Building a Sleigh Bed

Sensuous curves and well-chosen details enhance a simple design

by Christian Becksvoort

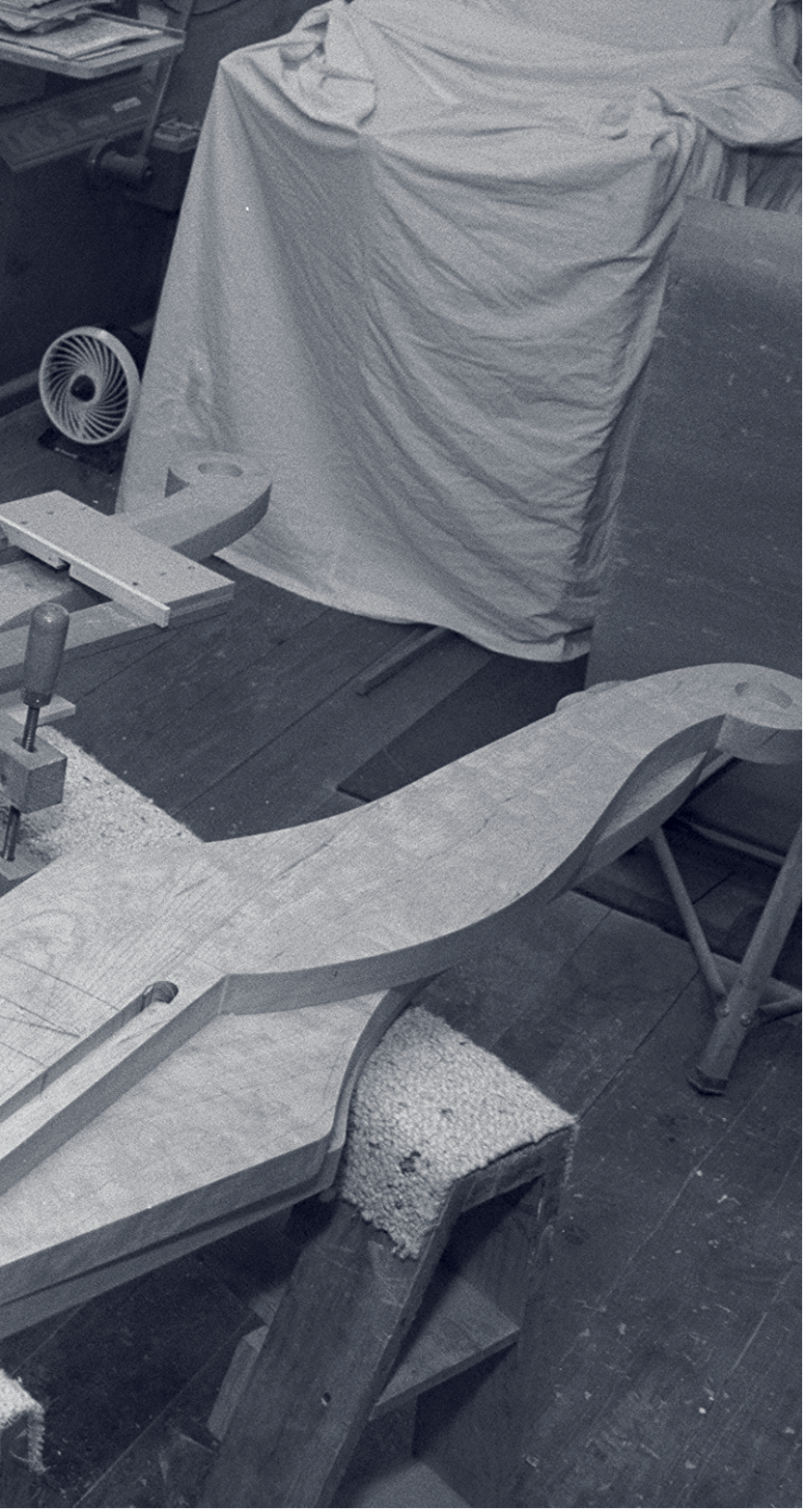
I've been building furniture full-time for 21 years and have made more than 1,000 pieces, including dozens of beds. But until recently I had never built a sleigh bed. So when a friend and long-time customer asked me to build one for her, I had some research to do. The nicest one I found was designed and built by William Turner and featured in *FWW* #91 (pp. 46-51). To my eye, it was all a sleigh bed should be. It had classic lines, style, grace. The only problem was that it took 1,200 hours to build. My client's budget dictated that the bed be built in less than 100 hours. So I had to capture the essence of a sleigh bed, but build it efficiently.

