# Garden Bench

## By Jean Bartholome

You've weeded and watered, sprinkled and spaded, and now your garden is a thing of beauty. You deserve a place to relax and enjoy it. The perfect spot is on our classic English garden bench.

**Materials**
Traditionally made of teak, benches like this grace hundreds of parks and gardens, aging beautifully through years of use and weather. Our version is made of white oak, which is almost as decay resistant as teak but less expensive and easier to find. You could also use decay-resistant softwoods such as cedar, redwood and cypress, which are even cheaper than white oak.

The thick legs and rails for this bench are glued up from standard 3/4-in. boards that you can buy at a lumberyard or home centre. Inspect the boards carefully, because they must be flat and straight to be laminated together into a thick sandwich. I prefer to mill my own boards from 1-in.-thick rough lumber, which saves money and guarantees good glue joints.

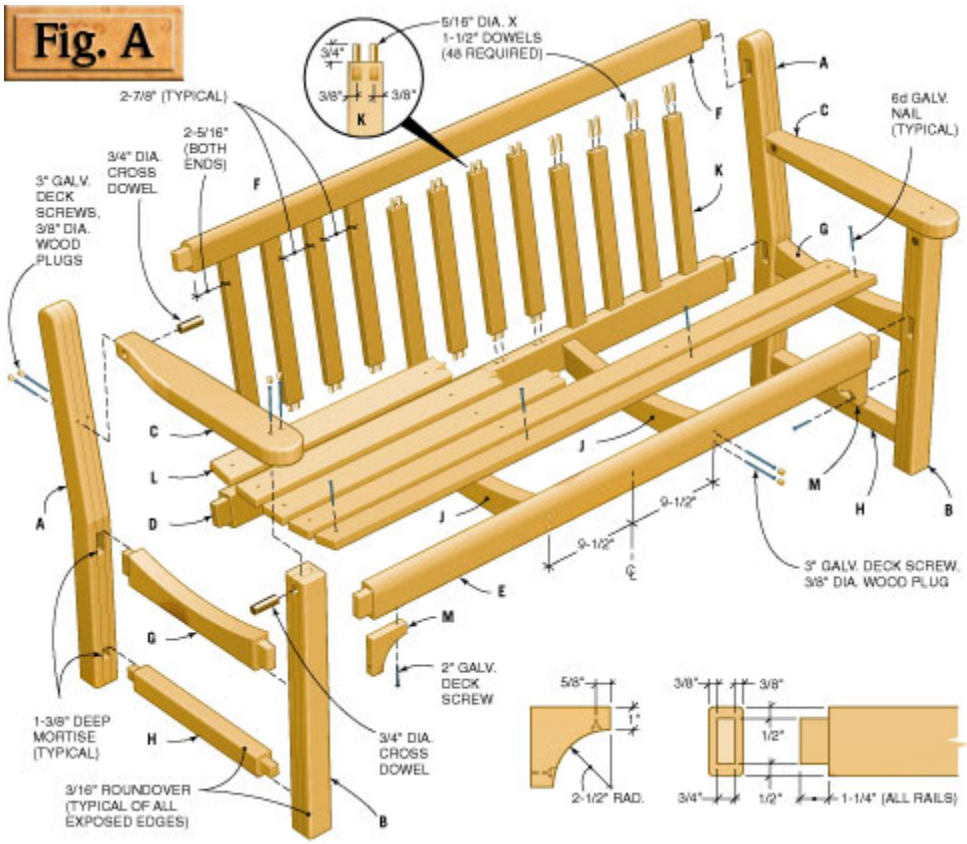
You'll need about 50 bd. ft. of 3/4-in. wood. That's about $150 for white oak and $100 for cedar. If you use rough lumber you'll need about 50 board feet of 4/4 (1-in.) wood. The total lumber cost for rough white oak is about $125.

