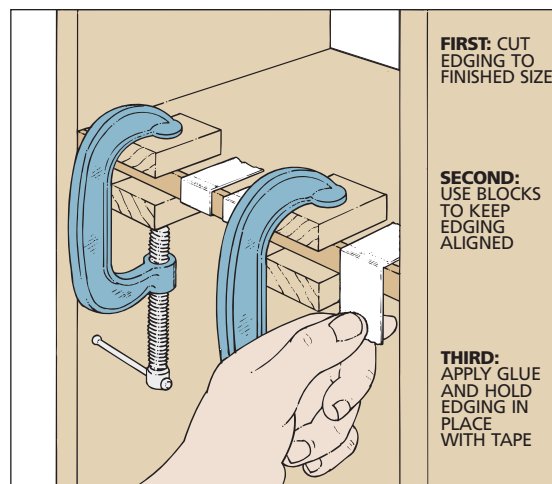
When it came time to install edging to the fixed shelves on the tower bookcase, I ended up doing things a little differently. Instead of installing oversize pieces that get trimmed flush later, I cut the edging to exact size and glued it in place.

The reason for doing things differently is the narrow edge on the shelf. It's too easy for the router and flush trim bit to tip and gouge the edging. By cutting the edging to an exact fit, only a little light sanding is needed.

One problem you run into when applying edging this way is keeping it aligned with the edge of the plywood. After the glue is applied, the edging seems to want to slide out of place.

My solution to this problem is to use scrap blocks to help align the edging. First, I clamp the scrap blocks to both sides of the shelf. They form a slot for the edging to fit into.

To "clamp" the edging in place, I'll use duct tape to pull it tight against the shelf until the glue dries.



MOLDING

With the case complete the next step is to add the decorative molding at the top and bottom.

BASE MOLDING. The easiest way to make the base molding (G) is to start with one long board and rip it to finished width (Fig. 6). Next, rip or rout a 45° chamfer along one edge (Fig. 6a). Now this blank can be mitered into three pieces to fit around the base.

Before attaching the base molding to the case, a half ellipse is cut in the front piece to add a decorative detail.

To create this shape, first enlarge the half pattern in Fig. 7. It isn't critical that you match the pattern exactly. But what you want to end up with is a design that looks balanced on the front piece.

The way I went about doing that is to first find the centerline of the front piece. Then position the half pattern on one side of this line and trace around it to draw one half of the partial ellipse (Fig. 8). Now by flipping the pattern over, the other half of the ellipse can be drawn next. When you're finished, the ellipse will be automatically centered.

Now cut out the shape and use a drum sander to sand the ellipse smooth. Finally, all three pieces can be glued and clamped to the case.

