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A Portable Folding Bench for Two



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A Portable Folding Bench for Two

Imagine this scenario: Your team has just scored its twenty-seventh run and it's still the bottom of the sixth. Most of the fans have been sitting on damp grass for over two hours already. No, this isn't a bad day in the majors — it's infinitely worse: We're parents at Tuesday night T-ball, and it's a double header.

Actually, as every parent really knows, T-ball is great fun. In fact, the only true downside to a long evening of spectating is those horrible chairs — you know the ones — flimsy nylon contraptions that fold up, usually while you're still in them! What we need is a comfortable bench that can hold two weary parents and still fit in the trunk after the game. Well, you're in luck, because that's exactly what this project is — a light-weight, strong, weather-resistant bench that, when folded and stored, protrudes a mere 3" from the garage wall or trunk floor.

The inspiration for this bench came from a similar design that dates from the early 1940s. It was made of weather-resistant white oak, so that's the species we're using for this project.

Building the Seat

The best way to get started on this project is to cut all the parts to the sizes given in the *Material List* on page 149, then

begin the milling process by working on the seat subassembly. The two seat supports (pieces 1) are shaped pieces, and their profile can be found in the *drawings* on page 151. Cut them to shape on your band saw, then clean up the kerf marks with a drum sander in the drill press.

Stay at the drill press to bore holes for the pivot hinges (pieces 2) and the dowel stretcher (piece 3) at the locations given on the *drawings*, noting the holes for the hinges step down from 1" in diameter to 1/2", requiring a change of bits (see *Figure 1*). Now turn your attention to the seat slats (pieces 4). Four of the five slats are simply rounded over on their top edges with a 1/4"-radius router bit, then screwed in place (see the *drawings* for locations and spacing).

Counterbore for the short screws (pieces 5) with a 3/8" Forstner bit: These will later be filled with oak plugs (pieces 6), to protect your family from sun-heated screw heads. Drive the screws home, but don't use

any glue yet. You'll remove the slats during the assembly process.

The fifth and middle slat is rabbeted on each end (prior to rounding over the top edges) so the back legs have room to pivot (see *drawings* on page 149). You can cut

