



Advanced Adirondack Chair

This lively interpretation of the classic Adirondack chair emphasizes curves and comfort. Both the seat and the back are shaped to welcome you as you nestle in for a little reading or relaxation. Its high back slats have gently radiused ends, and the generously proportioned arms provide ample room for resting a snack or a cool drink. Building this piece of furniture takes a little time and skill, but the results are worth the effort.

Vital Statistics: Advanced Adirondack Chair



TYPE: Adirondack chair

OVERALL SIZE: 37¹/₄W by 39¹/₄L by 37³/₄H

MATERIAL: Pine

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Chair parts are primed before assembly
- Seat and back assemblies are contoured
- Screws are countersunk, with the holes filled and sanded

FINISHING OPTIONS: Exterior latex primer and paint

Building time



PREPARING STOCK
0 hours



LAYOUT
3-4 hours



CUTTING PARTS
4-6 hours



ASSEMBLY
6-8 hours



FINISHING
3-4 hours

TOTAL: 16-22 hours

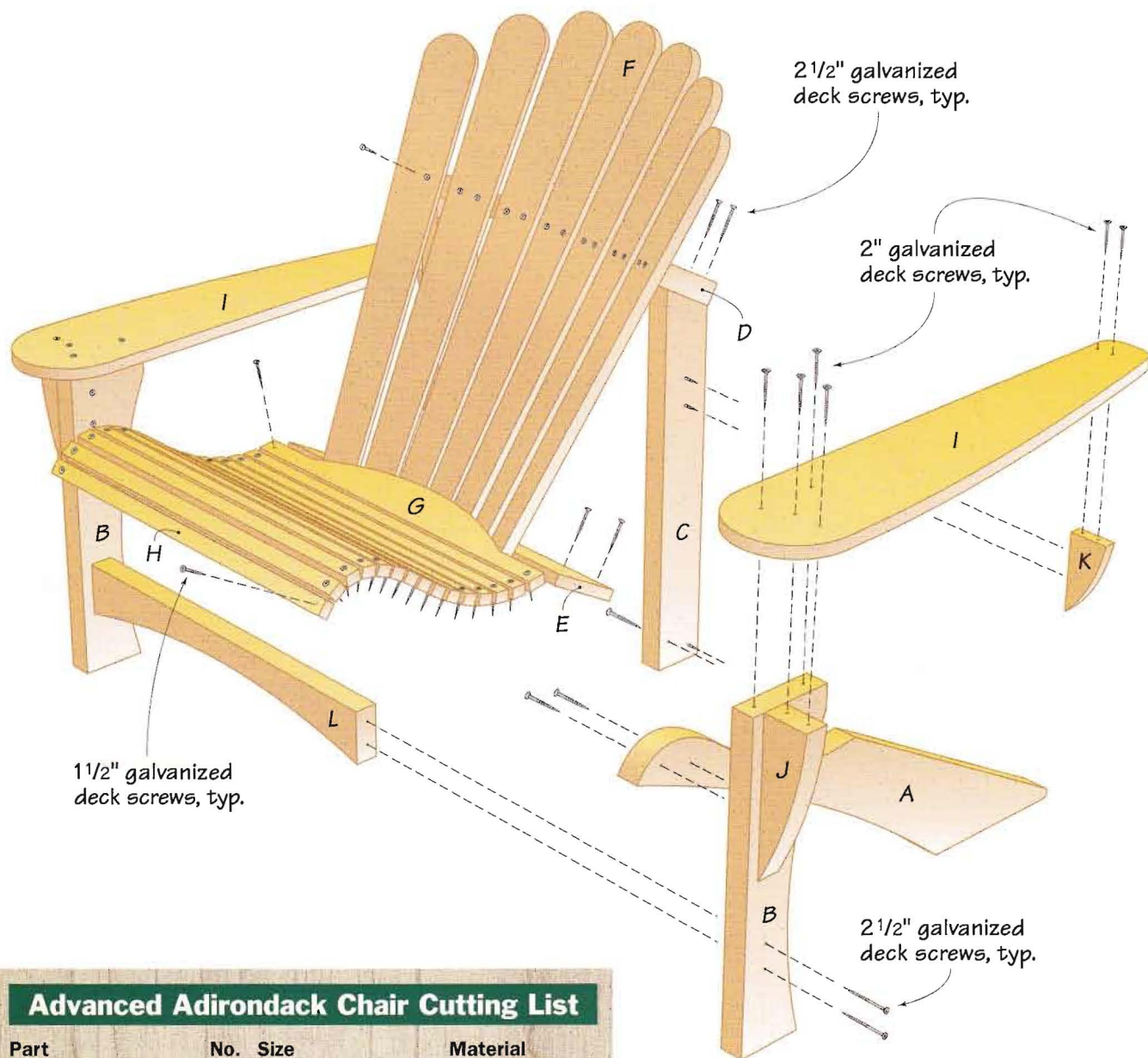
Tools you'll use

- Circular saw
- Table saw (optional)
- Power miter saw (optional)
- Jig saw
- Compass (nail and string) or trammel points
- Drill/driver
- Clamps
- Combination square

Shopping list

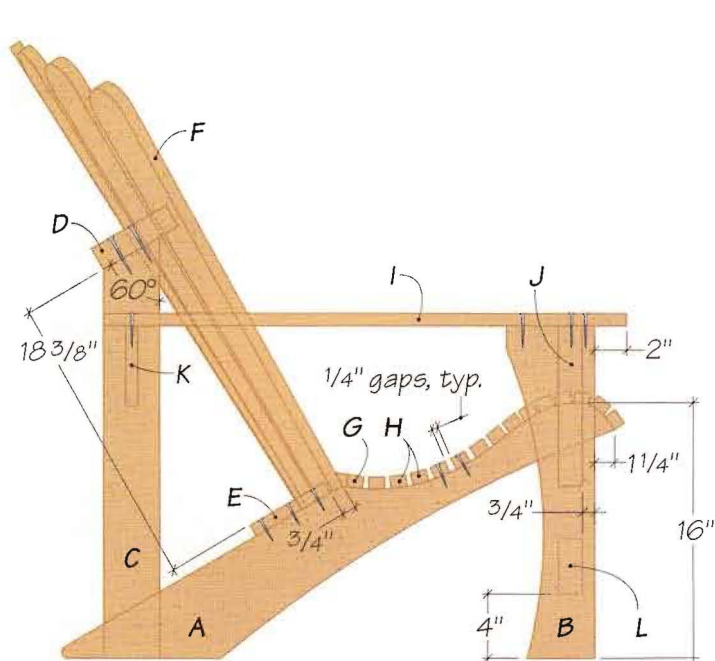
- ☐ (2) 2 × 6 in. × 8 ft. pine
- ☐ (1) 2 × 4 in. × 6 ft. pine
- ☐ (1) 1 × 8 in. × 8 ft. pine
- ☐ (1) 1 × 6 in. × 6 ft. pine
- ☐ (5) 1 × 4 in. × 8 ft. pine
- ☐ Galvanized deck screws (1¹/₂-, 2-, 2¹/₂-in.)
- ☐ Wood or auto body filler
- ☐ Latex primer
- ☐ Exterior latex paint

Advanced Adirondack Chair

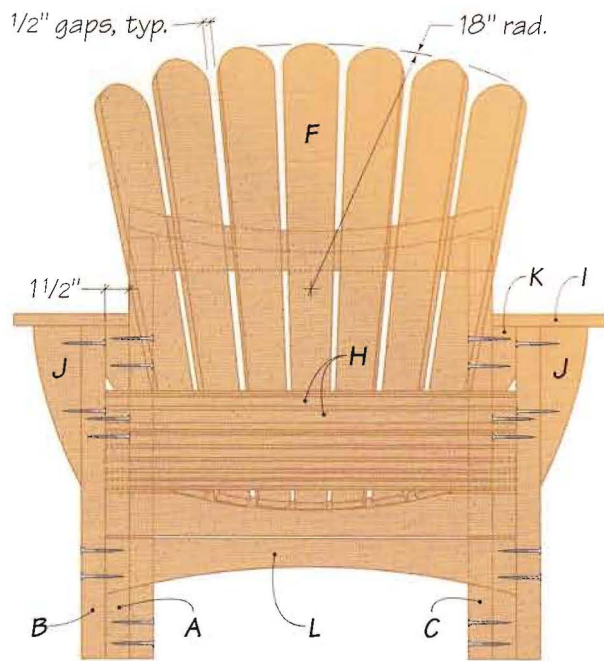


Advanced Adirondack Chair Cutting List

Part	No.	Size	Material
A. Back legs	2	1 1/2 x 5 1/2 x 38 in.	Pine
B. Front legs	2	1 1/2 x 5 1/2 x 20 3/4 in.	"
C. Back supports	2	1 1/2 x 3 1/2 x 26 1/4 in.	"
D. Upper back cleat	1	1 1/2 x 5 1/2 x 22 3/4 in.	"
E. Lower back cleat	1	3/4 x 5 1/2 x 25 3/4 in.	"
F. Back slats	7	3/4 x 3 1/2 x 34 in.	"
G. Shaped seat slat	1	3/4 x 3 1/2 x 25 3/4 in.	"
H. Seat slats	14	3/4 x 1 x 25 3/4 in.	"
I. Arms	2	3/4 x 7 1/4 x 32 3/4 in.	"
J. Front arm brace	2	1 1/2 x 3 x 10 in.	"
K. Rear arm brace	2	3/4 x 2 1/2 x 5 in.	"
L. Stretcher	1	1 1/2 x 3 1/2 x 25 3/4 in.	"



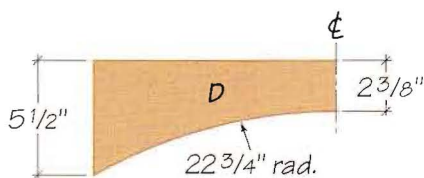
SIDE VIEW



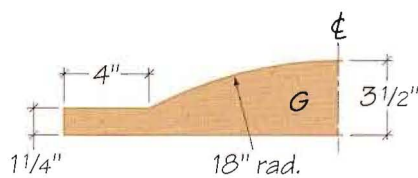
FRONT VIEW



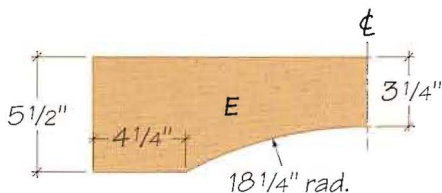
BACK SLATS



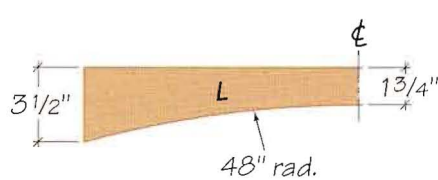
UPPER BACK CLEAT



SHAPED SEAT SLAT



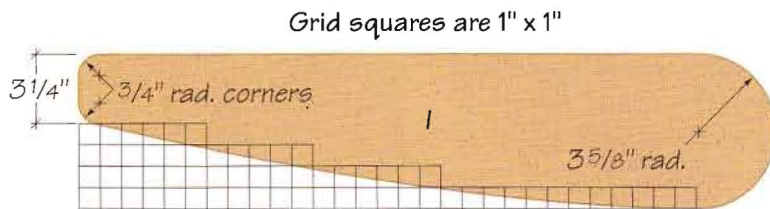
LOWER BACK CLEAT



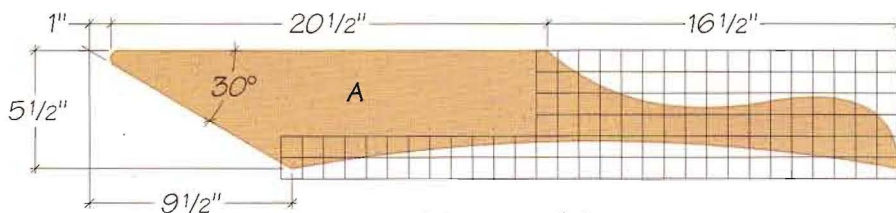
STRETCHER



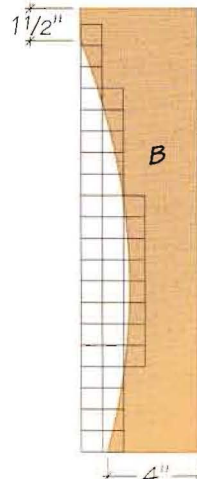
ARM BRACES



ARMS



BACK LEGS



FRONT LEGS

Grid squares are 1" x 1"

Advanced Adirondack Chair: Step-by-step

CUT OUT THE ARMS & LEGS

- 1 Cut pairs of blanks to length for the arms, front legs and back legs as specified on the *Cutting List*, page 16.
- 2 Refer to the drawings on page 17 to construct full-sized templates for the arms, front legs and back legs. Stiff cardboard will work if you plan to build only one of these chairs, but 1/4-in. hardboard is a better choice because the template can be reused again and again. Bend a piece of flexible hardboard to help form the gradual curved profiles when you draw them on the templates. Cut the templates to shape, and smooth the edges as needed.
- 3 Lay the templates on the arm and leg workpieces, draw the shapes and cut out the arms and legs with a jig saw (See Photo A).

MAKE THE BACK SLATS

The chair's back slats taper on both edges along their full length. You could shape the slats by first making a template from 1/4-in. hardboard, tracing the profiles on the slat blanks, and then using a jig saw to cut out the slats. An alternate method is to build a simple clamping jig (See *Clamping Taper Jig*, right), to cut the tapered back slats on the table saw instead. The jig will allow you to make the tapered cuts quickly and produce smooth, flat edges on the slats.

- 4 Cut seven blanks for the back slats to length from 1 x 4 stock. NOTE: *All the slats start out the same length at this stage, but six of the seven will be trimmed to actual length later during chair assembly.*
- 5 Lay out the end radius and draw the tapered edges on the slat blanks, using the *Back Slats* drawing on page 17.
- 6 Cut the tapered edges on the back slats. If you use

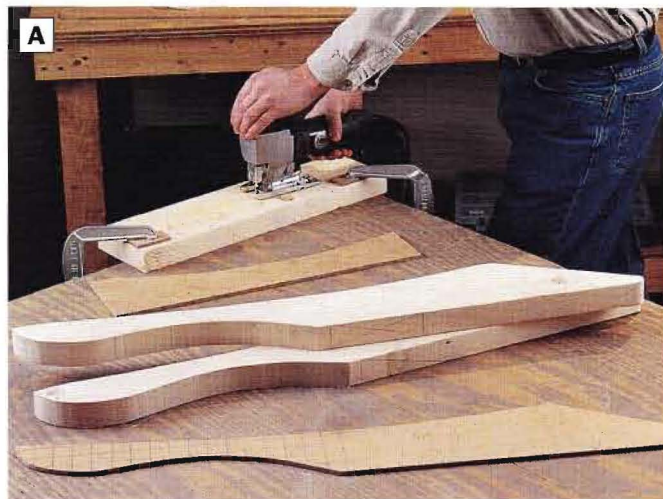


PHOTO A: Make templates for the arms and legs, trace the parts onto blanks for the workpieces and cut the parts with a jig saw.



This clamping jig allows you to make tapered cuts on the table saw using the saw's rip fence as your guide. Build the jig by fastening a piece of 3/4-in. "L"-shaped scrap to a length of 1/4-in. plywood. The thin plywood serves as a base to support the workpieces, and the "L"-shaped piece guides the slats at an angle through the blade. Select the jig base from a piece of plywood longer than your back-slat workpieces. Cut the 3/4-in. stock into an "L" shape, so the long inside edge of the "L" matches the taper angles you'll cut on the back slats. Fasten the jig parts so the back slats rest in the "L" guide, and one cutting line on the slat workpieces lines up with the edge of the jig base. Attach a toggle clamp to the jig to hold the workpieces in place as you cut. Slide the jig along the rip fence with the workpiece clamped in place to make the cuts. Once you cut the first taper, save the angled wastepiece—you'll need it to serve as a spacer for making the tapered cut along the opposite long edge of each slat.

the table saw and jig method for making these cuts, cut one tapered edge on each slat first. To do this, adjust the rip fence on the table saw so the jig rests against the rip fence, and the outside edge of the jig base is flush with the blade. Set the slats into the jig and clamp securely. Slide the jig and workpiece past the blade to make the first taper cuts.

7 Cut the second tapered edge on the back slats. Set one of the scrap wastepieces you made in Step 6 into the crook of the “L” on the jig, and flip each slat over in the jig so the tapered edge you just cut on the slats rests against the “L”. This configuration should align the second taper cutting line on each workpiece with the edge of the jig base for making the second taper cuts. Clamp the slats in the jig and make the taper cuts (**See Photo B**).

8 Cut the radiused ends of the slats with your jig saw. Sand the cuts smooth.

CUT THE REMAINING PROFILED PARTS

9 Cut the front and rear arm braces to size and shape. The exact curvature of the profiles on these parts isn’t critical, but like parts should match.

10 Cut the upper back cleat, the lower back cleat, the shaped seat slat and the stretcher to size and shape. The profiles on these parts are simple arcs of various circles, and the radiuses are specified in the drawings on page 17. To establish the radiuses, first rip- and crosscut blanks for the parts. Clamp each workpiece to your benchtop. Find the centerline of the workpiece and extend the line onto the bench. Measure from the workpiece along the centerline the distance of the radius to establish the centerpoint for drawing the arc. Fashion a large compass by driving a nail into the worksurface at the centerpoint. Attach a string to the nail, and loop a pencil to the string at the appropriate radius. Mark arcs on the workpieces, and cut out the parts.

MAKE THE BACK SUPPORTS & SEAT SLATS

11 Crosscut the back supports to length, and trim the top ends to a 60° angle, as shown in the *Side View* drawing, page 17.

12 Cut the 14 seat slats to size. Rip ¾-in. stock to 1 in. wide on the table saw or with a circular saw. Cut the slats to length. Crosscutting the slats is quick to do with a power miter saw if you clamp a stop to the saw fence. Or you could also use a circular saw.

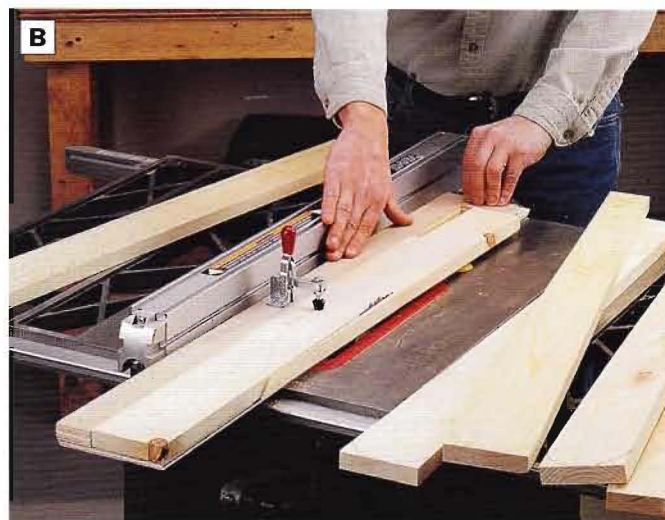


PHOTO B: Cut tapered edges on the back slats. We used a table saw jig for making these angled cuts. Once you’ve cut the first tapered edge, flip the slats over in the jig and cut the second tapered edge.



PHOTO C: Sand the chair parts smooth, and prime all surfaces with exterior latex primer. Primer will seal the wood and provide an even bonding surface for topcoating with paint.

PRIME THE PARTS

Because this chair is intended to remain outside in all kinds of weather and needs to be well sealed, it’s a good idea to prime the surfaces of all the parts at this stage before you begin assembly. Also, since the chair will be assembled with screws but no glue, priming now will not affect glue bonds.

13 Sand and smooth all the chair parts. Prime the parts with latex-based primer (**See Photo C**).

BUILD THE ARM ASSEMBLIES

14 Attach the front arm braces to the outside of the front legs, with the top edges flush. The braces should set back ¾ in. from the front edges of the front legs.

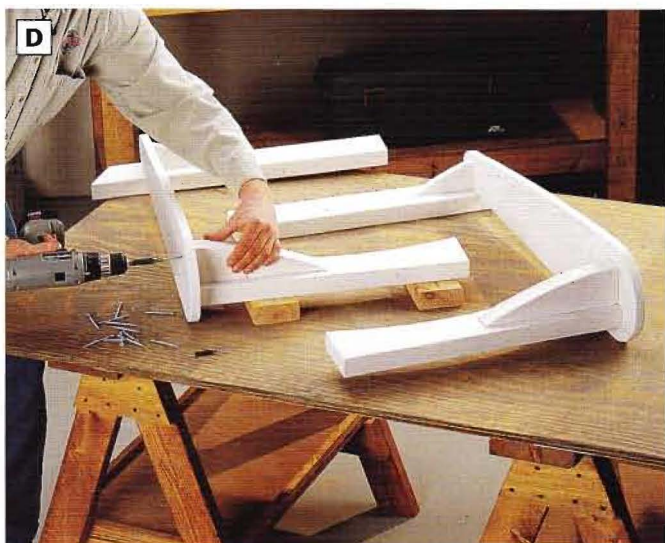


PHOTO D: Attach the arms to the arm braces on the front legs and back supports. Drive screws through the arms and down into the front legs as well. Drill countersunk pilot holes before you install the screws.

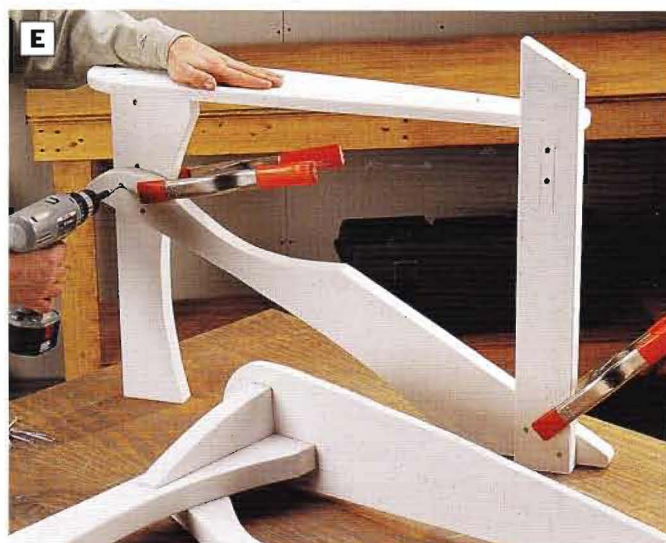


PHOTO E: Fasten the back legs to the inside face of the front legs and the outside face of the back supports with screws. Hold the parts in position with spring clamps to keep the parts from shifting.

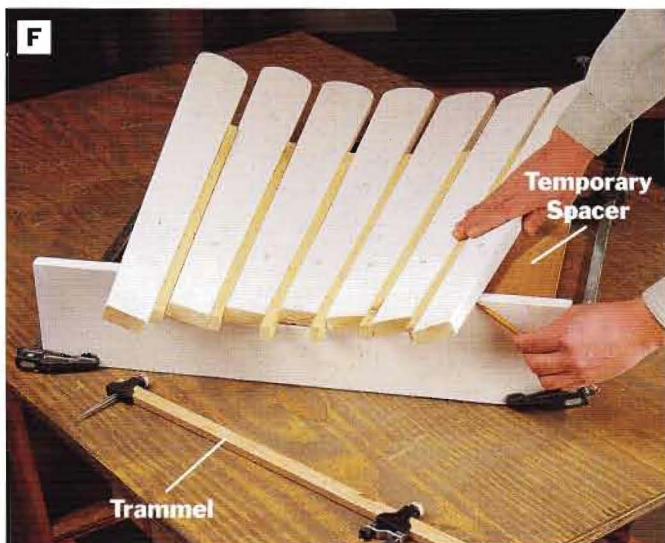


PHOTO F: Lay the back slats in place on the upper and lower back cleats. The tops of the back slats should follow the curve of an 18-in. radius. Mark the centerpoint of this radius on the center slat, and use a trammel or simple string compass to position the rest of the slats. Mark the slats for trimming where they intersect the lower back cleat.

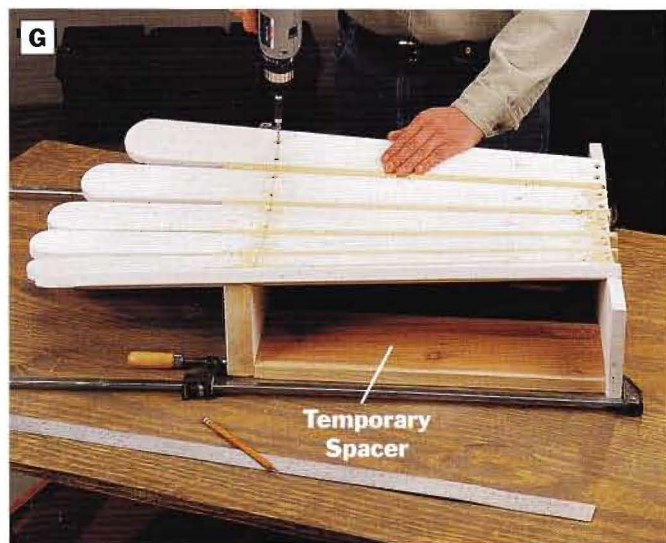


PHOTO G: Drill countersunk pilot holes for attaching the back slats to the upper and lower cleats. You may want to draw a reference line across the slats first to help establish screw placement on the upper back cleat. Attach the parts and remove the temporary spacer.

15 Attach the rear arm braces to the outside faces of the back supports, with the top edges of the braces set $20\frac{3}{4}$ in. from the bottom ends of the supports.

16 Attach the arms to the front legs and back supports with 2-in. galvanized deck screws (**See Photo D**). Refer to the *Side View* and *Front View* drawings on page 17 for more information about exact placement of the arms.

17 Attach the back legs to the inner faces of the front legs and the outer faces of the back supports. Position

the back legs so that the front tip of the back leg overhangs the front leg by $1\frac{1}{4}$ in. Adjust the parts until the measurement from the front edge of the front leg to the front edge of the back support is $27\frac{1}{4}$ in. Clamp the assemblies, drill countersunk pilot holes and attach the parts with $2\frac{1}{2}$ -in. galvanized deck screws (**See Photo E**).

BUILD THE BACK ASSEMBLY

18 Cut two temporary spacers to hold the upper and lower back cleats in position while you attach the back slats. Cut the spacers $18\frac{3}{8}$ in. long.

19 Stand the upper and lower back cleats on their flat back edges, and clamp the temporary spacers from Step 18 between the cleats. Lay the back slats into the curves on the cleats. Insert 1/2-in. spacers between the back slats to hold them evenly apart. Adjust the center back slat so it is even with the bottom face of the lower back cleat. Arrange the rest of the slats on the cleats so their top curved ends follow an 18-in.-radius arc. The easiest way to lay out this arc is to make a mark 18 in. from the top of the center slat and use this as the centerpoint for a trammel or string compass when you swing an arc. Adjust the back slats so the curved ends intersect with the end of the compass. Draw a line on the back slats where they cross the lower back cleat (**See Photo F**).

20 Remove the back slats and trim the bottom ends.

21 Reposition the slats on the back cleats, drill countersunk pilot holes and fasten the slats to the cleats with 2-in. galvanized deck screws (**See Photo G**).

ASSEMBLE THE CHAIR

22 Clamp the back assembly in position between the arm assemblies, with the lower back cleat held back 3/4 in. from the point where the curved seat profile begins on the top edge of the back legs. The upper back cleat should rest on the back supports.

23 Install the stretcher between the front legs; this will keep the structure rigid while you attach the back assembly. Fasten the stretcher 4 in. up from the bottoms of the front legs.

24 Attach the back assembly. Fasten the lower cleat to the back legs with 2-in. galvanized deck screws and the upper back cleats into the back supports with 2 1/2-in. deck screws (**See Photo H**).

25 Attach the seat slats. Remove the arms temporarily, for easier access to the screws. Attach the shaped seat slat first. Space the remaining seat slats evenly so they follow the full length of the curved profile on the back legs. Fasten the slats with countersunk 2-in. deck screws (**See Photo I**). Reattach the arms.

FINISHING TOUCHES

26 Fill all of the recessed screw holes with wood or auto body filler. Let the filler dry and sand smooth. Spot-prime the filled screw heads.

27 Brush on two coats of exterior latex paint.



PHOTO H: Set the back assembly in place between the two arm assemblies and clamp the parts together. Drive screws through the upper and lower cleats into the back supports and back legs.



PHOTO I: Remove the arm pieces to provide clearance for attaching the seat slats. Install the seat slats along the profiled areas of the back legs starting with the shaped seat slat. Space the slats evenly apart along the back leg. A 1/4-in.-thick scrap spacer will help keep the slat spacing uniform as you install the slats.



Tiletop BBQ Center

Can't you just smell the charcoal already? Outdoor cooking is often the centerpiece of summer gatherings, and when you get together with family and friends for barbecued ribs, grilled steaks or juicy burgers, this attractive outdoor grilling accessory will make the chef's job so efficient that he or she will be able to enjoy the conversation as well. Then, if the conversation lags, you can casually let people know that you built this versatile cart yourself, in just a weekend's worth of time. Impression guaranteed.

