



Classic floor-to-ceiling bookcases

**This article originally appeared in The Family Handyman magazine.
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Classic floor-to-ceiling bookcases

Designed to fit, even if your room isn't perfectly square.

by **David Radtke**

One of my earliest memories is of my mother holding my hand as we ambled up a huge set of steps to the front doors of our city library. I fought every inch of the way until we stepped inside. As I gazed at the floor-to-ceiling

bookcases, my mouth was still open, but now quiet. To my mother's surprise, I was silent the rest of the day, and the memory of those bookcases is as vivid as my first book.

The classic Greek Revival styling of our library is reminiscent of those bookcases built more than a hundred years ago. The bookcases look ornate but are relatively simple to build. There's no complex joinery like mortise-and-tenon, or even doweling, so if you've hung a new door or trimmed a room with new molding, you have the expertise to handle this project.

We sized the bookcases to fit into a typical room with an 8-ft. ceiling and at least 8 ft. of wall space, something like a typical bedroom you may want to convert to a library or home office. It can also be expanded by adding standards (the

upright partitions; see **Fig. B**, p. 37).

We've engineered this project to work even if your room is a bit out of kilter. The moldings are applied after the main standards are installed to cover any gaps resulting from uneven floors or walls.

Near the end of this article, you'll find lists of the tools and materials you'll need to complete this project. For a project the size of ours, expect to spend about \$600 on materials. The optional ladder and hardware will cost an additional \$800. And even though this project isn't complicated, it's still going to take you at least 40 hours to build.

PLANNING AHEAD

As you can see, the center section of our bookcases is 6 in. wider than the two outer sections. This establishes a focal point, and the two side sections



MEASURE THE HEIGHT and width of your wall. Note the locations of all receptacles, switches and vents. They may require you to modify our design.



AT THE LUMBERYARD

With the exception of the rolling ladder, the maple fluted casing and the plinth blocks, all the materials are available at lumberyards and well-equipped home centers (see Shopping List, p. 47). We made the four vertical standards and shelves from birch-veneer plywood sandwiched around ordinary 2x4s. The only hitch is finding really straight and dry 2x4s. They must not have any bow, but they can have a slight crook or crown (see "For More Information"). And since the 2x4s will be completely hidden, some rough edges are acceptable. Even if your 2x4s feel dry to the touch, let them dry inside the house for at least a week. Too much moisture will cause problems because the wood shrinks as it dries.

We used birch-veneer plywood and maple trim for our project because it complemented the existing maple woodwork. Whatever wood you choose, be sure it has a "plain-sawn" veneer, which has a straighter, less wild grain pattern (see "For More Information").

If you're a bit adventurous and want to make your own fluted casing and plinth blocks, read our article, "Making Door and Window Casing," Feb. '97, p. 39.

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provide symmetry. However, this exact design may not work for your room. To check, carefully measure your selected site (Photo 1). Take into consideration the height, width and any obstructions unique to your room. You may find you need to alter our plans a bit. Keep in mind, you can move the standards (Fig. B and Photo 12) closer together or add another standard or two to fit a longer wall.

As you plan, note the location of your electrical receptacles and heating ducts. They may dictate where you place the standards. Your only other absolute is that the ladder support rod (Photo 17) should not span more than 36 in. between brackets.

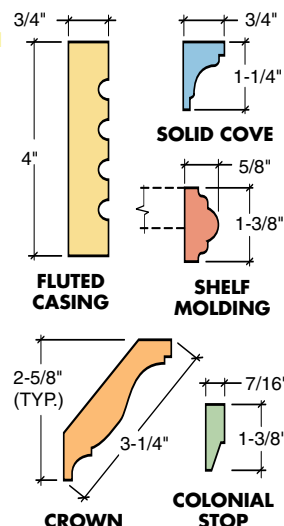
Use a level to check for

irregularities like a sloping floor or an uneven wall. If your walls and floor aren't exactly straight or level, you'll be able to scribe the standards on the backside and bottom, and then cut along your scribe for a perfect fit (see "For More Information" on p. 44).

If you decide to include the ladder in your design, be aware that it could take up to five weeks for delivery. This shouldn't slow you down—you can get started with the project and install the ladder when it arrives.

Our bookcases were built onto a wood floor. If you have carpeting, you'll need to pull back the carpet and pad and reinstall them later around the base of the bookcases (see "For More Information"). And

Fig. A Casings and moldings



yes, the ladder will roll on carpeting as well.