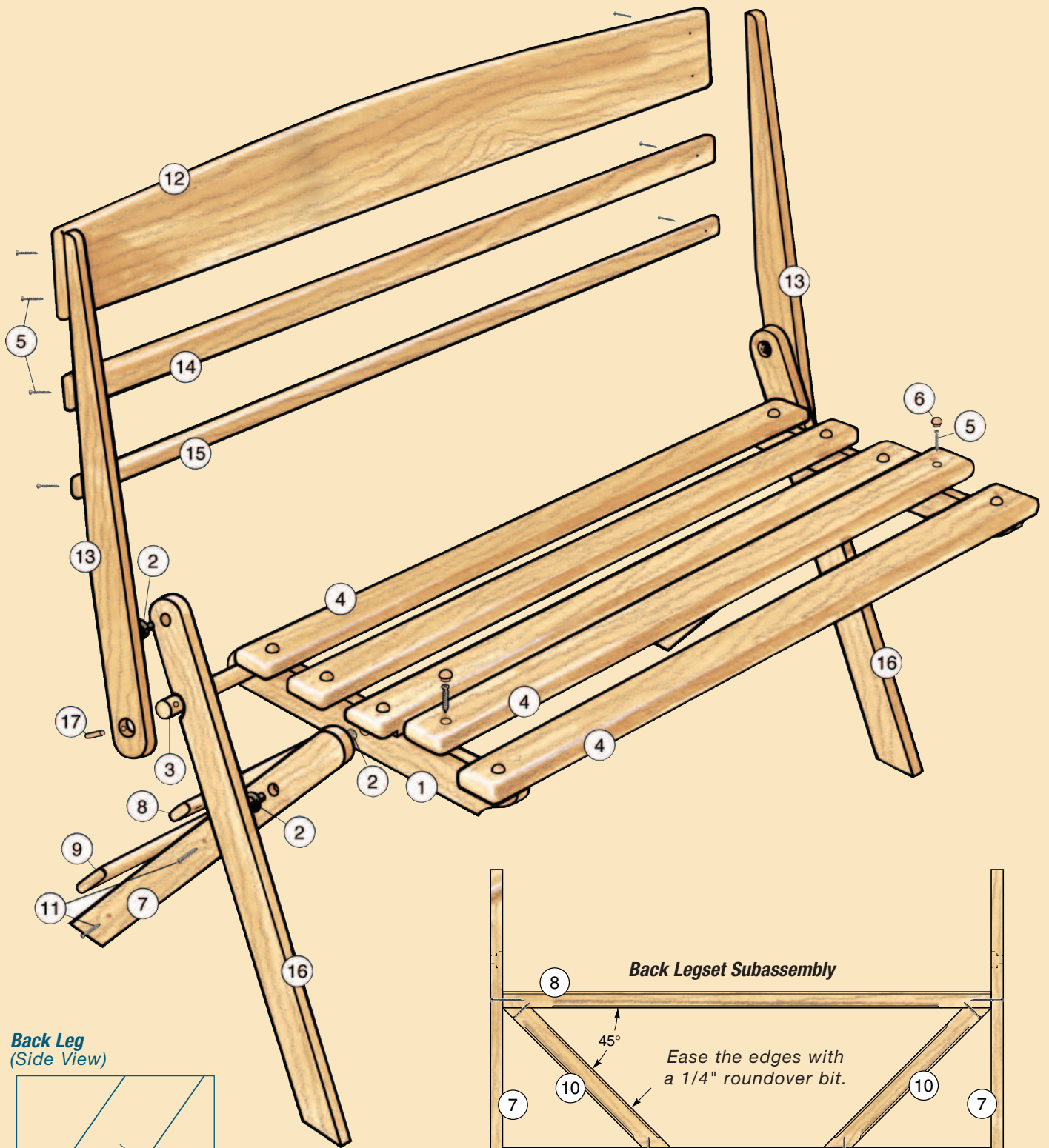


Figure 1: The holes in the seat supports for the pivot hinges are drilled in two stages, changing from a 1" bit to a 1/2" bit.

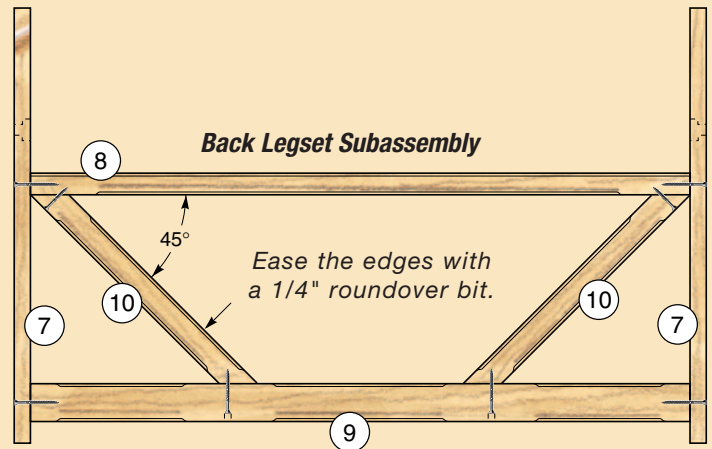
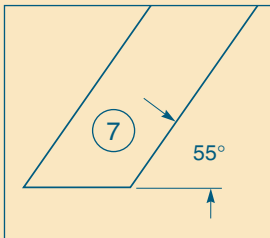


Figure 2: Various elements of the back leg assembly are rounded over with a 1/4"-radius router bit. These cuts are stopped.