The design work was left to me, with just a few stipulations: The bed was to be queen size, and both headboard and footboard were to be 54 in. high. I worked out several sketches for the post profiles, finally settling on the one on p. 56. Along with twin bands of cove-and-bead molding that ring the bed and rosettes at the top of each post, this profile gave the bed the classic look I wanted.

I saved time on this bed by using flat panels for the headboard and footboard, rather than coopering a curved panel or using a tambour. Also, instead of carving the rosettes, I turned them. It took less than an hour and a half (see the story on p. 61).

The bed is a very simple construction. The headboard and footboard assemblies are joined to a pair of thick rails with knock-

Photos except where noted: Vincent Laurence



down fasteners. These assemblies are each made up of two posts into which are tenoned a turned crest rail and a flat lower rail. A single large panel floats in grooves in both posts and in the crest and lower rails.

A template speeds fabrication of posts

The crest rails had to be 61½ in. long, but my lathe's capacity is only 39 in. So I farmed them out to a local millwork shop where I used to work. While I was at the shop, I ordered eight 8-ft.-long pieces of cove-and-bead molding.

I glued up the posts and rails from 8/4 stock (about 120 bd. ft., in-

SHAPING THE BEDPOSTS

Use post template to transfer profile onto stock. *Take time to smooth curves on the template. The more accurate the template, the less sanding you'll have to do.*

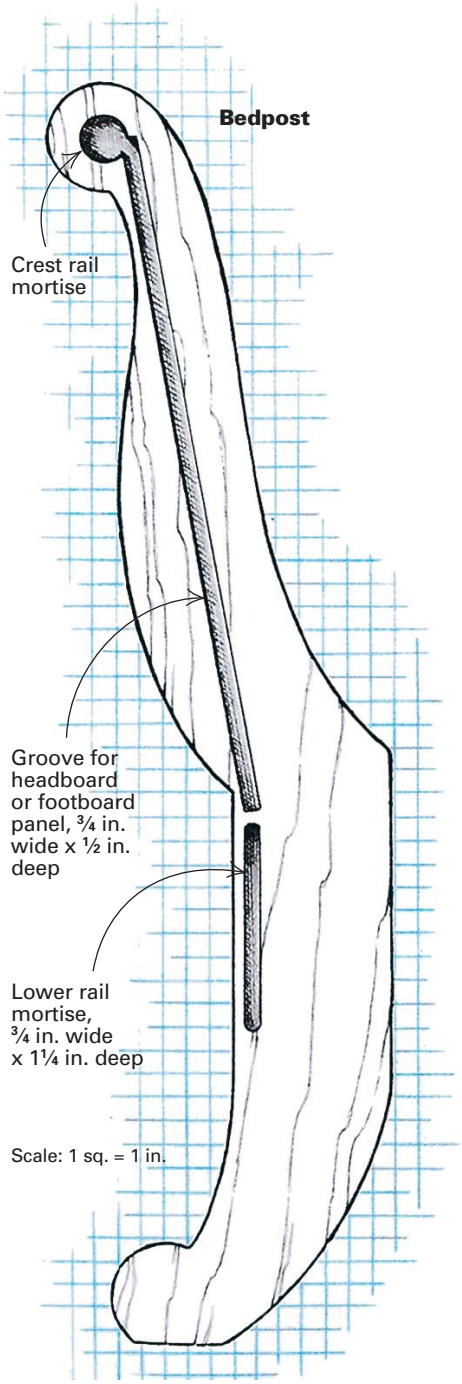
Bandsaw the post profile. *Stay outside of the line; what remains can be routed or sanded. An outfeed table attached to the author's bandsaw makes maneuvering the large blank much easier.*