GETTING STARTED

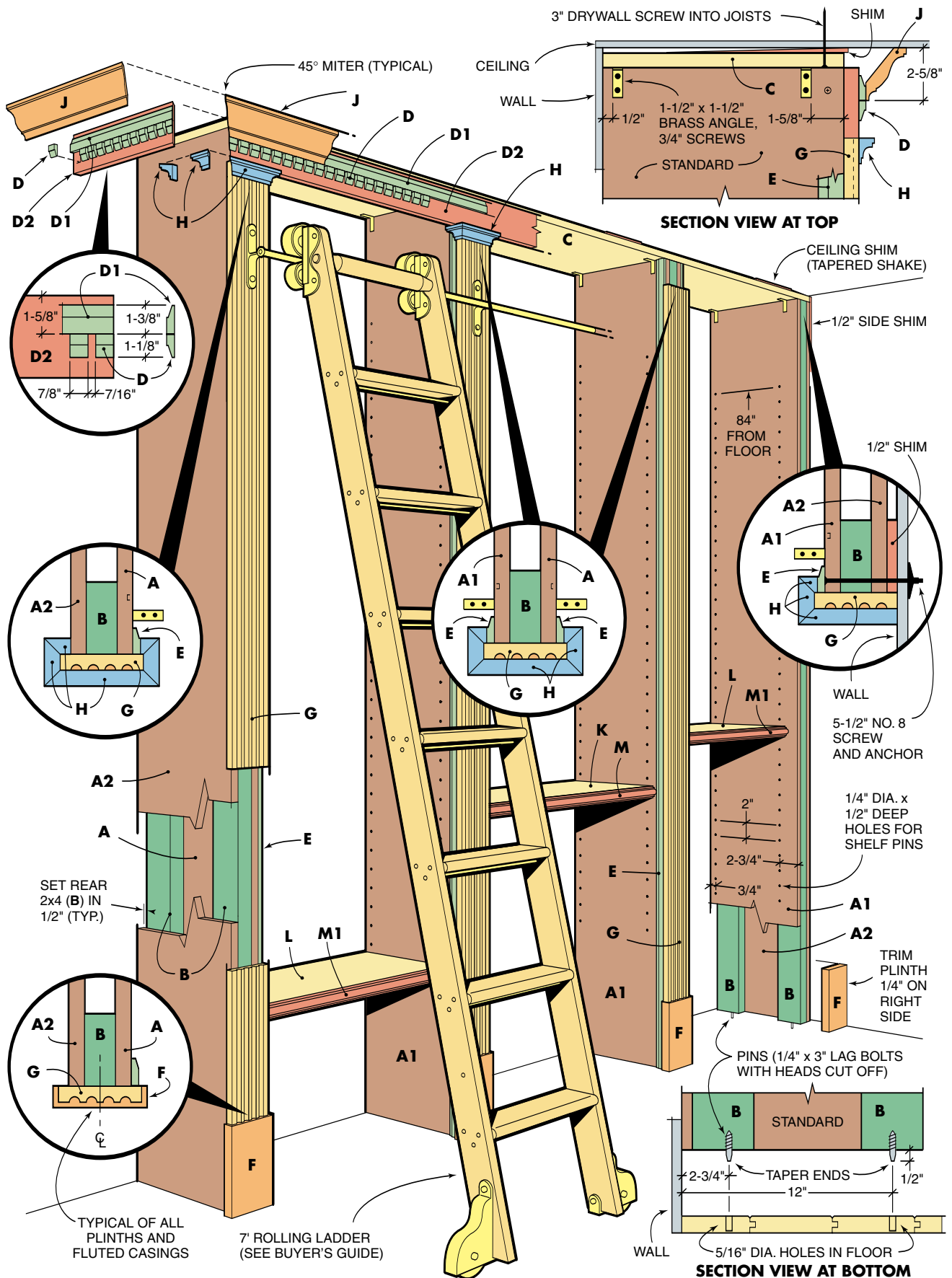
You don't need a fancy shop to cut the plywood and build the standards. A set of sawhorses under a sheet of 3/4-in. plywood will work just fine. The first order of business is to rip (cut lengthwise) the eight pieces of plywood



2

RIP THE 3/4-IN. PLYWOOD into the 13-3/4 in. strips you'll later use to construct each of the four standards. You'll need to rip eight identical pieces (see Fig. B) for the standards and one for the top (C).