Vital Statistics: Tiletop BBQ Center



TYPE: Tiletop BBQ center

OVERALL SIZE: 26⁷/₈W by 44¹/₄L by 35¹/₂H

MATERIAL: Cedar, ceramic tile

JOINERY: Butt joints reinforced with galvanized screws

CONSTRUCTION DETAILS:

- Ceramic tiles laid on exterior plywood subbase
- Integral handle and wheels for easy moving
- Recessed condiment shelf

FINISHING OPTIONS: Penetrating UV protectant sealer, exterior paint or leave unfinished and allow to weather naturally to gray

Building time



PREPARING STOCK

0 hours



LAYOUT

1-2 hours



CUTTING PARTS

2-3 hours



ASSEMBLY

5-6 hours



FINISHING

2-3 hours

TOTAL: 10-14 hours

Tools you'll use

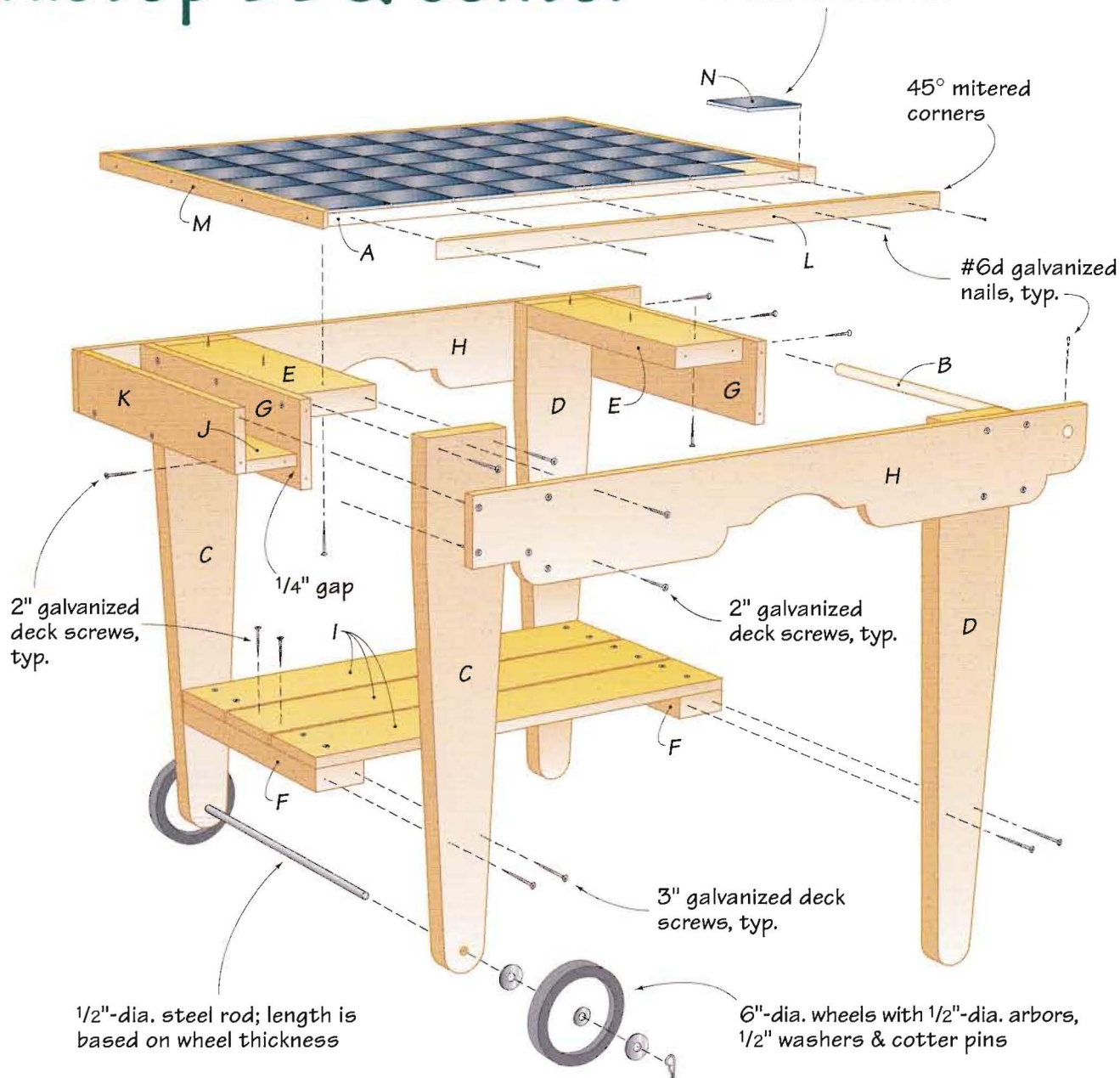
- Circular saw
- Power miter saw
- Compass
- Jig saw
- Drill/driver
- Clamps
- Hammer, nailset
- Combination square
- Tiling tools (1/4-in. notched trowel, grout float, sponge)
- Hacksaw

Shopping list

- ☐ (1) 3/4 in. x 4 x 4 ft. exterior plywood
- ☐ (1) 3/4 in.-dia. x 24-in. hardwood dowel
- ☐ (2) 2 x 6 in. x 8 ft. cedar
- ☐ (1) 2 x 4 in. x 6 ft. cedar
- ☐ (2) 1 x 6 in. x 8 ft. cedar
- ☐ (2) 1 x 6 in. x 6 ft. cedar
- ☐ Galvanized deck screws (2-, 3-in.)
- ☐ 6d galvanized finish nails
- ☐ (48) 4 1/4 x 4 1/4-in. glazed ceramic tiles
- ☐ Thinset mortar, tile grout
- ☐ (2) 6-in.-dia. wheels; 1/2-in.-dia. x 24-in. steel rod, washers, cotter pins
- ☐ UV protectant sealer

Tiletop BBQ Center

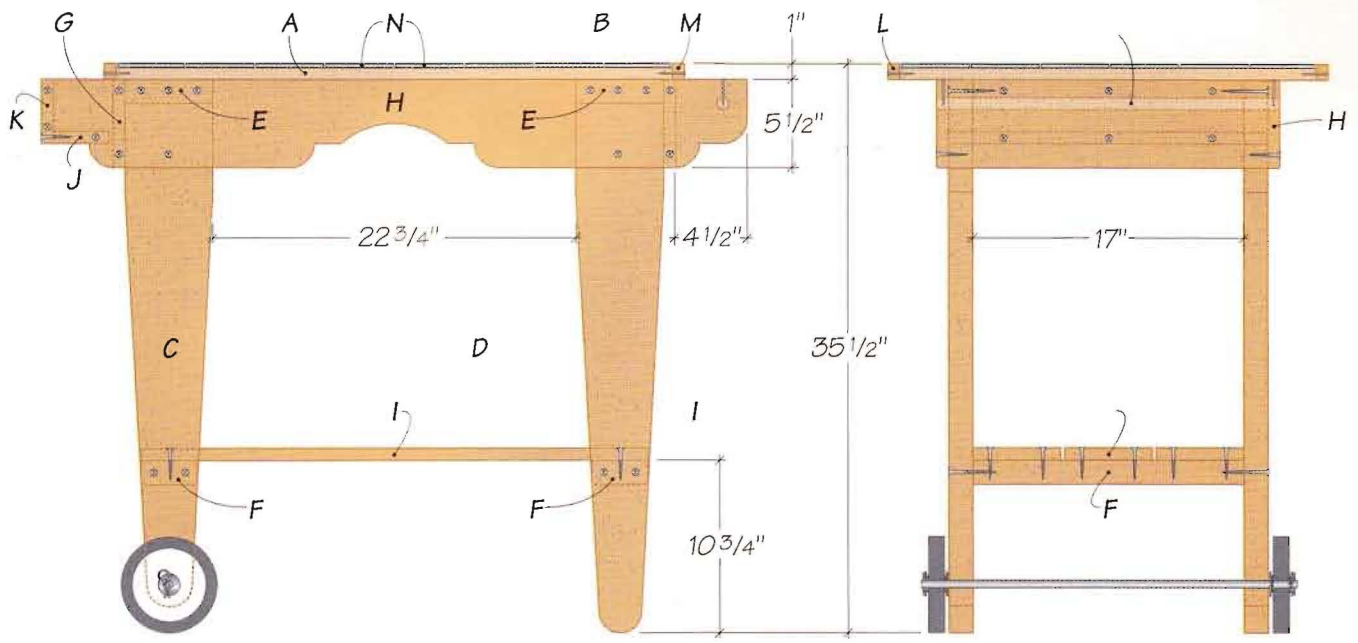
4 1/4" x 4 1/4" glazed
standard bathroom tiles



Tiletop BBQ Center Cutting List

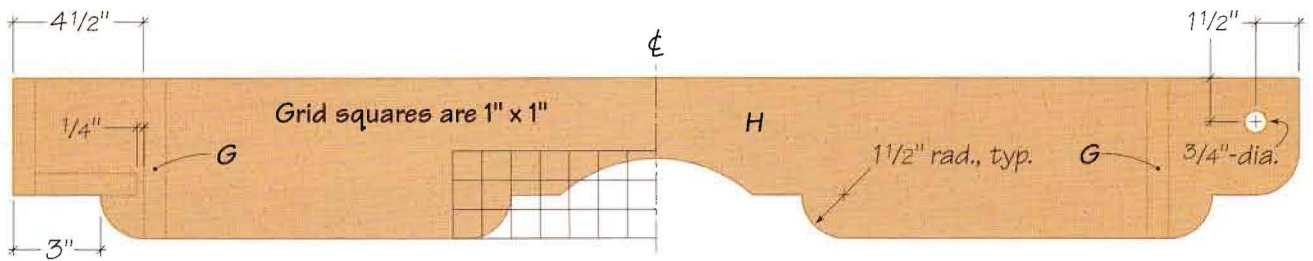
Part	No.	Size	Material
A. Plywood subtop	1	3/4 x 26 1/8 x 34 7/8 in.	Exterior plywood
B. Handle	1	3/4 dia. x 21 1/2 in.	Hardwood dowel
C. Front legs	2	1 1/2 x 5 1/2 x 32 7/8 in.	Cedar
D. Back legs	2	1 1/2 x 5 1/2 x 34 1/2 in.	"
E. Upper crosspieces	2	1 1/2 x 5 1/2 x 17 in.	"
F. Lower crosspieces	2	1 1/2 x 3 1/2 x 17 in.	"

Part	No.	Size	Material
G. End aprons	2	3/4 x 5 1/2 x 20 in.	Cedar
H. Side aprons	2	3/4 x 5 1/2 x 44 1/4 in.	"
I. Shelf slats	3	3/4 x 5 1/2 x 31 3/4 in.	"
J. Condiment shelf	1	3/4 x 31 1/2 x 20 in.	"
K. Condiment front	1	3/4 x 4 x 20 in.	"
L. Top side edging	2	3/4 x 1 x 36 3/8 in.	"
M. Top end edging	2	3/4 x 1 x 27 5/8 in.	"
N. Tiles	48	1/4 x 4 1/4 x 4 1/4 in.	Glazed bathroom tile

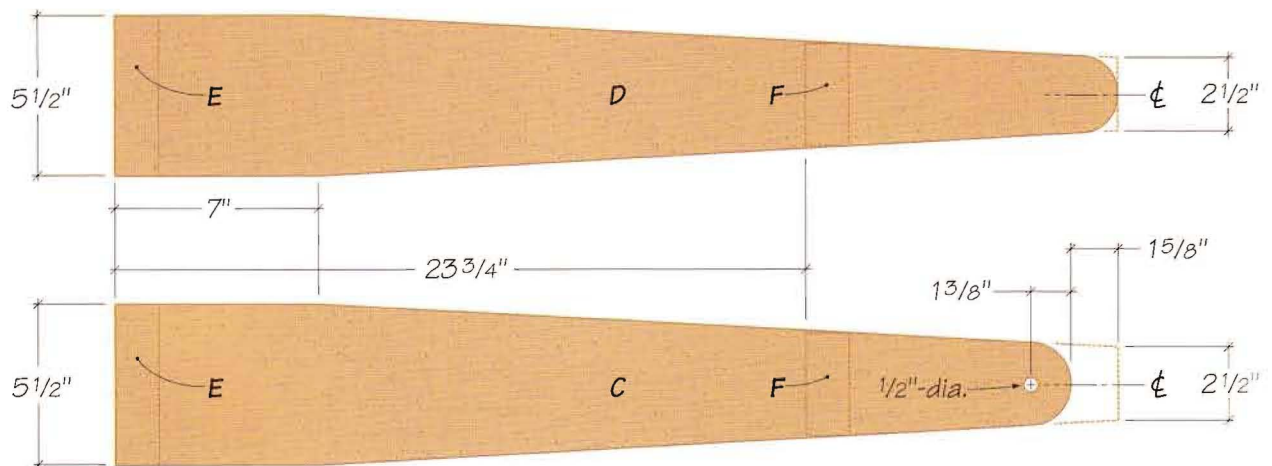


SIDE VIEW

END VIEW



SIDE APRONS



FRONT & BACK LEGS

Tiletop BBQ Center: Step-by-step

BUILD THE LEG ASSEMBLIES

1 Crosscut the legs to size. Cut identical blanks for all four legs, even though the front legs will eventually be shortened to allow clearance for the wheels.

2 Measure and mark the location of the lower crosspieces on the inside faces of the legs. Position the upper face of the crosspieces $10\frac{3}{4}$ in. from the bottom of the legs. Extend the marks across the legs with a combination square.

3 Cut identical tapers on all four legs (See *Front & Back Legs* drawings, page 33). The tapers begin 7 in. from the tops of the legs and reduce them to $2\frac{1}{2}$ in. at the bottom. Draw the foot radius on the two back legs with a compass.

4 Cut $1\frac{5}{8}$ in. off the bottom ends of the front legs, then mark for the $1\frac{3}{8}$ -in. foot radius. When you draw the foot radii, the pivot point for the compass marks the center-point of the wheel axle.

5 Clamp each leg to your work-surface and cut the curved foot profiles on all four legs with a jig saw (See **Photo A**).

6 Bore the $\frac{1}{2}$ -in.-dia. axle hole in the front legs. You may want to mount your drill in a right-angle drilling guide to ensure that these axle holes are straight.



PHOTO A: Once you've cut the leg tapers and shortened the front legs, mark and cut the rounded feet with a jig saw. Clamp each leg to your workbench to make sawing the feet easier.



PHOTO B: Fasten the legs to the upper and lower crosspieces with deck screws. Position the upper faces of the lower crosspieces so they are $10\frac{3}{4}$ in. from the bottoms of the legs.

7 Cut the upper and lower cross-pieces to length. Set the cross-pieces between the legs, and hold the parts in place with clamps. Drill countersunk pilot holes through the legs into the cross-pieces, and attach the legs to the crosspieces with 3-in. galvanized deck screws (**See Photo B**).

CUT THE REMAINING PARTS

Cedar is commonly sold smooth on one side and rough on the other. For the 1× apron, slat and condiment parts, you could choose to have the rough side facing out or in, depending upon the surface appearance you prefer. Building the cart with workpieces facing smooth-side-out will lead to fewer splinters later and will be easier to keep clean.

8 Make the side aprons. Cut the two apron blanks to length. Transfer the side apron profile (*See Side Aprons* drawing, page 33) to one of the blanks, and mark the centerpoint of the handle dowel hole. Stack the marked blank on top of the unmarked one with the edges aligned, and clamp the blanks together on your worksurface. Gang-cut the profile on both aprons at once with your jig saw. Sand the cut edges smooth.

9 Bore the 3/4-in.-dia. handle dowel holes while the side aprons are still clamped together.

10 Cut the end aprons, shelf slats and handle dowel to length.

11 Cut the condiment shelf and front to size. First rip 1 × 6 stock to width (*See Cutting List*, page 32), then cut the pieces to length.



PHOTO C: Attach the end aprons to the legs, then turn the leg assemblies upside down and fasten the side aprons in place. Hold the parts in position with clamps while you drive the screws.



PHOTO D: Fasten the shelf slats in position, then attach the condiment shelf and front to the side aprons. Leave a 1/4-in. gap between the condiment shelf and the end apron (*See Side Aprons* drawing, page 33), to allow for water drainage. Use 2-in. galvanized deck screws on these parts.



PHOTO E: Arrange rows of tiles to determine the length and width of the tile top. *NOTE: You may need to space the tiles to allow for grout lines if your tiles don't have self-spacing nubs on the edges. The overall dimensions will establish the size of the plywood subtop.*



PHOTO F: Spread a layer of thinset mortar over the subtop using a 1/4-in. notched trowel. Press the tiles into the mortar in a systematic fashion, working out from one corner both lengthwise and widthwise. Keep watch on your tile spacing to ensure that all the tiles will fit on the subtop.

ASSEMBLE THE WORKSTATION

12 Attach the end aprons to the leg assemblies with 2-in. galvanized deck screws. Fasten the parts by screwing through the end aprons and into the upper crosspieces and legs. *NOTE: Make sure that the longer back legs are at the same end of the aprons as the handle dowel holes.*

13 Fasten the side aprons to the leg assemblies. Stand leg assemblies upside down on your work surface with the end aprons facing out. Clamp the side aprons in place so they extend 4½ in. beyond the the end aprons on both ends of the cart. Drill countersunk pilot holes, and attach the side aprons to the leg assemblies with 2-in. screws, four screws per joint (See Photo C).

14 Install the shelf slats. Stand the workstation right-side-up on the floor. Put a 1½-in.-thick board under the shorter front legs to hold the workstation approximately level. Position the shelf slats so their ends are flush with the outer edges of the lower crossbraces and there are equal gaps between the slats. Drill countersunk pilot holes through the slats and into the lower crosspieces, and fasten the slats in place.

15 Attach the condiment shelf and front pieces. Start by drilling countersunk pilot holes in the side aprons on the end opposite the cart handle. Position the shelf ¾ in. from the ends of the side aprons to allow space for attaching the condiment front. Make sure there is about a ¼-in. gap between the shelf and the end apron to allow for water drainage. Fasten the shelf between the side aprons with 2-in. screws. Install the front by attaching it to the

side aprons and the shelf with 2-in. screws (**See Photo D**).

BUILD THE TOP

The sizes of the plywood top and edging are based on the assumption that the tiles are $4\frac{1}{4}$ in. square and grout lines between the tiles are all $\frac{1}{8}$ in. We did not leave a distinct grout line between the tile and the edging because this is an outdoor project, and the wood edging will expand and contract with changes in humidity. If you use a different size tile, you will need to modify the overall size of the top. Be sure to also factor in the space needed for grout lines.

16 Determine the plywood top size by laying out lines of tiles to mark the length and width of the workstation top (**See Photo E**). Cut the plywood subtop to size, taking care that it is square.

17 Fasten the top to the workstation. Position the subtop so there is an even overhang all around, and attach it with 2-in. screws driven through the upper crosspieces from below (attaching the top from below allows you the option of removing the top later on without destroying the tile).

18 Apply an even layer of thinset mortar to the subtop with a $\frac{1}{4}$ -in. notched trowel. Be sure to wear gloves when working with mortar or grout.

19 Set the tiles into the mortar (**See Photo F**). If you are not an experienced tile setter and your tiles are not self-spacing, we recommend starting at one corner of the top and setting one line of tile across the width and one line across the length. This allows you to verify the exact size of the grout lines, since it will be easier to



PHOTO G: Wrap the tile top with $\frac{3}{4} \times 1$ -in. cedar edging, mitering the corners. Fasten the edging pieces with wood glue and 6d galvanized finish nails, nailing into the plywood subtop. Then recess the nailheads with a nailset.

adjust the positioning of these first few guide tiles, if need be, than to reposition the whole top-full of tiles. Press the tiles firmly into the thinset mortar to ensure that they seat fully and will not come loose. Allow the mortar to dry thoroughly before continuing to finish the top.

20 Make and install the edging. Rip $\frac{3}{4} \times 1$ -in. strips from 1×6 stock, and crosscut the edging to length. Miter-cut the ends to 45° . Drill pilot holes, and attach the edging to the edges of the subtop with glue and #6d galvanized finish nails (**See Photo G**). Recess the nailheads with a nailset.

21 Apply the grout. Select a grout color that complements your tile; generally speaking, darker grout

shows spotting and stains much less than lighter-colored grout. Mix powdered grout according to the manufacturer's instructions to produce a relatively dry mixture that retains its shape when you ball it in your hand. Protect the top surface of the wood edging with masking tape.

22 Spread grout across the tiles and into the joints, using a grout float (**See Photo H**). Work diagonally across the tabletop to avoid digging the grout out of some joints as you fill others.

23 Wipe away the excess grout. Again working with diagonal strokes, use a sponge to remove the excess grout from the tile surface (**See Photo I**). Rinse the sponge frequently and get the top

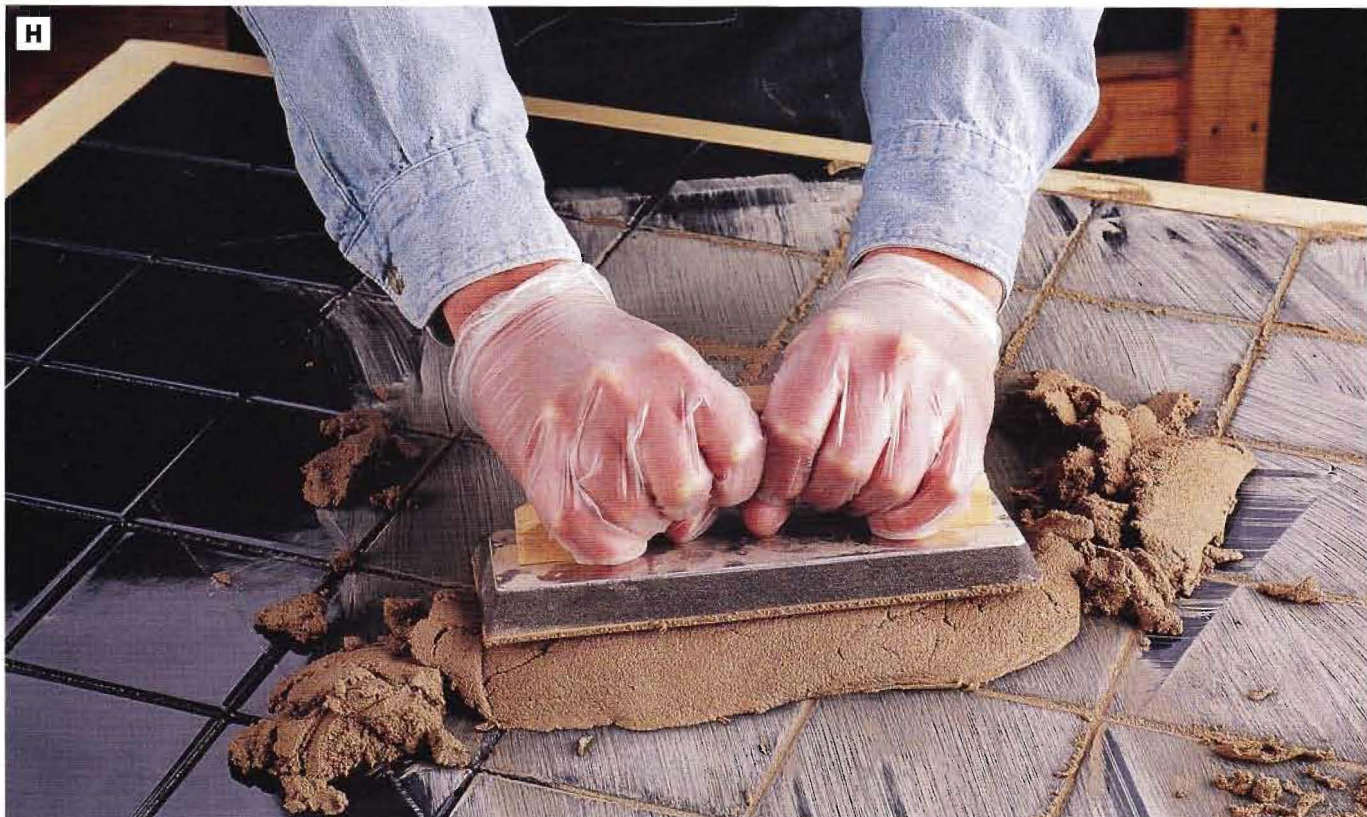


PHOTO H: Press grout into the gaps between the tiles using a grout float. Work diagonally across the surface, pulling the float toward you as you go. Working diagonally helps to minimize the chances of accidentally pulling grout out of the gaps you've already filled.



PHOTO I: Remove excess grout and smooth the grout lines with a water-dampened sponge. Again, work diagonally. Continue wiping the tiles, rinsing the sponge and wringing it out until the tiles are clean. Wipe away haze left by the grout with a soft cloth.

clean before the grout has a chance to fully set. As the grout dries, any grout residue will appear as a hazy film on the tiles. Wipe them clean with a soft, dry cloth.

INSTALL THE WHEELS

24 Cut the $\frac{1}{2}$ -in.-dia. axle rod to length with a hacksaw. To accommodate the washers and cotter pins, the axles must extend beyond the legs $\frac{3}{4}$ in. plus the thickness of the wheel hub on each side. Wheel hub dimensions will vary. Thus, if your wheel hubs are 1 in. thick, the axles need to be at least $23\frac{1}{2}$ in. long.

25 Drill holes in the axle for the cotter pins. To do this easily, make a wooden cradle by cutting a V-shaped groove into the face of an 8- to 12-in. piece of 2×4 with two passes of your saw set at a 45° angle. Fasten the grooved 2×4 to a slightly larger piece of $\frac{3}{4}$ -in. scrap.

Clamp the cradle to your drill press table to support the axle while you drill it. Set the axle in the groove and drill a 1/8-in. hole through the axle near (verify the exact position) each end of the rod (**See Photo J**). *TIP: Use a slow speed setting on the drill press and lubricate the bit with a drop of light machine oil to keep the bit from overheating.*

26 Install the wheels. Slide the axle into place on the legs, slip washers onto the axle next to the legs to serve as spacers, slide the wheels and another set of washers onto the axle, and insert the cotter pins to lock the wheels in place (**See Photo K**).

FINISHING TOUCHES

27 Check that all nailheads are set and all screw heads are countersunk slightly below the surface of the wood. You can either fill nail- and screw head recesses with wood putty or simply leave the heads exposed for a more rustic appearance.

28 Sand all exposed surfaces and edges, then apply the finish of your choice. We used a clear penetrating exterior wood sealer with good UV protection in order to retain and highlight the natural beauty of the wood. Depending on the tile you've selected for your top, you could elect to paint the workstation for a more dramatic look. Or, as with any cedar furniture, you may leave it unfinished and let it weather to a silvery gray.



PHOTO J: Cut a V-shaped notch in a scrap of 2 × 4 to help steady the axle as you drill holes for cotter pins. Fasten the notched cradle to another scrap, and clamp the jig to the drill press table. Drill through the rod using a slow speed setting and firm—but not excessive—force on the bit.



PHOTO K: Insert the axle through the holes in the front legs, then install washers, wheels and cotter pins to secure the wheels. The washers next to the cotter pins keep the wheels from rubbing against the cotter pins as the wheels turn.



Picnic Table & Benches

A good old-fashioned picnic table with matching benches is almost as All-American as baseball and apple pie. What yard or deck is complete without one? Our version of this classic is just a notch dressier than many similar pieces because it is designed with no visible screws in the table or bench surfaces, and the outer edges are neatly rounded over.