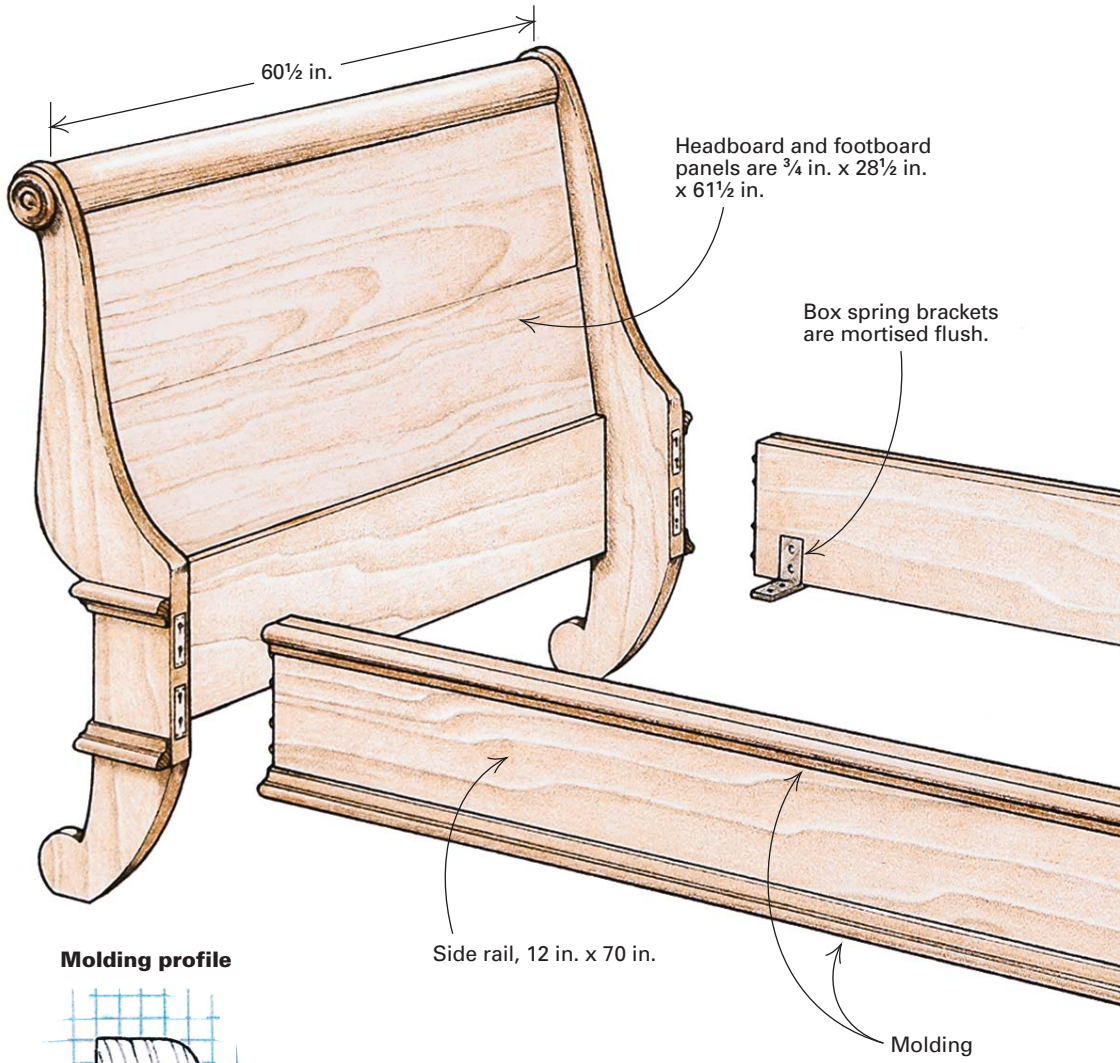
Use a flush-cutting, bearing-guided bit and a template to rout the profile. *Rout with the grain to avoid tearout. For sections where you can't rout with the grain, flip the post over, and reattach the template to the other side. Rounded areas at top and bottom are smoothed on a sander.*

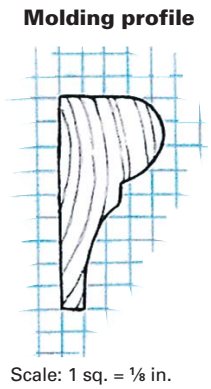
cluding waste) and then planed the eight planks to a bit more than 1½ in. thick. I bandsawed a pattern from ⅜-in. plywood and carefully sanded the edges so that all the curves were smooth and fair. I transferred the post profile to the blanks and then bandsawed the posts, staying about 1/16 in. back from the line (see the top two photos on p. 55). I bored 3/32-in. holes through the centers of all four crest circles and all four foot circles on the drill press. These holes were essential in indexing both the pattern and the rosette and in drilling the crest-rail mortise hole. On the finished bed, the top holes were covered by the crest rail and rosettes; the holes in the feet were plugged.

