

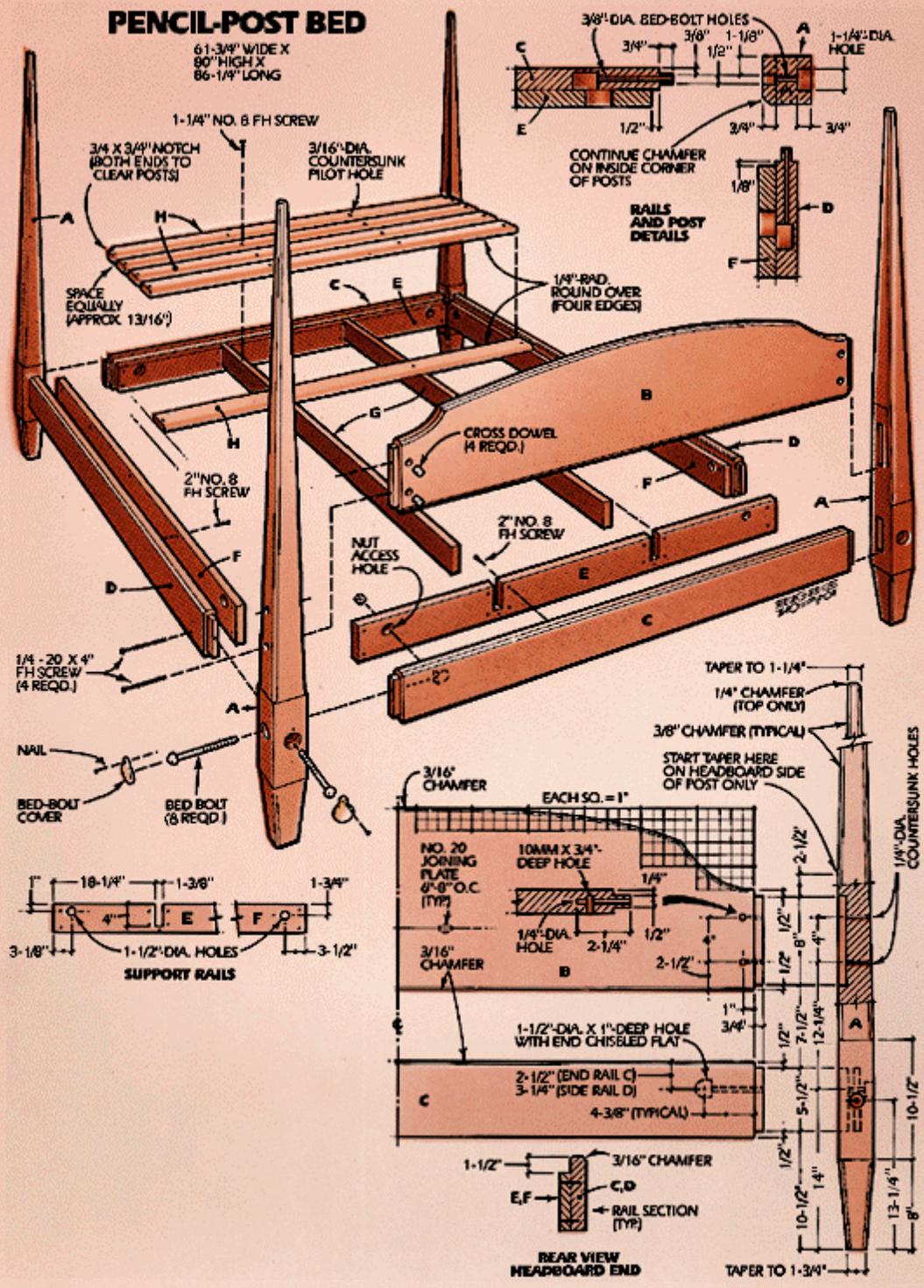
## **Shaker 4-posted design Bed**

The bed presented here is a variation of a Shaker 4-posted design, often called a pencil-post bed because of the thin octagonal posts. The bed looks good in contemporary homes, but its origins are in the Middle Ages, when canopied beds came into use. At that time, woven tapestries were often draped over a heavy frame for both decorative and practical effect because they kept the occupants warm in the absence of efficient heating systems.