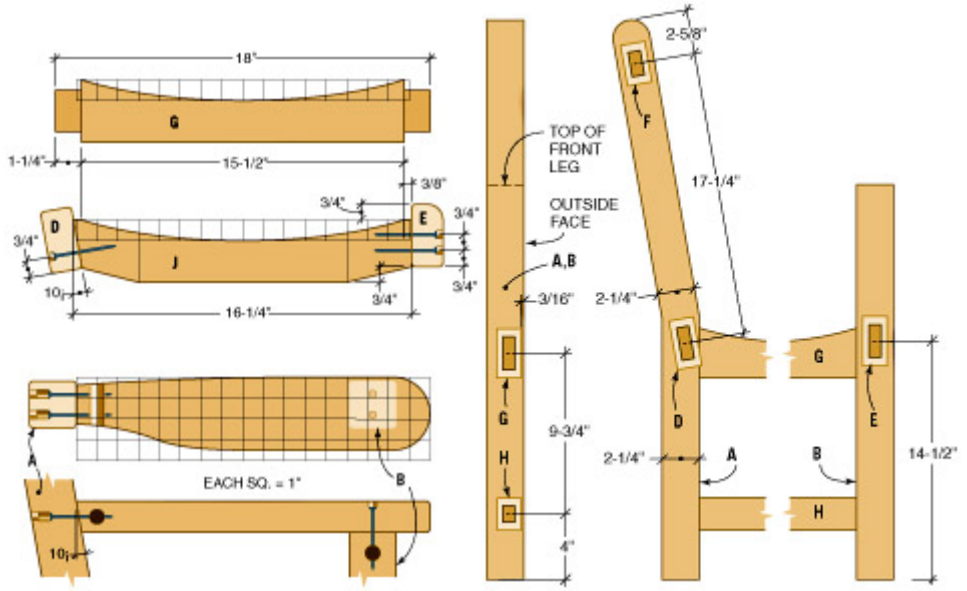
**Tools and Glue**
You'll need a table saw, jointer, band saw, belt sander and a router with a fence. A plunge router is the perfect tool to make the mortises, but you could use a drill and a chisel instead. You'll also need a doweling jig. Accessories required include 3/16-in. and 3/4-in. round-over bits for the router, a 1/2-in.-dia. straight bit, a 3/8-in.-dia. plug cutter and some long pipe clamps.

For assembly, use a water-resistant glue (like Titebond II) or a waterproof glue such as slow-setting epoxy or polyurethane (see

Sources, page 69).

## EXPLODED VIEW OF GARDEN BENCH




| CUTTING LIST<br>Dimensions: 34" H x 62" W x 24" D | | | | |
|---|---|---|---|---|
| **Part** | **Name** | **Qty.** | **Dimensions (TxWxL)** | **Comments** |

| | | | | |
|---|---|---|---|---|
| A | Back Legs | 2 | 2-1/4" x 5-1/4" x 34" | Rough leg blank is made of 3 pieces, 3/4" x 5-1/2" x 42" |
| B | Front Legs | 2 | 2-1/4" x 2-1/4" x 24" | |
| C | Arms | 2 | 1-1/2" x 3-1/2" x 21" | |
| D | Back Seat Rail | 1 | 1-1/2" x 3" x 58" | Length between shoulders is 55-1/2" |
| E | Front Seat Rail | 1 | 1-1/2" x 3" x 58" | |
| F | Top Rail | 1 | 1-1/2" x 2-1/2" x 58" | |
| G | Upper Side Rails | 2 | 1-1/2" x 3" x 18" | Length between shoulders is 15-1/2" |
| H | Lower Side Rails | 2 | 1-1/2" x 2" x 18" | |
| I | Seat Supports | 2 | 1-1/2" x 3" x 16-1/4" | |
| J | Back Slats | 12 | 3/4" x 1-1/2" x 14-1/2" | |
| K | Seat Slats | 5 | 3/4" x 2-1/2" x 60" | |
| L | Braces | 2 | 3/4" x 3-1/2" x 3-1/2" | |
| M | Cross Dowels | 4 | 3/4" dia. x 2-1/2" L | Walnut |
| **Materials:** White Oak | | | | |

## Making the Legs & Rails

**Complete plans for a sturdy lawn seat made from 3/4-in. lumber**

### Making the Legs

Thick white oak is expensive and prone to internal checking in the kiln-drying process, so it's both economical and smart to build up the legs from three pieces of thinner wood. You can get two legs from one lamination (Fig. B). Be sure to use plenty of clamps, ideally no more than 6-in. apart (Photo 1).