Fig. B Bookcase Details

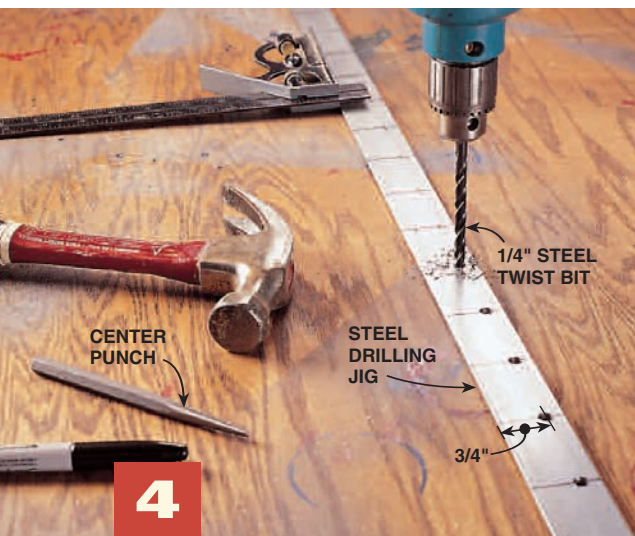


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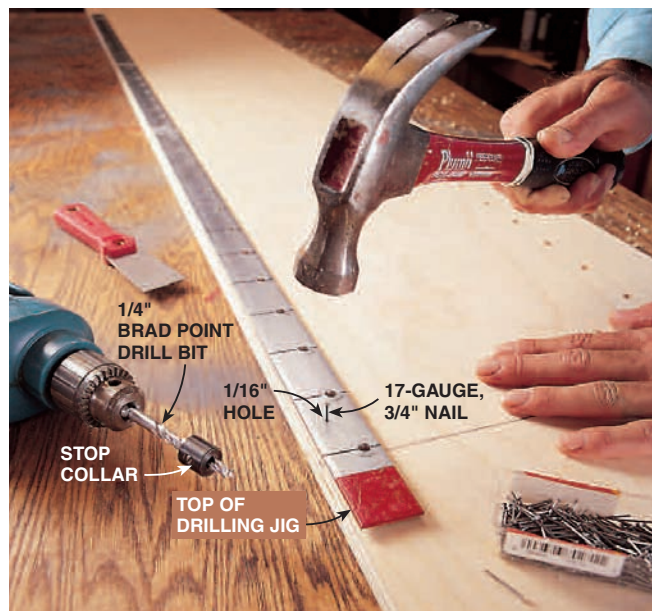
3

SCORE the 3/4-in. plywood with a sharp utility knife at a height 1 in. shorter than your floor-to-ceiling measurement in Photo 1. Crosscut along the edge of the scored line to get a splinter-free cut.



4

MAKE A JIG to drill accurate holes for the shelf-support hardware. Drill 1/4-in. dia. holes 2 in. apart and centered 3/4 in. from the edge into a 1-1/4 in. x 1/8-in. x 6-ft. piece of mild steel.



5

NAIL THE JIG (use 3/4-in. nails) to the plywood pieces (A and A1) you've already cut. The jig needs four 1/16-in. holes along its length for the small 3/4-in. nails that attach it to the plywood (see Fig. B). Once the jig is secure to the plywood piece, drill 1/4-in. holes 1/2 in. deep through each of the jig holes into the plywood. **NOTE:** The two outside end panels (A2) do not have holes drilled into them.

13-3/4 in. wide to make the standards. You can use a table saw, but we prefer to use a circular saw and a homemade rip guide, made from two pieces of straight scrap plywood (see **Photo 2** and "For More Information"). After ripping the pieces, you'll need to crosscut the tops to length as shown in **Photo 3**. The length will be the measurement from your floor to the ceiling minus 1 in. This extra inch of space is needed to slide the bookcase top (C) into position later (**Photo 12**).

After cutting the plywood to size, you'll need to drill 1/4-in. dia. holes into the *inner* sides for the shelf support hardware. These holes must be precise from one standard to the next so your shelves don't wobble. The best way to ensure this is to make a drilling jig.

To make your drilling jig, buy a 1-1/4 in. wide x 1/8-in. thick x 6-ft. long piece of mild steel from your hardware store. Mark

it every 2 in. from one end to the other as shown in **Photo 4**. Next mark centers 3/4 in. from the edge. To keep your bit from wandering as you drill, use a center punch to dent the steel at your mark. Using a 1/4-in. high-speed steel twist bit, drill all the holes. Sand off sharp burrs with 100-grit sandpaper.

To finish your jig, drill four 1/16-in. holes evenly spaced along its length so you can tack it to the plywood sides (**Photo 5**). **TIP:** Mark the jig with a bit of paint so the top can be identified at a glance. If you don't, you can easily flip it end for end and then get the shelf-hole pattern goofed up!

At 84 in. from the bottom, mark each plywood piece (A, A1) for drilling. *The A2 pieces don't get drilled.* Align the top hole of the jig with your mark. Align the edge of the jig with the back edge of the plywood (**Photo 5**). Nail the jig to the workpiece

with 3/4 in. long, 17-gauge nails.

To get clean, flat-bottomed holes, use a 1/4-in. brad point bit in your drill. Use a stop collar on the bit to ensure a 1/2-in. depth, and drill into each hole of the jig.

Drill the front holes next, centered at 2-3/4 in. from the front edge as shown in **Fig. B**.