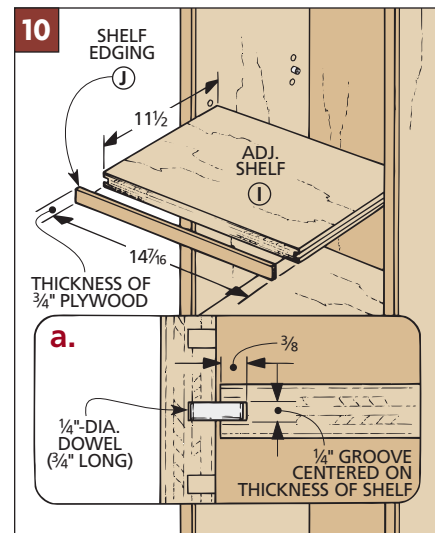
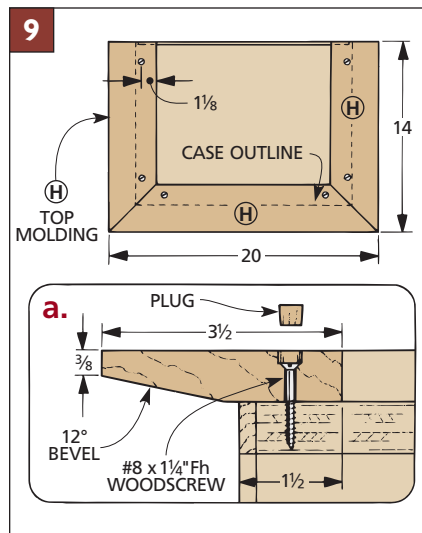
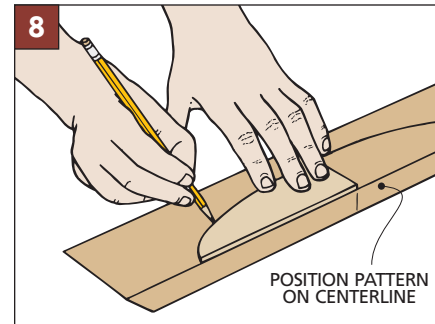
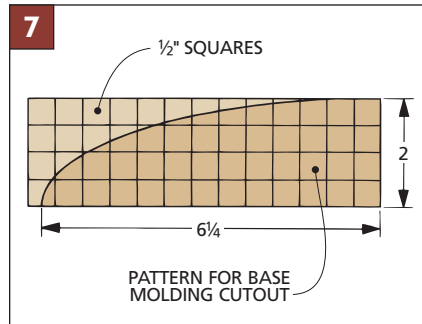
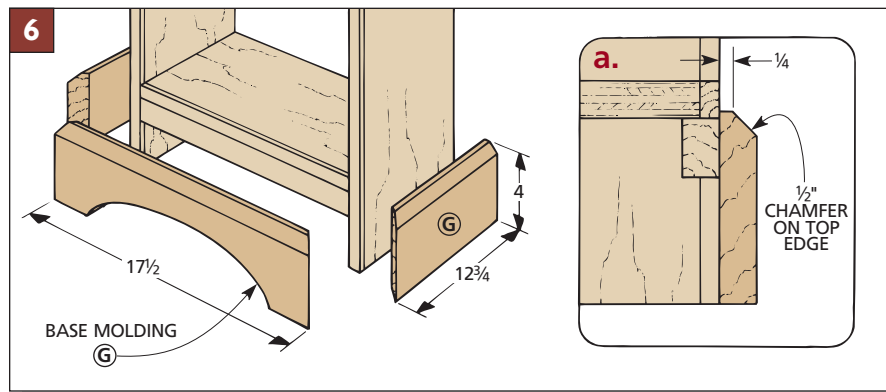
TOP MOLDING. To complete the molding for the case, top molding (H) is added next (Fig. 9). This is made in much the same way as the base molding. First, a blank for all three pieces is ripped to finished width. Next, a 12° bevel can be ripped on one face (Fig. 9a).

Now miter the ends of the pieces to fit around the top with a 2" overhang. Each piece can be glued and screwed in place to form a U-shaped frame to sit on top of the case. Finally, plug the screw holes to fill in the openings.

SHELVES

Now, all that's left for this bookcase is to add the rest of the shelves. So make four adjustable shelves (I) to fit inside the case (Fig. 10). These shelves are the same depth as the fixed shelves (C) that hold the case together (11½"). As for their length, I cut the shelves 1/16" shorter than the opening in the case.

The only thing unusual about the adjustable shelves is the way they're held in the case. It's a system of shelf support pins that fit in holes in the case. Not too



unusual. But the shelves don't rest on top of the support pins. Rather, they fit around the pins (Fig. 10a). It's all done with a simple groove in the ends of the shelves.

To cut the 1/4"-wide groove, I used a dado blade in the table saw. The grooves should be centered on the thickness so they sit level.

SHELF EDGING. After cutting the grooves on the four adjustable shelves, a piece of shelf edging (J) is glued and clamped to the front edge of each shelf. The edging hides the grooves as well as the plies of the plywood.