With the shape of the posts roughly bandsawn, it was time to template rout the posts to final shape—that is, attach the pattern to the posts and follow the template with a router and a flush-cutting, bearing-guided bit. Sounds good in theory, but there were a few problems. First, as with planing, you shouldn't rout into the grain. That meant having to make all downhill cuts on one side, switch the pattern to the other side of each post, and make the downhill cuts from that side. I penciled arrows onto the wood to indicate stop and start points for the bit.

I also discovered that a 1½-in. flush-cutting bit starts to burn after only a few minutes of chewing its way through 1½-in.-thick cherry. After seeing this on the first leg, I changed tactics. I sanded all the convex curves I could reach, including the crest and foot circles, using a stationary disc sander and a belt sander with an 80-grit belt. For the straight portion of each post, where the side rail meets the post, I ran the post over the jointer. As a result, the router had only half as much work, and the bit burned a lot less. On tight, inside corners, where the circles meet the curves, I used chisels, gouges and files to get a neat transition. Then the real fun started. All the edges of all four posts had to be sanded to 320-grit. I used a belt sander and a block plane here and there, but for the







Sleigh bed on a budget

This sleigh bed is relatively simple to build because all four posts are the same size and shape. Unlike more elaborate designs, this one calls for flat headboards and footboards.

Drawings: Heather Lambert

most part, it was burned fingertips. Incidentally, the 80-grit disc sander marks were easier to sand out than the router burns.

Laying out and cutting mortises

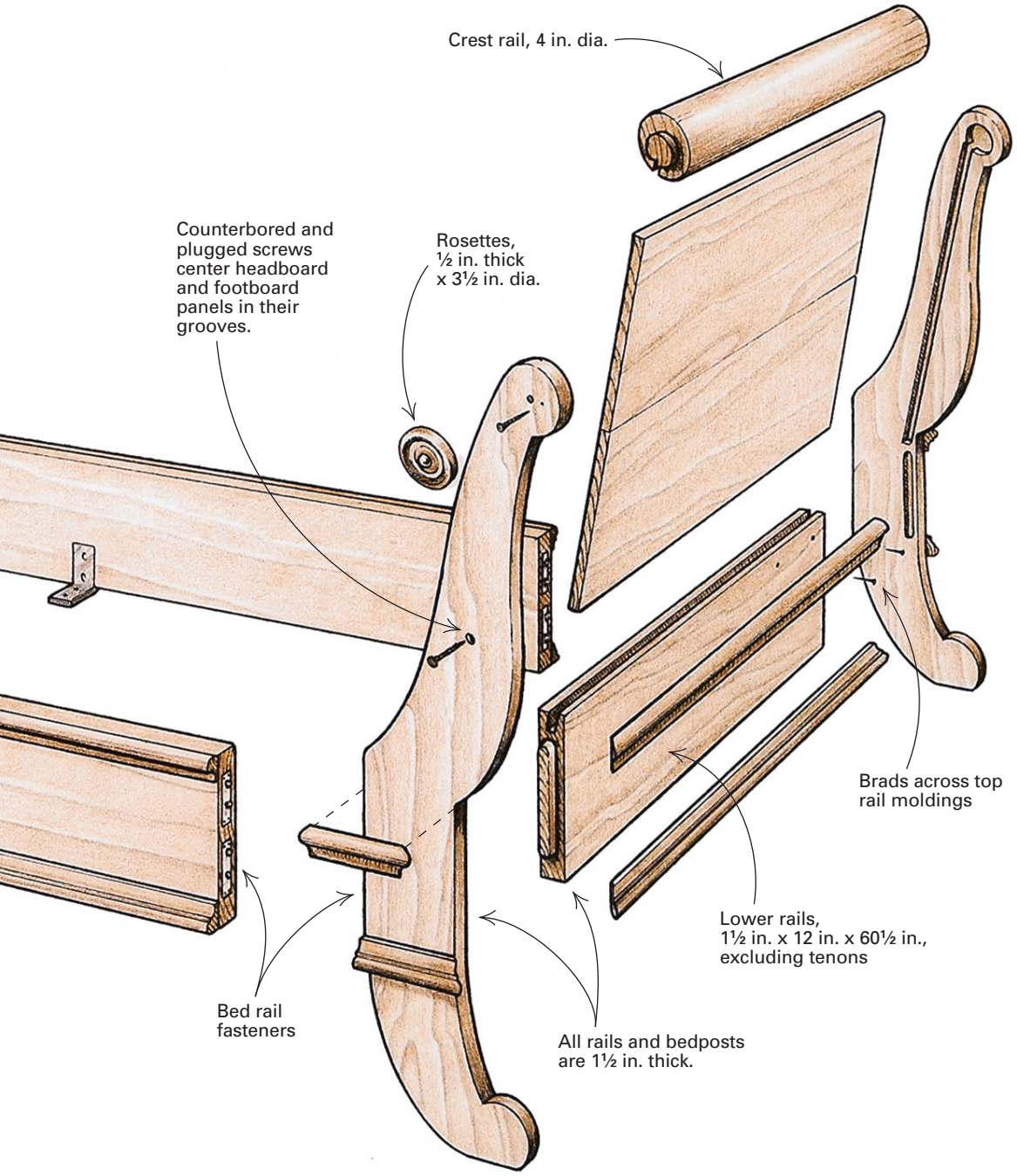
The next step was to decide which side of each post was going to be the face. I marked the faces with a pencil and then drilled a ½-in.-deep, 2-in.-wide hole on the inside center of each of the crest-rail circles. These holes matched the tenons turned on the ends of the two crest rails (see the drawing).