**BUILD UP THE LEGS from three pieces of 3/4-in. lumber. Apply the glue with a paint roller and have plenty of clamps on hand. Align the three boards so the grain along the edge runs in the same direction. This makes jointing the laminated leg much easier.**

Scrape off the dried glue

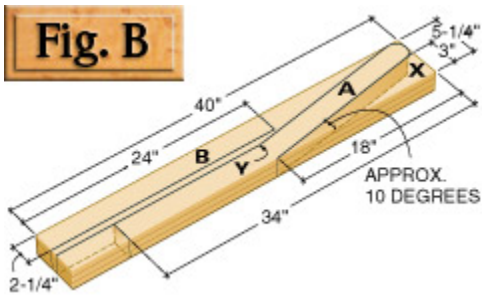
along one edge of the laminated leg blank and joint the edge straight and square. A jointer works best, but you can also use a straightedge and a router (See Q&A, page 8). Rip the leg blank to size and trim the ends, then saw out one back leg and one front leg (Fig. B). Clean up the rough band sawn surfaces with a jointer and belt sander.

Mortise the front and back legs for the side rails using a plunge router, a template guide and Template A (see "Mortising with a Plunge Router and Template," page 70 and Fig. D). You'll cut the front and back rail mortises later, after the sides of the bench are glued up. Note that the front leg is turned so the laminated edges face to the side. That way you won't see the glue lines from the front of the bench. The mortises should be at least 1/8-in. deeper than the tenons in order to leave room or surplus glue and wood shrinkage. Use the same template for mortising opposing pairs of legs (Fig. F).

Round the top of the back legs, round over the edges of all the legs and sand the faces.

**Making the Rails**


**ROUT THE TENONS. Set the fence so the distance between it and the far side of the straight bit is the length of the tenon. Cut all of the front cheeks first, then adjust the router's depth of cut on the back cheeks until you have a perfect fit into the mortise.**




**LAYOUT OF FRONT AND BACK LEGS**
**Mill the leg blank to dimension, then lay out the legs. Remove waste piece X first, then joint the rough band sawn face of the leg. Set the fence of your band saw to the width of the leg (or clamp a board on your band saw table) and rip the back leg starting at both ends of the blank and stopping at point Y.**

Laminate each rail from two pieces of 3/4-in. lumber that are at least 1-in. longer and 1/4-in. wider than the rail's final dimensions (see Cutting List, page 69). Cut all the rails to size. Note that their lengths include both tenons. Make the tenons with a router equipped with a fence (Photo 2 and Fig. A, Tenon Detail). Cut the tenons to width with a handsaw or on the band saw. Round the corners of the tenons with a rasp so they'll fit into the rounded holes left by the plunge router.

Saw the seat curves on the top edges of the two upper short rails (Fig. A, Detail of Seat Rail and Support). Clamp them together, then smooth the curves with the nose of your belt sander. Round over the edges of all the rails and sand the faces.

## Making the Legs & Rails

**Complete plans for a sturdy lawn seat made from 3/4-in. lumber**

## Making the Legs

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Scrape off the dried glue along one edge of the laminated leg blank and joint the edge straight and square. A jointer works best, but you can also use a straightedge and a router (See Q&A, page 8). Rip the leg blank to size and trim the ends, then saw out one back leg and one front leg (Fig. B). Clean up the rough band sawn surfaces with a jointer and belt sander.

Mortise the front and back legs for the side rails using a plunge router, a template guide and Template A (see "Mortising with a Plunge Router and Template," page 70 and Fig. D). You'll cut the front and back rail mortises later, after the sides of the bench are glued up. Note that the front leg is turned so the laminated edges face to the side. That way you won't see the glue lines from the front of the bench. The mortises should be at least 1/8-in. deeper than the tenons in order to leave room or surplus glue and wood shrinkage. Use the same template for mortising opposing pairs of legs (Fig. F).