Our plans accommodate a queen-size mattress without needing a box spring. If you want to use a box spring, position the framework to yield the proper bed height.

# PENCIL-POST BED

61-3/4" WIDE X  
80" HIGH X  
86-1/4" LONG



1-1/4" NO. 8 FH SCREW

3/4 X 3/4" NOTCH (BOTH ENDS TO CLEAR POSTS)

3/16" DIA. COUNTERSUNK PILOT HOLE

SPACE EQUALLY (APPROX. 13/16")

2" NO. 8 FH SCREW

CROSS DOWEL (H REQ.)

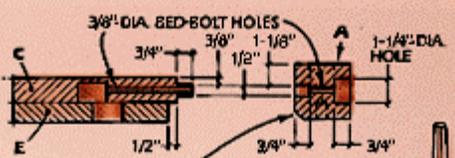
2" NO. 8 FH SCREW

NUT ACCESS HOLE

1/4 - 20 X 4" FH SCREW (4 REQ.)

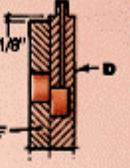
NAIL  
BED-BOLT COVER

BED BOLT (6 REQ.)



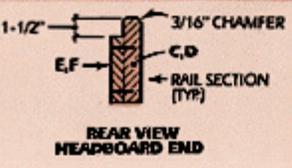
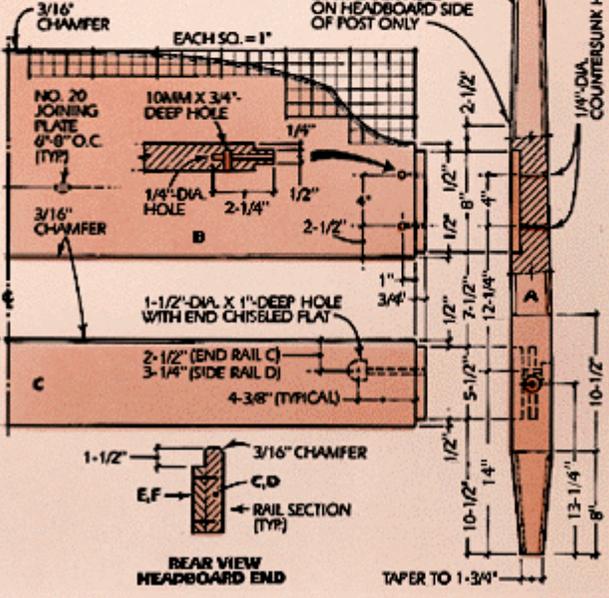
CONTINUE CHAMFER ON INSIDE CORNER OF POSTS

RAILS AND POST DETAILS



1/4" RAD. ROUND OVER (FOUR EDGES)

TAPER TO 1-1/4"  
1/4" CHAMFER (TOP ONLY)  
3/8" CHAMFER (TYPICAL)  
START TAPER HERE ON HEADBOARD SIDE OF POST ONLY



TAPER TO 1-3/4"

**Materials List  
Pencil-post bed**

<b>Key</b>	<b>No.</b>	<b>Size and Description (use)</b>
<b>A</b>	<b>4</b>	<b>2 3/4 x 2 3/4 x 80" cherry (post)</b>
<b>B</b>	<b>1</b>	<b>1 x 16 x 60 3/4" cherry (headboard)</b>
<b>C</b>	<b>2</b>	<b>1 1/4 x 6 1/2 x 60 3/4" cherry (end rail)</b>
<b>D</b>	<b>2</b>	<b>1 1/4 x 6 1/2 x 80 3/4" cherry (side rail)</b>
<b>E</b>	<b>2</b>	<b>1 x 5 x 58 1/4" poplar (end support rail)</b>
<b>F</b>	<b>2</b>	<b>1 x 5 x 79" poplar (side support rail)</b>
<b>G</b>	<b>2</b>	<b>1 3/8 x 4 x 80 3/4" poplar (side support)</b>
<b>H</b>	<b>14</b>	<b>3/4 x 5 x 60 3/4" maple (slat)</b>

