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- Step-by-step construction instruction.
- A complete bill of materials.
- Construction drawings and related photos.
- Tips to help you complete the project and become a better woodworker.

Fabulous Futon

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The Fabulous Futon

BUILD THIS POPULAR CONVERTIBLE COUCH

Futons have become enormously popular of late—and for good reason. They easily convert from a sofa to a bed, making them ideal for spare rooms, small apartments and college dorms. And, since they are reasonably lightweight, you are less likely to suffer a week of sore muscles after moving one. We've worked out a design that simplifies the construction, so even woodworkers just starting out should be able to tackle this project with little difficulty. Our Futon, which is queen sized, is made from maple, but a softwood like pine is also a good choice—especially if you want to keep costs to a minimum.

In the sofa position (see Side View), the seat section tilts down at a 3 degree angle. The ends of the support cleats rest flat on the floor, and the two knobs are tightened to lock the back and support cleats in place.

To convert the Futon to a bed, simply loosen the knobs and straighten the seat, back and support cleats (see Fig. 1). Note that, as the back section is lowered to the floor, the seat section pivots up to create a flat sleeping surface.

Since mattress sizes tend to vary a bit, it's best to have your mattress on hand before starting the project. It's never easy to make adjustments after a project is completed.

Prepare the Stock

Begin by selecting enough five-quarter (5/4) stock to make the two seat cleats (A), the two back cleats (C) and the two support cleats (D). Also, select enough one inch (4/4) stock to make the seat front (B) and the 13 slats (E). When selecting the wood, look for straight-grained stock that's free from large knots or other defects. Boards that are cupped or twisted should be avoided.

If you purchased rough-sawn boards, you'll need to thickness plane the 5/4 stock to 1 in. and the 4/4 stock to 3/4 in. thick. If you don't have a thickness planer, most lumber dealers will, for a small charge, plane the boards for you.

Cut the Parts to Size

Next, rip the 1 in. thick stock to 5 1/2 in. wide for the six cleats. Then, rip the 3/4 in. thick stock to 4 1/2 in. wide for the seat front and 3 1/2 in. wide for the slats.

Once all the parts have been ripped to width, crosscut each one to the lengths shown in the Bill of Materials.

Shape the Cleat Parts

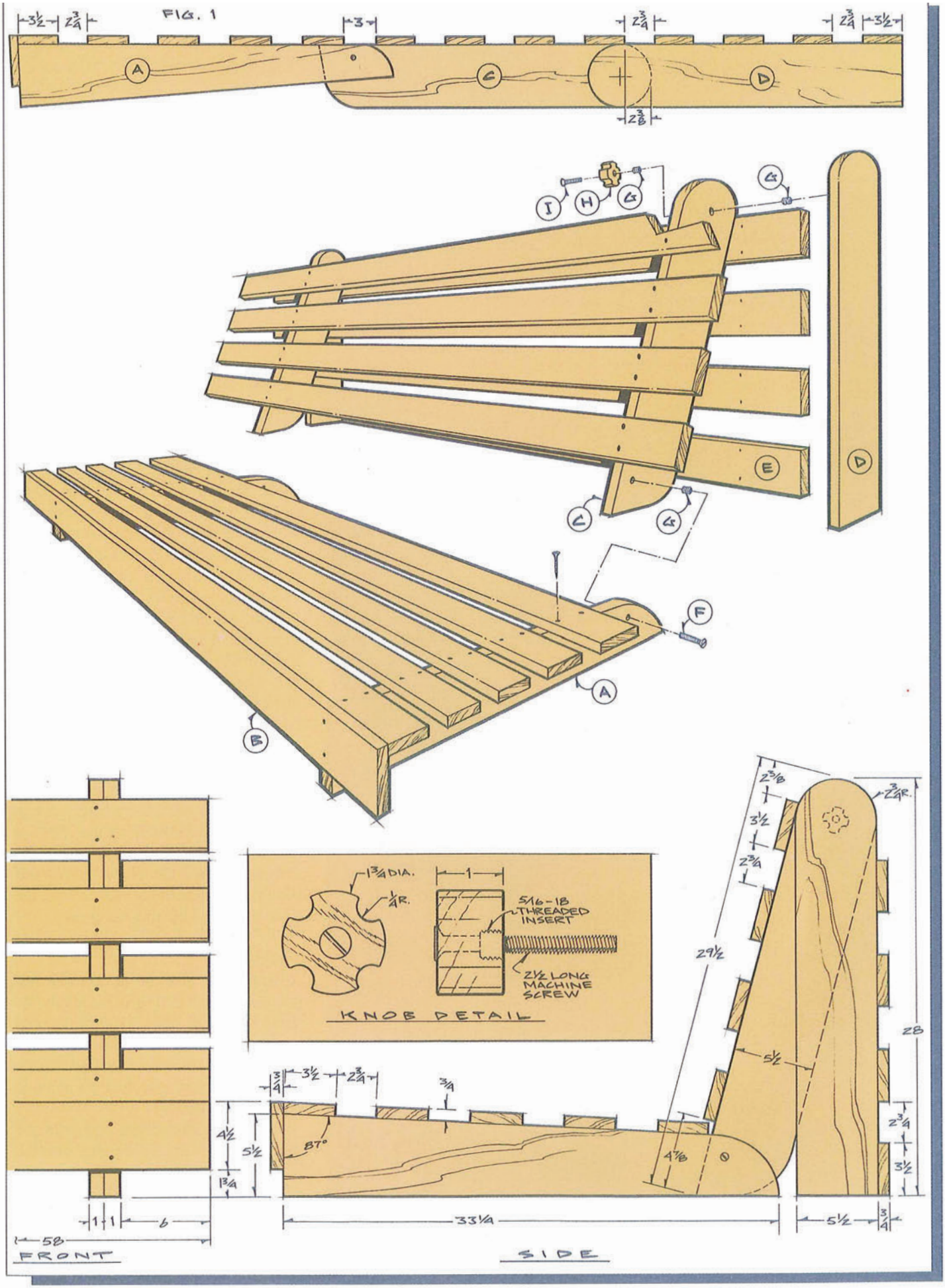
The two seat cleats can now be cut to final shape. First, lay out and mark the taper and the 4 in. radius curve (see Fig. 2). Then, using the band saw, cut the taper and the curve. Make the saw cut slightly on the outside of the marked line, then sand exactly to the line.