Bench Exploded View

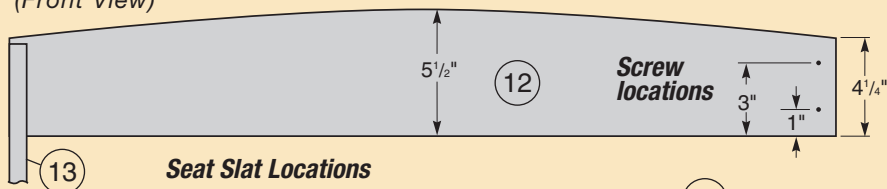


Back Leg
(Side View)

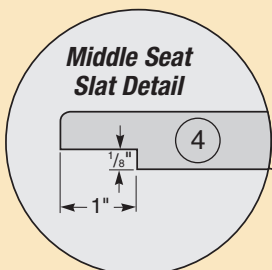
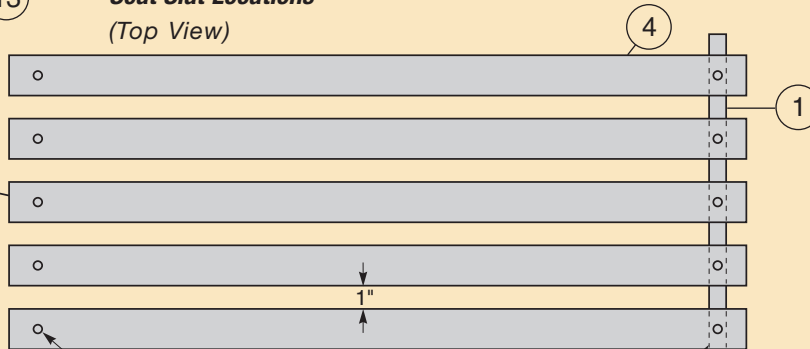


To draw the profile on the backrest top rail (piece 12), clamp a strip of hardboard at each end, then flex the strip in the middle to create a nice even curve.

Backrest Top Rail
(Front View)



Seat Slat Locations
(Top View)



Cap the screws with hardwood plugs or buttons.

The seat support is flush with the front slat.

Use a weather-resistant adhesive like Gorilla Glue or Titebond II when gluing up this subassembly.

MATERIAL LIST

	T x W x L
1 Seat Supports (2)	3/4" x 2" x 13 3/4"
2 Pivot Hinges Pair (3)	Weatherproof
3 White Oak Stretcher (1)	1" x 36" Dowel
4 Seat Slats (5)	3/4" x 1 3/4" x 32"
5 Short Screws (20)	#8 x 1 1/2"
6 White Oak Plugs (10)	3/8"
7 Back Legs (2)	3/4" x 2" x 20 7/8"
8 Back Legset Top Rail (1)	3/4" x 1" x 30 7/8"
9 Back Legset Bottom Rail (1)	3/4" x 1 3/4" x 30 1/2"
10 Diagonal Braces (2)	3/4" x 1 1/4" x 13 5/8"
11 Long Screws (6)	#8 x 2 1/2"
12 Backrest Top Rail (1)	3/4" x 5 1/2" x 35 7/8"
13 Backrest Stiles (2)	3/4" x 2" x 22"
14 Backrest Middle Rail (1)	3/4" x 1 1/4" x 35 7/8"
15 Backrest Bottom Rail (1)	3/4" x 3/4" x 35 7/8"
16 Front Legs (2)	3/4" x 2" x 23 3/8"
17 Retainer Pins (2)	1/4" x 1" Dowels

these rabbets on your table saw with a dado head, using the miter gauge to keep the cuts square to the end of the slat. Now secure this final slat to the seat supports with the same screws.

Making the Back Leg Subassembly

This subassembly is made up of the two back legs (pieces 7), two rails (pieces 8 and 9) and a couple of diagonal braces (pieces 10). Create a radius on the top of each leg with your band saw (see *Elevation Drawings*, page 151) and sand it smooth. Cut the 55° miter on the bottom of each leg using a table saw with the miter gauge set at 35°. A similar setup can be used to create



Figure 3: Installing the weather-resistant pivot hinges is a simple matter of lining up the two sides of each hinge and bolting them together.

the 45° miters on both ends of the braces.