Vital Statistics: Picnic Table & Benches



TYPE: Picnic table and benches

OVERALL SIZE: Table: 37¹/₄W by 71L by 29¹/₂H
Benches: 11W by 71L by 16¹/₂H

MATERIAL: Cedar

JOINERY: Butt joints reinforced with galvanized screws

CONSTRUCTION DETAILS:

- Butt joint construction
- No exposed screw heads in tabletop or bench surfaces
- Angled table braces allow for comfortable leg room
- Bench legs tuck between table legs for compact storage

FINISHING OPTIONS: Penetrating UV protectant sealer, exterior paint or leave unfinished to weather to gray

Building time



PREPARING STOCK
0 hours



LAYOUT
1-3 hours



CUTTING PARTS
2-4 hours



ASSEMBLY
3-5 hours



FINISHING
2-3 hours

TOTAL: 8-15 hours

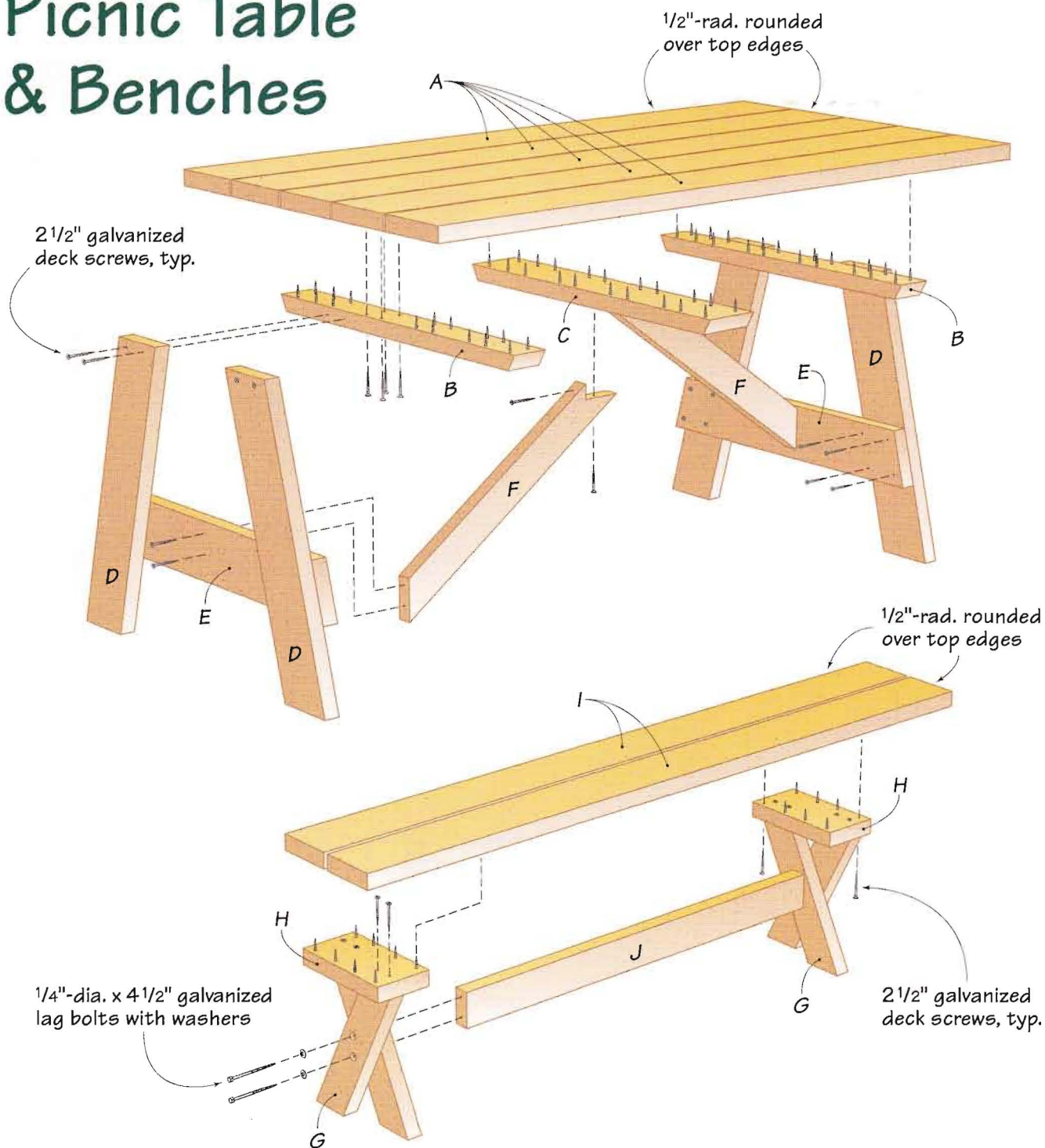
Tools you'll use

- Circular saw or power miter saw
- Router with 1/2-in. roundover bit
- Jig saw
- Drill/driver
- Clamps
- Sockets
- Combination square
- Bevel gauge

Shopping list

- ☐ (5) 2 × 8 in. × 6 ft. cedar
- ☐ (3) 2 × 6 in. × 8 ft. cedar
- ☐ (3) 2 × 6 in. × 6 ft. cedar
- ☐ (5) 2 × 4 in. × 8 ft. cedar
- ☐ Galvanized deck screws (2 1/2-in.)
- ☐ Galvanized lag bolts (1/4 × 4 1/2-in.)
- ☐ Finishing materials

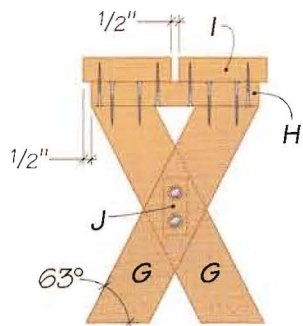
Picnic Table & Benches



Picnic Table & Benches Cutting List

Part	No.	Size	Material
A. Table slats	5	1 1/2 x 7 1/4 x 71 in.	Cedar
B. Outer stretchers	2	1 1/2 x 3 1/2 x 34 1/4 in.	"
C. Center stretcher	1	1 1/2 x 5 1/2 x 34 1/4 in.	"
D. Table legs	4	1 1/2 x 5 1/2 x 30 1/2 in.	"
E. Leg braces	2	1 1/2 x 5 1/2 x 33 in.	"

Part	No.	Size	Material
F. Angled braces	2	1 1/2 x 3 1/2 x 31 3/8 in.	Cedar
G. Bench legs	8	1 1/2 x 3 1/2 x 16 3/4 in.	"
H. Bench stretchers	4	1 1/2 x 5 1/2 x 10 1/2 in.	"
I. Bench slats	4	1 1/2 x 5 1/2 x 71 in.	"
J. Bench braces	2	1 1/2 x 3 1/2 x 42 in.	"



BENCH END VIEW

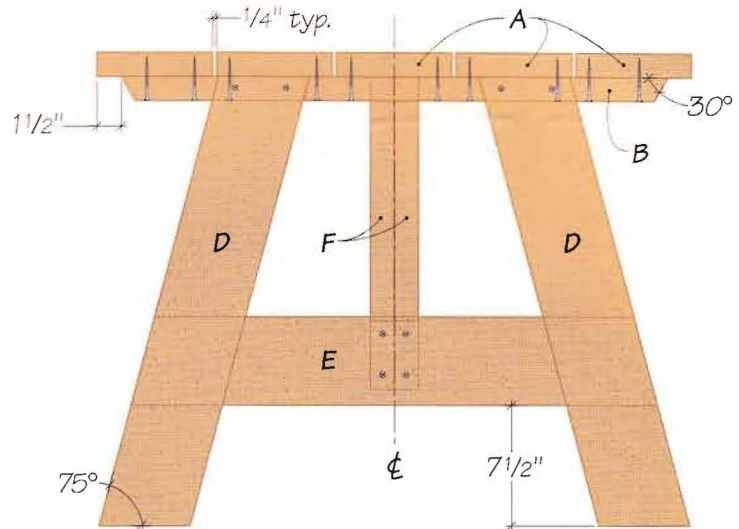


TABLE END VIEW

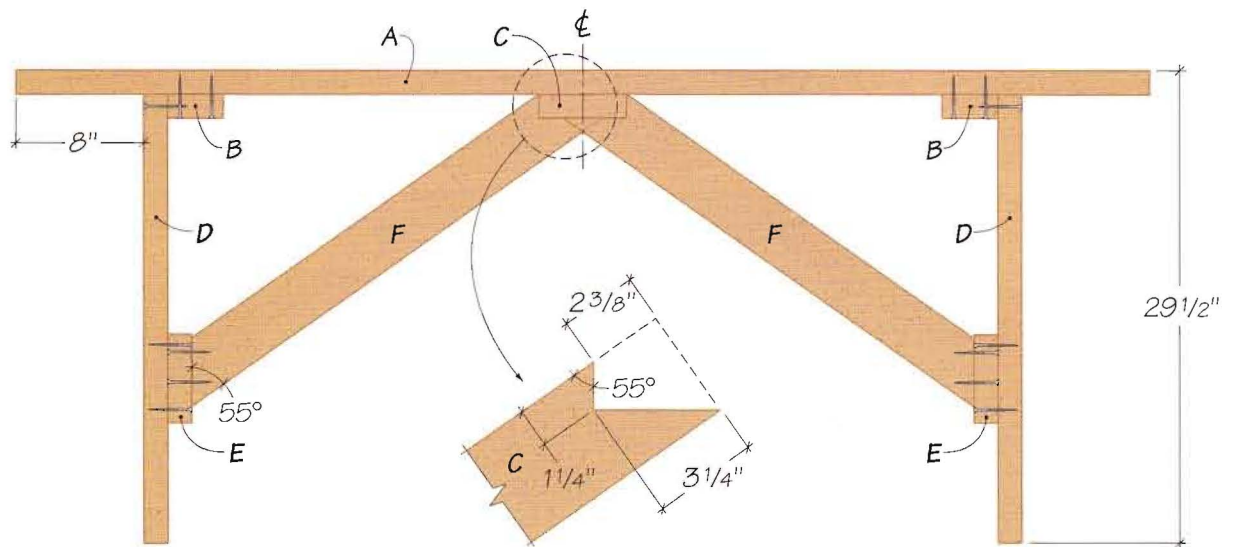
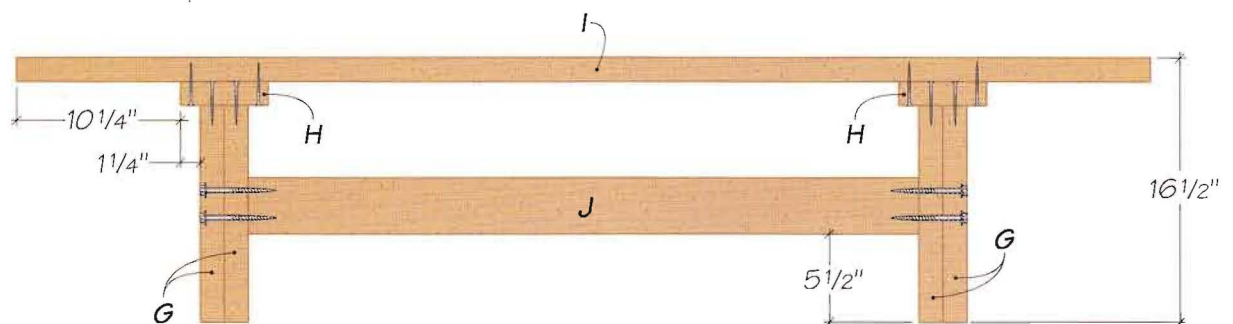


TABLE FRONT VIEW



BENCH FRONT VIEW

Picnic Table & Benches: Step-by-step

BUILD THE TABLETOP

1 Crosscut the five table slats to length from 2 × 8 stock.

2 Round over the outside edges and ends of the table slats. Clamp the slats together, faceup, with the ends flush. Use your router and a 1/2-in. roundover bit to ease the ends of the slats and the edges of the outer slats (See Photo A). Unclamp the slats.

3 Mark the three stretcher locations on the table slats. Turn the slats facedown and clamp the slats together again with their ends flush. Mark the locations of the outer and center stretchers. The center stretcher is centered on the length of the slats. The outer stretchers are 9 1/2 in. from each end of the tabletop. Extend the stretcher layout lines across the slats with a carpenter's square.

4 Measure and cut the stretchers to length, with the ends beveled at a 30° angle (See Photo B).

5 Fasten the stretchers to the table slats. To do this, first insert 1/4-in.-thick scrap spacers between the slats to hold them evenly apart. Set the stretchers in place. Drill countersunk pilot holes, and attach the stretchers to the slats with 2 1/2-in. galvanized deck screws (See Photo C).

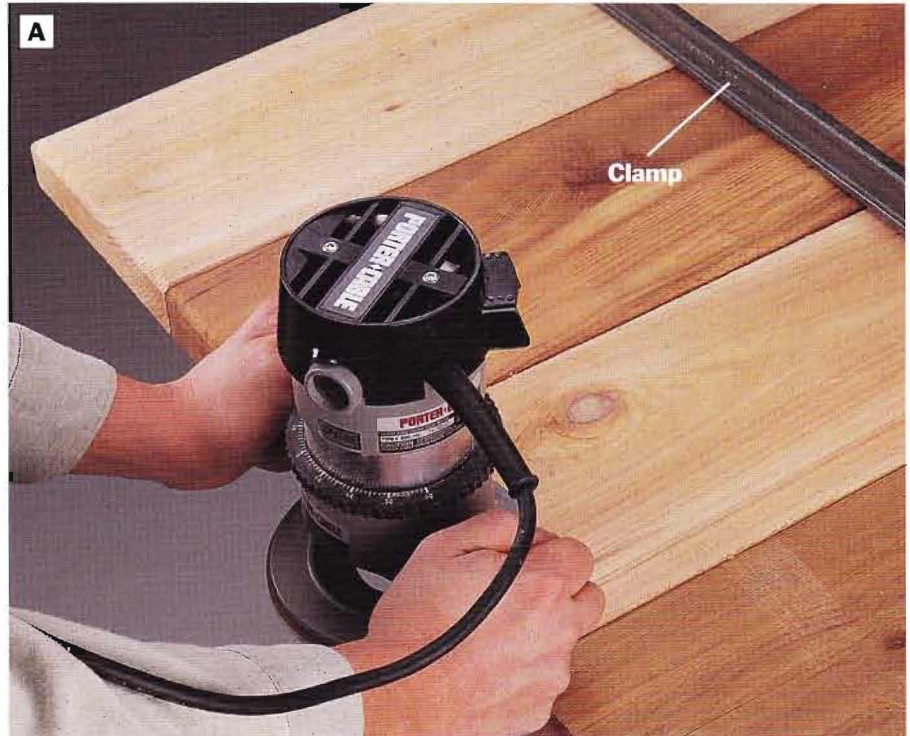


PHOTO A: Clamp the tabletop slats together and rout the ends and edges with a 1/2-in. roundover bit. Clamping the slats together will produce an even profile on the ends of the slats.



PHOTO B: Bevel-cut the ends of the outer and center table stretchers at 30° angles. We used a power miter box, but you could also make these cuts with a circular saw or a table saw.

BUILD THE LEG ASSEMBLIES

6 Crosscut the four table legs to length. If you are using a radial arm saw or a power miter saw, clamp a stop to the saw's fence to ensure that the legs are cut exactly to the same length. Cut the ends of each leg to 75° .

7 Cut the two leg braces to length and trim the ends to 75° .

8 Attach the braces to the legs. Use a square to establish a mark $7\frac{1}{2}$ in. up from the bottom end of each leg (See *Table End View*, page 57). Set a bevel gauge to 75° and use the gauge to draw a line across this mark so the line is parallel to the ends of the leg. Position a brace on each pair of legs, holding the ends of the brace flush with the outer edges of the legs. Drill four countersunk pilot holes through the leg braces and into the legs. Fasten the parts with deck screws (See **Photo D**).

ASSEMBLE THE TABLE

9 Cut the two angled braces. First crosscut the braces to length from 2×4 stock. Next, cut a 55° angle on the lower ends. Then, refer to the *Table Front View* detail drawing on page 57 to mark the “birdsmouth” notches on the upper ends of the braces. Clamp each brace to your work-surface, and cut out these notches with a jig saw (See **Photo E**).

10 Attach the leg assemblies to the tabletop. Drill a pair of countersunk pilot holes in the top end of each leg. Stand the leg assemblies in place against the outside edges of the outer stretchers on the tabletop. Be sure the leg braces face in toward the center of the table. Drive $2\frac{1}{2}$ -in. galvanized deck screws through the legs into the tabletop stretchers.



PHOTO C: Mark locations for the three table stretchers on the bottom of the tabletop, then fasten the stretchers to the table slats with $2\frac{1}{2}$ -in. galvanized deck screws. Set $\frac{1}{4}$ -in. spacers between the slats before you fasten the stretchers to keep the slats held evenly apart.



PHOTO D: Cut the legs and leg braces to size, and cut the ends of the parts at 75° angles. Use the *Table End View* drawing, page 57, as a reference for cutting the parts. Then construct the two table leg assemblies by fastening each leg brace to a pair of legs with deck screws.

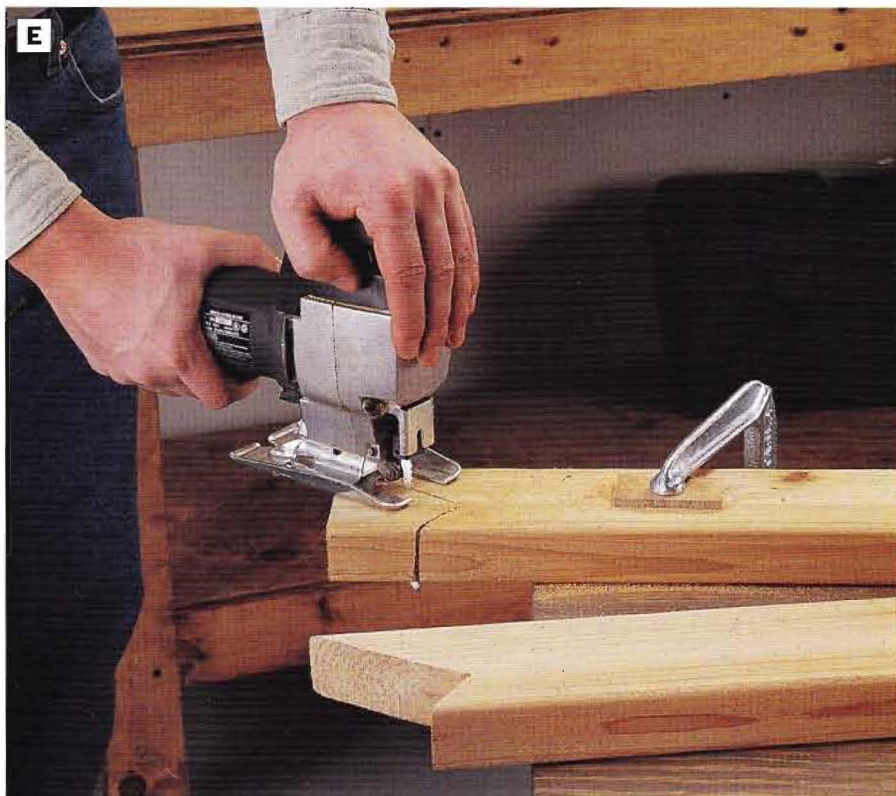


PHOTO E: Cut birdsmouth notches on the upper ends of the angled braces with a jig saw so the braces will interlock with the center table stretcher. Clamp each brace to your worksurface to hold it steady while you make the cuts.



PHOTO F: Fasten the leg assemblies to the outer stretchers, then attach the angled braces to the center stretcher and leg braces. The parts will be easiest to manage if you work with the tabletop turned upside down on sawhorses.

11 Attach the angled braces. Mark a centerline across the width of the center stretcher. Position the birdsmouth ends of the angled braces on either side of this centerline, so the angled braces flare out to the leg braces. Drill countersunk pilot holes, and attach the angled braces to the center stretcher with $2\frac{1}{2}$ -in. deck screws (**See Photo F**). Use a carpenter's square to adjust each angled brace so it is square with the leg brace. Attach the angled braces to the leg braces by holding each one in position, drilling countersunk pilot holes, and fastening the parts with $2\frac{1}{2}$ -in. deck screws. Drive the screws through the leg braces and into the angled braces.

BUILD THE BENCH LEG ASSEMBLIES

12 Cut the eight bench legs to length, then trim the ends to 63° . Temporarily fasten pairs of legs together with a single deck screw where the legs cross to form four "X"-shaped leg assemblies. Attach the legs together so the overall measurement at the top of the "X" is $10\frac{1}{2}$ in. *NOTE: The screw will make it possible to adjust the "X" formed by the legs in or out so the bottoms of the legs stand flat.* Take care to position these temporary screws so that they don't interfere with the lag screws that will be used later to attach the leg assemblies to the bench braces.

13 Fasten the four bench stretchers to the leg pairs. Cut the stretchers to length. Draw a centerline along the length of each stretcher. When you attach the bench stretchers to the legs, align the inside faces of the legs along the stretcher centerlines. Adjust the legs in or out until they rest flat against the bottom of the stretcher. Check to be sure the

legs also stand flat at the bottom. Fasten the stretchers to the legs with deck screws (See Photo G).

ASSEMBLE THE BENCHES

- 14** Cut the bench slats to length. Clamp pairs of slats together with the ends flush, and round over the top ends and edges of the slats as you did in Step 2 with a router and 1/2-in. roundover bit.
- 15** Attach the leg assemblies to the bench slats. Drill countersunk pilot holes through the stretchers from the underside. Lay the bench slats facedown on your work surface. Mark the stretcher locations on the slats, 10 1/4 in. from each end. Set the leg assemblies in place on the bench slats, and space the slats apart so they overhang the ends of the stretchers by 1/2 in. Fasten the leg assemblies by driving 2 1/2-in. deck screws through the stretchers and into the slats.

- 16** Install the bench braces. Cut the bench braces to length. Clamp each brace in place between the bench leg assemblies. Drill 3/8-in.-deep holes in the outermost legs to recess two lag screw heads using a 3/4-in.-dia. spade bit. Then drill 1/4-in.-dia. holes in the center of the counterbored recesses through the legs and into the braces. Drive pairs of 4 1/2-in.-long lag screws and washers into place with a ratchet to fasten the legs to the braces (See Photo H). Remove the temporary screws you installed in Step 12.

FINISHING TOUCHES

- 17** Sand all surfaces of the table and benches smooth. We applied a clear UV protectant exterior sealer to highlight the beauty of the cedar, but this project could be stained, painted or left to weather naturally.

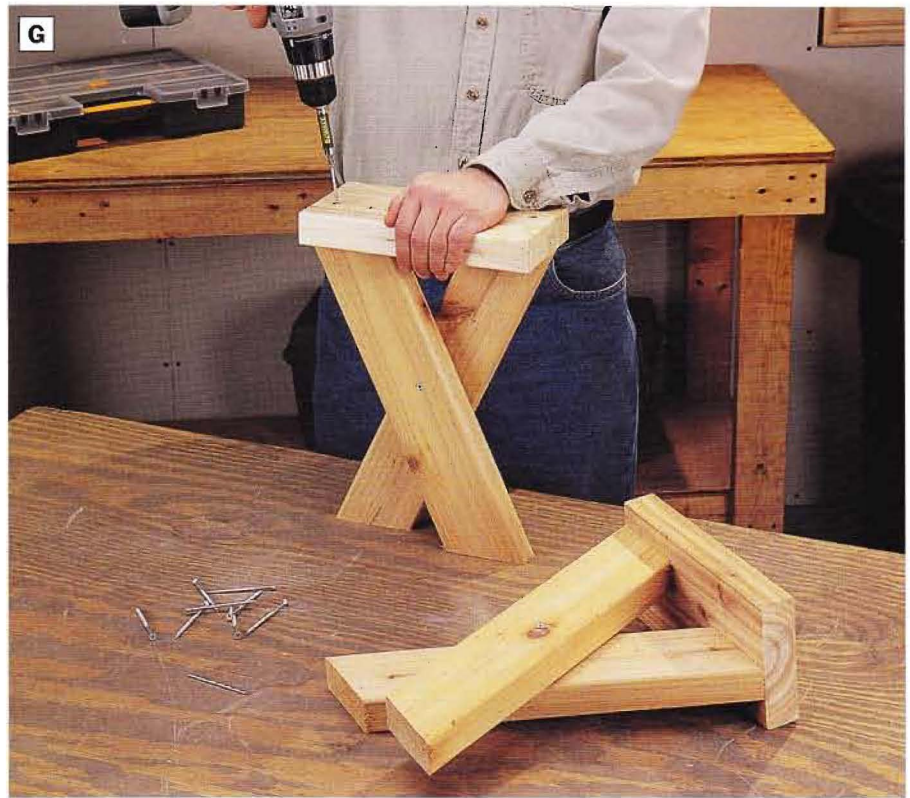


PHOTO G: Attach a bench stretcher to each pair of legs with screws. Align the top outer corners of the legs with the ends of the stretchers, and center the legs widthwise on the stretchers. **NOTE:** Adjust the spread of the legs on the stretchers, if necessary, so the legs will stand flat.

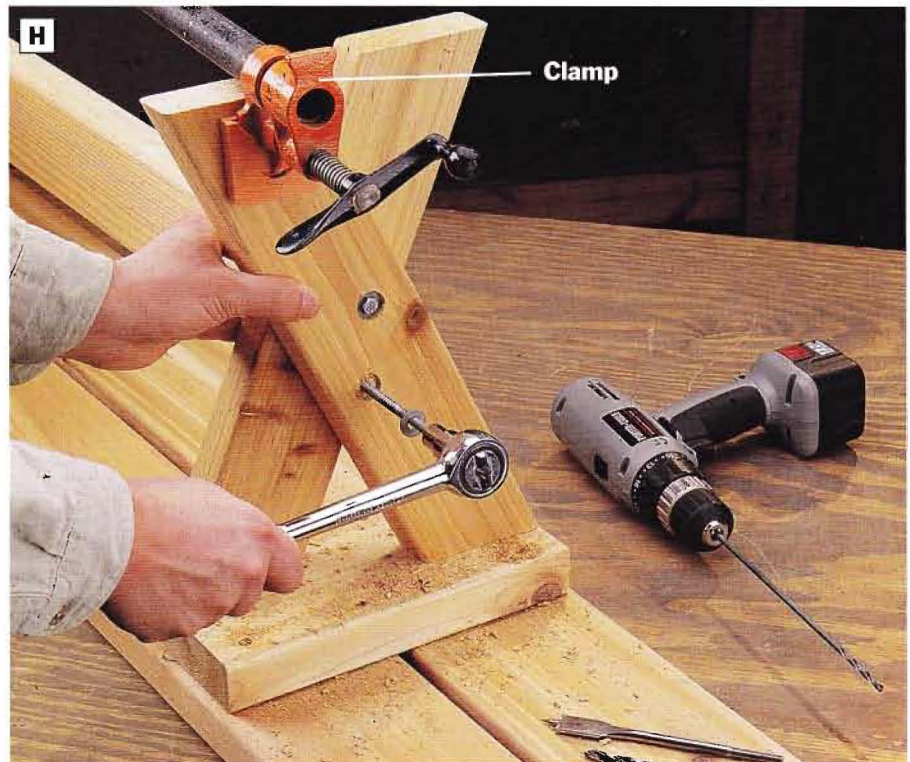


PHOTO H: Cut the bench braces to length and clamp them in position 5 1/2 in. from the bottoms of the legs on each bench. Drill 3/4-in.-dia. counterbores in the outermost legs to recess two lag bolt heads, then drill pilot holes through the counterbored holes to install the lag bolts. Slip a washer onto each lag bolt before you screw it through the legs and into the bench braces.

Daytripper Chair

This two-part chair is made up of two interlocking and removable substructures that nestle one inside the other for easy storage or portability. When set up, it is as handsome as it is sturdy and comfortable. This chair will be equally at home on your deck, on the sidelines of the soccer field or in your living room, if you're ever in need of extra seating.



See pages 68-75 for plans on how to build a matching table to accompany this Daytripper Chair project. The table folds down to nearly flat for storage and transport.