**Misc:**

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**8 No. 6021 bed bolt covers  
8 no. 6010 bed bolts**

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**1 No. 6012 wrench from  
Paxton Hardware  
7818 Bradshaw Rd.  
PO Box 256  
Upper Falls, MD 21156**

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**4 No. 31823 cross dowels from  
Woodworker's Store  
21801 Industrial Blvd.  
Rogers, MN 55374**

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**4 1/4-20 flat head screws  
1 1/4" No. 8 flat head screws  
2" No. 8 flat head screws**

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**Watco Danish Oil Finish  
4/0 Steel wool  
varnish**

## The Posts

Begin by preparing the blanks for the bedposts. Glue up stock if necessary, then joint, rip and crosscut the blanks to 2 3/4 in. wide € 80 in. long. Use a long straightedge to lay out the tapers on each side of the posts (**Photo 1**). The taper on the inside edge of the headboard posts begins 15 in. higher than the other tapers. This allows for a square joint with the headboard.

Lay out and cut the mortises in each post at this point -- it's easier to do this now, while the posts are straight, than after the tapers are cut. The quickest way to cut the post mortises is by using a plunge router with a 1/2-in.-dia. straight bit. Clamp the workpiece between bench dogs, and use an edge guide on the router to make the cut (**Photo 2**). Cut each mortise in two or three passes to avoid overloading the router. After making each cut, use a sharp chisel to chop the mortise square (**Photo 3**).

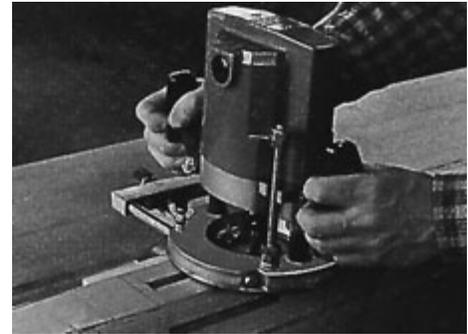
To make the bed easier to move, its joints are bolted together rather than glued. This construction requires that you bore a hole through the mortise bottoms and bore a matching hole into the tenons on the rails and headboard. Use the drill press to bore the 3/8-in.-dia. holes through the rail mortises and the 1/4-in.-dia. holes through the post mortises for the headboard.

Use the band saw to cut the tapers on each post. Note that the tapers are also marked on the posts' ends (**Photo 4**). Cut two tapers, then use the marks on the ends of the posts to draw the tapers on the newly sawed surfaces. Also, use a roller stand or have a second person help you when sawing the tapers. The posts are simply too long to saw without support. Use a sharp and finely set hand plane to smooth the cut surfaces and to refine the tapers (**Photo 5**).

Next, use a Forstner or multispur bit to counterbore the bolt holes on the outside surface



1 Rip and crosscut the post blanks, and use a long straightedge to mark the taper. Also mark the mortise positions.



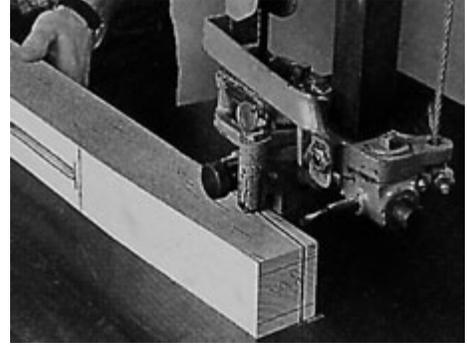
2 Cut the post mortises before sawing the tapers. Use a plunge router or bore out the mortises on the drill press.