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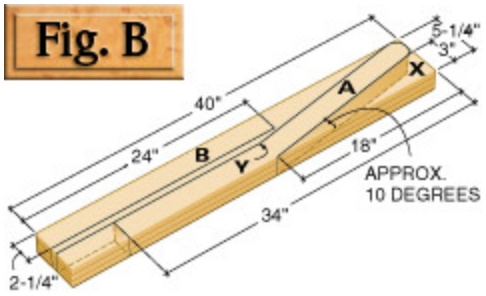
Round the top of the back legs, round over the edges of all the legs and sand the faces.

## Making the Rails

Laminate each rail from two pieces

of 3/4-in. lumber that are at least 1-in. longer and 1/4-in. wider than the rail's final dimensions (see Cutting List, page 69). Cut all the rails to size. Note that their lengths include both tenons. Make the tenons with a router equipped with a fence (Photo 2 and Fig. A, Tenon Detail). Cut the tenons to width with a handsaw or on the band saw. Round the corners of the tenons with a rasp so they'll fit into the rounded holes left by the plunge router.

Saw the seat curves on the top edges of the two upper short rails (Fig. A, Detail of Seat Rail and Support). Clamp them together, then smooth the curves with the nose of your belt sander. Round over the edges of all the rails and sand the faces.




**LAYOUT OF FRONT AND BACK LEGS**
**Mill the leg blank to dimension, then lay out the legs. Remove waste piece X first, then joint the rough band sawn face of the leg. Set the fence of your band saw to the width of the leg (or clamp a board on your band saw table) and rip the back leg starting at both ends of the blank and stopping at point Y.**

## GLUING UP & MORTISING THE SIDES

**Gluing Up and Mortising the Sides**
Glue up each side of the bench, less the arms. After the glue is dry, use Template B (Fig. E) to rout the mortises in the back legs for the long rails (Photo 3). It's best to cut these mortises after assembling the sides because several pairs of mortises meet in the centre of a leg. If you were to cut all the mortises at once, before assembling the sides, you'd have to chop away part of a tenon by hand in order to fit the long rails.

Mark the centre of the front rail's mortise on the front leg (Fig. A, Location of Mortises). Then centre the large window of Template B on the mark and rout the mortise (Photo 4).

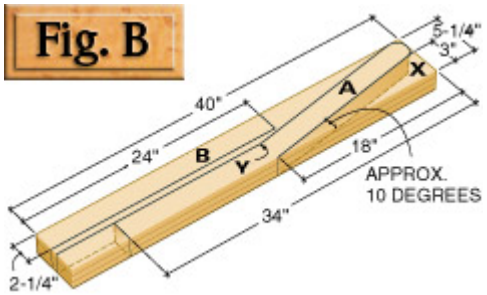
**Fitting the Slats, Arms and Seat Supports**
Now that you've made the major components of the bench, clamp them all together without glue. Then cut the remaining bench pieces to


**ROUT MORTISES into the back leg with Template B. A template guide fixed to the base of the router follows the window in the template (see "Mortising with a Plunge Router and Template," at left). One end of the template is flush with the end of the leg.**

fit.

• Slats: Cut them to fit between the back rails.
• Arms: Cut the end of each blank to fit the angle of your legs (Fig. A, Arm Detail). Then cut out the profile of the arm. Drill holes for the plugs and screws at the front of the arm.
• Seat Supports: Cut the blanks to fit between the front and back seat rails (Fig. A, Detail of Seat Rail and Support). Once they fit tight, slide each seat support over to the end of the bench and trace the curve of the side rail onto the seat support. Remove the board and cut its profile.