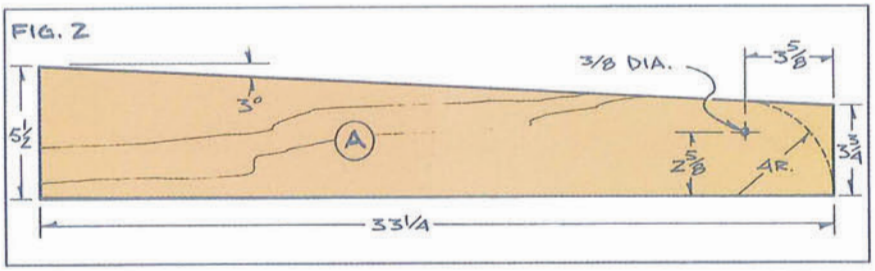
Still referring to Fig. 2, mark the location of the 3/8 in. diameter through hole in each seat cleat. Once marked, bore each hole using the drill press. It's best to use the drill press here, and for all the holes that will follow (including those for the threaded inserts), as it's important for them to be square.

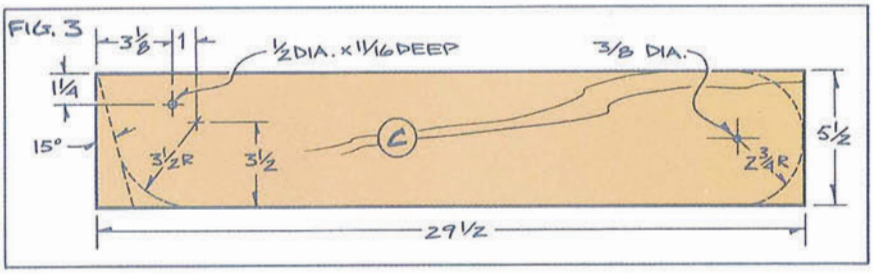
The back cleat has a 15-degree angle and a 3 1/2 in. radius cut on one end, and a 2 3/4 in. radius on the other (see Fig. 3 and Side View). The support cleat has a 2 3/4 in. radius on one end, while the other end is square.

Cut the 15 degree angle on the back cleat, then use a compass to scribe the various radii on each of the parts. Cut them out on the band saw. A disk sander, if you have one, will make it easy to sand the band sawn edges.

A 1/2 dia. by 11/16 in. deep hole is bored in each back cleat to accept a 5/16 - 18 by 5/8 in. long brass threaded insert (G). Referring to Fig. 3, lay out and mark







the centerline of each hole, then bore them out. On the other end of the back cleat, at the center of the 2 3/4 in. radius, bore a 3/8 in. dia. through hole.