3 Clamp the posts firmly to the bench, and chop the ends of the post mortises square using a sharp chisel.

of each post (**Photo 6**). Then use a countersink to recess the holes for the headboard screws.

Cut the 3/8-in.-wide chamfers along the tapered edges of each post using a chamfer bit in the router. The chamfers on the inside post corners run the length of the post, while the remaining chamfers are stopped just above the point where the rails join the post. Use a sharp plane or chisel to cut the chamfers at the top of each post.



**4** Saw two tapers, then use the marks on the ends of the posts to redraw the tapers on the sawed surfaces.



**5** Smooth the sawed surfaces and refine the taper with a hand plane. Set the plane to take a fine shaving.



**6** Counterbore the bed bolt holes and headboard screwholes in the posts. Use a Forstner bit in the drill press.

## The Headboard and Rails

Rip, crosscut and joint the stock for the headboard so it forms an oversize blank. Also rip, crosscut and joint the stock for the bed rails and the support rails.

Position the headboard stock so it forms a blank with the grain positioned attractively, then mark it for joining plate slots 6 in. to 8 in. on center along the mating board edges. Don't position a plate too close to the blank edge -- you might expose the plate when cutting the headboard to shape. Hold the headboard pieces firmly to a flat, clean worksurface, center the plate joiner on the mark and make the plunge cut (**Photo 7**).

Apply glue to the board edges, slots and the biscuits. Clamp the assembly, and when the glue sets, plane and scrape it smooth.

The headboard joins the two front posts with two tenons that run nearly the width of the headboard. To ensure tight-fitting joints, it's important that the headboard be perfectly rectangular. Crosscut the headboard blank on the radial-arm saw or table saw. With either machine, be sure you are making a square cut.

Cut the tenons on the ends of the headboard and on the bed rails using the dado blade in the table saw (**Photo 8**). The headboard and rails have shoulders on the top and bottom of the tenon. To cut the shoulders on the rails, readjust the blade height on the table saw, stand the rail on edge and cut the shoulder. The headboard shoulders are cut later with a handsaw.

Lay out the curved shape of the headboard, and make the cut with a sabre saw just to the outside of the line. Clamp the workpiece in a vise, and use a sharp and finely set plane and spokeshave to smooth the cut surfaces and work down to the line (**Photo 9**). Then mark the shoulders on the top and bottom edges of the headboard tenon, and make the cuts using a



**7** Rip and crosscut the headboard stock oversize. Cut joining plate slots in the stock, then glue and clamp the stock.



**8** Saw the headboard tenons using a dado head on the table saw. The tenon width here requires great accuracy.



**9** Saw the headboard to shape. Smooth away saw marks and refine the shape using a smooth plane and spokeshave.

dovetail saw (**Photo 10**).

Next, using a router and chamfer bit, cut chamfers on the top edges of the bed rails and the top and bottom edges of the headboard.

Dry assemble the headboard and head rail to the posts. Clamp the subassembly, and use a long 3/8-in.-dia. bit to bore slowly through the post into the end of the rail tenons (**Photo 11**). Use a 1/4-in.-dia. bit for the headboard joints. Bore the other holes for each bolted joint.

Now, lay out and bore the pocket holes for the bed bolt nuts on the inside of the bed rails. Use a Forstner bit in the drill press to bore the holes, then use a chisel to square the sides of each hole, forming a flat surface on which the nut can bear (**Photo 12**).

Using the drill press, bore the 10mm-dia. holes for the cross dowels in the back of the headboard. To get the hole in a cross dowel aligned with the hole in the end of a tenon, poke a screw into the tenon and twist the cross dowel with a screwdriver so you can thread the screw into the cross dowel (**Photo 13**).

Rip and crosscut the poplar stock for the end support rails. Then, bore the access holes for the rail bolts. Remember to bore the holes so they are offset from those in the outer rails. When the two rails are joined, this allows better access to the rail nuts than if the holes were aligned.