**ALIGN THE CENTER MARK inside the template's window with a centre mark drawn on the front leg. Clamp the template to the leg and rout the mortise for the front rail.**

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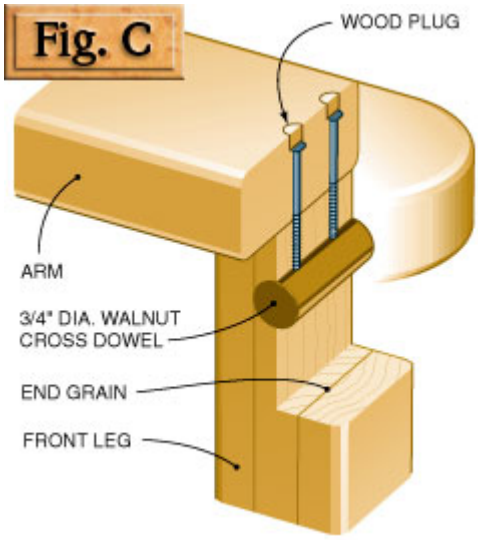



**CROSS SECTION OF SCREWS AND CROSS DOWELS**
**Cross-dowels hold screws that pass through end grain. The side grain of the dowel holds screws better than the end grain of the leg.**

**Dowels made from a dense, decay-resistant hardwood work best. (Birch is commonly available, but rots quickly. Walnut dowel rod lasts longer. White oak is difficult to find.) If the dowel fits fairly tight, don't glue it in place. Gluing the dowel might cause the leg to crack by restraining the leg's seasonal expansion and contraction.**

## MORTISING WITH A PLUNGE ROUTER & TEMPLATE

A plunge router can cut a nearly perfect mortise when it's guided by a wooden template. You'll need a set of template guides that fit into the sub-base of your plunge router (see Sources, page 69). Unlike a bearing, a template guide doesn't spin with the bit. It's a fixed collar that surrounds the bit and travels around the inside of a "window" built into the template (Photo 3).

Aligning the template is quick and easy. You can use its end or a centreline drawn in the window (Photo 4). Clamp the template's fence to a leg and you're ready to go. The fence guarantees that mortises for upper and lower rails line up on a leg. The fence is also removable so you can use both sides of the template. Unscrew the fence, flip the template over and re-attach the fence to mortise the opposite leg (Fig. F).

Good technique and a spiral bit make clean, smooth-walled mortises. Lower the bit about 1/4-in. at a time. Removing a small amount of wood, rather than cutting the whole mortise in one pass, prevents the bit from chattering. An up-cutting spiral bit pulls chips out of the mortise as you cut. Getting the waste out of the way also results in cleaner edges.

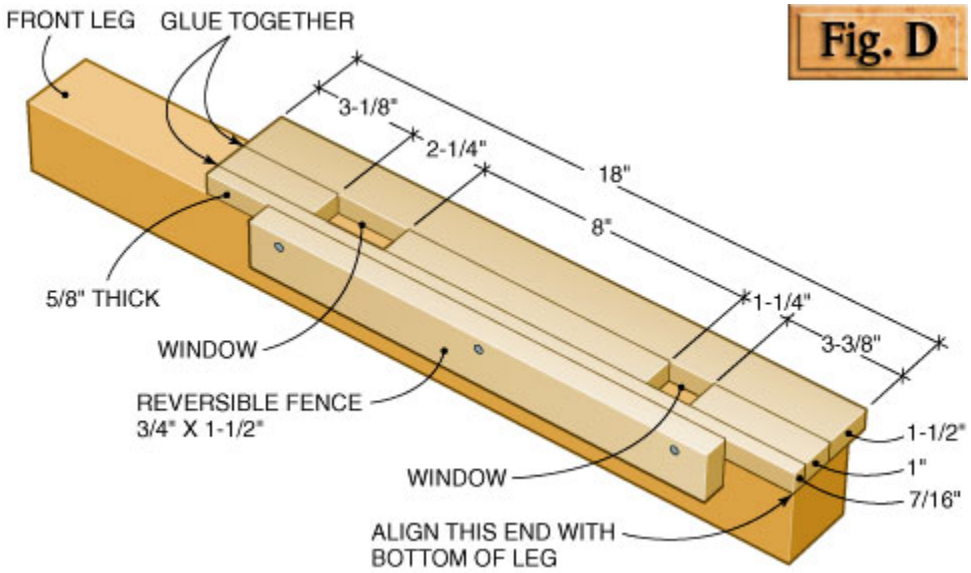



Fig. D

**TEMPLATE A: SIDE RAILS**

**This template is for mortising both the front and back legs with a plunge router. Its dimensions are based on using a 1/2-in.-dia. bit and a 3/4-in. outside dia. (O.D.) template guide. Each window is 1/4-in. longer and 1/4-in. wider than the mortise. See "Tips for Making a Mortising Template," page 71, for instructions on assembling this type of template.**