Vital Statistics: Daytripper Chair



TYPE: Daytripper chair

OVERALL SIZE: 23W by 30L by 30¹/₂H

MATERIAL: Red oak, pressure-treated pine

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Back and seat supports built from treated lumber for strength
- Oak plugs conceal screws in slats
- Handle integrated into top two back slats
- Chair disassembles for ease of storage and transport

FINISHING OPTIONS: Danish oil or a penetrating UV protectant sealer, exterior latex paint

Building time



PREPARING STOCK
0 hours



LAYOUT
1-2 hours



CUTTING PARTS
1-2 hours



ASSEMBLY
4-6 hours



FINISHING
2-3 hours

TOTAL: 8-13 hours

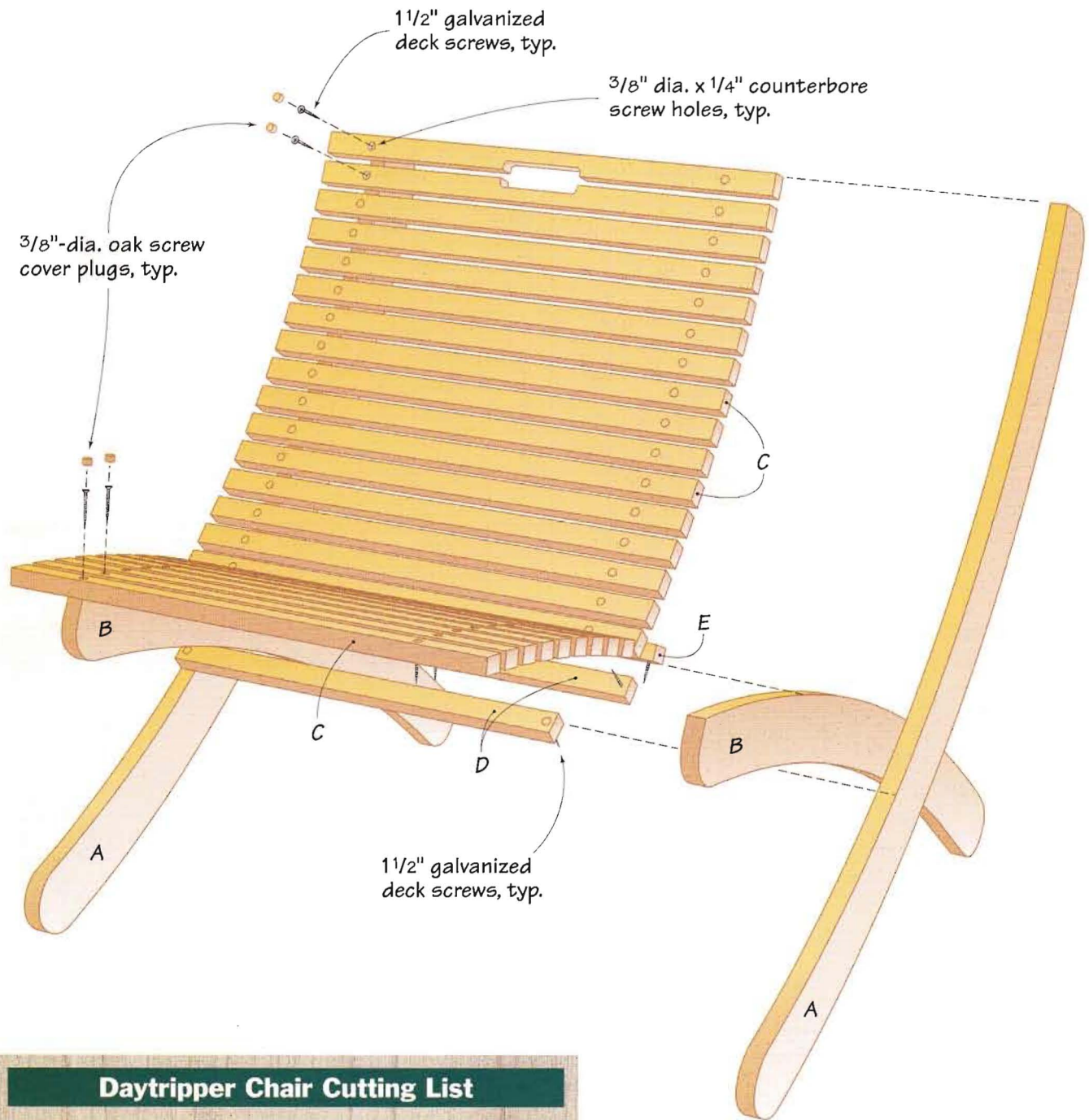
Tools you'll use

- Band saw or jig saw
- Circular saw or power miter saw
- Router with ¹/₈-in. roundover bit, ¹/₂-in. straight bit
- Drill/driver
- Drill press
- ³/₈-in. plug cutter
- Compass
- Mallet
- Clamps

Shopping list

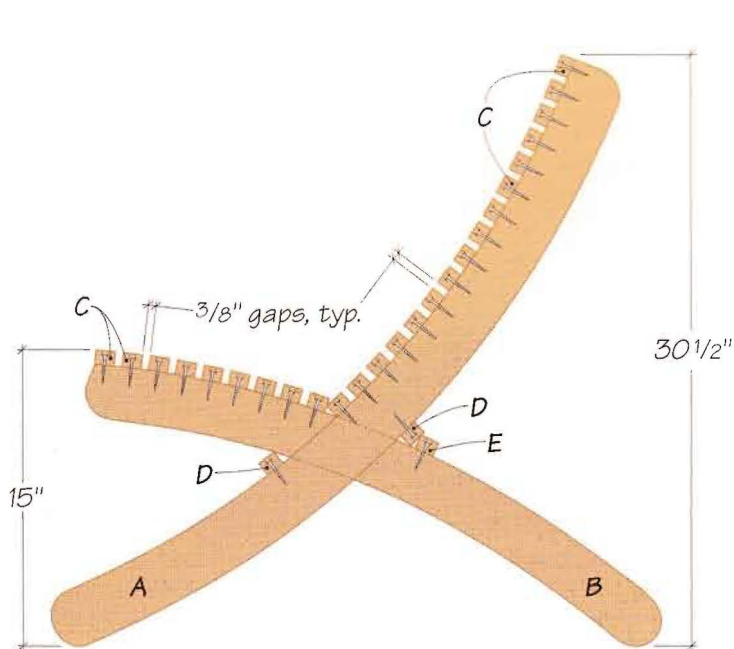
- ☐ (1) ³/₄ × 10 in. × 8 ft. pressure-treated pine
- ☐ (1) ³/₄ × 8 in. × 8 ft. pressure-treated pine
- ☐ (2) ³/₄ × 4³/₄ in. × 8 ft. red oak
- ☐ Galvanized deck screws (1¹/₂-in.)
- ☐ Moisture-resistant wood glue
- ☐ Danish oil or penetrating UV protectant sealer
- ☐ Latex primer
- ☐ Exterior latex paint

Daytripper Chair

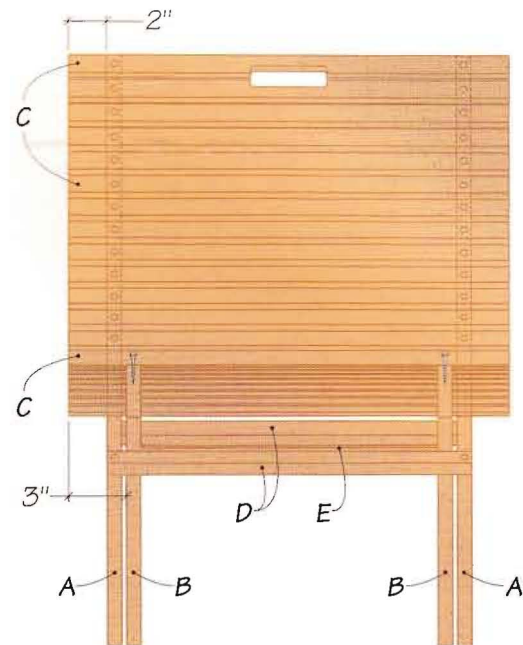


Daytripper Chair Cutting List

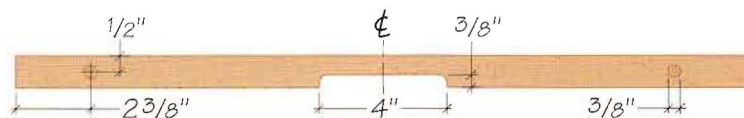
Part	No.	Size	Material
A. Back supports	2	3/4 x 75/8 x 41 in.	Treated pine
B. Seat supports	2	3/4 x 55/8 x 32 1/2 in.	"
C. Slats	25	3/4 x 1 x 23 in.	Red oak
D. Inner crossbar	2	3/4 x 2 x 19 in.	"
E. Outer crossbar	1	3/4 x 1 x 17 in.	"
F. Short crossbar	1	3/4 x 1 x 17 in.	"



SIDE VIEW



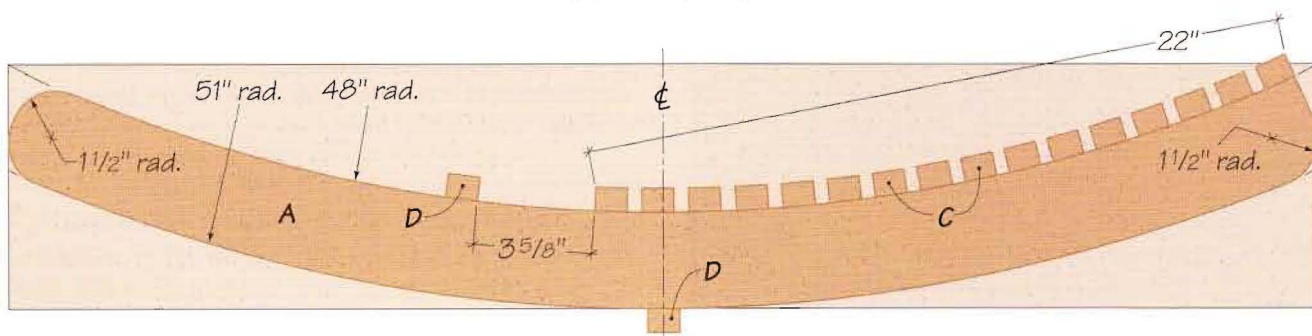
FRONT VIEW



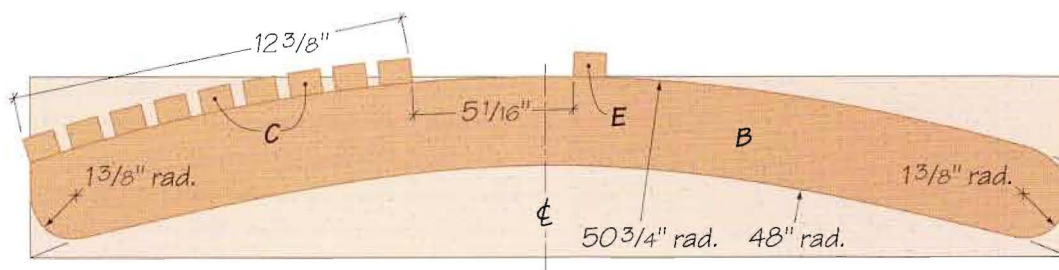
BACK & HANDLE SLATS



SEAT SLATS



BACK SUPPORTS



SEAT SUPPORTS

Daytripper Chair: Step-by-step

CUT OUT THE PARTS

- 1 Cut two back supports and two seat supports to size and shape. To ensure identical pairs, use templates made from 1/4-in. hardboard to trace profiles onto the workpieces (See Photo A). Follow the dimensions shown in the *Back Supports* and *Seat Supports* drawings, page 65. Before cutting out the back supports, measure and mark the centerline to use later as a reference line for crossbar installation.
- 2 Paint the supports. Sand the surfaces and edges well. Apply a coat of latex primer, then two coats of exterior latex paint. Transfer the centerline reference mark on the back supports to the painted surfaces.
- 3 Make the slats and crossbars. Cut blanks to length from 3/4-in. oak stock. Set the fence on your table saw to rip the 1-in.-wide slats and crossbars. Re-set the fence to cut the 2-in.-wide, inner long crossbar.
- 4 Drill counterbored pilot holes in the back slats and seat slats for attaching these parts to the supports later. Designate 16 slats as the back slats and the remaining nine slats for the seat. Drill a pilot hole 2 3/8 in. from each end of the back slats, so the counterbore portion of each hole is 3/8 in. deep. This is easiest to do using a depth setting on a drill press. At the same drill press depth setting, drill a pilot hole 3 3/8 in. from each end of the seat slats.

5 Make the crossbars. Crosscut the two long crossbars and the short crossbar to length from the 1-in. stock you ripped in Step 3. Drill counterbored pilot holes for screws 3/8 in. from each end.

6 Rout a 1/8-in. roundover on the edges and ends of one face of the slats and crossbars (See Photo B). The proportions of these parts are too narrow to rout “freehand” with a router, so shape these parts on a router table with a pin-style guide installed.



PHOTO A: Create seat and back support templates from hardboard, and use these templates to draw the profiles on the back and seat support workpieces (use treated lumber, not plywood as shown). Cut out the parts with a jig saw.

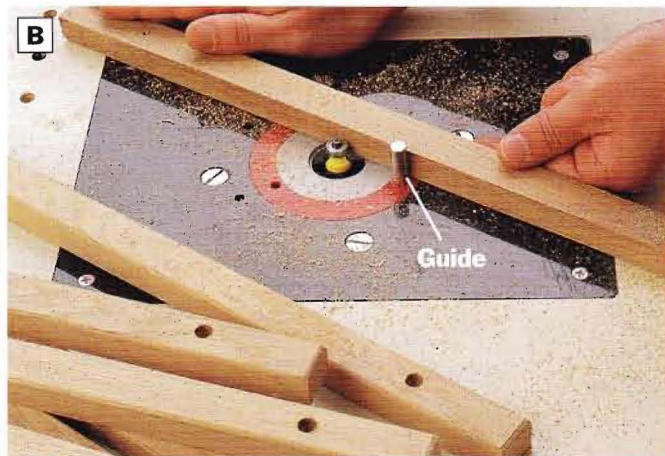


PHOTO B: Ease the edges and ends of the slats and crossbars with a 1/8-in. roundover bit in the router table. Use a pin-style guide on the router table to help control the workpieces as you machine them.

7 Rout a “handle” in the adjoining edges of two back slats (See *Back & Handle Slats*, page 65), using a 1/2-in. straight bit in the router table and cutting a 3/8 x 4-in. centered notch in both slats (See Photo C).

ASSEMBLE THE BACK

8 Cut two 17 1/2-in.-long spacers from scrap, and clamp them between the back supports to hold the supports in place. Use a carpenter’s square to verify that the ends of the supports are even with one another. Set the assembly concave-side-up.

9 Attach the back slats. Screw the top slat in place, holding the upper edge flush with the top corners of the back supports and the handle profile facing inward. Measure from the attached slat (See *Back*

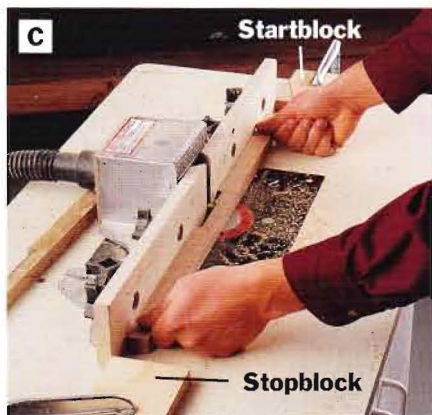


PHOTO C: Make handle cutouts in two back slats using a router table and straight bit. Install start- and stopblocks to limit the length of cut when routing these recesses.



PHOTO D: When installing the back and seat slats to the supports, clamp scrap spacers between the supports to keep them aligned.



PHOTO E: Cover exposed screw heads on the slats and crossbars with oak plugs. Glue and insert the plugs, trim them and sand smooth.

Supports drawing, page 65) and mark the location of the lowest back slat. Screw this slat in place.

10 Verify the spacing of the remaining back slats between the top and bottom slats (about $\frac{1}{2}$ in.). Attach these 15 back slats with $1\frac{1}{2}$ -in. galvanized deck screws, starting from the top with the slat that completes the handle cutout.

11 Install the inner long crossbar. Measure $3\frac{5}{8}$ in. from the lowest back slat to position the crossbar. Screw the crossbar in place.

ASSEMBLE THE SEAT

12 Follow the same procedure as for the back assembly. Cut two spacers $15\frac{1}{2}$ in. long, and clamp them between the seat supports.

13 Screw the front seat slat in place, with the edge flush with the top corners of the seat supports.

14 Measure $12\frac{3}{8}$ in. from the attached seat slat, and mark the location of the last seat slat. Screw this slat in place.

15 Verify the spacing of the remaining seat slats (approximately $\frac{3}{8}$ in.), and attach the rest of the slats with $1\frac{1}{2}$ -in. galvanized deck screws (**See Photo D**).

ASSEMBLE THE CHAIR

16 Plug all of the screw holes. Cut $\frac{3}{8}$ -in.-dia. oak plugs with a plug cutter. Glue and tap the plugs into place (**See Photo E**). Trim and sand the plugs flush.

17 Attach the outer long crossbar in place on the back support centerline you drew in Step 1.

18 Slide the seat into position between the back supports. Use C-clamps at the intersections of the supports to hold the two assemblies in place. Mark the correct locations for the short crossbar (**See Photo F**). It should rest against the outer long crossbar. Attach the crossbar with galvanized deck screws. Then plug, trim and sand the crossbar screw holes.

FINISHING TOUCHES

19 Break all edges on the raw oak parts thoroughly with sandpaper. Mask off the painted surfaces of the supports, and cover the slats with Danish oil or a UV protectant sealer.

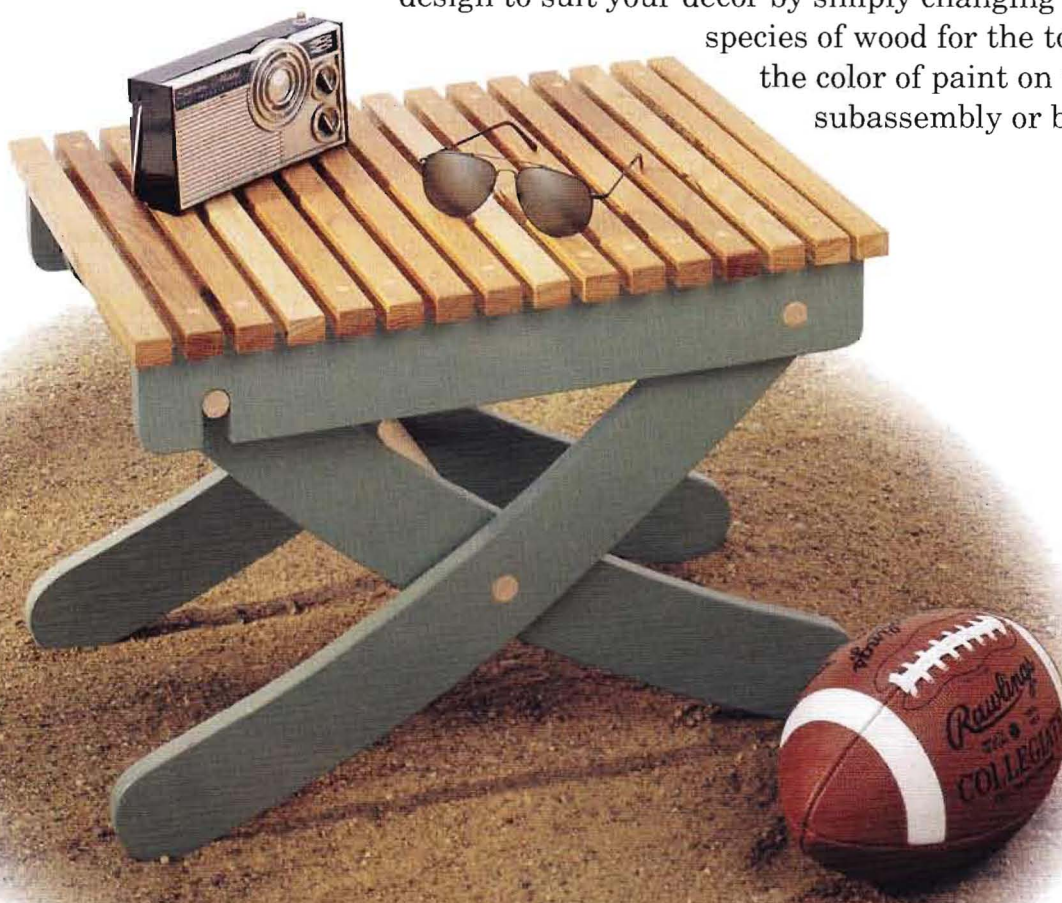


PHOTO F: Slide the seat assembly into the back assembly and use C-clamps to hold the chair together. Set the short crossbar against the lower long crossbar, mark its position, and install it with screws.

Daytripper Table

This folding table goes anywhere and stores easily, yet it has the look of fine furniture. Its contrasting base and top and its neatly plugged screw holes highlight both stylishness in conception and craftsmanship in construction. You can easily alter this versatile design to suit your decor by simply changing the

species of wood for the top slats, the color of paint on the table subassembly or both.



See pages 62-67 for plans on how to build a matching chair to complement this Daytripper Table project. The chair pulls apart into two sections that nest one inside the other for storage.

Vital Statistics: Daytripper Table



TYPE: Folding table

OVERALL SIZE: 16W by 22L by 16H

MATERIAL: Red oak, exterior plywood

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Legs made of plywood for strength
- Screws concealed with matching wood plugs on oak parts
- Table folds flat by way of pivot dowels on the stretchers and legs

FINISHING OPTIONS: Penetrating UV protectant sealer, exterior latex paint

Building time



PREPARING STOCK
0 hours



LAYOUT
2-3 hours



CUTTING PARTS
2-3 hours



ASSEMBLY
2-3 hours



FINISHING
2-3 hours

TOTAL: 8-12 hours

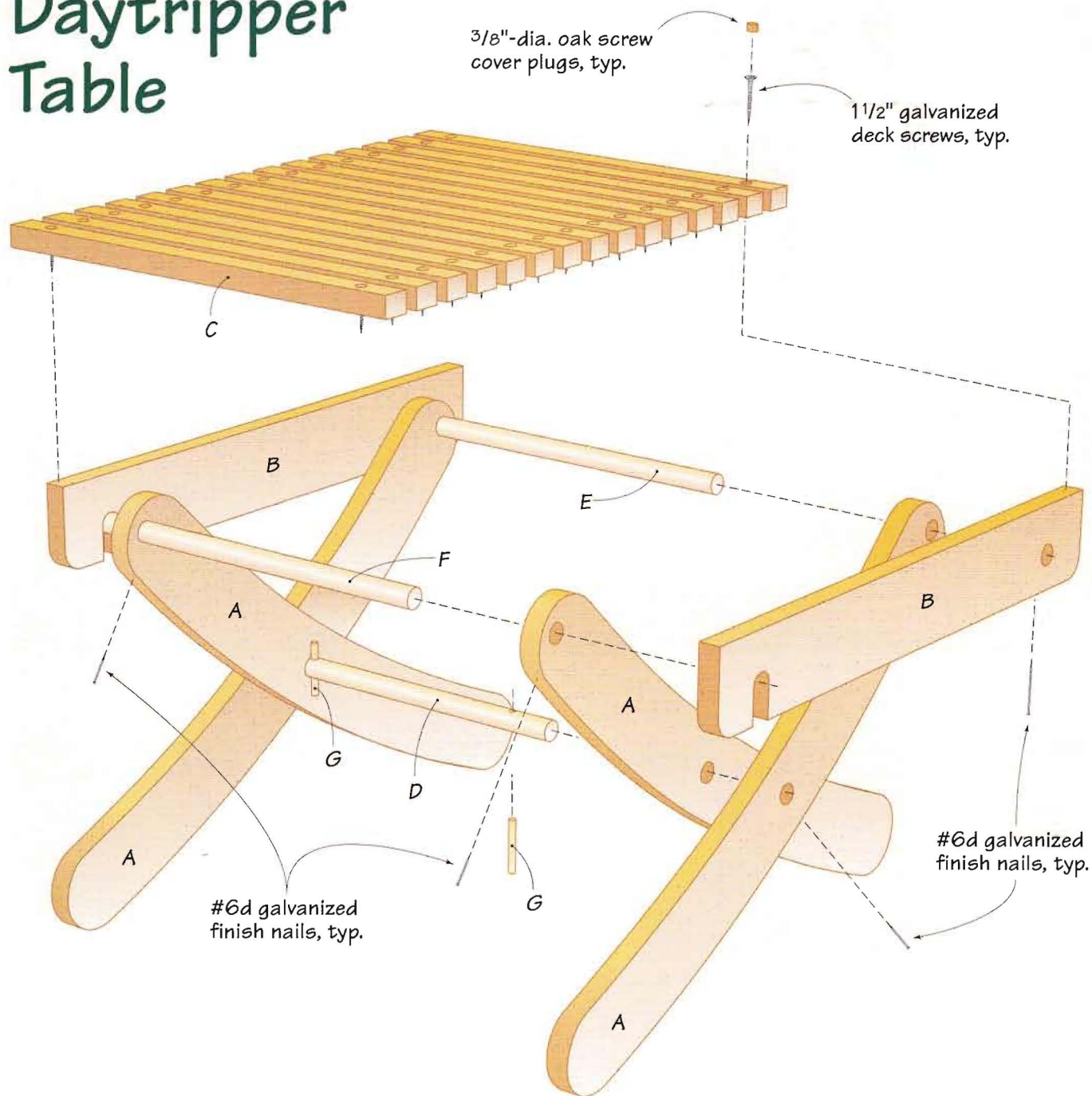
Tools you'll use

- Band saw or jig saw
- Drill press
- Table saw
- Circular saw or power miter saw
- Compass
- Drill/driver
- Clamps

Shopping list

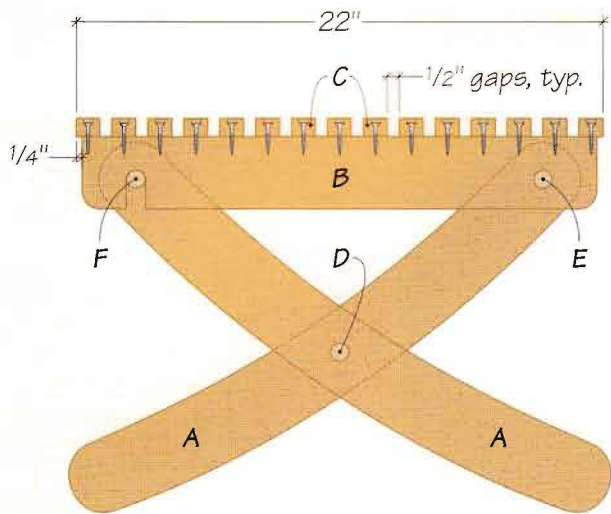
- ☐ (1) $\frac{3}{4}$ in. $\times$ 4 $\times$ 4 ft. exterior plywood
- ☐ (1) $\frac{3}{4} \times 3\frac{1}{2}$ in. $\times$ 8 ft. red oak
- ☐ (2) $\frac{3}{4}$ -in.-dia. $\times$ 36-in. hardwood dowel
- ☐ (1) $\frac{1}{4}$ -in.-dia. $\times$ 36-in. hardwood dowel
- ☐ Galvanized deck screws (1 $\frac{1}{2}$ -in.)
- ☐ #6d galvanized finish nails
- ☐ UV protectant sealer
- ☐ Latex primer
- ☐ Exterior latex paint

Daytripper Table

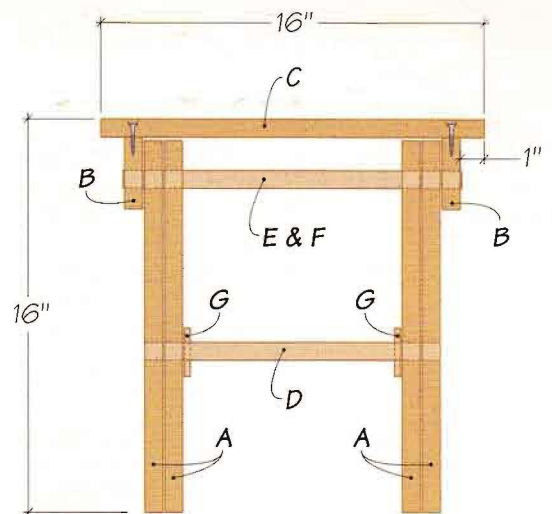


Daytripper Table Cutting List

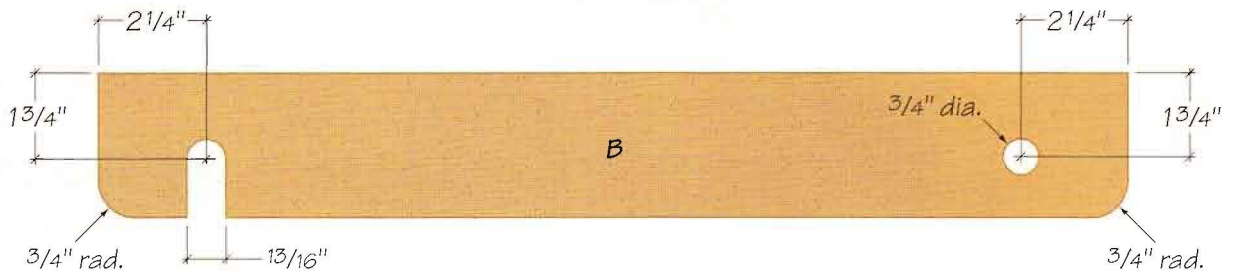
Part	No.	Size	Material
A. Legs	4	3/4 x 4 1/4 x 25 in.	Exterior plywood
B. Stretchers	2	3/4 x 3 x 21 1/2 in.	"
C. Slats	15	3/4 x 1 x 16 in.	Oak
D. Leg pivot dowel	1	3/4 dia. x 12 7/16 in.	Hardwood
E. Table pivot dowel	1	3/4 dia. x 14 1/8 in.	"
F. Table lock dowel	1	3/4 dia. x 14 1/8 in.	"
G. Lock dowels	2	1/4 dia. x 1 1/4 in.	"



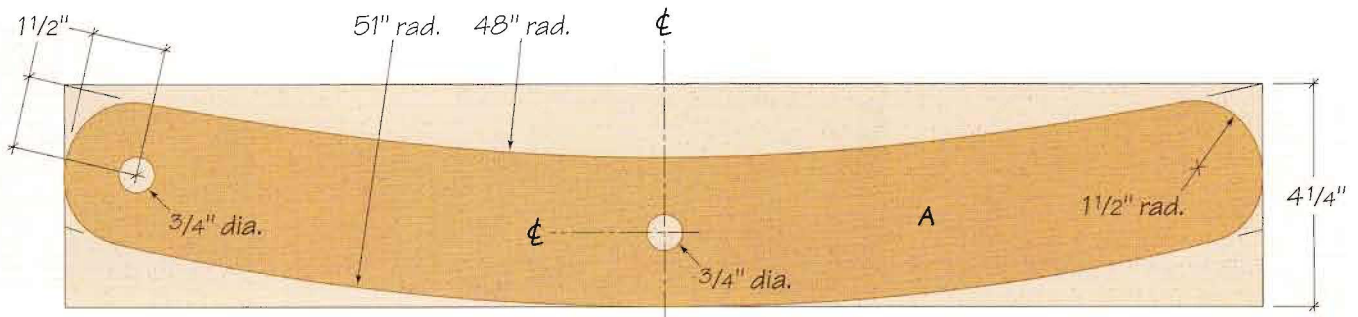
SIDE VIEW



END VIEW



STRETCHERS



LEGS

Daytripper Table: Step-by-step

MAKE THE LEGS

1 Lay out one leg on a piece of $\frac{3}{4}$ -in. exterior plywood, cut it to shape, and use it as a template for the other three legs. To lay out the leg, draw two 3-in.-dia. circles with their centerpoints 22 in. apart. Mark the midpoint between the circles with a perpendicular line, for use later in locating the hole for the leg pivot dowel. Clamp the workpiece to your workbench and extend the perpendicular line you just drew onto the benchtop. Use this line as the pivot point for connecting the circles with a 48-in.-radius arc for the inner curve of the leg and a 51-in.-radius arc for the outer curve (See the *Legs* drawing, page 71). Drill a $\frac{1}{16}$ -in. locator hole through the centerpoints of the two dowel holes in the leg. Cut out the leg and sand the cut edges smooth.

2 Trace the leg template onto three plywood leg blanks. Mark the centerpoints of the leg dowel holes by drilling through the locator holes in the template.

3 Cut out the legs (See **Photo A**), and sand the profiles smooth.

4 Drill the dowel holes in the legs (See **Photo B**). It is important that these holes be bored straight, so use a drill press or right-angle drill guide.



PHOTO A: Lay out and cut the four table legs on the band saw or with a jig saw. Since the profiles of the legs match, mark and cut one to serve as a template for tracing the profiles onto the other three leg blanks.