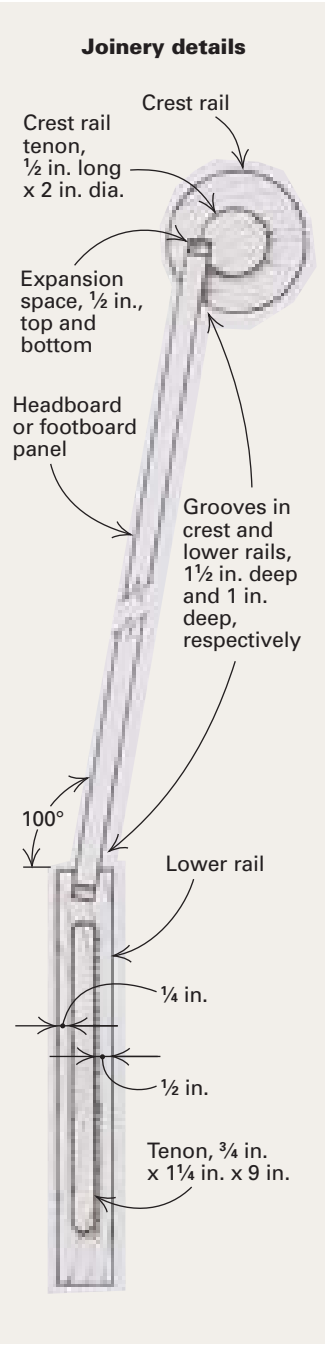
I then laid out the mortises for the lower head and foot rails. I offset the mortises to give more strength to the outside wall of the mortise. This gave me ½ in. of wood from the outside of the post to the mortise, a ¾-in.-wide mortise, and still allowed the rail to have a ¼-in.-wide shoulder on the inside (see the drawing detail below).

I routed the mortises using a fixture that has two parallel fences with pieces connecting them. (For more on this routing fixture, see *FWW* #119, p. 74.) The distance between the fences is the diameter of the router base. For ease of operation, I used two routers. The first, with a ⅝-in.-dia. bit, made three passes to achieve the mortise's full 1¼ in. depth. With the second router, I used a ¾-in.-dia. bit to take the mortise to its full width.