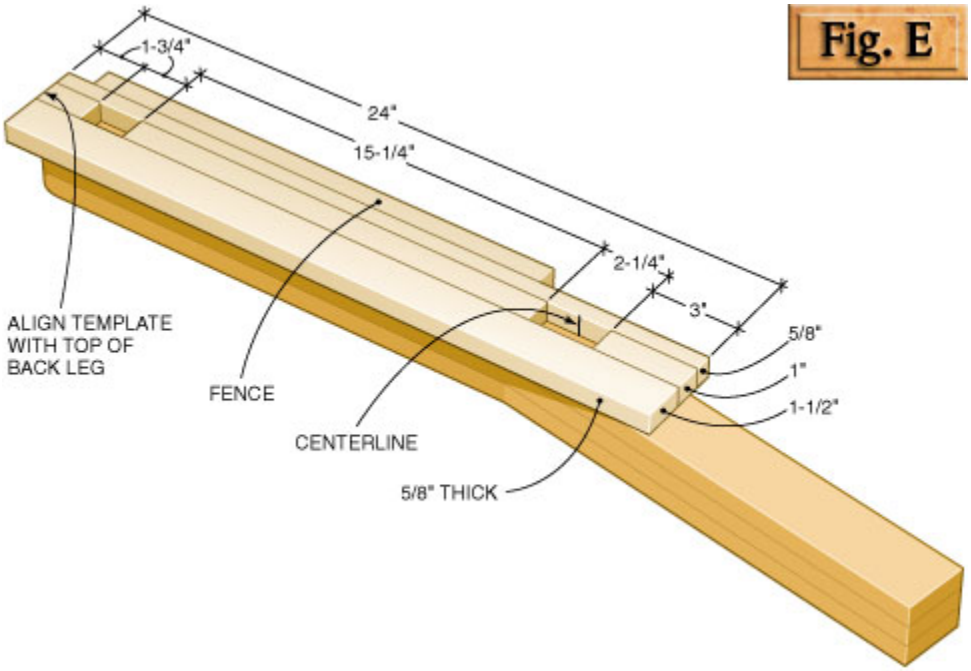
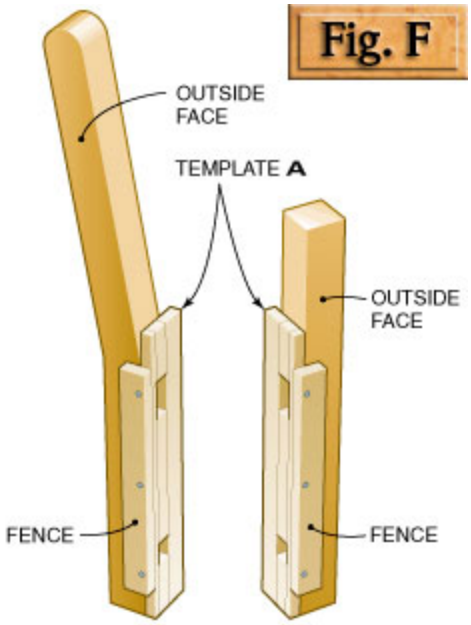



Fig. E

**TEMPLATE B: FRONT AND BACK RAILS**

**Use the same bit and template guide in your plunge router as in Template A. Note that the distance between the fence and the window is greater than that for the other template. Mark a centreline in the large window.**




**MORTISING OPPOSITE LEGS**
**Use the same template for opposing legs, but switch the position of the fence so that it always registers against the outside face of the leg.**