NOTE: Pieces A and A1 are mirror images of each other, so double-check to make sure you drill them correctly.

SANDWICH-GLUING THE STANDARDS

Now you're ready to glue the plywood pieces (A, A1, A2) and the 2x4s (B) that make each standard. To make sure you glue the correct sides (A, A1, A2) together, study **Fig. B**. Cut the 2x4s to the same length as the plywood. Spread glue (about a 1/4-in. bead in a squiggly pattern) on both sides of the 2x4s and place them onto the plywood (**Photo 6**). Recess the rear 2x4 about 1/2 in. from the back. If your wall is uneven, this will make it much easier to scribe it to the wall later on. **TIP:** To keep the pieces from drifting as you clamp them, drive a finish nail through the plywood into the 2x4 to hold it in position. Set this nail just below the surface and fill the hole later.

Once the glue has set overnight, position each standard in your room to



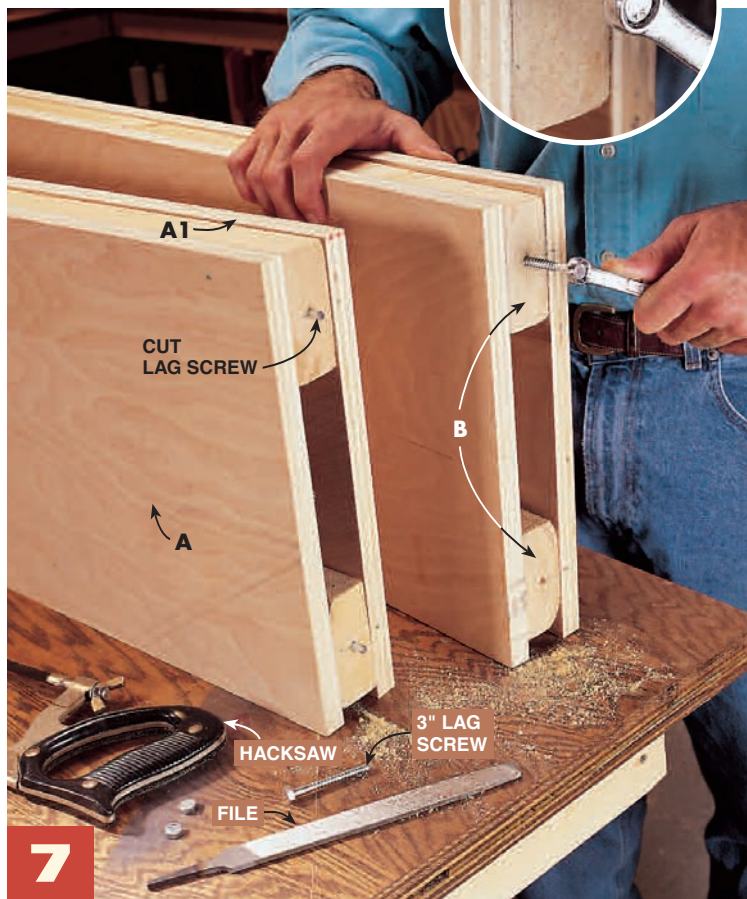
see how each one fits against the floor and the wall. A gap of 1/8 in. at places against the wall is OK; if the gap is any larger, the standard should be scribed to fit. If you live in an old house that's settled considerably, check for a gap on the floor as someone holds each standard against the wall. If there's a gap at the front, scribe the standard to the floor and sand to your mark with a belt sander (see "For More Information"). If you make any adjustments to the standards, mark them in the order you'll install them—1, 2, 3 and so on.

INSTALLING THE PINS

The pins that secure the standards to the floor are nothing more than 1/4-in. x 3-in. lag screws with their heads cut off with a hacksaw. Carefully mark the hole centers as shown in **Fig. B**, then predrill a