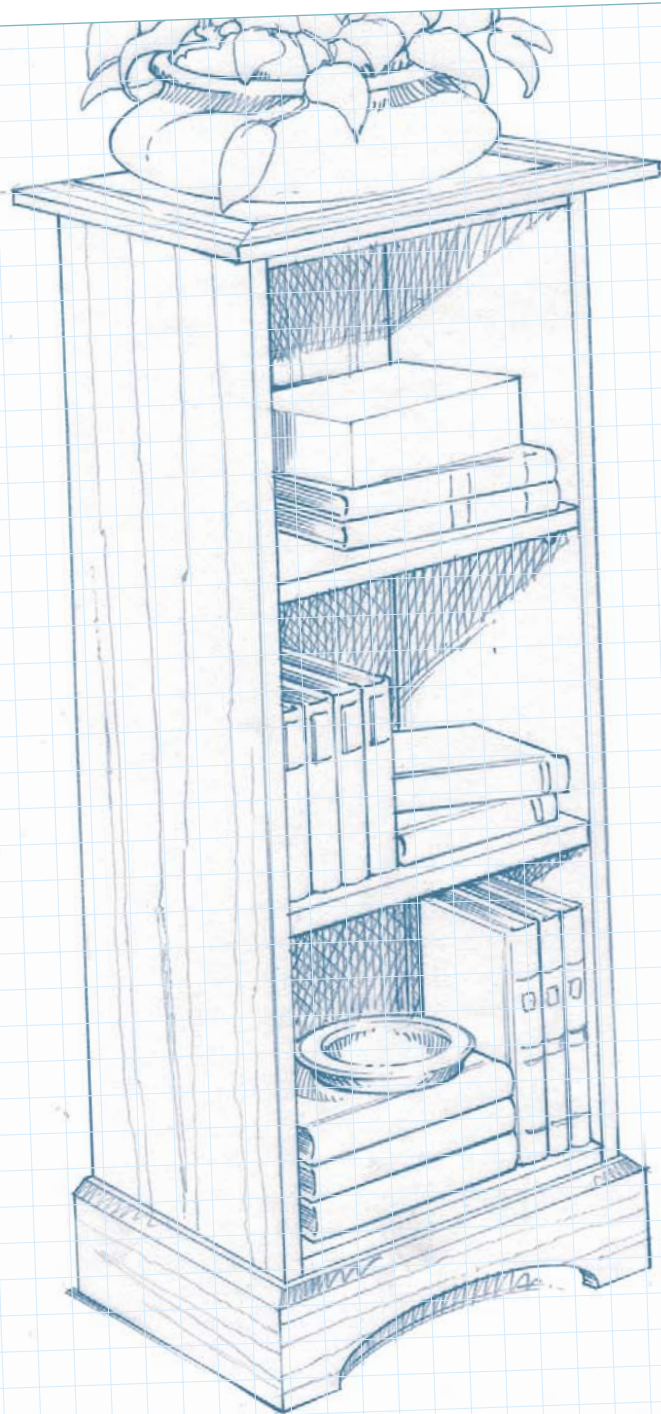
DOWEL PINS. To support the shelves

in the bookcase and make them adjustable at the same time, short pins cut from 1/4"-diameter dowel rod are installed in holes drilled in the sides of the case. The location of the 1/4" holes to accept the pins is shown in the side view on page 2. I drilled three hole positions for each adjustable shelf.

Finally, cut four shelf support pins from the dowel rod for each of the shelves. Because the pins need to be removable, I didn't stain or finish them. Just add a coat of wax so they will be easy to pull out when changing the height of the shelves.

DESIGNER'S NOTEBOOK

The Tower Bookcase can be reduced in height and turned into a plant stand or just a shorter bookcase. Here are three options for building a top for a shorter case.



PLANT STAND OR SHORT BOOKCASE

TOP OF SHORT BOOKCASE CAN BE BUILT WITH A SOLID TOP OR A 3-SIDED FRAME AND PANEL TOP



SOLID WOOD TOP



FRAME AND PANEL TOP WITH PLYWOOD PANEL



FRAME AND PANEL TOP WITH PLASTIC LAMINATE PANEL

CONSTRUCTION NOTES:

■ To shorten the Tower Bookcase, cut the two $\frac{3}{4}$ " plywood case sides (A) and edging (B) only $40\frac{5}{8}$ " high. That will make the overall height of the new design $41\frac{3}{8}$ " tall. The width and depth of this short design remain the same as the original.