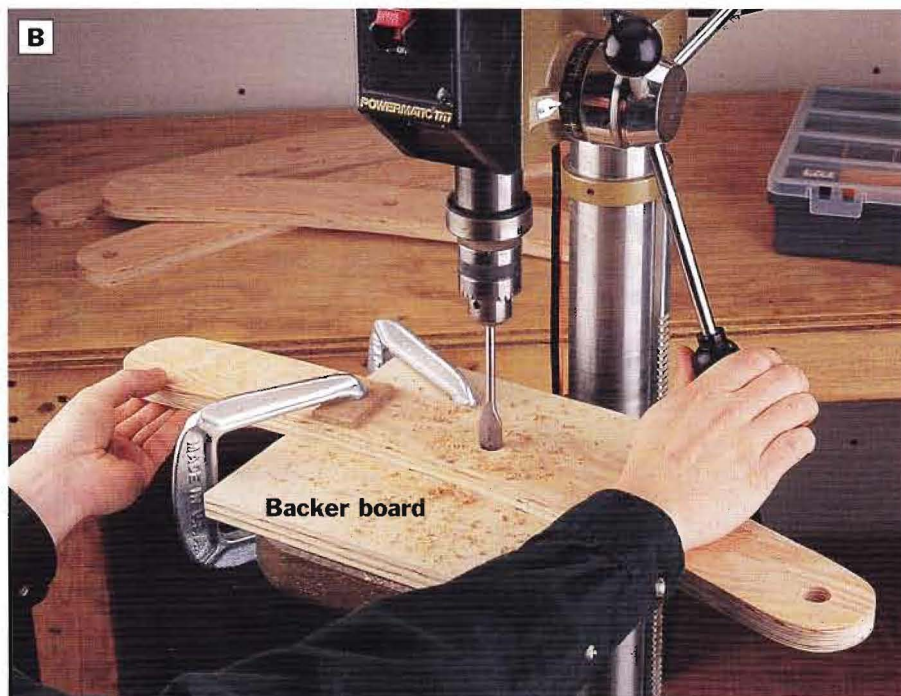


PHOTO B: Bore the $\frac{3}{4}$ -in.-dia. leg pivot and lock dowel holes in the legs. These holes must be drilled straight through the legs, or the dowels will be difficult to align during assembly. Bore the holes with a drill press, or mount your drill/driver in a right-angle drill guide. Set a backer board beneath each workpiece before you drill, to keep the bit from tearing out the wood as it exits.

MAKE THE STRETCHERS & SLATS

5 Cut the stretchers to size and shape. Start by cutting two plywood blanks to length and width. Mark the centerpoints of the pivot dowel hole and the hole that will form the base of the lock dowel slot on each stretcher (See *Stretchers* drawing, page 71). Draw the $\frac{3}{4}$ -in. radiused corners and cut them with your jig saw.

6 Drill the dowel holes. Note that the diameter of the hole that will become the slot for the table lock dowel is $\frac{13}{16}$ in., so that the lock dowel can move freely in and out of the slot. Use a drill press or right-angle drill guide to bore these holes as straight as possible.

7 Cut the lock dowel slots in the stretchers (See **Photo C**). Use a combination square to draw lines from the outer edges of the $\frac{13}{16}$ -in. lock dowel hole to the edge of the stretcher with the curved corners. Clamp the stretcher to your work surface, and cut along the lines to make the slots.

8 Finish the legs and stretchers. Fill any voids in the edges of the plywood with wood putty or auto body filler. Sand the parts smooth. Prime the legs and stretchers with a high-quality latex primer. After the primer dries, apply two coats of exterior latex paint.

9 Make the slats. Crosscut six 16-in.-long blanks from red oak stock. Set the fence on your table saw 1 in. from the blade, and rip the 15 slats to width.

10 Drill counterbored pilot holes in the slats. Make a right-angle jig for your drill press to index placement of the screw holes. Clamp the jig in place so the pilot holes are centered on the slats and inset



PHOTO C: Connect the lock dowel hole with straight lines to the edge of each stretcher, forming the lock dowel slots. Clamp the legs to your work surface and cut along these lines. The width of the slots should be $\frac{13}{16}$ in., to provide a loose fit for the $\frac{3}{4}$ -in.-dia. lock dowel.

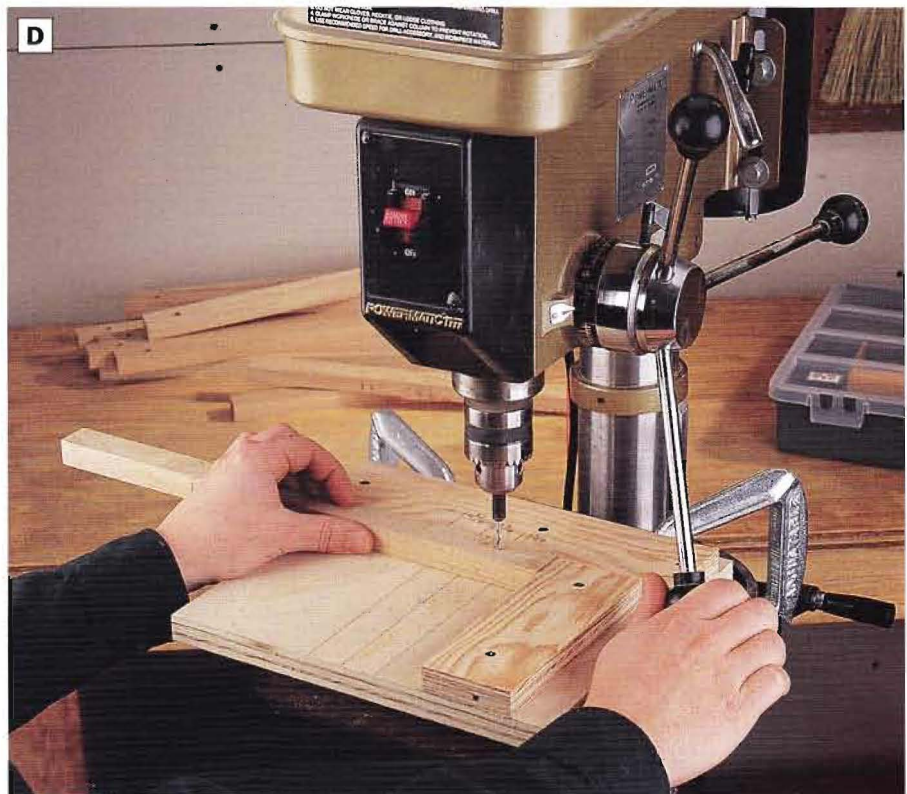


PHOTO D: Build a right-angle jig from scrap to help index placement of the counterbored holes in the ends of the slats. Clamp the jig to the drill press table so each slat is exactly aligned for drilling when you lay it in the jig. This way, there's no need to measure and mark each slat hole.

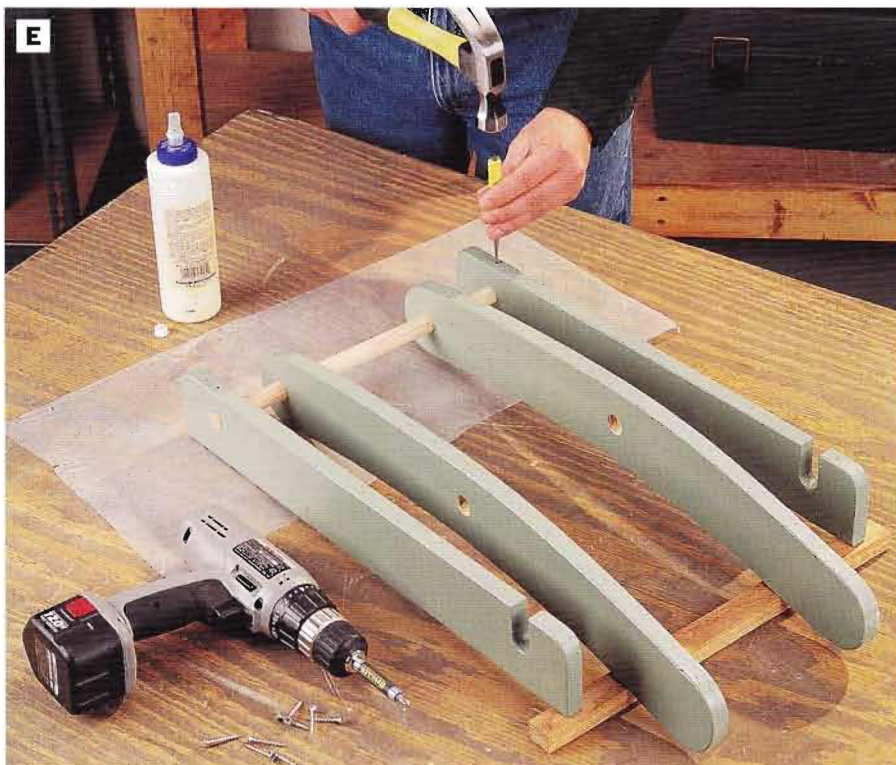


PHOTO E: Attach the first tabletop slat to the stretchers with screws. Lay the outer legs between the stretchers, and slide the table pivot dowel through the stretchers and outer legs. Pin the dowel in place with glue and finish nails driven into the dowel through the stretchers. Do not glue or nail the outer legs to the table pivot dowel.



PHOTO F: Install the inner legs between the outer legs, and insert the leg pivot dowel through the center dowel holes in the legs. Cut and insert the table lock dowel through the inner legs. Pin the table lock dowel to the inner legs and the leg pivot dowel to the outer legs with finish nails.

$1\frac{3}{8}$ in. from the ends (**See Photo D**). Set the depth stop on the drill press so the counterbored portion of the holes is $\frac{1}{4}$ in. deep, to allow for inserting wood plugs later.

11 Round over the edges and ends on one face of all the slats. The quickest method for doing this is to use a $\frac{1}{8}$ -in. piloted roundover bit in the router table. Or, you could ease these edges and ends with a sander instead.

ASSEMBLE THE TABLE

12 Attach the first slat to the stretchers to help establish their alignment during assembly. Start at the end with the lock dowel slot. Position the slat so it overhangs the outside faces of the stretchers by 1 in. and the ends of the stretchers by $\frac{1}{4}$ in. Fasten the slat in place with $1\frac{1}{2}$ -in. galvanized deck screws.

13 Install the table pivot dowel. Cut the dowel to length, and slip it through the end holes in the outer legs and stretchers. Assemble the parts so the concave profiles of the outer legs will face the tabletop slats. Fasten the dowel with glue and a #6d galvanized finish nail driven through each stretcher (**See Photo E**). Drill $\frac{1}{16}$ -in. pilot holes before driving the nails. Once fastened, the pivot dowel holds the tabletop frame in shape.

14 Attach the remaining table slats with screws. Start with the other end slat, overhanging it $\frac{1}{4}$ in. beyond the ends of the stretchers. Space the 13 intermediate slats $\frac{1}{2}$ in. apart, with all ends lined up. Use spacers to help establish even gaps as you attach the slats.

15 Install the inner legs. With the table facedown on your worksur-

face, position the inner legs by setting them concave-side-down between the outer legs and sliding the leg pivot dowel through the center dowel holes in the legs.

16 Cut and fasten the table lock dowel to the inner legs. Space the inner legs by sliding them lightly against the inner faces of the outer legs. Insert the lock dowel through the end holes in the inner legs and position it so there is an equal overhang on each side. Fasten the lock dowel by drilling a pilot hole through the end of each leg and driving a finish nail into the dowel.

17 Fasten the leg pivot dowel. Drill a pilot hole into each outer leg, and drive a finish nail through the pilot hole into the dowel (**See Photo F**).

18 Install lock dowels through the leg pivot dowel. The lock dowels hold the inner legs in place against the outer legs. It's important to leave enough space between the two pairs of legs for easy movement when the legs are opened or closed. With the assembled table facedown on your worksurface, drill $\frac{1}{4}$ -in.-dia. pilot holes through the pivot dowel (**See Photo G**). Cut the lock dowels to length, coat them with glue, and insert them.

FINISHING TOUCHES

19 Insert oak plugs with glue into the screw holes in the slats, let dry, and sand the plugged areas smooth. You could use wood filler instead of plugs, but the result will be less visually appealing.

20 Mask off painted surfaces of the table, and apply Danish oil or another clear exterior finish to the dowels and slats (**See Photo H**).



PHOTO G: Lock the inner legs in place by drilling and inserting $\frac{1}{4}$ -in.-dia. dowels through the leg pivot dowel. Position the lock dowels to leave a slight bit of room between the legs, so they can move easily past one another without damaging the painted finish of the parts.

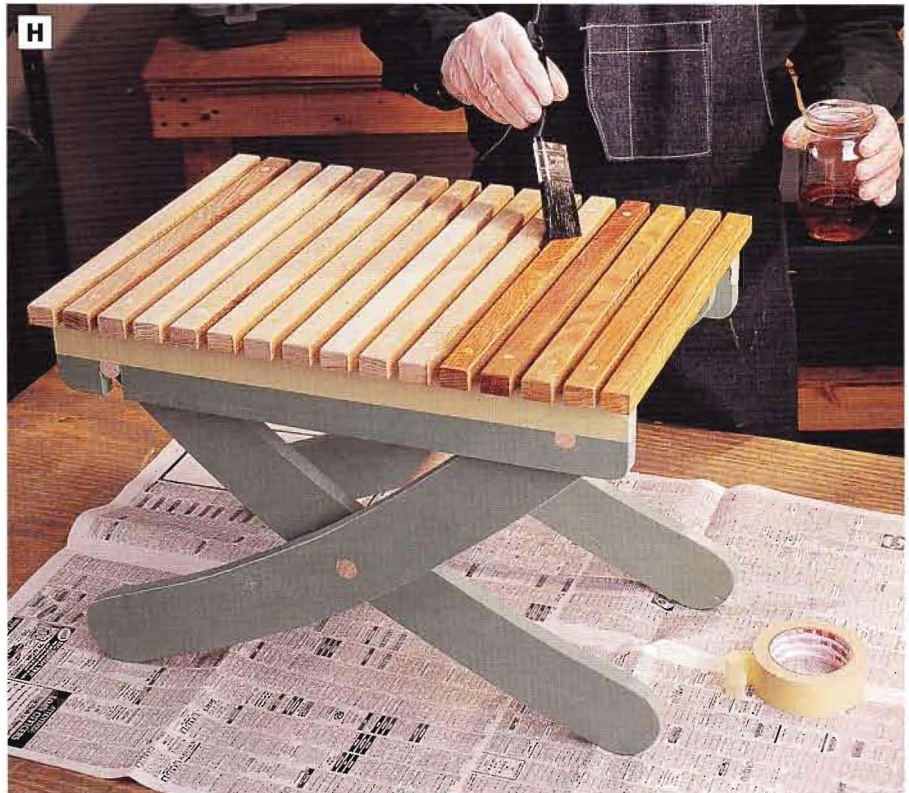


PHOTO H: Coat all raw wood, including the dowels, with Danish oil or another clear exterior-rated wood finish to protect the wood from UV rays and moisture exposure. Use masking tape to keep painted surfaces clean when you brush the slats and dowels with wood finish.



Porch Glider

The gentle rocking motion of this two-person porch glider will make it one of your favorite summer spots. Built entirely of solid red oak, this charming piece of furniture is destined to become a family heirloom. Set it in a sheltered area, sit back and enjoy!

Vital Statistics: Porch Glider



TYPE: Porch glider

OVERALL SIZE: 27D by 59³/₄L by 35H

MATERIAL: Red oak

JOINERY: Butt joints reinforced with dowels or screws

CONSTRUCTION DETAILS:

- Many parts of the bench constructed with dowel joints for ease of construction and durability
- Bench suspended from stand by way of oak glider arms and pivoting hinges
- Screw heads concealed with matching oak plugs

FINISHING OPTIONS: Penetrating UV protectant sealer

Building time



PREPARING STOCK
1-2 hours



LAYOUT
3-4 hours



CUTTING PARTS
3-4 hours



ASSEMBLY
8-12 hours



FINISHING
2-4 hours

TOTAL: 17-26 hours

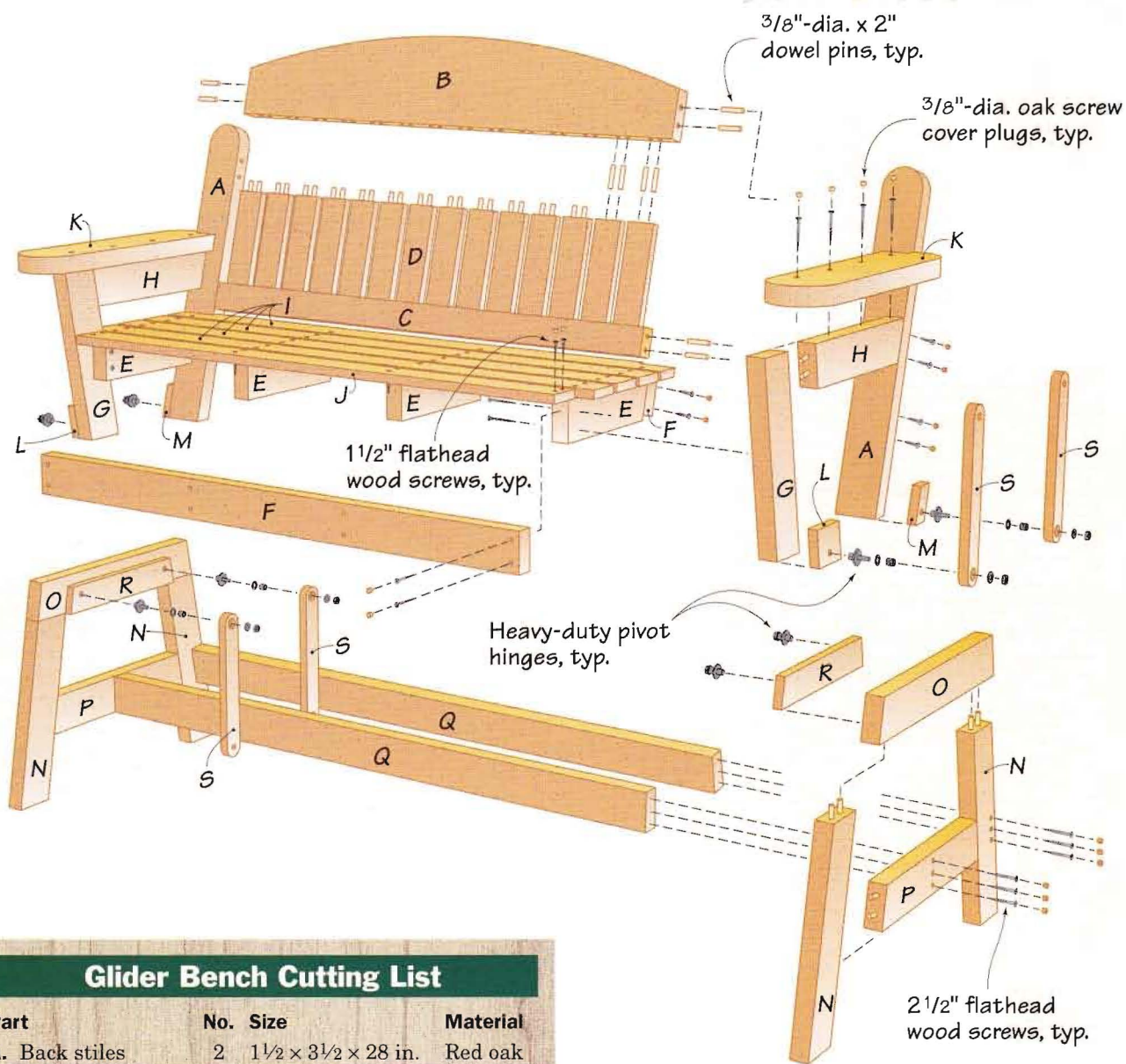
Tools you'll use

- Band saw
- Power miter saw or circular saw
- Table saw
- Drill press
- ³/₈-in.-dia. plug cutter
- Drill/driver
- Drill bits (¹/₂-, 1-in.)
- Doweling jig
- Clamps
- Router with ¹/₄-in. roundover bit
- Wooden mallet
- Flush-trimming saw
- Wrenches
- Combination square

Shopping list

- ☐ (1) ¹/₂ × 8 in. × 4 ft. red oak
- ☐ (1) ¹/₂ × 5¹/₂ in. × 4 ft. red oak
- ☐ (6) ¹/₂ × 3¹/₂ in. × 8 ft. red oak
- ☐ (1) ¹/₂ × 2¹/₂ in. × 4 ft. red oak
- ☐ (5) ³/₄ × 3 in. × 6 ft. red oak
- ☐ (2) ³/₄ × 2¹/₂ in. × 8 ft. red oak
- ☐ (1) ³/₄ × 1³/₄ in. × 6 ft. red oak
- ☐ (84) ³/₈-in.-dia. × 2-in. fluted dowels
- ☐ Moisture-resistant wood glue
- ☐ Flathead wood screws (1¹/₂-, 2¹/₂-in.)
- ☐ (8) pivot hinges (available from Rockler Companies)
- ☐ UV protectant sealer

Porch Glider

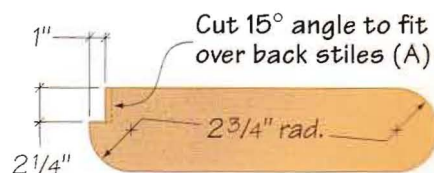
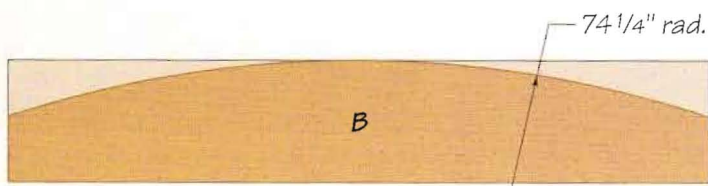
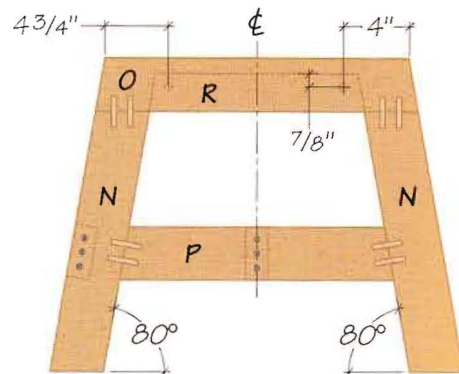
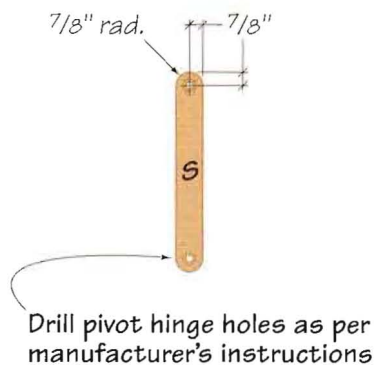
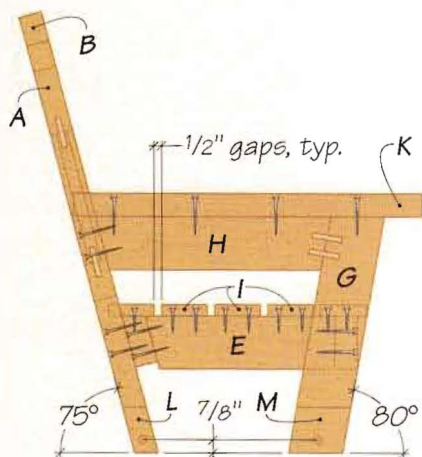
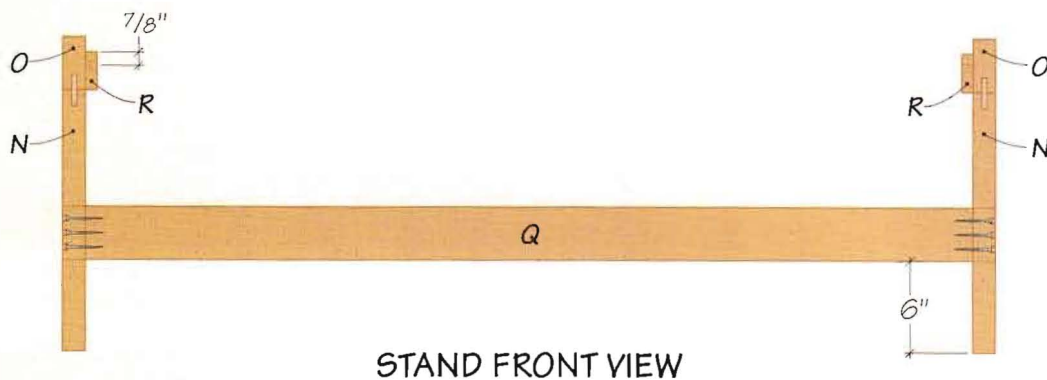
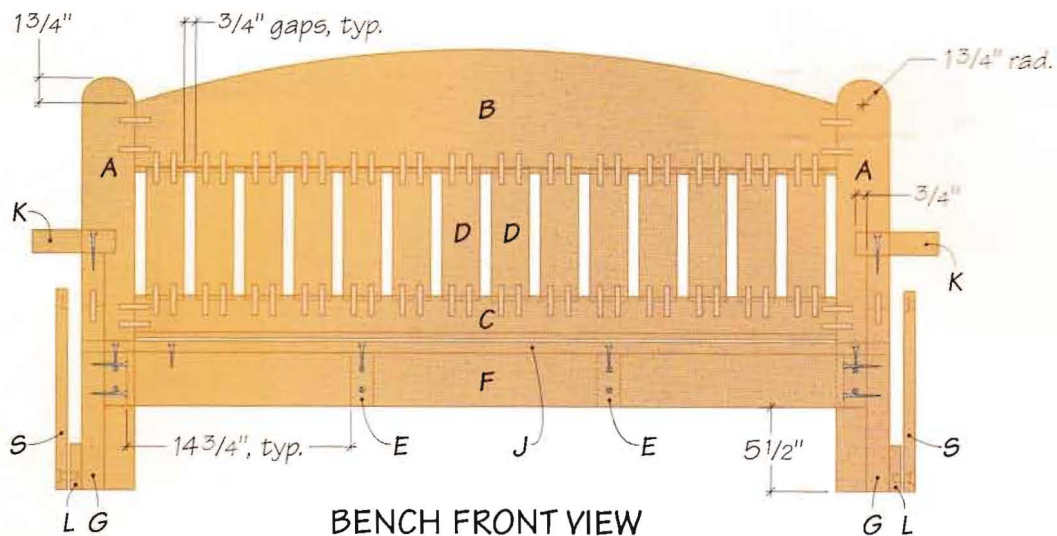


Glider Bench Cutting List

Part	No.	Size	Material
A. Back stiles	2	1 1/2 x 3 1/2 x 28 in.	Red oak
B. Upper back rail	1	1 1/2 x 8 x 46 1/4 in.	"
C. Lower back rail	1	1 1/2 x 2 1/2 x 46 1/4 in.	"
D. Back slats	14	3/4 x 2 1/2 x 8 3/4 in.	"
E. Bench struts	4	1 1/2 x 3 1/2 x 12 1/2 in.	"
F. Bench rails	2	1 1/2 x 3 1/2 x 50 1/4 in.	"
G. Bench legs	2	1 1/2 x 3 1/2 x 16 3/8 in.	"
H. Arm supports	2	1 1/2 x 3 1/2 x 15 1/2 in.	"
I. Bench slats	4	3/4 x 3 x 53 1/4 in.	"
J. Front bench slat	1	3/4 x 3 x 50 1/4 in.	"
K. Arm rests	2	1 1/2 x 5 1/2 x 23 in.	"
L. Bench leg blocking	2	3/4 x 3 x 4 1/16 in.	"
M. Back stiles blocking	2	3/4 x 3 x 2 3/8 in.	"

Glider Stand Cutting List

Part	No.	Size	Material
N. Stand legs	4	1 1/2 x 3 1/2 x 18 in.	Red oak
O. End top rails	2	1 1/2 x 3 1/2 x 21 1/4 in.	"
P. End bottom rails	2	1 1/2 x 3 1/2 x 18 1/16 in.	"
Q. Stand stretchers	2	1 1/2 x 3 1/2 x 58 1/2 in.	"
R. Spacers	2	3/4 x 2 1/2 x 14 1/4 in.	"
S. Glider arms	4	3/4 x 1 3/4 x 13 1/8 in.	"



Porch Glider: Step-by-step

This porch glider is made up of two distinct structures joined together with glider arms and pivot hinges. The hinges we used are available from the Rockler Companies. You'll start by building the bench, then the glider stand. After both parts are constructed, you'll join them together. All the face screws in this piece are countersunk $\frac{1}{4}$ in. and concealed with $\frac{3}{8}$ -in.-dia. matching oak plugs. Building the glider will require you to make many angled cuts. Assembly will go much more smoothly if you take the time to make these angled cuts precisely.

BUILD THE BACK ASSEMBLY

1 Make the upper and lower back rails. Cut workpieces for both parts to length from $1\frac{1}{2}$ -in.-thick stock. Mark the arched profile on the upper back rail, using the *Upper Back Rail* drawing, page 79, as a layout guide. Cut the profile on your band saw (**See Photo A**). Sand the profile smooth, and save the curved waste pieces to use later as clamping cauls.