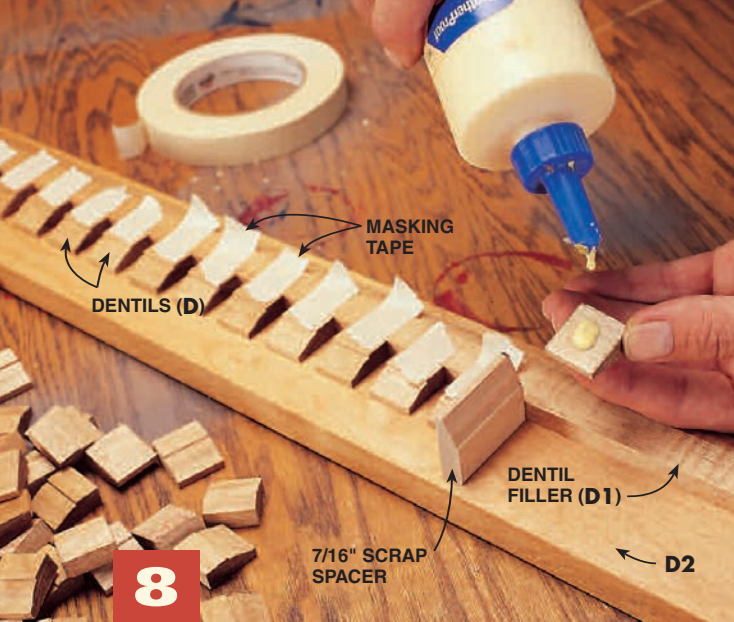
6

GLUE THE 2x4s between the plywood pieces (A and A1) "sandwich style" to create the two middle upright standards. Also, glue together an A2 and A1 for the far right standard and an A and an A2 for the far left standard. After gluing, clamp them for at least two hours. Be sure the front 2x4 (B) is flush with the front side of the panels and the rear 2x4 (B) is set in about 1/2 in. The extra 1/2 in. on the back makes scribing to the wall much easier (see text).



INSTALL A PAIR of 3-in lag screws in the bottom of each standard. Use a wrench to turn them until the threads are all inside the bottoms of the 2x4s. Next, cut the heads off the screws with a hacksaw and file a slight taper on the bottom of the protruding screw shaft. These pins will hold the standards into holes in the floor (to be drilled later).

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GLUE THE DENTIL PIECES (D) to the 1x4 backer board (D2), using masking tape to hold them as the glue dries. Parts D, D1 and D2 must be prestained before gluing. Allow the stain to dry at least a day so the glue will stick. The dentils are made from colonial-style stop that is first ripped to 1-1/8 in. then cut to 7/8-in. lengths. The filler piece at the top is the same uncut stop with the detailed side up. This piece will be hidden by the crown molding (J) later.

3/16-in. hole. Turn the lag screws into the holes with an end wrench, leaving 1/2 in. of the shaft exposed (**Photo 7**). Now, cut the heads off the screws and file a slight taper near the end to help guide the pins into the holes you'll be drilling later into the floor.

MAKING THE DENTIL MOLDING

Our dentils (D) are made from colonial stop molding (also called Princeton style; **Fig. A**). First, rip off the square side so the stop is 1-1/8 in. wide (if you don't own a table saw, have this done at the lumberyard). Now cut the molding into 7/8-in. long pieces

to make each dentil. It's slow-going but the finished look is worth it. We used a power miter saw to cut the lengths (you can rent one for about \$45 a day). The filler piece (D1) at the top side of the dentils (D) is the same molding with the square side toward the top of the dentil as shown in **Photo 8**. The backer board (D2) is 1x4 maple.

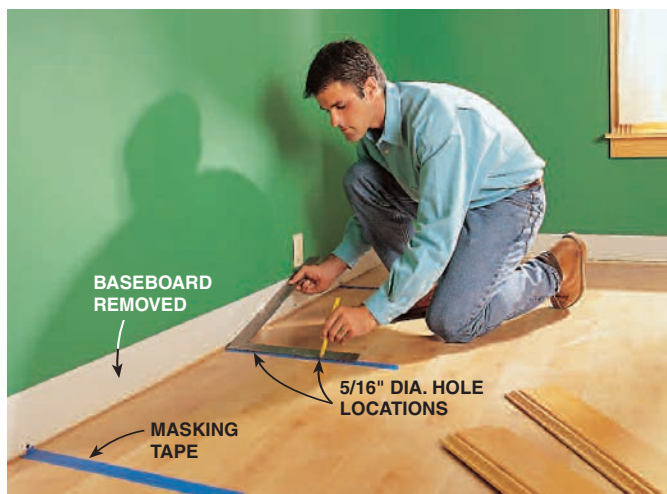
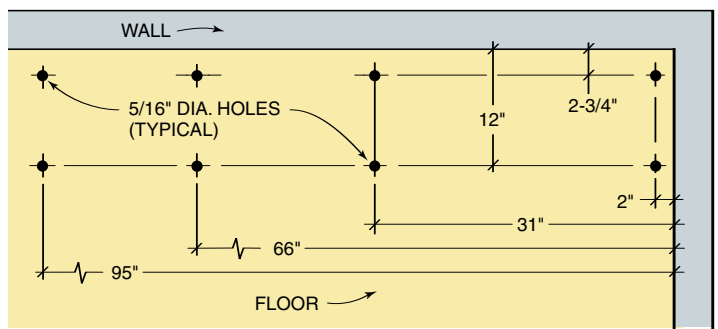
Nail the filler (D1) to the backer board using 1-1/4 in. brads every 6 in. Then glue the dentil pieces to D2 as shown in **Photo 8**, using just enough glue so it doesn't ooze from the sides of the dentils. Let this piece sit for 24 hours before handling it.