Drill 1/8" pilot holes through the bottom rail (locations are on the *drawings*), then counterbore for the heads of the long screws (pieces 11). Dry-fit the braces to the bottom rail and extend the pilot holes with a 3/32" bit. Apply Titebond® II or a similar water-resistant glue to the joint and drive the screws home.

Attach the top rail to the braces in much the same fashion, only this time use the short screws. Be careful that your pilot holes follow the *drawings* exactly, as there is little room for error here. Now drill countersunk pilot holes through the legs and glue and screw them to the rails. Make sure this subassembly is perfectly flat, and set it

aside to dry. Once the glue has dried, round over all the areas shown on the *drawings* using a 1/4" roundover bit in your router table, as shown in *Figure 2* on page 147.

Assembling the Backrest

Cut the profile on the top edge of the backrest's top rail (piece 12) according to the *Backrest Top Detail Drawing*, page 149, then sand it smooth. Round over both the top and bottom edges with the same 1/4" router bit you used on the seat and legs earlier, then drill 1/8" pilot holes at the locations shown on the *drawings*. Countersink these holes on the rear face of the top rail, then turn your attention to the two backrest stiles (pieces 13). These are also shaped pieces, and their profiles can be found on the *drawings*. Cut them on the band saw, round over the areas indicated (use the 1/4"-radius bit), and then break all the other edges with sandpaper. Use the pattern to locate the holes for the dowel and pivot hinges and drill them on your drill press. Be aware of the stepped nature of the pivot hinge holes as well as which side is drilled with the larger bit (see *sidebar*, this page).

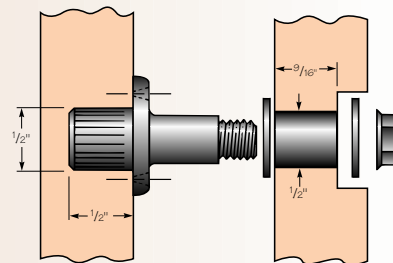
Clamp the top rail to the stiles, then extend the pilot holes with a 3/32" bit, apply glue and drive the screws in snug.

At this time you can also round over the two lower rails (pieces 14 and 15) and drill countersunk pilot holes in them. But don't attach them to the uprights yet — you'll see why during the next assembly step.

Moving to the Front Legs

The front legs (pieces 16) are simply cut to shape on your band saw and sanded (see the *Elevations* on page 151). Miter their bottom ends on the table saw. You'll have to drill each leg in two locations for the pivot hinges (refer to the *drawings* for locations), then you're ready to try a dry assembly on the whole project. The pivot hinges are the key to this assembly process, so let's take a closer look at them.

INSTALLING PIVOT HINGES



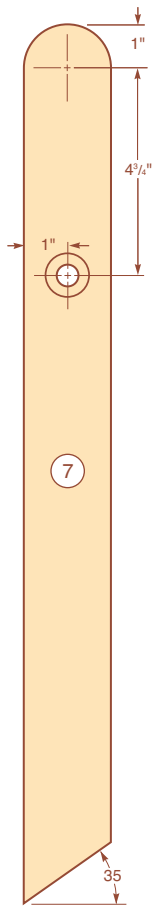
Install the main, knurled section of the hinge (the piece on the left) into a stopped boring in the first piece of wood. Slide on a washer and the plastic sleeve, then insert the threaded end into the 1/2"-diameter boring in the second piece of wood. Secure it with a second washer and a nut, both of which are set into a larger counterbore to keep them below the surface of the wood.

Installing the Pivot Hinges

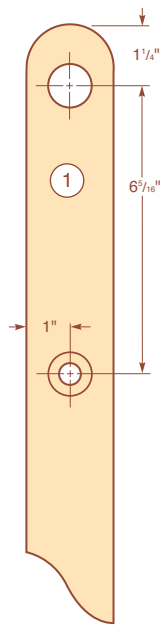
The drawing of the pivot hinge (above) gives you a good idea of how this inexpensive but wonderful piece of weather-resistant hardware works. One end is fixed in place by a combination of knurled teeth and a pair of screws. The other end is threaded, allowing you to secure the second (moving) piece of wood to the fixed piece with a nut. A sleeve placed over the middle of the hinge ensures you don't overtighten the nut, and it also prevents any friction buildup.