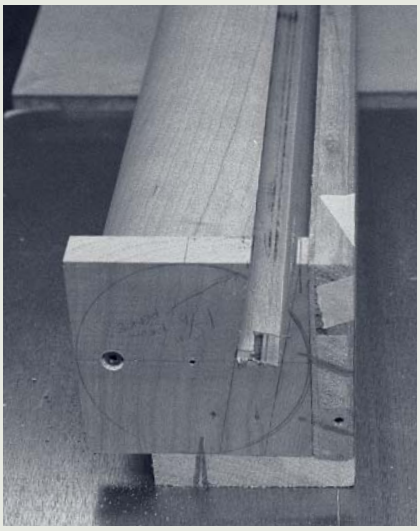
When all four mortises were routed, it was time to cut the end rails to length. Because this is a queen-size bed, I allowed 60½ in. between the posts. With the addition of a 1¼-in. tenon on either end, that brought the total rail length to 63 in.

I cut the rails to length and then cut the tenons (remember, they're offset—a ½-in. shoulder on the outside and a ¼-in. shoulder on the inside), leaving 1½-in. shoulders at the top and bottom for an overall tenon width of 9 in. I rounded the ends of the tenons with a knife, so they would conform to the routed mortises in the posts. Then I dry-fitted the rails in the mortises. Be sure that the rails are flush with or slightly in from the posts. It's much easier to





SAWING THE CREST RAIL GROOVE



Plow a groove in the crest rail *(above). A two-sided box with end caps holds the crest rail at a fixed angle to the blade and provides a flat surface to run against the fence. Tenons on the ends of the crest rail fit snugly in mortises in the end caps (right), which are screwed to the crest rail and to the two sides of the box.*

take a little off the back of the post than it is to sand down the whole rail.

Build a box to groove the crest rail— I needed to cut ¾-in.-wide by 1½-in.-deep grooves at 10° along the entire length of both round crest rails to accept the headboard and footboard panels. This required some creative thinking. My solution was to drill centered ½-in.-deep by 2-in.-dia. mortises in two 4-in.-sq. end caps and slip the caps over the tenons on the crest rail. I set the whole thing flat on the tablesaw and outfeed table and connected the end caps with two pieces of scrap—one on the side to run against the fence and another on the top to keep the jig from racking (see the photos at left). Screws through the end caps keep the crest rail from rotating while being cut. Remember to keep screws away from the area being grooved.

I laid out the location of the groove on the end cap, put the ¾-in. dado set on the saw and adjusted its height and angle. I set the fence to align with the marking on the end cap and ran the entire unit through the blade. Only one end cap had to be removed to repeat the operation with the second crest rail.

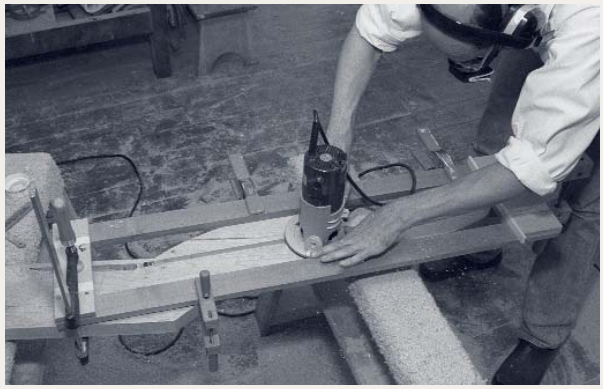
With the dado in place and already tilted, I cut the identical groove in the tops of the head and foot rails. Remember that head and foot panels tilt out from the bottom rails and, unlike the crest rails, cannot be reversed. Think before you cut.

Sized stick provides layout lines for head- and footboard panels— The next trick is to lay out the grooves for the headboard and footboard panels on the inside faces of the posts. To do this, I used a stick to align the grooves that were already in the crest and lower rails. I set one of the posts face down on a pair of low sawhorses and placed both the lower rail and crest rail in position. The top outside edge of the lower rail should meet the junction of the curved and the flat back sections of the post. This is essential if the molding is to align all the way around the bed.

I placed a straight stick, precisely ¾ in. wide and about 29 in. long, into the crest rail groove and turned the crest rail until I could drop the stick into the groove in the bottom rail. Perfect alignment. I marked the post on both sides of the stick, then removed it (see the photo at left on the facing page). Without shifting the crest rail, I marked inside the grooves so I'd know where to stop the groove.