9

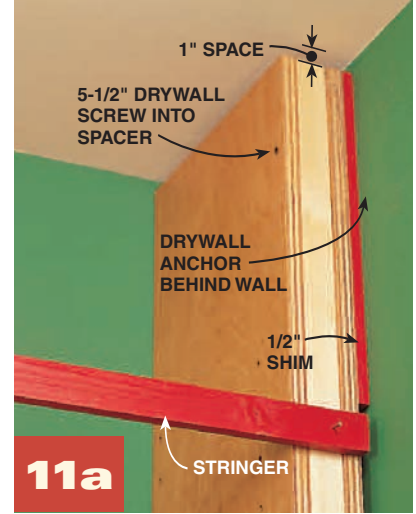
GLUE THE EDGE MOLDING (M) to the shelf (K). Use masking tape to align the molding and clamp it until the glue sets.

Fig. C Hole location for pins (top view)



10

APPLY MASKING TAPE to the floor where the standards will be placed, then mark the hole locations for the pins (cut-off screws). Use a framing square as a guide to ensure that the holes will be perpendicular to the wall. Be sure to remove the baseboard.



TIP THE STANDARDS into position, making sure the 1/4-in. pins fall into the 5/16-in. holes. The standard against the corner wall is spaced 1/2 in. away from the wall and is secured at the top front with a 5-1/2 in. drywall screw driven into a drywall anchor. The screw and anchor will hold the first piece in position while the temporary stringers will hold the rest of the standards parallel. Nail the temporary stringers to each standard, making sure the top width measurement equals the bottom width measurement.

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MAKING THE SHELVES

We recommend cutting the shelves at the same time as the standards (see Cutting List, p. 47). Cut the shelf fronts (M and M1) and glue them to the shelves (**Photo 9**). You can trim the completed shelves

to exact length (the measurement between standards, minus 3/16 in.) when you're ready to install them. This way, they can be prefinished along with the other pieces.

PREFINISHING

It's a lot faster to stain and varnish in your shop than it is to painstakingly avoid spilling onto your walls and floor. And you can confine the odor of the finish to your workshop or garage; just be sure your work area is at least 60 degrees F. After the bookcases are completely installed, you can touch up any cut ends with stain and

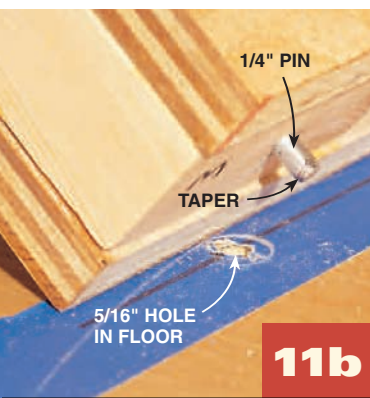
fill nail holes with colored putty. For a blotch-free even color on the birch, we applied Minwax Wood Conditioner before the Minwax No. 245 pecan stain. Use a polyurethane varnish for durability.

INSTALLING THE STANDARDS AND TOP

Remove your baseboard where the bookcases will go. Pull the nails through from the backside with a pliers and set the baseboard aside. You'll reinstall it later between the standards. To help you see the pin location marks for the standards, apply tape on

the floor as shown in **Photo 10**. Next, carefully measure using **Fig. C** as your guide. Use a square so your measurements will be perpendicular to the wall, and drill the 5/16-in. dia. holes into the floor for the first standard (**Fig. C**).

Space the first standard 1/2 in. from the side wall (**Photo 11a**). This will provide enough space for the fluted front casing (**Photo 14**) to overhang equal amounts on each side of the standard. To hold the top of the standard away from the wall (**Photo 11a** and **Fig. B**), install a shim near the top as shown and secure the standard to the





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SLIDE THE CABINET TOP (C) over the standards and secure it in place with brass angle hardware (Fig. B) in the front and back of each standard. Be sure the standards are positioned and spaced properly before screwing the top in place. Once the top is secured to the standards, be sure the standards are against the wall. Then screw the top to the ceiling joists in three locations (two screws at each location), shimming the gaps (Photo 13) between the top and the ceiling with wood shims. **Note:** You may have to use a stud finder to locate the joists. Or install blocks between joists in the attic.

wall with a 5-1/2 in. dry-wall screw driven into a drywall anchor. Make sure the shim is thick enough so the standard is plumb (Photo 11a). Now cut temporary stringers from scrap 1x2, two pieces 32 in. long and one piece 36 in. long (Photo 11).

Drill the corresponding 5/16-in. dia. holes for the second standard into the floor and set it in place (Photo 11b). Nail a 32-in. temporary stringer from the first unit to the second, making sure the standards are perfectly parallel.