Cut the notches in the end support rails with a handsaw (**Photo 14**), and then chop the notches square with a chisel.



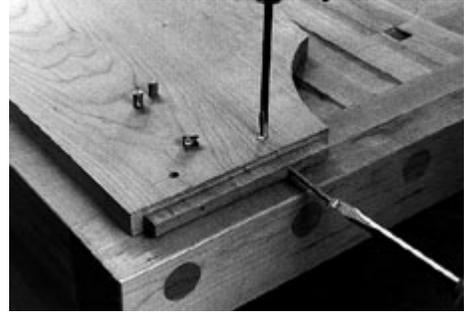
**10** With the headboard edges smoothed, mark and cut the shoulders at the top and bottom of the tenon.



**11** Use a long bit to bore slowly through the post holes and into the headboard and rail tenons.



**12** Use a chisel to cut a flat surface into the hole on the side rails. The bed bolt nut bears on the flat surface.



**13** Bore 10mm holes for cross dowels in the back of the headboard. Turn the dowel to align its hole with the screw.

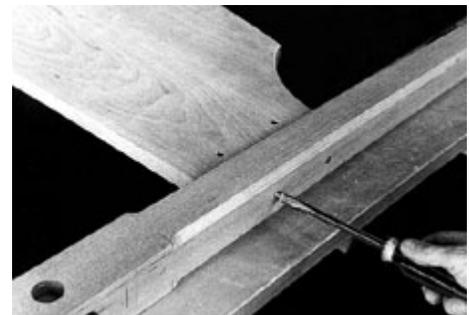


**14** Clamp the end support rails firmly together, and cut the cross support notches in them using a handsaw.

## Assembly

Bore and counterbore pilot holes through the poplar rails to screw them to the cherry rails. Bore a screw hole below the notches in the head and foot rails. Clamp the rails together, and drive screws through the holes. Screw the headboard to the posts (**Photo 15**), and use bed bolts to attach the head rail to the posts. Follow the same procedure for the foot rail and posts. Have an assistant help you bolt together the head and foot assemblies with the side rails. Tighten the bolts using a bed bolt wrench (**Photo 16**).

After the frame is assembled, install the cross supports by sliding each into its notches (**Photo 17**).



Rip and crosscut the maple bed slats, then cut the notches in the slats at the head and foot of the bed to fit around the posts (**Photo 18**). Bore and counterbore pilot holes in the slats, then use a 1/4-in.-rad. rounding-over bit mounted in a router table to cut the slats' edges. Screw the slats to the cross supports using 13/16-in. spacer blocks between each (**Photo 19**).

Disassemble the bed, and sand all parts with 220-grit sandpaper followed by 320-grit paper. Apply four coats of Watco Danish Oil Finish using a brush or rag, and let it soak in for 20 to 30 minutes, then wipe it off. Let the piece dry overnight between coats. After the final coat has dried, rub it smooth with 4/0 steel wool. The maple slats need no finish, but a coat of varnish seals them.

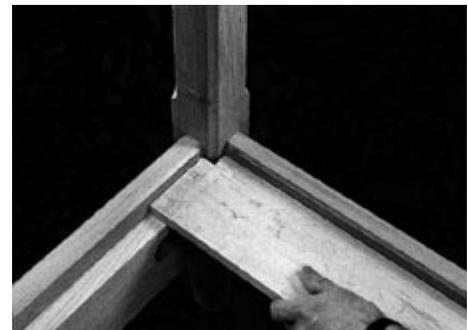
Reassemble the bed and nail the bed bolt covers in place. Each cover should be loose enough to swivel.



**16** Use a bed bolt wrench and an open-end wrench to tighten the connection between the rails and posts.



**17** Prepare for installing the slats by fitting the cross supports into the notches that are cut in the end support rails.



**18** Cut the slat stock. Cut notches in the slats at the foot and at the head of the bed so they fit around the posts.



**19** Position 13/16-in.-wide spacer blocks between the slats, and screw the slats to the cross supports.