I routed all four posts, using the same router fixture as before. To position the fixture, I cut a scrap so it fit perfectly between the two

LAYING OUT AND ROUTING THE SIDES



***Lay out the headboard and footboard panel grooves** (left). To guarantee alignment, cut a piece of scrap to fit between the crest and bottom rail grooves; then mark both sides of it.*

***Position routing fixture** (top). A piece of scrap as long as the space between the fences aligns the routing fixture. Marks indicating the width of the bit are lined up with the groove lines near both ends of the fixture. Then the fixture is clamped to the post.*

***Rout headboard and footboard panel grooves** (bottom). The author makes two passes with a 5/8-in.-wide bit, one at half depth and one at full depth. He makes one cleanup pass with a 3/4-in.-wide bit.*

fences, marked a 3/4-in.-wide section at its center and moved the fixture around until the marking on the scrap matched the marking on the post at both ends of the groove (see the top right photo). As before, I took two passes with a 5/8-in.-dia. bit and a final cleanup pass with a 3/4-in.-dia. bit for each 1/2-in.-deep groove (see the bottom right photo). I squared the ends of the grooves with a chisel.

Now the headboard and footboard assemblies can be dry-fitted. I cut the headboard and footboard panels to size (28 1/2 in. by 61 1/2 in.) and sanded both sides of both panels to 320-grit. Because the whole unit is so large and unwieldy, I first dry-fitted each edge of the panels in its respective groove and then dry-assembled the entire unit. I disassembled it, finished sanding the posts and eased all the sharp edges with a block plane.

Sizing side rails and adding hardware

To determine the length of the side rails, I laid one foot post and one head post down so the inside faces of the end rails would be 80 1/2 in. apart (enough space around a standard queen-size mattress or box spring for sheets and covers). The distance from the inside face of the end rail to the inner edge of the post was 5 1/4 in., so I subtracted twice that from 80 1/2 in. and cut the side rails 70 in. long.

Hardware for a bed this large proved to be difficult to find. I fi-

INSTALLING BED FASTENERS

Lay out mortises for bed fastener hardware. *Clamp all four legs together with their feet flush, and use a marking knife to get a crisp line.*

A couple of taps eliminate slop. *Because two bands of molding ring the bed, the posts and side rails have to be absolutely flush. The author used a center punch to eliminate all play in the bed fasteners.*

nally located some heavy-duty, zinc-plated knockdown bed fasteners in the Whitechapel catalog (800-468-5534). I ordered eight pairs, two for each rail end, because this is such a heavy bed.

To mark out the bed fastener locations, I clamped all four posts together with feet flush at the bottom (see the photo at left). This ensured that all eight mortises would line up precisely. For accuracy, I used a knife to make the scribe lines. Then I transferred those lines to the ends of the side rails and marked the top edge so that the rails couldn't be flipped upside down. The rails took the pin part of the fasteners; the slotted plates were fitted to the posts.

I did all the mortising on a horizontal mortiser, transferring the scribe lines from a bedpost to the fence of the mortising table. Then I set my stops and proceeded to cut. Because the bed hardware was about ⅞ in. wide, I used a ½-in. bit. I flipped the posts and rails over to make two overlapping cuts, which ensured a centered cut. Next I squared the ends of all 16 shallow mortises with a chisel and marked and mortised the deeper slots to accept the rail pins. The routing and inlaying could be done with a router and jig.

Before attaching the hardware, I checked mating pieces for a fit. I noticed about 1⁄32 in. of side-to-side play—very little really, but for this situation, still too much. The hardware had to align the rails perfectly flush with the posts so the moldings would line up. To remedy this situation, I took a metal punch and pounded a dimple on either side of the slots (see the bottom photo at left). It worked perfectly. Absolutely no play. With the hardware in shape, I drilled pilot holes in all the posts and rails and screwed all the bed fasteners into place.

Before gluing anything, I dry-fitted the entire bed to be sure that everything was in order and that the rails were interchangeable. Then I disassembled the bed and sanded all the parts to 320-grit.

Gluing up the head- and footboard assemblies

I set one post flat on a piece of carpet on the floor and another on a sawhorse within reach. I spread glue into the two round mortises for the crest rail and the two long mortises for the lower rail. Then I set the headboard panel into position, leaving a ½-in. gap at both the top and bottom of the groove. The headboard and footboard panels are not glued in; they must be free to expand and contract with seasonal changes in humidity. Holding the panel with one hand, I first slid the crest rail and then the lower rail into their mortises. Then I lowered the opposite post onto the lower rail and manipulated the crest rail into position. Before pounding the post home, I made sure that the headboard was centered in its groove. I pounded the post home, laid the unit gently down on its back and clamped it.