■ The top of the short design will "show" so make it out of a matching solid wood or use frame and panel construction.

■ If the top is to be solid $\frac{3}{4}$ "-thick stock, build it up by edge gluing two or three pieces (to minimize warp). Then cut the blank to finished dimensions of 14" wide by 20" long.

■ If the top is to be built with frame and plywood panel construction, use $\frac{3}{4}$ " hardwood plywood for the panel. Start by gluing a $\frac{1}{4}$ " strip on the back edge of an oversized plywood blank. Then cut the blank to $11\frac{3}{8}$ " x $15\frac{1}{4}$ ".

■ If the shorter bookcase is to become a plant stand, you may want to use a frame and panel top with a plastic laminate panel to prevent water damage. To do this, first glue a $\frac{1}{4}$ " strip on the back edge of an oversized $\frac{3}{4}$ "-thick plywood blank. Then use contact cement to glue

the plastic laminate on top of the plywood and over the top of the edging strip. Finally, cut the laminate-covered blank to $11\frac{3}{8}$ " x $15\frac{1}{4}$ ".

■ To make the three-sided frame for a frame and panel top, cut or plane solid stock to match the thickness of the hardwood plywood or panel covered with plastic laminate. Then cut the frame pieces to a final width of $2\frac{3}{4}$ ".

■ The panel is held within the frame using tongue and groove joinery. Cut a $\frac{1}{4}$ "-wide groove centered on the thickness of the frame pieces. Then cut a matching tongue on the front and ends of the panel. (The tongue is $\frac{1}{16}$ " shorter than the depth of the groove to allow for excess glue.)

■ Rout or rip a 12° bevel on the bottom edges of the top (front and sides only) after the frame and panel are assembled.

■ The new top is attached from below with four flathead woodscrews located 1" in from each corner. They're countersunk up through the "sub-top" (fixed shelf, part C). (If using a solid wood top, drill oversize shank holes for the screws. This will allow the top to expand and con-

CHANGES TO MATERIALS AND HARDWARE

PLANT STAND/SHORT BOOKCASE

A	Case Sides (2)	$\frac{3}{4}$ ply - $11\frac{3}{4}$ x $40\frac{5}{8}$
B	Case Edging (2)	$\frac{3}{4}$ x $\frac{1}{4}$ - $40\frac{5}{8}$
C	Fixed Shelves	Only Need Two
D	Fix. Shelf Edging	Only Need Two
E	Case Back (1)	$\frac{1}{4}$ ply - $15\frac{1}{2}$ x $36\frac{3}{4}$
I	Adj. Shelves	Only Need Two
J	Adj. Shelf Edging	Only Need Two

SOLID WOOD TOP

K	Solid Top (1)	$\frac{3}{4}$ x 14 - 20
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FRAME AND PANEL TOP

H	Top Molding (1)	$\frac{3}{4}$ x $2\frac{3}{4}$ - 50 rough
L	Top Panel (1)	$\frac{3}{4}$ ply - $11\frac{3}{8}$ x $15\frac{1}{4}$
M	Back Edging (1)	$\frac{3}{4}$ x $\frac{1}{4}$ - $15\frac{1}{4}$

HARDWARE

(24)	No. 16 x $\frac{5}{8}$ " brads
(4)	No. 8 x $1\frac{1}{4}$ " Fh woodscrews
(1)	$\frac{1}{4}$ x 12" birch/maple dowel

tract with changes in humidity. Don't glue it down.)

■ The shorter bookcase only needs one piece of $\frac{1}{4}$ " plywood for the back. It's cut $36\frac{3}{4}$ " long, stopping just below the new top. Then it's nailed to the sub-top, bottom fixed shelf, and side rabbets.