2 Drill dowel holes for the back slats in the upper and lower rails. Clamp the rails together, face to face, holding the ends and dowel edges flush. Mark centerlines for drilling the dowel holes by measuring $1\frac{1}{2}$ in. from one end of the rails to the center of the first hole,

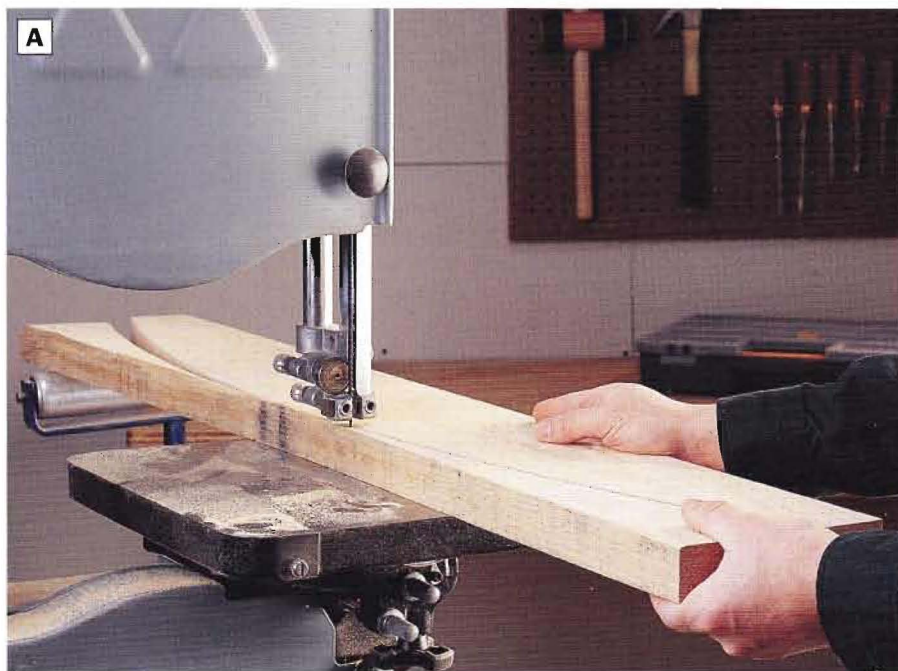


PHOTO A: Cut the profile on the upper back rail to shape on the band saw. Save the curved cutoff pieces to use as cauls when you clamp the back rails and slats together later.

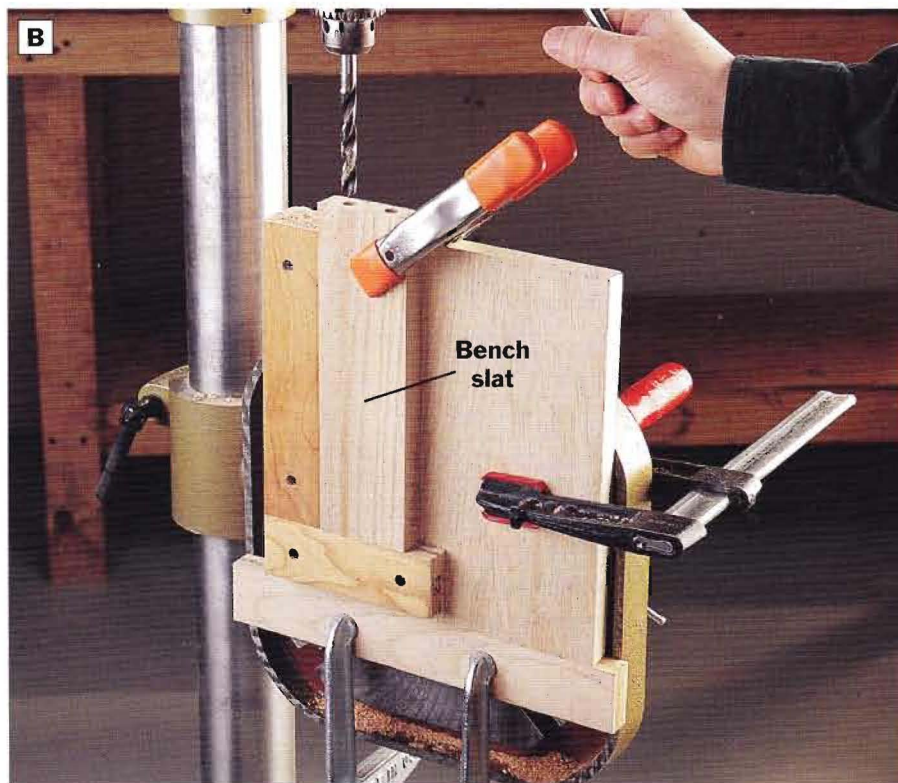


PHOTO B: A right-angle jig will make the job of drilling dowel holes in the slats quicker and more precise. Tip the drill press table vertically and clamp the jig in place so the bit aligns with the dowel locations on each slat. Flip the slats edgewise and endwise to drill all four holes.

1 in. from that mark to the center of the second hole and $2\frac{1}{4}$ in. from the second mark to the third hole. From that point on, alternate 1-, and $2\frac{1}{4}$ -in. spaces. The final measurement at the other end should be $1\frac{1}{2}$ in. Unclamp the rails and drill the dowel holes, using a doweling jig as a guide. Each hole should be $\frac{5}{8}$ in. deep, to allow clearance at the bottom of the holes for glue.

3 Make the back slats. Cut the 14 slats to length, then make a right-angle jig for your drill press to drill the dowel holes in the slat ends. The centerlines of the holes should be $\frac{3}{4}$ in. from each edge, leaving a 1-in. space between them. Tip your drill press table into the vertical position. Clamp the right-angle jig to the table with a slat in place, and adjust the jig position to achieve the correct hole position. Once the jig is set up, four dowel holes can be drilled in each back slat without changing the jig setting. Flip the slats edge-for-edge and end-for-end to drill the holes (**See Photo B**).

4 Assemble the back rails and slats. Glue and insert two fluted dowels into one end of each of the back slats, then put a spot of glue in the holes in the lower back rail and on the mating surfaces of these joints. Tap the back slats into place against the rail with a wooden mallet. Insert glued dowels into the top ends of the slats, spread a thin layer of glue on the mating surfaces of the slats and the top back rail, and install this rail. Use the curved cutoffs from the upper rail as clamping cauls, and clamp up the back assembly (**See Photo C**).

5 Make the back stiles. Cut the stiles to length, then bevel-cut the



PHOTO C: Assemble the upper and lower back rails and back slats with glue and dowels. Clamp the assembly together, using the waste pieces from Step 1 to make clamping the top rail easier. Alternate the clamps above and below the assembly to distribute clamping pressure evenly.



PHOTO D: Complete the back assembly by attaching the stiles to the back rails. Fasten the stiles to the ends of the rails with pairs of dowels and moisture-resistant wood glue.

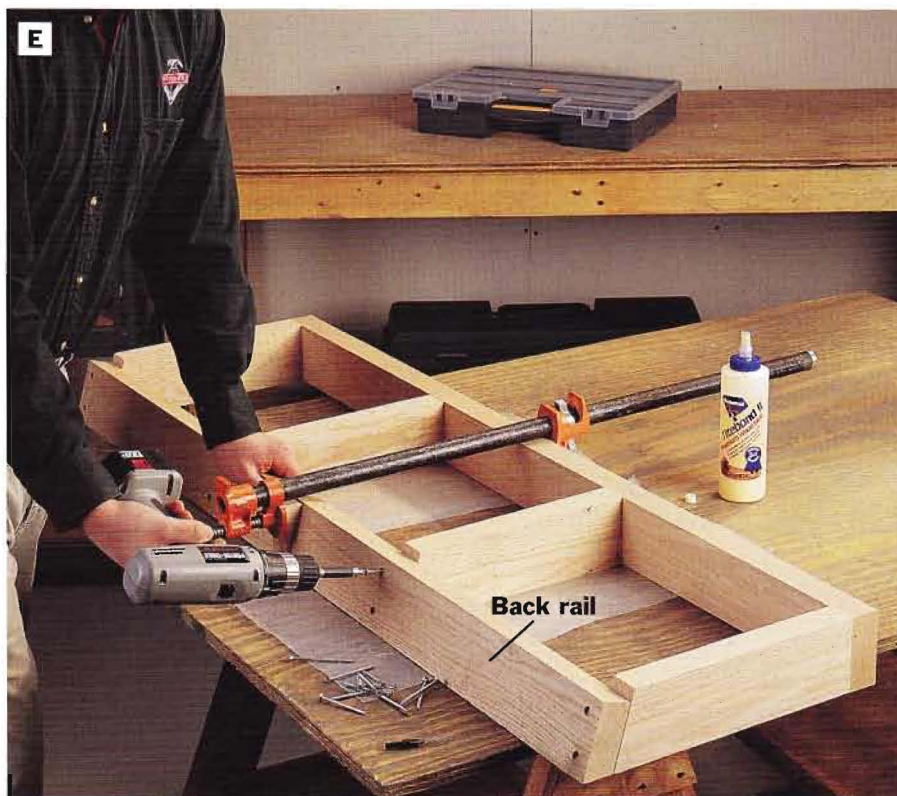


PHOTO E: Build the bench frame by installing four struts between the front and back bench rails with glue and screws. In this photo, the bench frame is upside down. Notice that the beveled edge of the back rail lines up with the edges of the struts, leaving an offset on the other edge.



PHOTO F: Fasten the back assembly to the bench frame by driving countersunk screws through the stiles and into the back bench rail. Be sure the bottom beveled ends of the stiles are parallel with the bottom edges of the bench.

bottom ends of the stiles to 15°, using a power miter saw. Mark the arcs on the upper ends of the stiles and cut them with a jig saw.

6 Drill pairs of matching dowel holes in the stiles and rails to join the rails to the back assembly. On your worksurface, lay the stiles in position against the ends of the upper and lower rails. The top corners of the top back rail should be 1¾ in. down from the tops of the stiles. Mark the dowel hole locations and use a doweling jig as a guide to drill the ⅜-in.-dia. dowel holes, two dowels per joint.

7 Attach the back stiles. Insert glued dowels into the holes, spread a thin coat of glue on the mating surfaces of the rails and stiles, and clamp the parts together (**See Photo D**). Protect the wood from clamp marks by using wooden cauls between the clamp jaws.

8 Ease the outer edges of the back frame assembly with your router and a ¼-in. roundover bit.

BUILD & ATTACH THE BENCH FRAME

9 Make the bench struts. Cut the struts to length. Then cut one end of each strut at a 75° angle across the width of the strut.

10 Cut both bench rails to length, and rip one edge of the back bench rail at a 15° angle on the table saw (**See Bench Side View**, page 79).

11 Build the bench frame. Mark the locations of the struts on the inner faces of the bench rails—two flush with the ends of the rails and the other two struts spaced 14¾ in. from the end struts. The beveled edge of the back bench rail should be flush with the tops of the struts when the bench is right-

side-up. Drill pairs of countersunk pilot holes in the rails, and fasten the rails to the struts with wood glue and 2½-in. flathead wood screws (See Photo E).

12 Attach the back assembly to the bench frame. When attached, the bottom edge of the bench frame is parallel to the angled cut at the bottom end of the stiles and 5½ in. above it. Clamp the back in position against the bench, drill countersunk pilot holes, and screw the stiles to the back rail (See Photo F).

BUILD & ATTACH THE ARM ASSEMBLIES

The arm assemblies consist of the bench legs and arm supports, joined together with dowels. When you attach the assemblies to the bench frame and back, be sure that the bottoms of the legs are even with the bottoms of the back stiles. Otherwise, the bench will not hang evenly later on when attached to the glider stand.

13 Cut the bench legs and arm supports to size, with their ends angled to 80°, as shown in the *Bench Side View* drawing, page 79.

14 Mark and drill dowel holes for connecting the arm supports and legs together. Lay out two dowels per joint. As before, butt the two mating parts together, draw a single line across the joint for each dowel, and drill straight holes for the dowels with a doweling jig (See Photo G).

15 Connect the arm supports and legs. Insert glued dowels into the holes and spread glue on the mating surfaces. Use wooden cauls to protect the finished surfaces of the parts, and join the arm supports to the legs with clamps.



PHOTO G: Join the bench legs to the arm supports with pairs of 2-in. fluted dowels. Use a doweling jig when you drill the holes to be sure that the dowel holes are drilled straight across the joints. Wrap a piece of tape around the drill bit to serve as a temporary depth stop.



PHOTO H: Fasten the arm assemblies to the bench by driving screws through the back stiles and into the arm supports. Screw from inside the bench to attach the end bench struts to the legs as well. Clamp the arm assemblies in place first, to make installing the assemblies easier.



PHOTO I: Cut the arm rests to shape, ease the edges with a router and roundover bit, then clamp them on top of the arm supports. Attach the rests to the supports with countersunk screws.

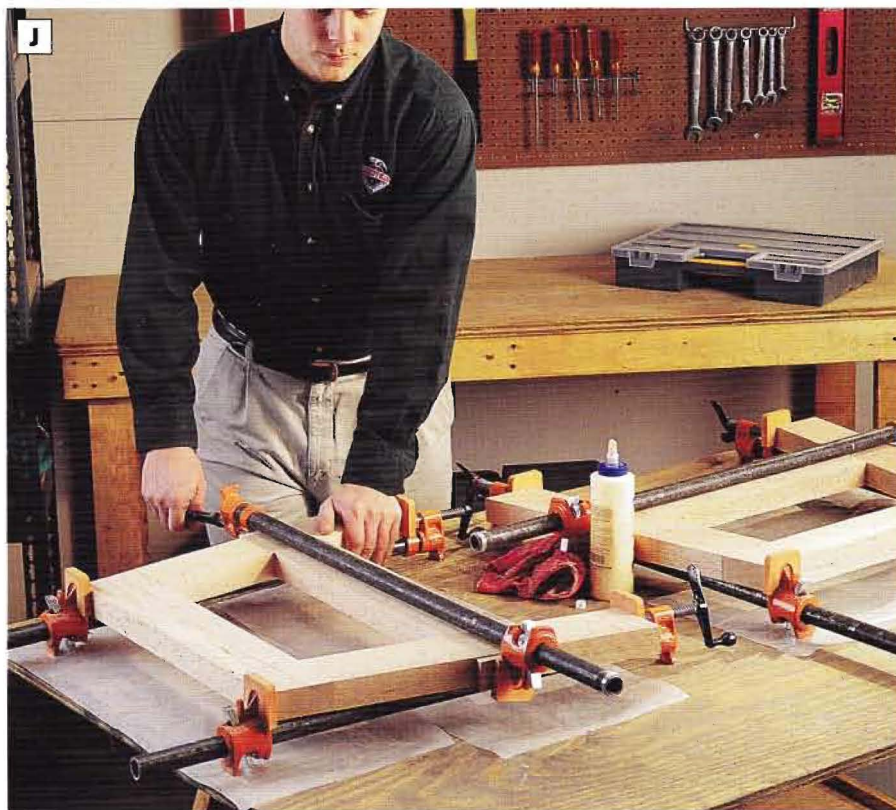


PHOTO J: Build the glider stand ends by attaching the top and bottom end rails to the stand legs with dowels and glue. The bottom rails fit between the legs, while the top rails overlap the top ends of the legs.

16 Fasten the arm assemblies to the bench. Use a square to make a mark $5\frac{1}{2}$ in. up from the bottom of both legs. Clamp the arm assemblies in position, so your leg marks align with the bottom edges of the bench frame, and the backs of the arm supports rest against the back stiles. Drill countersunk pilot holes through the back stiles into the arm supports, and fasten the stiles to the supports with $2\frac{1}{2}$ -in. screws. Then drill pilot holes and drive screws from inside the bench through the outer bench struts and into the bench legs (See **Photo H**).

COMPLETE THE BENCH

17 Cut and position the bench slats. Cut the bench slats and the front bench slat to length. Ease the edges and ends on the top face of each slat with a router and $\frac{1}{4}$ -in. roundover bit. Lay the slats in place on the bench frame so the back edge of the front slat is even with the back edge of the legs. Allow for $\frac{1}{2}$ -in. spaces between the slats. Mark the rear slat so it will notch around the back stiles. Cut out the notches on this slat with your jig saw.

18 Fasten the slats to the bench struts. Use two screws per strut location on the slats, centering the screws on the thickness of the struts. Drill countersunk pilot holes and fasten the slats in place with $1\frac{1}{2}$ -in. flathead wood screws.

19 Cut and attach the arm rests. Refer to the *Arm Rests* drawing, page 79, to lay out the shape of the parts. Cut the arm rests to size and shape with radiused ends and notched back corners. *NOTE: The easiest way to determine the 15° notch angle is to simply set each arm rest in position on the arm supports and mark the angle where the*

arm rests cross the back stiles. Ease all the arm rest edges except the notched portion with a router and a 1/4-in. roundover bit. Clamp the arm rests in place, drill countersunk pilot holes, and fasten them to the arm supports with 2 1/2-in. flathead wood screws (See Photo I).

20 Cut and attach the blocking pieces for the legs and stiles. Cut blanks to size for the four blocking pieces, hold them in place against the legs and stiles and mark the angle cuts. Cut the angles on a band saw. Apply an even coating of glue on the mating surfaces, clamp firmly and let dry completely. *NOTE: Since these parts are fastened with glue alone, it is important to build the best glue joints possible. Be sure the mating surfaces are flat and clean before gluing the joints.* Sand the edges flush and, if desired, ease the sharp edges with your router and a 1/4-in. roundover bit.

BUILD THE STAND ENDS

21 Cut out the stand legs, top and bottom rails. Refer to the *Stand Side View* drawing, page 79, for details on determining the angled ends of these parts.

22 Drill pairs of dowel holes to attach the stand legs to the rails. Butt mating surfaces together, positioning the bottom rails 6 in. up from the bottoms of the legs. Mark the dowel locations and drill the holes with a doweling jig.

23 Assemble the stand ends. Insert glued dowels into the ends of the bottom rails, apply glue to the mating surfaces, and slide the legs into place over the dowels and against the bottom rails. Attach the top rails to the ends of the legs similarly. Clamp up the end assemblies (See Photo J).



PHOTO K: Cut the four glider arms to shape on the band saw. Both ends of the arms receive 7/8-in.-radius curves. Sand the cut edges smooth and round them over with a router if you wish.



PHOTO L: Bore 5/16-in.-deep, 1-in.-dia. counterbores on both ends of the glider arms. Notice that the counterbores are on opposite faces of the arms. Then drill a 1/2-in.-dia. hole through the center of the counterbores all the way through the arms, to accommodate the pivot hinges.



PHOTO M: Install pivot hinges to connect the glider arms to the blocking pieces on the bench. The hardware is essentially a shaft that slides inside a plastic bushing in the glider arms. The hinges press into holes in the blocking and hold the arms in place with washers and nuts.



PHOTO N: Set the bench on your worksurface so the glider arms hang freely. Attach the glider arms to the blocking pieces on the glider stand end assemblies with pivot hinges.

24 Install the spacers. Cut the spacers to size and shape, and fasten them to the inside faces of the end assembly top rails with glue. The bottom edges of the spacers should be flush with the bottom edges of the end top rails.

MAKE THE GLIDER ARMS

25 Cut four blanks for the glider arms to length and width. Mark the $\frac{7}{8}$ -in.-radius arc on the ends, and cut the arcs on your band saw (See Photo K). Sand the cut edges smooth.

26 Drill the counterbored pivot hinge-mounting holes. Each of the hinge holes needs a $\frac{5}{16}$ -in.-deep by 1-in.-dia. counterbore to recess the pivot hinge washer and nut. Drill the 1-in. counterbores first, then drill $\frac{1}{2}$ -in.-dia. through holes at the center of the counterbores (See Photo L). Note in the photo that the two holes in each arm are counterbored from opposite sides of the arms.

27 Attach the glider arms to the bench. Locate and drill the $\frac{1}{2}$ -in.-dia. $\times$ $\frac{1}{2}$ -in.-deep hinge holes in the blocking pieces at the ends of the bench. The holes should be centered across the width of the blocking pieces and $\frac{7}{8}$ in. up from the bottom of the blocking. Install the lower pivot hinges and connect the glider arms to the bench, according to the manufacturer's instructions (See Photo M).

INSTALL THE BENCH IN THE GLIDER STAND

28 Attach the stand end assemblies to the glider arms. Locate and drill the $\frac{1}{2}$ -in.-dia. $\times$ $\frac{1}{2}$ -in.-deep hinge holes in the spacers attached to the end top rails. The *Stand Side View* drawing, page 79, identifies the exact location of the hinges on the glider stand

spacers. Support the bench structure on a platform so the stand ends can rotate freely, and install the upper pivot hinges and glider arms (**See Photo N**).

29 Install the stand stretchers. Cut the stretchers to length, and round over the edges. Mark the position of the stretchers on the glider stand ends—one stretcher is centered on the bottom rails, and the other stretcher lines up with the back edge of the back legs. Clamp the stretchers in place between the stand ends, and drive 2½-in. screws through counter-bored pilot holes to attach the parts (**See Photo O**).

FINISHING TOUCHES

30 Plug all the visible screw holes. Cut ⅜-in.-dia. oak plugs with a plug cutter mounted in your drill press. Spread glue on the plugs and tap them into the screw counterbores with a wooden mallet (**See Photo P**). Trim the plugs flush with the surrounding wood and sand smooth.

31 Sand the completed project thoroughly. Finish the glider with two coats of UV protectant sealer.

Shelter the glider

If you build this project from red oak, place the glider in an area sheltered from direct contact with moisture. Red oak, though durable, is not as weather-resistant as other woods. Should you desire to build the glider for an exposed location, use white oak, cedar, teak or Honduras mahogany instead. And be sure to use galvanized or stainless-steel screws as fasteners.



PHOTO O: Install stretchers between the end assemblies of the glider stand with 2½-in. counter-sunk flathead wood screws. Clamp the stand's ends to hold them stationary as you fasten the stretchers in place.



PHOTO P: Conceal all exposed screw heads with oak plugs. You could use oak dowel for making the plugs, but the preferred method is to cut the plugs from the face grain of a piece of oak stock. This way, the plugs will match the wood grain direction of the bench slats.



Planters

Deck plants provide a graceful transition from the distinctly indoor space of your home to the distinctly outdoor space of your yard. Attractive planters filled with flowers, herbs and shrubs can transform your deck into a cozy and inviting outdoor “room.” These planters are designed to be used either as enclosures for potted plants or to be lined with landscape fabric and filled with dirt. We built these planters for a cedar deck; for best results, build yours from the same material as your deck.

Vital Statistics: Planters



TYPE: Deck and railing planters

OVERALL SIZE: Railing planter: $7\frac{1}{4}$ W by $35\frac{1}{4}$ L by $7\frac{1}{4}$ H
Deck planter: 16W by $20\frac{1}{2}$ L by $15\frac{1}{8}$ H

MATERIAL: Cedar, exterior plywood

JOINERY: Butt joints reinforced with galvanized finish nails and screws

CONSTRUCTION DETAILS:

- Railing planter fits over standard 2×6 railing cap
- Recessed bottoms and weep holes improve air circulation and drainage on both planters

FINISHING OPTIONS: UV protectant sealer, exterior paint or leave unfinished to weather naturally to gray

Building time



PREPARING STOCK
0 hours



LAYOUT
1-2 hours



CUTTING PARTS
1-2 hours



ASSEMBLY
2-3 hours



FINISHING
1-2 hours

TOTAL: 5-9 hours

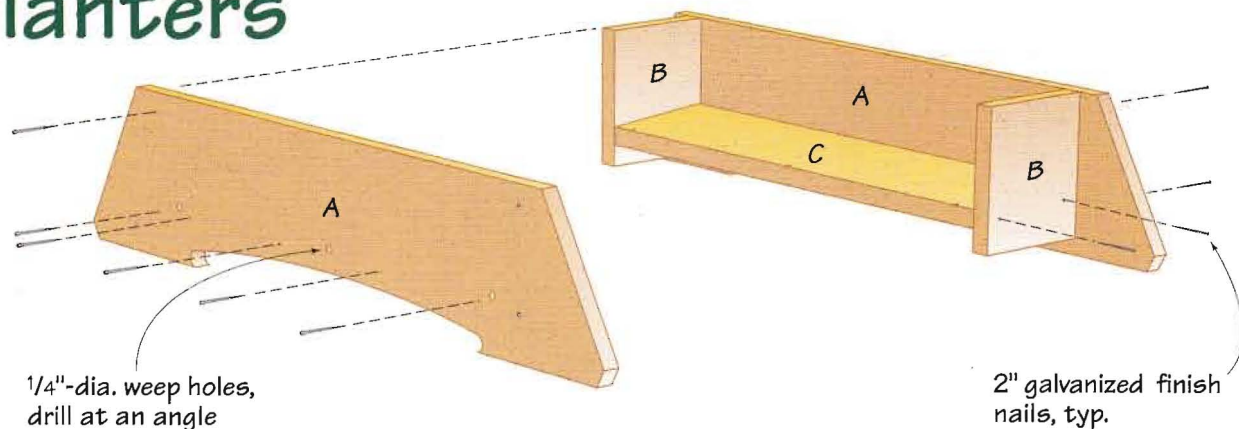
Tools you'll use

- Circular saw
- Jig saw
- Drill/driver
- Clamps
- Hammer
- Nailset

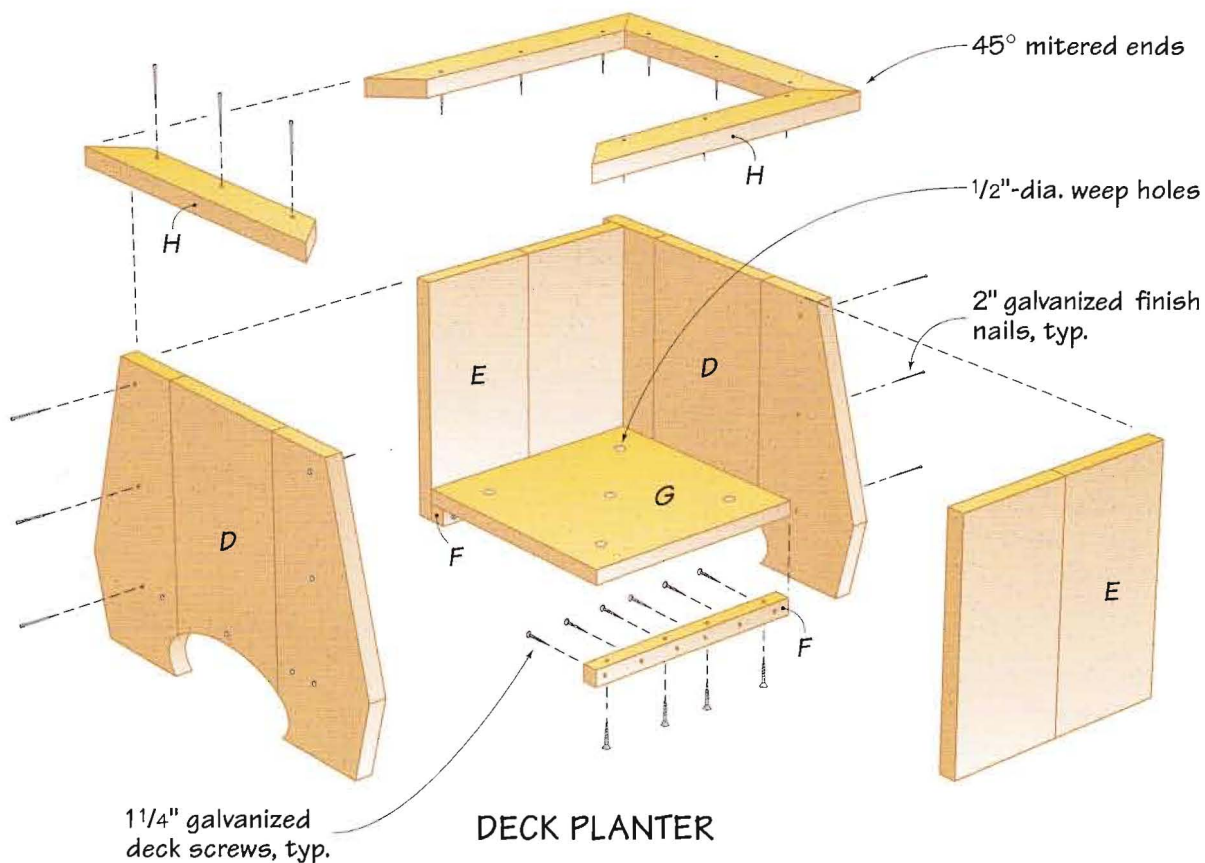
Shopping list

- ☐ (3) 1×8 in. $\times$ 8 ft. cedar
- ☐ (1) $\frac{3}{4} \times 12 \times 12$ in. exterior plywood
- ☐ Galvanized deck screws ($1\frac{1}{4}$ -in.)
- ☐ Galvanized finish nails (2-in.)
- ☐ UV protectant sealer

Planters



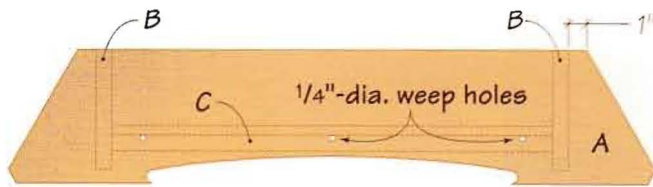
RAILING PLANTER



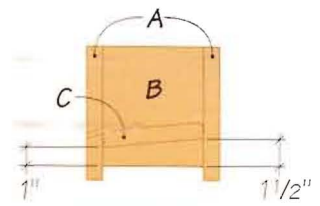
DECK PLANTER

Planters Cutting List

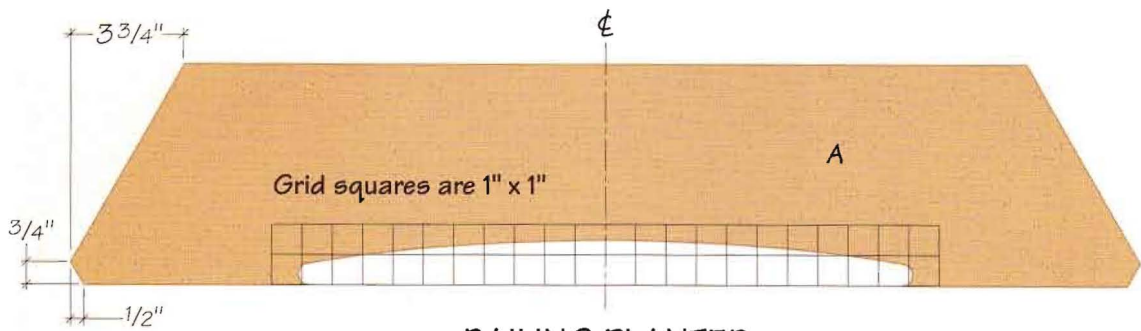
Part	No.	Size	Material	Part	No.	Size	Material
Railing Planter				Deck Planter			
A. Sides	2	7/8 x 7 1/4 x 35 1/4 in.	Cedar	D. Sides	2	7/8 x 20 1/2 x 14 1/4 in.	Cedar
B. Ends	2	7/8 x 5 1/2 x 6 1/2 in.	"	E. Ends	2	7/8 x 12 x 12 in.	"
C. Bottom	1	7/8 x 57/16 x 24 in.	"	F. Cleats	2	7/8 x 7/8 x 12 in.	"
				G. Bottom	1	3/4 x 12 x 12 in.	Exterior plywood
				H. Crown	4	7/8 x 2 x 16 in.	Cedar



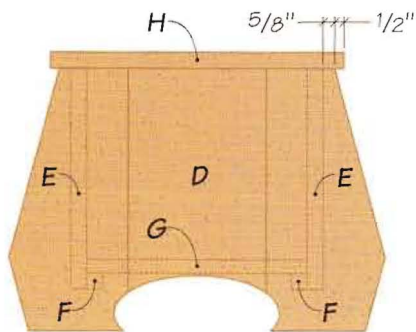
FRONT VIEW



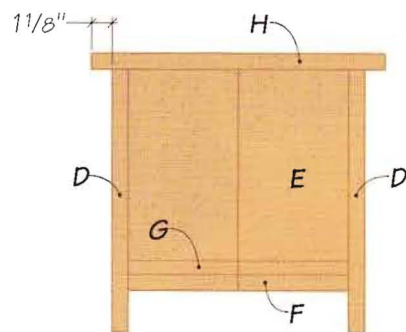
SIDE VIEW



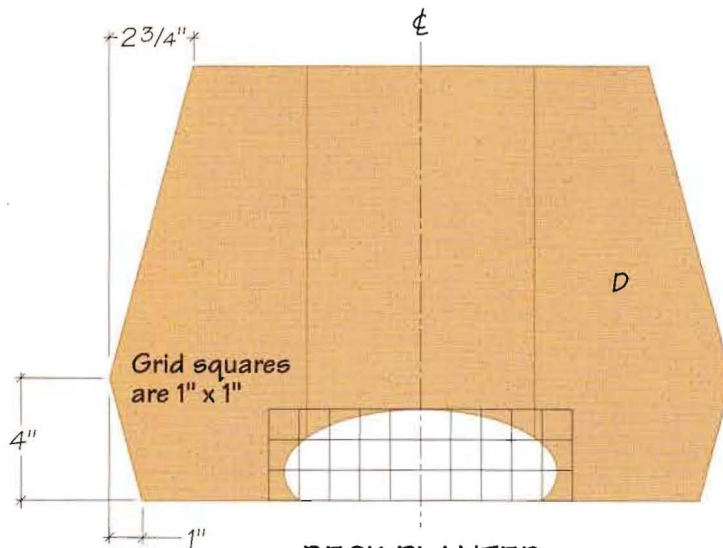
RAILING PLANTER



FRONT VIEW



SIDE VIEW



DECK PLANTER

Planters: Step-by-step

Cedar lumber is typically sold with one side rough and one side smooth. This feature provides you the opportunity to choose which surface to emphasize in the finished planters. For these planters, we held the rough side out because we wanted a casual, rustic look. If you prefer, you can achieve a more refined look simply by building your planters with the smooth surface out. If you intend to paint your finished planters, we recommend building with the smooth side out.