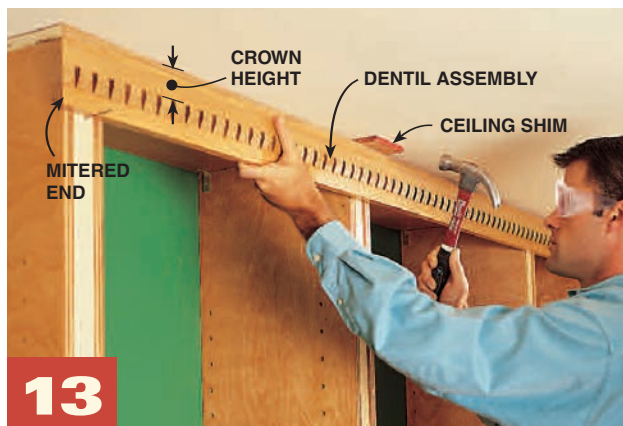
Once all the standards are in place, slip the top (C) into position (Photo 12) between the standards and the ceiling. When the front edge of the top is even with the fronts of the standards, screw it to the top of the standards (Fig. B) with 3/4-in. screws and brass angles. Then shim it tight to the ceiling. To lock the bookcases into position, screw the top to the ceiling joists with 3-in. drywall screws, making sure the backs of the standards are against the wall.

Tools

Tape measure
Masking tape
Screwdriver
Hammer and nail set
Circular saw
Utility knife
Framing square
Drill and assorted bits, including:
1/4" brad point drill bit
1/4" steel twist bit
1/4" stop collar
Center punch
Power miter saw
Table saw
Level
Belt sander
10 clamps (6" or larger)
3 clamps (12" or larger)
Stud finder
File
Hacksaw
End wrench

For More Information

- "Library Shelves," Nov./Dec. '94, p. 43.
- "Crown Molding," May '90, p. 30.
- "Scribing for Tighter Fits," "Using Tools," May '93, p. 20.
- "Buying Dimensional Lumber," June '97, p. 79.
- "Hardwood Plywood," "Handyman Reports," Sept. '97, p. 94.
- "Making Door and Window Casings," Feb. '97, p. 39.
- "How to Install Carpet," Oct. '94, p. 69.



13

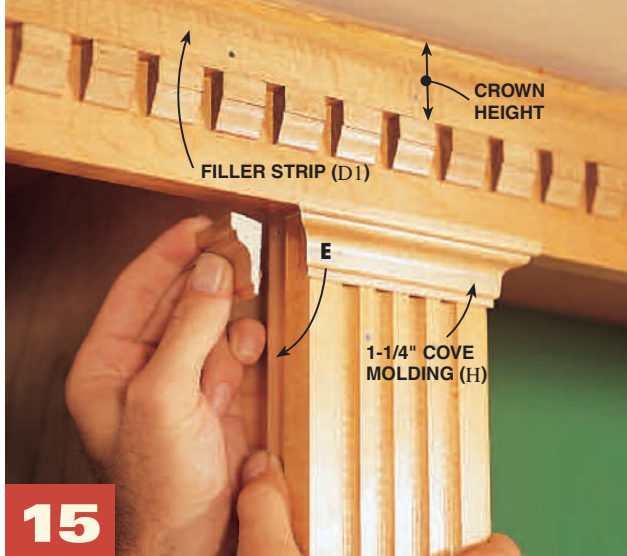
MITER THE END of the dentil assembly, then cut it to length. Nail the assembly to the front of the standards with 6d finish nails. The 2-5/8 in. distance from the ceiling to the top of the dentil is critical. The bottom of the crown molding profile needs to align with the top of the dentils (Photo 16).



14

NAIL THE FLUTED CASING fronts (use 6d finish nails) to the front edge of each standard after nailing the plinth blocks at the bottom. Also, be sure to nail the side trim (E) even with the fronts of the standards. Since the plinths are wider than the fluted casing, you'll need to rip 1/4 in. from the width of the plinth against the wall.

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NAIL THE 1-1/4 IN. COVE MOLDING (H) to the tops of the fluted casing. The cove molding should wrap around to meet the colonial column returns (E).



16

SET THE NAILS AFTER NAILING the crown molding (J) into the filler strip (D2). Use 4d finish nails every 12 in. to nail the crown molding. Miter each end at the outside corner and butt the other ends against the wall.

Use at least six screws to secure the top directly to the joists. You can now remove the temporary stringers.

INSTALLING THE TRIM

First, nail the dentil assembly to the standards as shown in **Photo 13**. It should be high enough that the crown molding, when installed, will just touch the top of the dentils (D). Our crown molding is 3-1/4 in. wide across its face, and its bottom edge sits 2-5/8 in. below the ceiling (**Fig. A**).