Next, at the centerpoint of the 2 3/4 in. radius in the support cleat, use the drill press to bore a 1/2 in. diameter by 11/16 in. hole for the threaded insert. Once bored, thread the inserts in place. A thin coat of paste wax added to the outside threads of the inserts will help them go in easier.

Make the Knobs

To make each knob, use the compass to scribe a 1 3/4 in. dia. circle on a piece of 1 in. thick stock that's at least 2 in. square. At the center of the circle, bore a 1/2 in. dia. by 11/16 in. deep hole for the threaded insert and a 3/8 in. dia. through hole for the knob machine screw (I). Thread the insert into the hole.

Next, mark the centerline location of the four 1/4 in. radius cutouts, then use a 1/2 in. dia. drill bit to bore each one. Now, to complete the handle (H), use the band saw to cut the scribed 1 3/4 in. dia. circle. Stay just on the waste side of the line, then sand the edges smooth. A disk sander will once again come in handy here. Add the machine screws to complete work on the knobs.

Sand the Parts

Give all the parts a thorough sanding, finishing with 220-grit sandpaper. When sanding, round all the corners and sharp edges to about a 1/8 in. radius.

Assembly

We used 1 1/2 in. by no. 8 flathead wood screws to join the seat front and 13 slats to the cleats. A total of 56 screws are required. For each screw you need to bore a pilot hole in the cleat. Also, you need to bore a shank hole and countersink in the seat front and slats. If you have one, a countersinking drill bit will make things much easier. These one-piece bits will drill the pilot hole, shank hole and countersink in one operation. If not available at your local hardware store, they can be ordered from most woodworking mail-order outfits.

Begin assembly by joining the seat front to the two seat cleats. Note that the seat front extends 3/4 in. above the front edge of the seat cleats. Also, as shown in the front view, the cleats are inset 6 in. from the ends of the seat front.

Now, add the first slat. To create a tight fit at the seat front, we used the table saw to cut a 3 degree bevel along the front edge of this slat only. (The remaining slats don't require any beveling.) After the first slat is beveled, butt it up against the seat front, then use the countersink drill bit to bore a pair of screw holes through the slat and into the cleat. With the holes bored on each end, secure the slat to the cleat with the flathead wood screws. We chose not to use any glue here, since the screws provide more than enough strength.

Now, rip a 58 in. length of scrap stock to 2 3/4 in. wide. This "spacer board" will be used to establish the 2 3/4 in. spacing between the remaining slats.

Butt the spacer board against the first slat, then butt the second slat against the spacer board. Make sure the ends are flush. You may want to use a bar clamp to hold everything in place. Once all looks okay, bore the holes on each end and add the screws. Use this same basic procedure to assemble all the remaining slats to the seat cleats.

Next, the slats are added to the back cleats. Begin by attaching the first slat at a point 4 7/8 in. from the cleat bottom ends (see Side View). Before going any further, use the pivot screws to temporarily join the back cleats to the seat cleats, then pivot the parts from the bed position to the sofa position. The first back slat should just clear the last seat slat, but if it doesn't, use a hand plane to apply a slight chamfer to the slats, or readjust the slat spacing a bit.

Now, remove the pivot screws and assemble the remaining slats to both the back cleats and the support cleats.

Finishing

At this point, give the project one last going over with 220- grit sandpaper. To remove the dust you should thoroughly vacuum all the surfaces, then use a tack rag to pick up what remains. For a finish, we used two coats of a clear water-based polyurethane varnish.

Once the finish dries, assemble the seat, back and support sections with the pivot screws and knobs. The mattress simply lies flat when the Futon is used as a bed. When it's converted to a sofa, the mattress is folded under in the front as shown in the photo.

Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Seat Cleat	1 x 5 1/2 x 33 1/4	2
B	Seat Front	3/4 x 4 1/2 x 58	1
C	Back Cleat	1 x 5 1/2 x 29 1/2	2
D	Support Cleat	1 x 5 1/2 x 28	2
E	Slat	3/4 x 3 1/2 x 58	13
F	Pivot Screw	5/16-18 by 1 1/2 long	2
G	Threaded Insert	5/16-18 by 5/8 long	6
H	Knob Handle	See Detail	2
I	Knob Screw	5/16-18 by 2 1/2 long	2

Queen Size Futon Mattress
60-in by 80-in

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