**Tips for Making a Mortising Template**

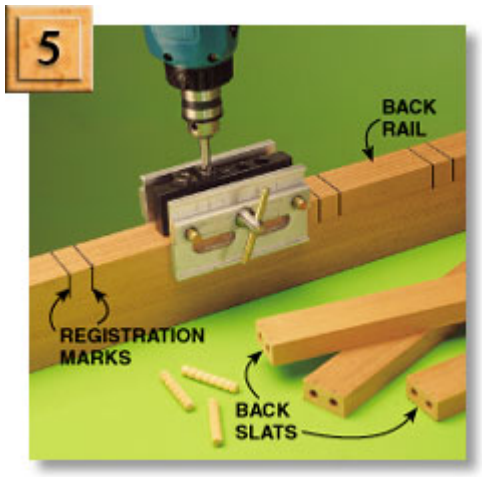
1. Cut all the pieces from 3/4-in.-thick stock.
2. Cut short pieces the length of the windows to act as spacers.
3. Use a minimal amount of glue to assemble the template, but don't glue the spacer pieces. Wax their edges so they won't get stuck.
4. Put a long clamp across the length of the section that includes the spacer pieces. This keeps them from shifting. Then clamp across all three sections.
5. Remove the spacers once the glue is set.
6. Joint and plane the template to 5/8-in. thick.
7. Screw on the fence.

## Final Assembly

**Assembling the Back**
Take the bench apart and drill dowel holes in the slats and rails (Photo 5 and Fig. A). Round over the slats and seat rails. The front seat rail and the top rail have large, 3/4-in. round-overs for comfort. Take it easy with the large round-over bit when you shape the rails. Make three passes, lowering the bit each time until you form the complete profile.

Glue up the back rails and slats as one unit. With so many pieces going together at once, you'll probably need a helper. Sight down your assembly to make sure there's no twist to it and place a straightedge across the ends to make sure the rails line up. Your back should be a perfect rectangle, not a parallelogram. You can clamp the assembly, without glue, between the ends of the bench before you clamp the slats to the rails. This helps make the back square.

Glue the whole bench together (Photo 6). Glue and screw the two corner brackets between the front rails and legs (Fig. A,




**DRILL DOWEL HOLES with a jig. Drill the slats first, then clamp the two back rails together and transfer the registration marks from the slats to the rails.**

Brace M).

**Strengthening the Arm Joints**
Use cross dowels to strengthen the arms (Fig.C). Arms take a lot of abuse in a large piece of furniture. After all, how will you move such a heavy bench around the yard? You'll pick it up by the arms. That puts a lot of strain on a fairly weak, screwed joint. Cross dowels reinforce the joint.

To locate the holes for the cross dowels, clamp the arm in place. Insert screws into the clearance holes in the back leg and front of the arm, then sight down the screws to judge where your dowels should go. Drill the holes and insert the dowels.

**Final Assembly**
Insert the seat supports and drill pilot holes. Use an extra-long twist bit (see Sources, page 69) for these long screw holes so you don't have to remove the seat supports to drill them. Lubricate your screws with soap and drive them in. Glue in wood plugs over the screws. Install the arms the same way.

Install the seat slats. You can use galvanized nails or stainless steel screws, which won't need plugs to cover them. If you're building in white oak, you must pre-drill holes for the nails.

Finish your bench with an outdoor oil, if you wish, but count on renewing the finish every few years. White oak doesn't require a finish, however. It will slowly turn a beautiful silver-grey.


**GLUE THE BENCH with long clamps. To extend the length of short pipe clamps you can join two pipes together with a threaded coupler (available at the hardware store) or hook two clamps together, as shown here.**


## Epoxy for Loose-Fitting Joints

Rats, my template slipped while routing this mortise! I've put a lot of work into making the leg so far, and I'm not about to throw it away and start over. I can rescue the leg and the poorly fitting joint by using slow-setting epoxy glue, which fills gaps like nobody's business. The five-minute epoxy you'll find at the hardware store sets up way too fast. My favourite kind, G-2 by System III Resins, gives me at least a half-hour open time. I mix an anti-sag thickener with the glue so it won't leak out of the joint (see Sources, page 69).