RAILING PLANTER CUT OUT THE PARTS

- 1 Make a template for marking the two side profiles. Cut a piece of hardboard or stiff cardboard to size, 7¼ in. by 35¼ in., for use as a pattern. Following the *Railing Planter* drawing on page 91, mark the angles on the ends and the curved cutout profile on the bottom edge. Cut the template to shape with a jig saw and sand the cuts smooth.
- 2 Trace the profile from the template onto the side workpieces.
- 3 Cut out the sides. Clamp the blanks securely to your workbench and cut the profiles with your jig saw (See **Photo A**).
- 4 Cut the ends and bottom to



PHOTO A: Lay out and cut a template for making the sides of the railing planter, then use this template to draw the shapes on the side workpieces. Cut out the shapes with a jig saw.

size, according to the dimensions in the *Cutting List* on page 90.

ASSEMBLE THE PLANTER

- 5 Attach the ends to the bottom. The bottom is sloped to route seepage water away from your deck railing cap. Refer to the *Side View* drawing, page 91, and mark the slope of the bottom piece on the inside faces of the ends. Drill pilot holes in the ends. Clamp the bottom in place between the ends, and attach the parts with 2-in. galvanized finish nails (See **Photo B**).
- 6 Attach the sides. Lay the end/bottom assembly on your workbench. Center the first side piece on the assembly left-to-right

with all top edges flush. Clamp it in place. Note that the lower edges of the end pieces are ¾ in. above the lower edges of the sides; this allows the planter to rest on the railing cap while the sides overlap it for stability. Attach the side by driving galvanized finish nails through the side into the ends and the bottom. Use a nailset to recess the nailheads. Follow the same procedure to position and attach the remaining side.

- 7 Drill the weep holes. Clamp the assembled planter to your worksurface with the deeper side of the compartment facing up. Drill three angled ¼-in.-dia. weep holes through the side of the planter into the deepest corner of

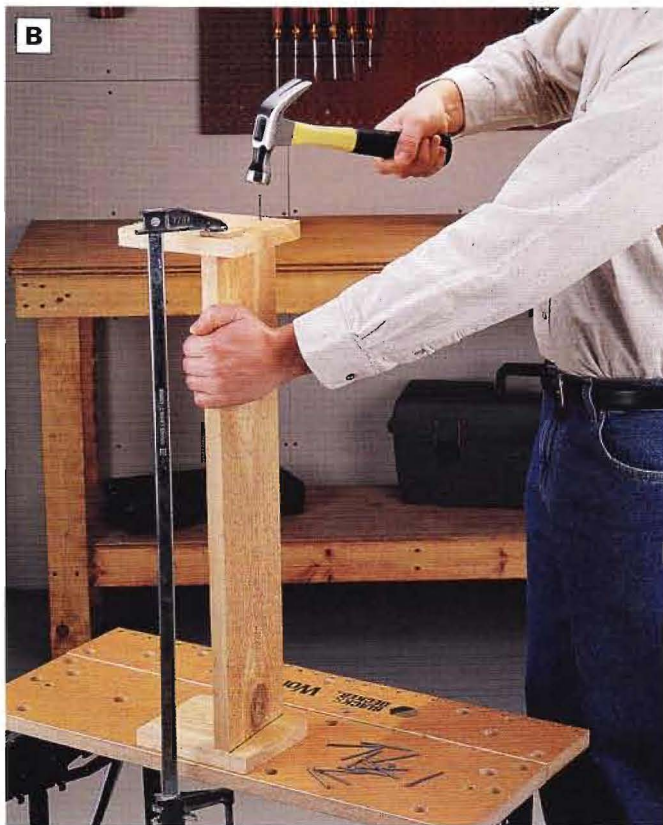


PHOTO B: Mark the slope of the bottom piece on the planter end pieces, then attach the ends to the bottom with galvanized finish nails. Clamp the pieces to help hold them steady during assembly.

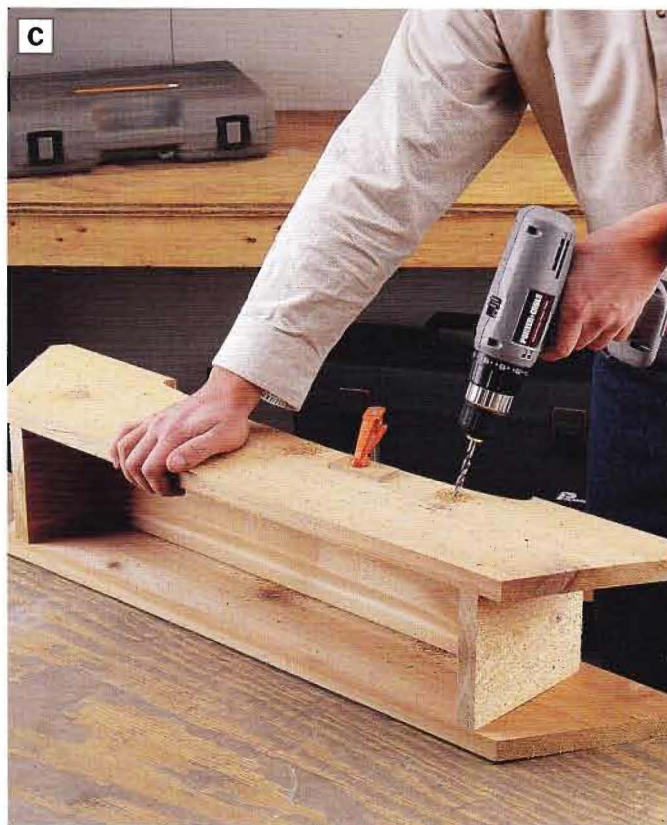


PHOTO C: Fasten the planter sides to the ends and bottom with nails, then drill three angled $\frac{1}{4}$ -in.-dia. weep holes through the side where the bottom of the planter slopes to its lowest point.

the compartment (See Photo C). Position the weep holes so they are just above the bottom piece inside the planter.

DECK PLANTER

MAKE THE SIDE PANELS

Each side panel is composed of three boards, which are held together during the construction process by a temporary cleat.

1 Cut six pieces of 1×8 cedar to $14\frac{1}{2}$ in. long (you'll need three pieces for each side).

2 Cut two temporary cleats (not shown on the *Cutting List*) $13\frac{1}{2}$ in. long from scrap wood.

3 Build the sides. Lay groups of three boards facedown on your workbench in two groups. Center a temporary cleat left-to-right along the top edge of each group of



PHOTO D: Assemble two blanks for the deck planter sides using three lengths of 1×8 cedar per blank, fastened together with a temporary cleat. Mark the profiles on the side pieces with a template, then cut the sides to shape. You'll remove the temporary cleats later.



PHOTO E: Clamp pairs of 6-in.-wide boards for the end panels and fasten each panel together with a cleat. Use 1¼-in. galvanized screws to join the parts. These two cleats are permanent parts of the planter.



PHOTO F: Cut the bottom piece to size, drill five weep holes through the bottom for drainage, and fasten it to the cleats on the end pieces with countersunk screws. Attach the bottom so it will rest on the cleats when the planter is finished.

boards, and fasten each panel together by driving 1¼-in. wood screws through the cleat into the boards.

4 Make a template for marking the profiles of the two sides. Cut a piece of hardboard or stiff cardboard 14¼ in. wide by 20½ in. long. Following the *Deck Planter* drawing on page 91, mark the angles on the ends and the shape of the curved cutout along the bottom edge. Cut the template to shape with a jig saw and sand the cut edges smooth.

5 Trace the profile from the template onto the side panels. Draw on the face of the panels that does not have the cleats. Clamp each panel securely to your workbench and cut the parts with a jig saw (See **Photo D**).

MAKE THE ENDS & BOTTOM

The end panels are each composed of two boards fastened together with a permanent cleat.

6 Rip a 4-ft., 1-in. length of 1 × 8 cedar to 6 in. wide. Cut the ripped board into four 12-in. lengths. Lay each pair of boards facedown on your workbench and clamp them together with the ends flush.

7 Cut two pieces of scrap left over from Step 6 to 7/8 × 7/8 × 12 in. to form two cleats. Drill countersunk pilot holes in the cleats.

8 Assemble the end panels by positioning a cleat flush with the bottom edges of each pair of boards and fastening the parts with 1¼-in. galvanized deck screws, screwing through the cleats into the end panels (See **Photo E**).

9 Cut the bottom to size from $\frac{3}{4}$ -in. exterior plywood. Draw intersecting lines from corner to corner to use as a guide for locating and drilling five $\frac{1}{2}$ -in.-dia. weep holes.

ASSEMBLE THE PLANTER

10 Attach the end panels to the bottom. Clamp the bottom in place between the ends so it will rest on top of the cleats when the planter is right-side-up. Drill through the cleats from below to fasten the bottom (**See Photo F**).

11 Attach the sides. Position the first side panel on the end/bottom assembly so it is centered left-to-right and the top edges are all flush. Drive 2-in. galvanized finish nails through the side panel into the ends and the bottom, using a nailset to drive the nails below the surface of the wood. Attach the remaining side in the same fashion (**See Photo G**).

12 Unscrew and remove the temporary cleats from the side panels.

13 Cut the four crown pieces. Rip cedar stock to 2 in. wide. Measure your planter to verify the length of the crown pieces. The inside edges of the crown should sit flush with the inside of the planter when installed. Cut the pieces to length with the ends mitered at 45° .

14 Attach the crown pieces to the planter with finish nails (**See Photo H**).

FINISHING TOUCHES FOR BOTH PLANTERS

15 Break all edges with sandpaper and check that all nailheads are set. You may choose to leave the planters unfinished, apply the same finish as you have on your deck, or topcoat with paint.

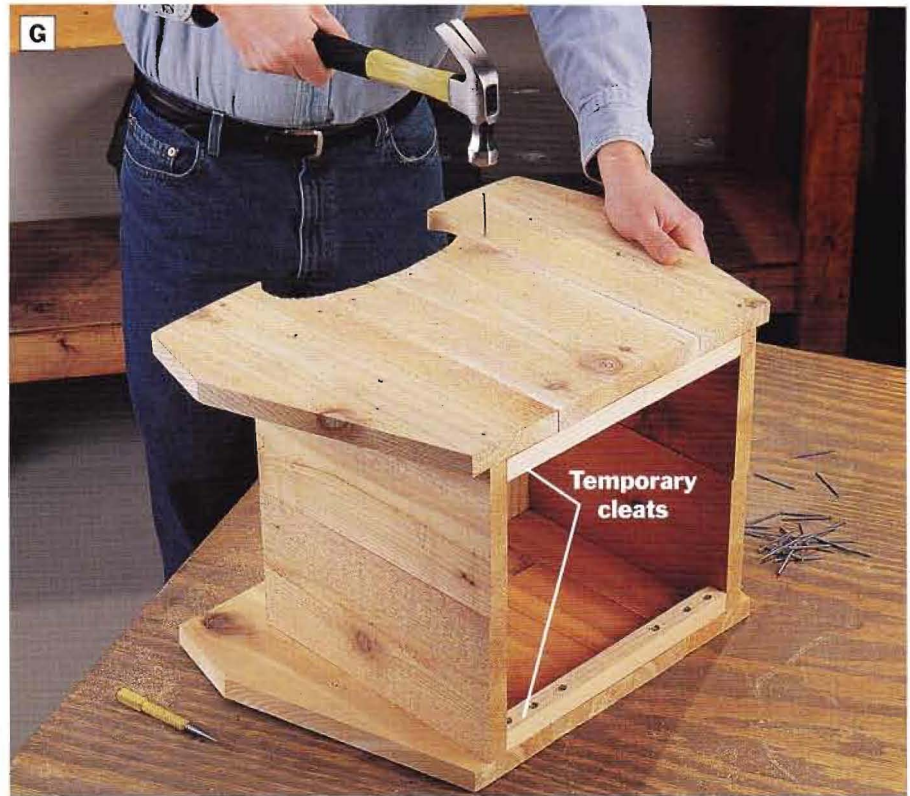


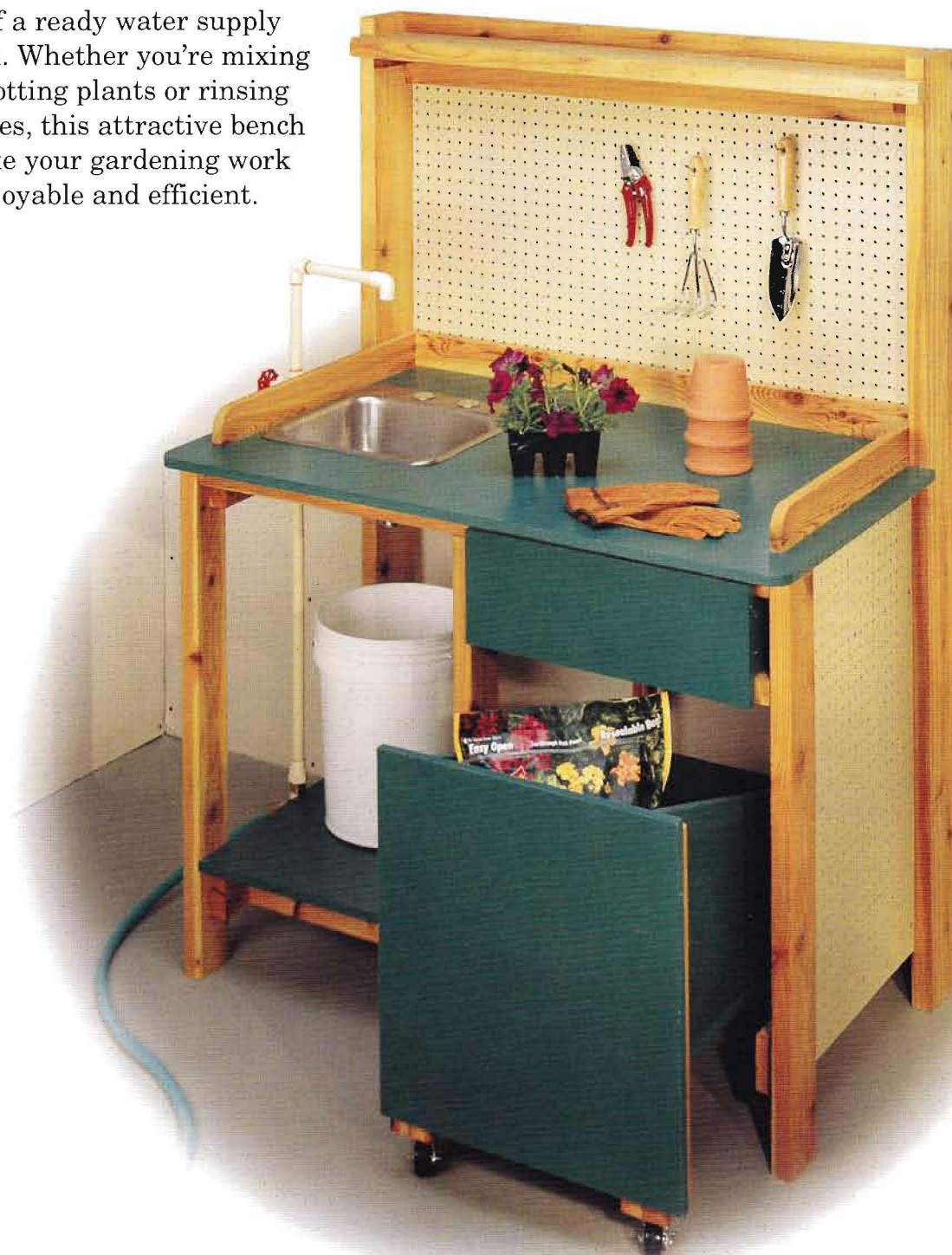
PHOTO G: Fasten the sides to the end/bottom assembly by nailing through the sides and into the ends and bottom. Drill pilot holes before you drive the nails to keep the cedar from splitting. Once both sides are attached, remove the temporary cleats.



PHOTO H: Install the four crown pieces around the top of the planter with nails. Lay out and cut the crown pieces so they are mitered on the ends and fit flush with the inside of the planter.

Potting Bench

The gardeners in your family will wonder how they ever got along without this versatile potting bench. Ruggedly built to withstand hard use, this bench features a rolling cart for potting soil or compost, a drawer for all those small tools and the convenience of a ready water supply and sink. Whether you're mixing soil, repotting plants or rinsing vegetables, this attractive bench will make your gardening work more enjoyable and efficient.



Vital Statistics: Potting Bench



TYPE: Potting bench

OVERALL SIZE: 48W by 28¹/₂D by 63¹/₂H

MATERIAL: Cedar, exterior plywood, perforated hardboard

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Countertop outfitted with removable bar sink
- Shop-made PVC plumbing system designed for garden hose hook-up
- Cart outfitted with rolling casters

FINISHING OPTIONS: Cedar parts topcoated with penetrating UV protectant sealer, exterior paint or leave unfinished to weather naturally to gray. Hardboard and exterior plywood finished with exterior latex primer and paint

Building time



PREPARING STOCK
0 hours



LAYOUT
3-4 hours



CUTTING PARTS
2-3 hours



ASSEMBLY
5-8 hours



FINISHING
3-5 hours

TOTAL: 13-20 hours

Tools you'll use

- Circular saw
- Jig saw
- Drill/driver
- Clamps
- Combination square
- Hacksaw

Shopping list

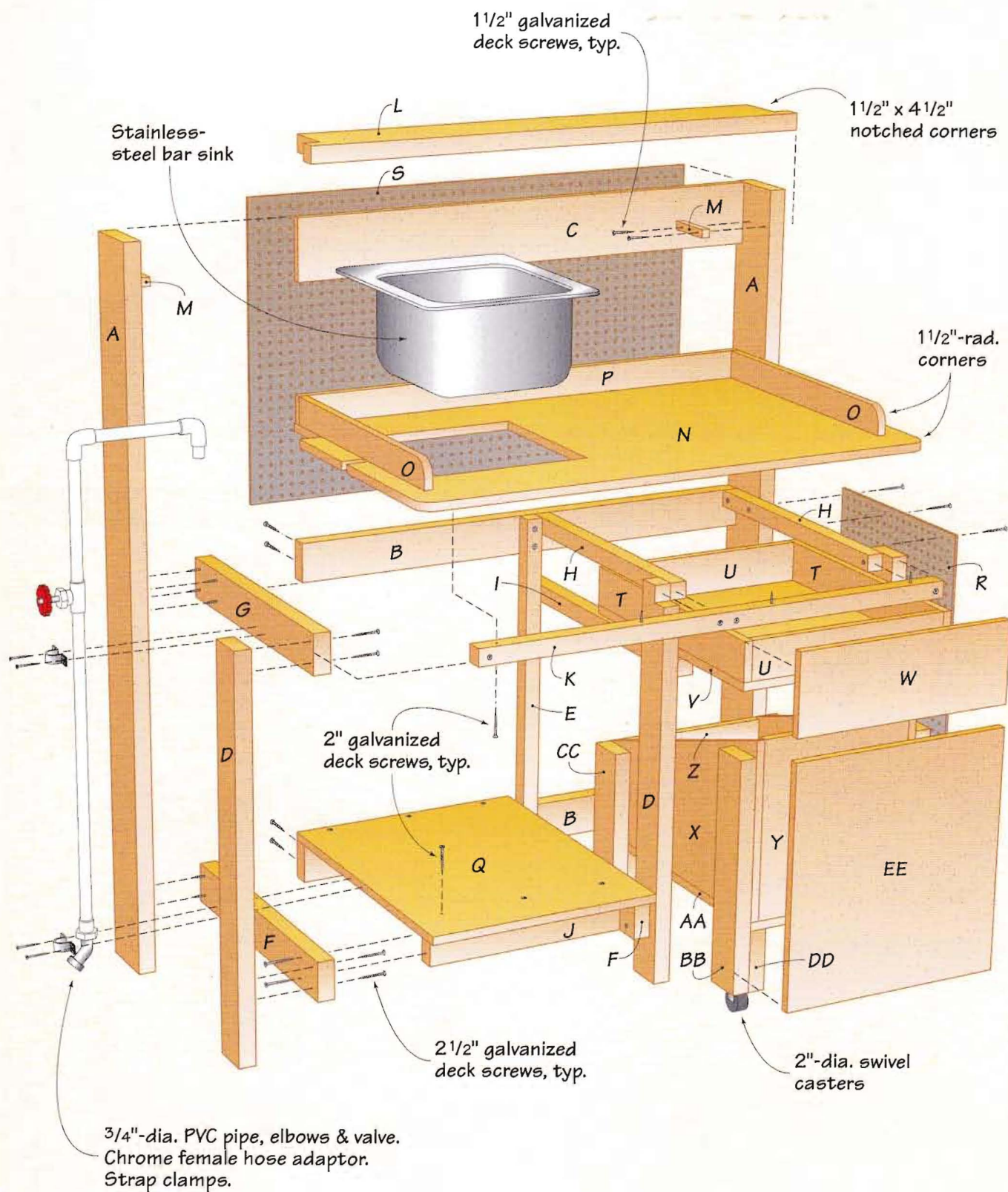
Bench materials:

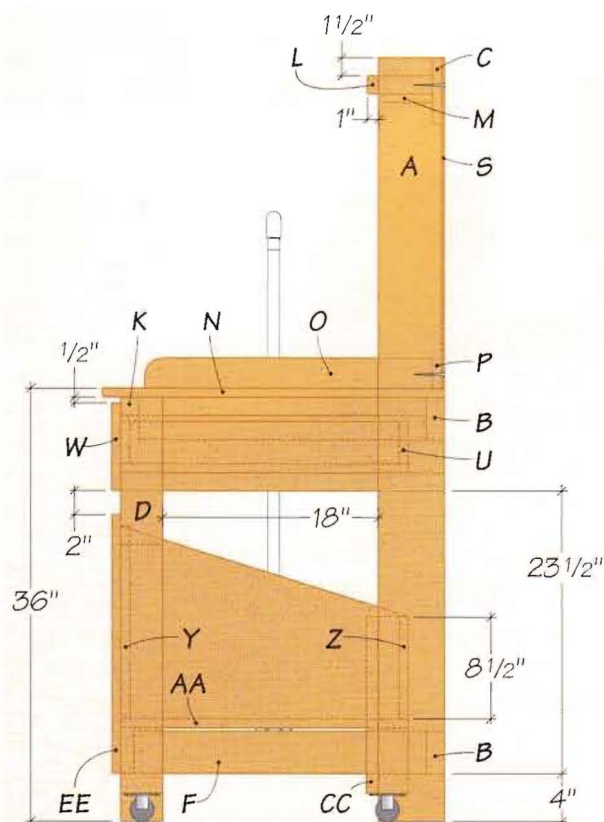
- ☐ (2) 2 × 6 in. × 6 ft. cedar
- ☐ (1) 2 × 6 in. × 4 ft. cedar
- ☐ (6) 2 × 4 in. × 8 ft. cedar
- ☐ (4) 2 × 2 in. × 8 ft. cedar
- ☐ (1) 1 × 6 in. × 4 ft. cedar
- ☐ (1) 1 × 3 in. × 8 ft. cedar
- ☐ (2) 3/4 in. × 4 × 8 ft. exterior plywood
- ☐ (1) 1/4 in. × 4 × 4 ft. perforated hardboard
- ☐ (4) 2-in.-dia. casters
- ☐ Galvanized deck screws (1/4-, 1/2-, 2-, 2 1/2-in.)
- ☐ Latex primer and paint
- ☐ UV protectant sealer

Plumbing parts:

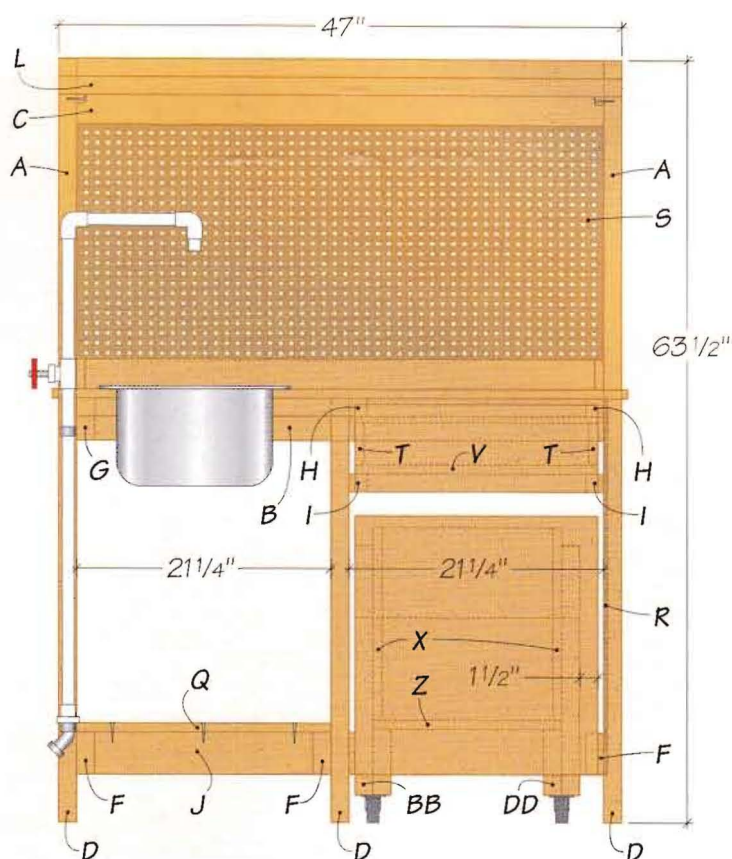
- ☐ Stainless-steel bar sink
- ☐ 3/4-in.-dia. PVC pipe (6 ft.)
- ☐ (2) strap clamps
- ☐ (2) 90° elbows
- ☐ PVC stop valve
- ☐ PVC female adaptor
- ☐ Hose thread to pipe thread transition fitting
- ☐ Angled hose fitting
- ☐ CPVC primer and cement

Potting Bench





SIDE SECTION VIEW



FRONT SECTION VIEW

Potting Bench Cutting List

Part	No.	Size	Material
A. Tall legs	2	1 1/2 x 5 1/2 x 63 1/2 in.	Cedar
B. Back stretchers	2	1 1/2 x 3 1/2 x 44 in.	"
C. Shelf stretcher	1	3/4 x 5 1/2 x 44 in.	"
D. Front legs	3	1 1/2 x 3 1/2 x 35 1/4 in.	"
E. Rear support	1	1 1/2 x 1 1/2 x 35 1/4 in.	"
F. Lower stretchers	3	1 1/2 x 3 1/2 x 24 1/2 in.	"
G. Upper stretcher	1	1 1/2 x 3 1/2 x 24 in.	"
H. Drawer stretchers	2	1 1/2 x 1 1/2 x 24 in.	"
I. Drawer slides	2	1 1/2 x 1 1/2 x 27 in.	"
J. Bottom stretcher (Front)	1	1 1/2 x 3 1/2 x 18 1/4 in.	"
K. Top stretcher (Front)	1	1 1/2 x 1 1/2 x 44 in.	"
L. Shelf	1	1 1/2 x 5 1/2 x 47 in.	"
M. Shelf cleats	2	3/4 x 3/4 x 4 1/2 in.	"
N. Countertop	1	3/4 x 28 1/2 x 48 in.	Exterior plywood
O. Side splashes	2	3/4 x 2 1/2 x 24 in.	Cedar
P. Back splash	1	3/4 x 2 1/2 x 44 in.	"

Part	No.	Size	Material
Q. Lower shelf	1	3/4 x 27 x 21 1/4 in.	Exterior plywood
R. Side panel	1	1/4 x 18 x 31 1/4 in.	Perforated board
S. Back panel	1	1/4 x 27 1/2 x 44 in.	"
T. Drawer sides	2	3/4 x 3 1/2 x 24 in.	Exterior plywood
U. Drawer ends	2	3/4 x 3 1/2 x 18 3/4 in.	"
V. Drawer bottom	1	3/4 x 20 1/4 x 24 in.	"
W. Drawer face	1	3/4 x 7 1/4 x 20 1/4 in.	"

Cart Cutting List

Part	No.	Size	Material
X. Sides	2	3/4 x 16 x 24 in.	Exterior plywood
Y. Front	1	3/4 x 14 1/4 x 16 in.	"
Z. Back	1	3/4 x 14 1/4 x 8 1/2 in.	"
AA. Bottom	1	3/4 x 15 3/4 x 24 in.	"
BB. Front legs	2	1 1/2 x 3 1/2 x 20 3/4 in.	Cedar
CC. Back legs	2	1 1/2 x 3 1/2 x 14 3/4 in.	"
DD. Leg cleats	4	1 1/2 x 3 1/2 x 5 1/2 in.	"
EE. Face	1	3/4 x 20 1/4 x 21 1/2 in.	Exterior plywood

Potting Bench: Step-by-step

BUILD THE BENCH FRAME

1 Cut the following cedar parts to size: tall legs, front legs, drawer stretchers, drawer slides, upper stretcher and lower stretchers. Label each part in pencil to make the pieces easy to identify.