To make sure the panel's edges wouldn't be exposed when it contracted in the winter, I drilled counterbored holes into the posts at midpoint along the groove. I screwed the panels in place and plugged the holes. This ensured that the headboard panel would remain centered between the rails and that they would expand evenly top to bottom. Once both head- and footboard units were assembled, I pinned the tenons of the lower rails and screwed the crest rails through the posts with 2-in. drywall screws, just off center, to reinforce the mortise-and-tenon joint. Finally, I sanded the posts flush with the lower rails where they meet.

Molding and rosettes finish the bed

Before attaching the two bands of molding, I made sure that the rails were firmly seated all the way down in the hangers. It would be embarrassing to have the molding glued on only to have one

Turning rosettes

Reground block plane blade scrapes rosette. *The author ground an old blade into a scraper (right) to make the rosettes for his sleigh bed. To get the correct profile, he reshaped a grinding wheel with a dressing stick. The scraper is used to shape the face of each rosette on the lathe (left).*

A rosette is a great detail on a simple piece of furniture. You can buy rosette cutters for your drill press, but they're expensive, limited to certain designs and diameters, and intended to be used on square blocks for Victorian door and window frames. For this bed, I wanted round rosettes with slightly undercut edges, 3½ in. dia.

My solution was to grind my own lathe tool, a scraper essentially, from a spare block plane blade, as shown in the photo above right. (Don't buy a new one. Short, worn or chipped blades are available at most flea markets or used tool sales.) I honed the back of the blade flat, kerfed a piece of scrap with the bandsaw and screwed the blade to the scrap wood.

Then I screwed a 1½-in.-thick, 4-in.-sq. block of cherry to my 3-in. faceplate on the lathe, set my tool rest in front of it and began turning. I forced the tool straight in with a series of slow, shallow pushes. As I approached full depth, I lightened up on the cuts to reduce tearout. Then I marked the intended diameter and, using a parting tool, turned the square block round. Next, using a diamond point, I undercut the outside shoulder. I stopped the lathe, looked for blemishes and sanded from 100-grit to 320-grit, followed by 0000 steel wool.

I used a parting tool to just score the back edge of the rosette. Then I unscrewed the rosette from the faceplate and bandsawed it across the kerf created by the parting tool. I pared the middle of the back roughly flush and flattened the back of the rosette against the disc on my disc sander. *—C.B.*

section of the rail drop ¼ in. when the box spring was set in place.

Attaching the molding is pretty straightforward, but a few hints are in order. I did the top of the end rails first because it's the most difficult to attach. I fit, mitered, drilled brad holes about 8 in. apart along the center and glued and attached the molding with brads. The molding here is virtually impossible to clamp.

The short pieces of molding across the grain of the posts needed special attention because the post will change slightly in width. My posts were at about 11% moisture content. To allow for some shrinkage, I left about a 3/32-in. gap between this short piece and the side-rail molding. I tacked down this short strip with a brad at either end and one in the middle, and glued about two-thirds of the way from the miter to the end. The side rail moldings were cut to precisely the same length as the rails and glued using spring clamps and bits of molding cutoffs turned upside down to spread the clamping pressure. The procedure was the same for the lower band of molding.

To support the box spring, I marked and routed mortises for short (1¼ in. wide) sections of ¼-in.-thick, 4-in. steel angle iron I had cut for that purpose. I screwed those brackets directly to the side rails.

The crowning touch was attaching the turned rosettes (see the box above). I drilled a 3/32-in. hole into the center of the back of the rosette, tacked in a snipped off piece of 6d finishing nail to center the rosette with the post hole, and glued and clamped the rosette.

The bed was finished with three coats of Tried and True varnish oil (available from Garrett Wade; 800-221-2942). This is the only pure linseed oil on the market, with no additives or driers. It requires a good deal of elbow grease to wipe off, but the build and depth of shine is worth it.

For the record, the bed was completed in 96 hours. □

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Bottom photo: Dennis Griggs