With the holes for your hinges already drilled at the locations given in the *Elevations*, you can go ahead and secure all

Back Leg
(Side View)

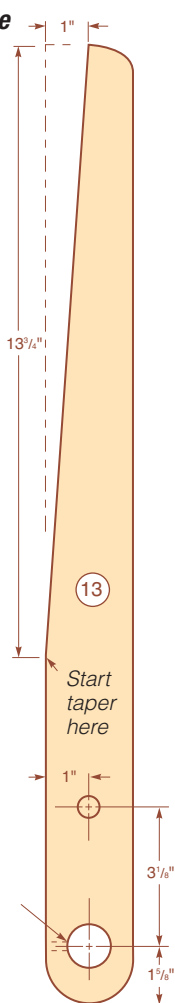


Seat Support
(Side View)

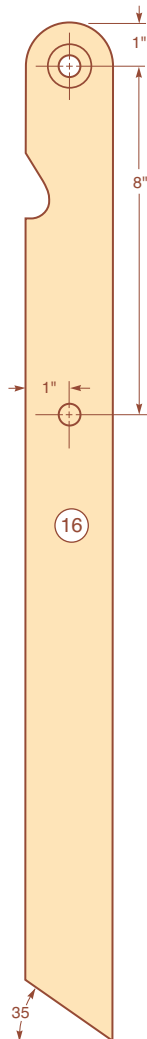


Note: The leg pieces are constructed as mirror images of each other. When facing the bench, the seat support, back leg, backrest stile and front leg (pieces 1, 7, 13 and 16) are on the right. The stepped bores for the pivot hinges are drawn accordingly. The hinges come complete with full instructions and bore dimensions.

Backrest Stile
(Side View)



Front Leg
(Side View)



the knurled ends of the hinges in place. Pre-drill for the screws that come with the hinges to avoid splitting, and locate these screws so they aren't exactly in line with the grain of the wood.

You have already drilled four holes for the stretcher (piece 3), one hole in each seat support and another in each of the backrest stiles. Now chuck a sanding drum in your portable drill and enlarge these holes slightly — enough so the dowel passes freely through them without much play.

Slip the dowel through the holes in the seat supports, then attach the backrest in the same manner. Secure the stretcher in the backrest uprights with retainer pins (pieces 17), glued into holes drilled through both pieces. Attach the back leg assembly next (temporarily remove the screws in the seat slats to do this), then install the spacers, nuts and washers that come with the hinges.

Wrapping Up Construction

Apply waterproof glue to the seat slats and drive the screws home for the last time. Glue oak plugs into the screw counterbores. We used button plugs with domed tops to make sure the rain runs off. Measure diagonally in both directions to verify that the seat is square before the glue dries, and tweak it if it's not. Slip the front legs in place next, then install the spacers, washers and nuts and fold the bench into its closed position.

The last step in assembly is to install the two lower rails of the backrest — the ones you held aside awhile back. The idea is to ensure that the backrest rails fit neatly on either side of the front seat slat when the bench is folded. Instead of relying on the pattern, simply fold the backrest down and position the rails on either side of the front slat. Once they're positioned, drill the pilot holes and countersinks and attach the rails to the stiles with the short screws.

Applying Finish

We wanted this bench to last at least as long as the original — that one was built around World War II — so we sprayed it with exterior polyurethane. With all its slat nooks and narrow parts, this project really lends itself to spraying rather than brushing. If you don't own spray equipment, a couple of aerosol cans will do a respectable job. To avoid exposure to the fumes, spray the bench outside. After all, that's where this handy, lightweight folding bench belongs.