Next, nail the colonial stop (**Fig. A**) on each side of the standards (E in **Fig. B**). Nail each piece in place with 4d finish nails every 12 in., aligning it with the front of each standard. After the stop is nailed, nail the plinth blocks (F) at the base of each standard using 8d finish nails. To cover the exposed faces of the standards, nail the fluted casing (use 6d finish

nails in pairs every 18 in.) to each standard (**Photo 14**). Fit it tightly between the plinth and the dentil stringers.

To give each fluted casing the look of a real column, glue and tack the cove molding (H), mitering the corners around each top (**Photo 15**). Now to finish the bookcase at the ceiling, miter the crown molding and nail it in place as shown in **Photo 16**. **NOTE:** To enhance the built-in look of the project, we continued the crown molding around the entire ceiling. For more on crown molding installation, see "For More Information."

THE LADDER

The rolling ladder is a handsome addition to any library. We purchased ours by mail (see Buyer's Guide) after sending a dimensioned sketch of our project. All the necessary hardware along with very clear instructions were included. The ladder is a safety hazard for small children, so adult supervision is advised. 🏠

Art Direction • MARCIA WILLISTON
Photography • BILL ZUEHLKE
Technical Art • EUGENE THOMPSON

Buyer's guide

■ **ROLLING LADDER** and hardware are available from Putnam Ladder, Dept. TFH, 32 Howard St., New York, NY 10013; (212) 226-5147. Specify the length of rod (ours is 8 ft.) and the height of the finished ladder (ours is 7 ft.). Available in a wide variety of hardwoods. Rolling ladder kits are also sold by ALACO Ladder, Dept. TFH, 5167 G St., Chino, CA 91710; (909) 591-7561.

■ **FLUTED CASING** (4 in.) and **PLINTH BLOCKS** (4-1/2 in.) are available in a wide variety of hardwoods from Woodharbor Doors & Cabinetry, Dept. TFH, 3277 Ninth St., Mason City, IA 50401; (515) 423-0444. Call to order or to find a dealer near you.



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INSTALL THE ROLLING LADDER hardware to the face of the cabinet according to the manufacturer's instructions.



Shopping List

ITEM	QTY.
3/4" x 4' x 8' birch plywood	5
2x4 x 8' pine	8
1x2 x 10' pine	1
1x4 x 10' maple board	1
7/16" x 1-1/2" x 10' colonial stop	2
7/16" x 1-1/2" x 8' colonial stop	6
1-1/16" x 4-1/2" x 8" plinth blocks*	4
3/4" x 4" x 7' fluted casing*	4
5/8" x 1-1/2" x 8' shelf molding	7
1-1/4" x 8' cove molding	1
3-1/4" x 10' crown molding	1
1/4" peg-style shelf brackets	84
1-1/4" x 1/8" x 6' flat steel	1
1-1/2" x 1-1/2" brass angle with screws	12
Carpenter's glue	1 qt.
3/4" x 17-gauge nails	1 pkg.
1-1/4" x 17-gauge brads	1 pkg.
4d, 6d and 8d finish nails	1 lb. each
Minwax wood conditioner	2 qts.
Minwax No. 245 pecan stain	2 qts.
Minwax satin polyurethane	2 qts.
Colored putty stick	1
7-ft. rolling ladder and hardware*	1

*See Buyer's Guide on p. 46 for mail order sources.

Cutting List

KEY	QTY.	SIZE & DESCRIPTION
A	3	3/4" x 13-3/4" x 96" plywood (trim to fit)
A1	3	3/4" x 13-3/4" x 96" plywood (trim to fit)
A2	2	3/4" x 13-3/4" x 96" plywood (trim to fit)
B	8	1-1/2" x 3-1/2" x 96" pine
C	1	3/4" x 13-3/4" x 96" plywood (trim to fit)
D	1	7/16" x 1-3/8" x 10' maple colonial stop (cut into dentils)
D1	1	7/16" x 1-3/8" x 10' maple colonial stop (cut to fit)
D2	1	3/4" x 3-1/2" x 10' maple dentil backer board
E	6	7/16" x 1-3/8" x 8' maple colonial stop (cut to fit)
F	4	1-1/16" x 4-1/2" x 8" maple plinth blocks
G	4	3/4" x 4" x 7' maple fluted casing (cut to fit)
H	1	1-1/4" x 8' maple cove molding (cut to fit each column)
J	1	3-1/4" x 10' maple crown molding
K	7	3/4" x 11-3/8" x 32" plywood (trim to fit)
L	14	3/4" x 11-3/8" x 26" plywood (trim to fit)
M	7	5/8" x 1-3/8" x 32" shelf molding
M1	14	5/8" x 1-3/8" x 26" shelf molding