2 Build the left (plumbing) end assembly. As shown in the exploded drawing on page 98, the left end consists of a tall leg and a front leg joined by an upper stretcher and one of the lower stretchers. Install the upper stretcher flush with the top of the front leg, and inset it $1\frac{1}{2}$ in. on both the front and back legs to allow space for the front top stretcher and the back stretcher. Install the lower stretcher 4 in. above the floor, and hold it in $1\frac{1}{2}$ in. at the back and 1 in. at the front. Square up the assembly, drill countersunk pilot holes and fasten the parts with $2\frac{1}{2}$ -in. galvanized deck screws. When completed, the overall depth from the back edge of the tall leg to the front edge of the front leg should be 27 in.

3 Build the right end assembly. The right end consists of a tall leg, front leg, drawer stretcher, drawer slide and lower stretcher. Install the drawer stretcher just as you did for the upper stretcher in Step 2. Install the lower stretcher 4 in.

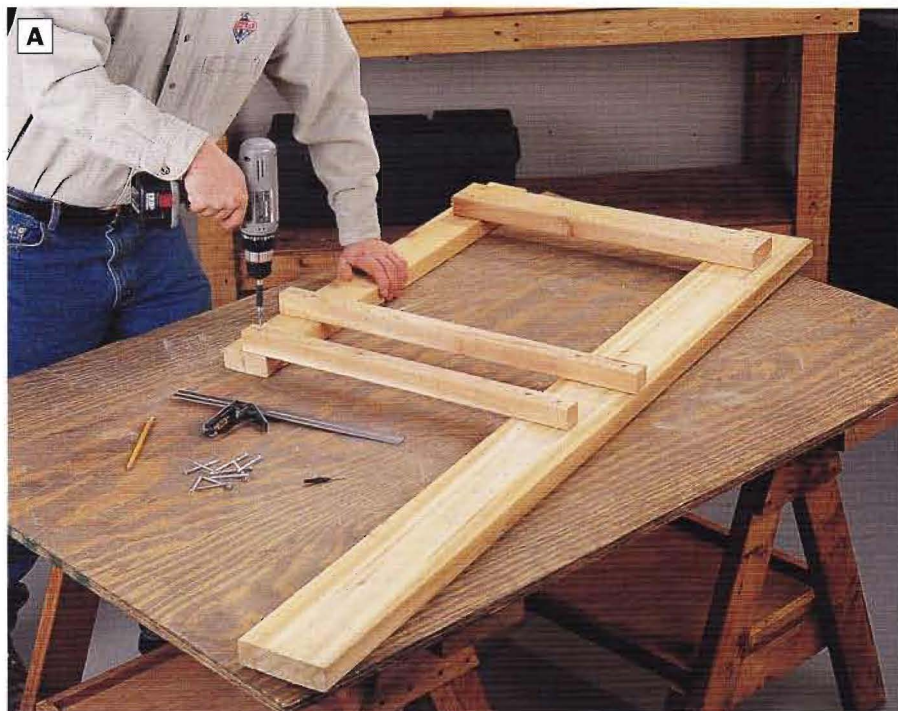


PHOTO A: Build the right assembly by attaching a drawer stretcher, drawer slide and lower stretcher between a tall leg and front leg. Fasten the parts together with $2\frac{1}{2}$ -in. deck screws. Use a combination square to draw layout lines for the parts and to check the joints for square.



PHOTO B: Assemble the bench framework by attaching the two back stretchers, shelf stretcher and top front stretcher to the end assemblies. The ends of the stretchers should butt against the inside faces of the front and back legs. See Step 4 for exact stretcher placement.

above the floor, holding it in $1\frac{1}{2}$ in. at the back and 1 in. at the front. Install the drawer slide $4\frac{3}{4}$ in. below the bottom edge of the drawer stretcher and flush with the outside edges of the legs. Fasten the whole assembly together with deck screws driven into countersunk pilot holes (**See Photo A**).

4 Connect the end assemblies with stretchers. Cut to size and attach the two back stretchers, shelf stretcher and the front top stretcher (**See Photo B**). When you install the shelf stretcher, inset it $\frac{1}{4}$ in. from the back edges of the tall legs to allow for the thickness of the back panel. Position the back stretchers 4 in. and $35\frac{1}{4}$ in. from the bottoms of the back legs.

5 Build and install the middle support assembly. Cut the rear support, front bottom stretcher and remaining front leg to size. Cut a $1\frac{1}{2} \times 1\frac{1}{2}$ -in. notch in the top end of the front leg (**See Photo C**). Fasten the rear support, front leg, drawer stretcher, drawer slide and lower stretcher together with deck screws.

6 Stand the support assembly you made in Step 5 in place, and position it by attaching the front bottom stretcher with deck screws (**See Photo D**). Complete the installation by screwing the support to the top front stretcher and both back stretchers.

7 Build the benchtop. Cut the countertop to size (see *Cutting List*, page 99) from exterior plywood. Mark and cut a $1\frac{1}{2}$ -in.-radius arc on both front corners. Cut a $2 \times 5\frac{1}{2}$ -in. notch on the back corners so the countertop fits around the tall legs and overhangs the bench by $\frac{1}{2}$ in. on each end.



PHOTO C: Notch the top front corner of the center front leg so it will fit around the top front stretcher. Then combine this leg with the rear support, drawer stretcher, drawer slide and lower stretcher to form the middle support assembly.



PHOTO D: Install the front bottom stretcher 3 in. back from the front ends of the lower stretchers to position the middle support assembly. Fasten the bottom stretcher in place, then attach the middle support assembly to the top front stretcher and back stretchers.

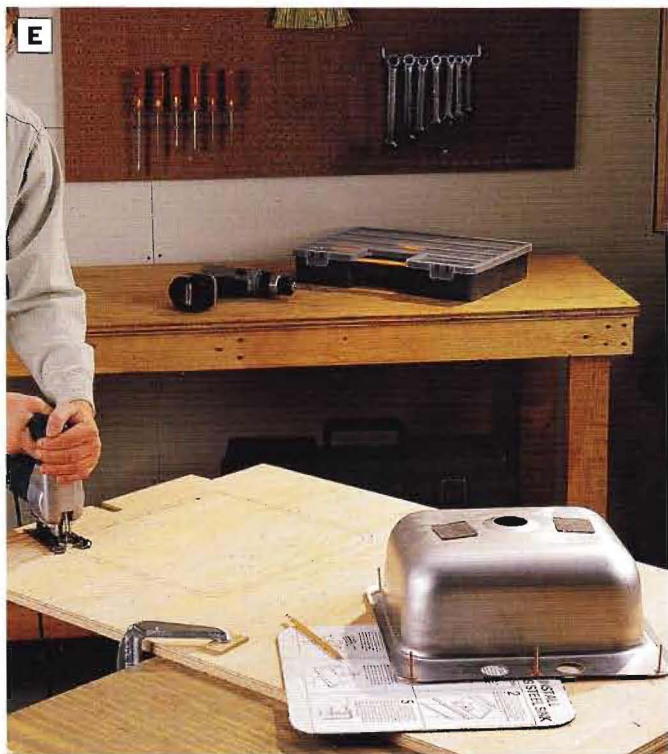


PHOTO E: Center the sink so it will hang over the storage area on the left side of the bench. Lay out the sink opening using the template provided by the manufacturer, and cut out the sink opening.



PHOTO G: Fasten the perfbord side and back panels to the bench framework with 1½-in. galvanized deck screws. Be careful not to over-drive the screws when installing the perfbord.



PHOTO F: Install the back splash and side splash pieces on the countertop, then fasten the countertop to the bench framework by driving screws through the stretchers from below and into the countertop.

Mark and cut a clearance slot in the left edge of the top, 1¼ in. wide by 1½ in. deep, for the plumbing assembly.

8 Position the sink on the countertop so it is centered above the open storage area on the left half of the bench. Mark and cut out the sink opening (See **Photo E**).

9 Cut the lower shelf, side panel and back panel to size. Then prime and paint the countertop, lower shelf and the side and back panels.

10 Cut out and attach the shelf cleats and the shelf to the tall legs. Position the cleats 3 in. from the tops of the tall legs, drill countersunk pilot holes and attach the cleats with 1½-in. galvanized deck screws. Notch the ends of the shelf (See drawing, page 98) to fit around the tall legs. Install the shelf with screws driven through the shelf stretcher from the back.

11 Cut out and attach the back and side splashes to the countertop. Clamp the back splash in place between the notches at the back of the countertop, and inset it ¼ in. from the back edge of the countertop to allow for the back panel. Drill countersunk pilot holes up through the bottom of the countertop

and into the bottom edge of the back splash, then fasten it to the countertop with 2-in. galvanized deck screws. Round the top front corner of each side splash. Clamp the splashes in place and attach with screws.

12 Install the lower shelf to the back and bottom front stretchers with 2-in. deck screws.

13 Attach the countertop assembly to the bench with 2-in. screws (See Photo F).

14 Install the perfbboard back and side panels (See Photo G).

BUILD THE DRAWER & CART

15 Cut the drawer sides, ends, bottom and face to size from $\frac{3}{4}$ -in. exterior plywood.

16 Cut the plywood cart parts to size. To cut the angle on the cart sides, mark a point on each back edge $8\frac{1}{2}$ in. from the bottom corner. Draw lines from each of these marks to the upper front corners (See Photo H). Cut the angles.

17 Prime all surfaces of the drawer and cart parts. Sand the surfaces and edges smooth first.

18 Assemble the drawer box. Apply glue to the ends of the end pieces, clamp the ends in place between the side pieces and assemble with $1\frac{1}{2}$ -in. galvanized deck screws (See Photo I). Position the drawer bottom, using it to square up the rest of the drawer structure. Fasten the bottom to the ends and sides with screws.

19 Assemble the cart box. As with the drawer, the ends are fastened between the sides, and the bottom piece fastens to the bottom edges of the ends and sides. Use counter-

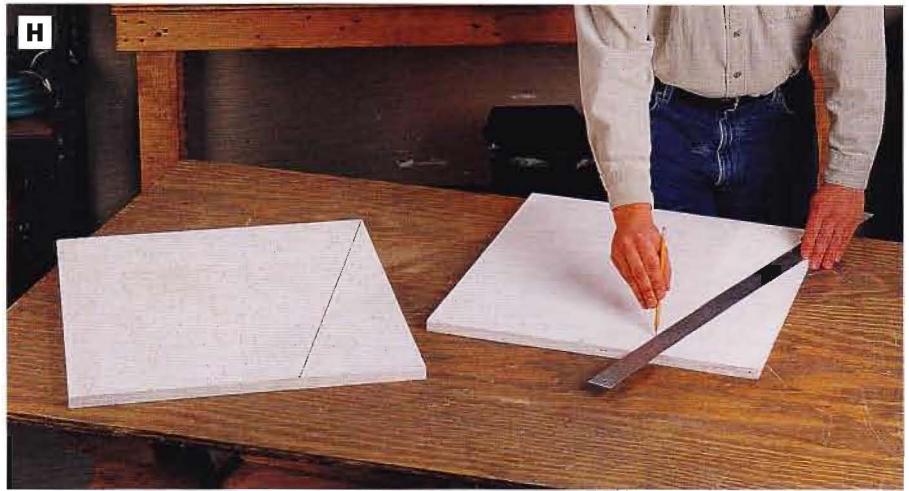


PHOTO H: Cut the cart's angled sides by measuring $8\frac{1}{2}$ in. along one short edge of each side panel. Connect this point to the top corner on the opposite edge with a straightedge. Cut these parts to shape. Assemble the sides, ends and bottom panel to form the cart box.

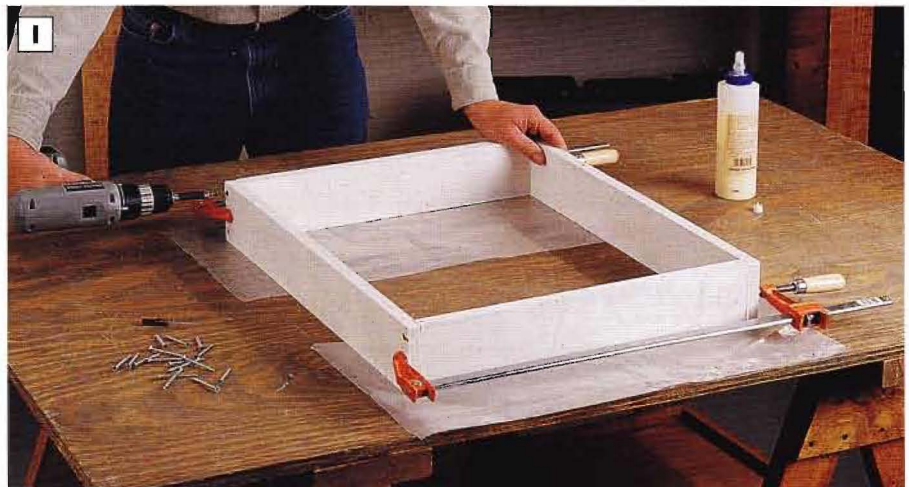


PHOTO I: Glue and screw the drawer ends to the side pieces, driving the screws through countersunk pilot holes to keep the plywood from splitting. Then, fasten the drawer bottom to the bottom edges of this drawer frame. Use the bottom as a guide for squaring up the drawer.



PHOTO J: Clamp the drawer face to the front of the drawer box so the ends of the drawer face are flush with the drawer sides. The face should overhang the top and bottom of the drawer by $1\frac{1}{2}$ in. Fasten the drawer face with $1\frac{1}{4}$ -in. deck screws, driven from inside the drawer.



PHOTO K: Install the leg assemblies to the cart box with 1½-in. screws. The front legs should butt against the back of the cart face. Attach the rear legs so they are flush with the cart back.

sunk 1½-in. screws for attaching the parts.

20 Paint the assembled drawer box and the loose drawer face, as well as the cart and the cart face. Apply two coats of exterior latex paint.

21 Attach the drawer face. Center the face on the front of the drawer box, flush on the ends and overhanging 1½ in. on both the top and the bottom edges. Clamp the face in position, drill countersunk pilot holes and attach the face from inside the drawer with 1¼-in. galvanized deck screws (**See Photo J**).

22 Attach the cart face. Note that the face is not centered on the cart: it overhangs 1½ in. on the left side, 3 in. on the right side and ½ in. at the top. Hold the face in position with spring clamps, and screw the face to the cart from inside the cart box.

23 Attach the cart legs and cart leg cleats. Cut the cart legs and cleats to size. Fasten the cleats to the legs with 2½-in. deck screws. Attach the legs to the cart with 2-in. deck screws (**See Photo K**).

24 Attach the casters to the legs and cleats (**See**

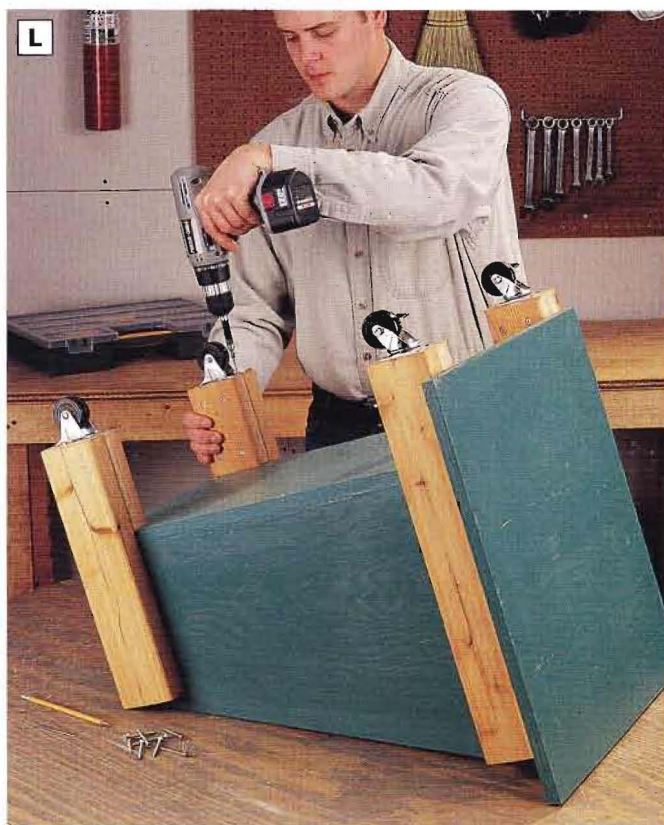


PHOTO L: Attach casters to the cart leg and cleat assemblies. We used swiveling locking casters on the front legs and fixed casters on the back. If you plan to fill the cart with dirt, be sure the casters are sturdy.

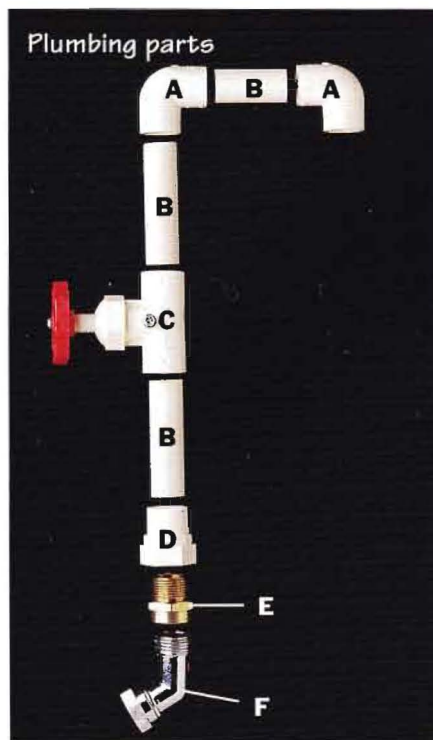
Photo L). We used locking casters in the front so the cart stays in its place until you want to move it.

ADD THE PLUMBING

The sink is simply set loose into the countertop cut-out. It can drain either directly into a 5-gallon pail, or you can use a hose clamp to attach a length of flexible tubing to the drain tail and route it to your desired location. The “faucet” is fabricated from PVC and metal parts (*See Plumbing Parts*, next page) that are available from any local building supply center.

25 Fabricate the PVC water supply and faucet assembly. Cut the three sections of straight piping to length with a hacksaw. De-burr the cuts with a utility knife or emery paper. Dry-fit the PVC assembly together to make sure the lengths are correct. Draw an alignment mark across the fitting and pipe at every joint with a permanent marker to help you make the proper alignments quickly, once the pieces are cemented together. Disassemble the pieces.

26 Build the plumbing assembly. Prepare the joint surfaces by scuffing with emery cloth. When you make the joints, wear gloves and be sure your work



This plumbing system is designed to hook up to a garden hose for a water supply. To build it, you'll need: (A) 90° elbow; (B) 3/4-in. PVC pipe; (C) PVC stop valve; (D) Female adaptor; (E) Hose thread to pipe thread transition fitting; (F) Angled hose connector.

area is well ventilated. Make one joint at a time. Apply an even coat of PVC primer to both joint surfaces. Spread PVC cement onto the primed surfaces, following the directions on the can. Quickly slip the fitting and pipe together. Rotate the pieces a quarter turn to spread the glue evenly, and hold the parts in place with the marks aligned for approximately one minute (**See Photo M**).

27 Attach the plumbing assembly to the bench. Position the assembly in the countertop notch, and secure the plumbing with strap clamps (**See Photo N**).

FINISHING TOUCHES

28 Seal or paint the cedar parts of your bench as you like. No finish is actually required, but the cedar will turn gray if it isn't covered with a UV sealer.



PHOTO M: Cut the straight pipe sections to length and dry-assemble the entire plumbing unit to check its fit on the potting bench. Then disassemble the PVC, prime the mating parts of each joint, and bond the PVC together with CPVC cement. Wear gloves when bonding the parts.



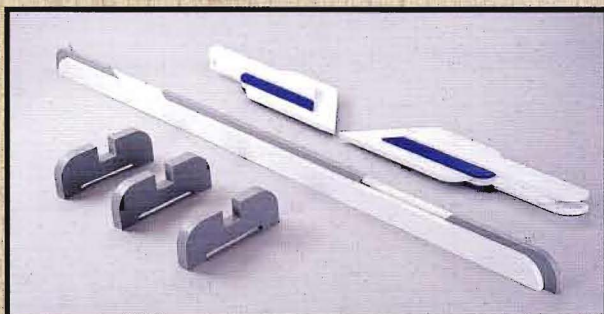
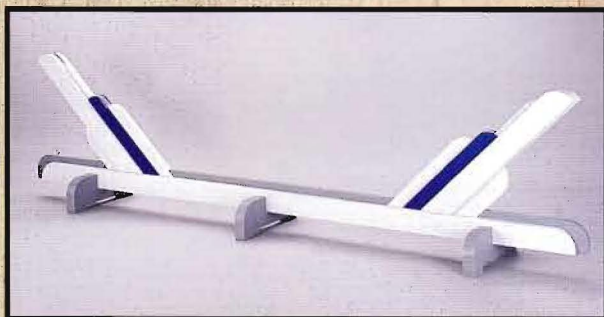
PHOTO N: Use strap clamps to attach the plumbing assembly to the bench.

Art Deco Hammock Stand

Are you among the many people who would love to while away a summer afternoon nestled in the comfort of a hammock, but you just don't have two conveniently spaced trees? Well, despair no more! This solid hammock stand goes where you want it to—your deck, porch, yard or poolside. The angled uprights and feet are conveniently friction-fit to allow for quick disassembly and easy off-season storage.



Vital Statistics: Art Deco Hammock Stand



TYPE: Hammock stand

OVERALL SIZE: 24W by 14 ft. 5 in.L by 49H

MATERIAL: Pine

JOINERY: Butt joints reinforced with galvanized screws

CONSTRUCTION DETAILS:

- Legs notched to fit around base
- Uprights install like tenons into "mortise" spaces in base
- Supports and legs designed to be removable for seasonal storage (See bottom left photo)

FINISHING OPTIONS: Exterior latex primer and paint

Building time



PREPARING STOCK
0 hours



LAYOUT
2-3 hours



CUTTING PARTS
2-3 hours



ASSEMBLY
2-4 hours



FINISHING
3-5 hours

TOTAL: 9-15 hours

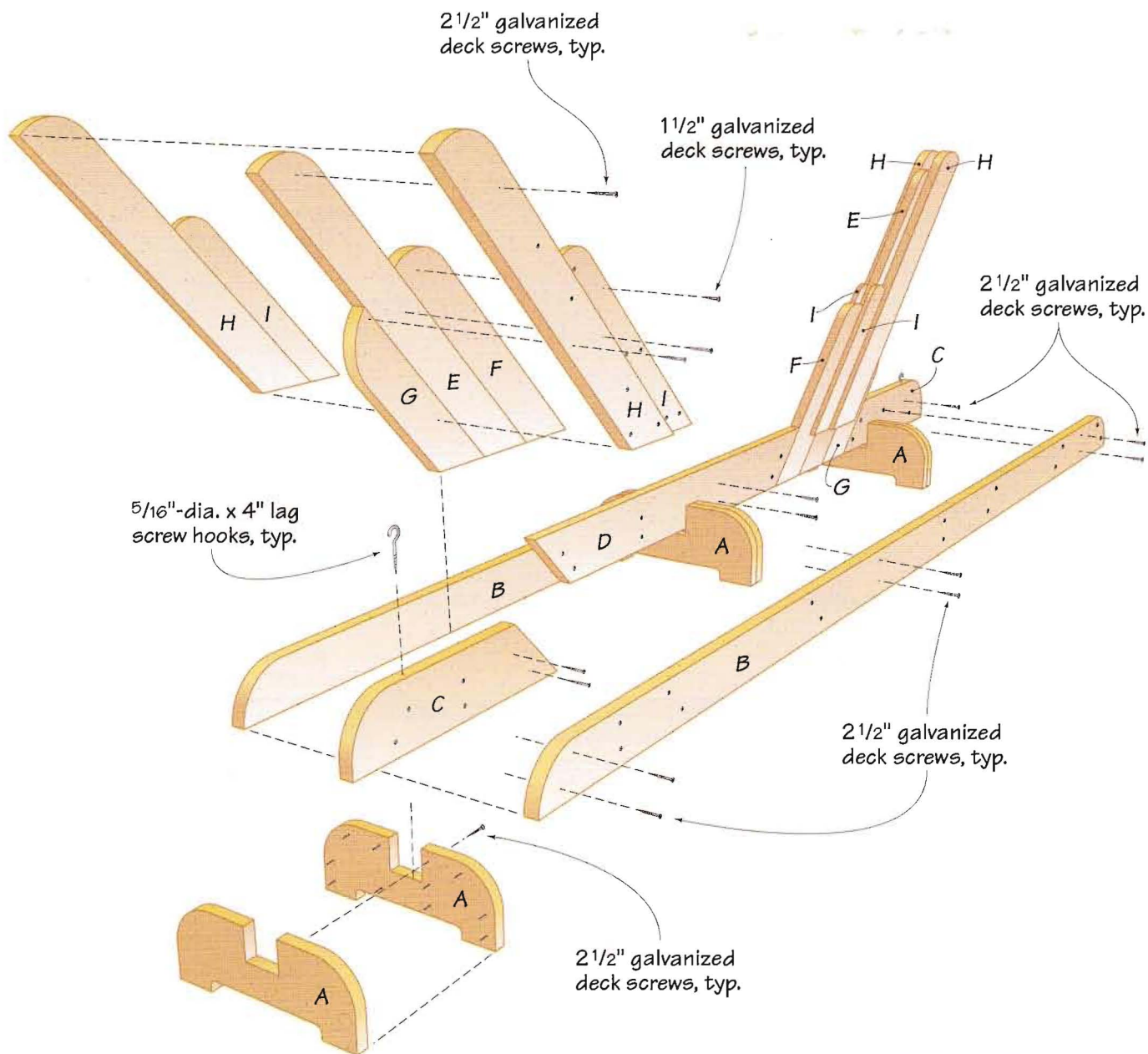
Tools you'll use

- Circular saw or power miter saw
- Compass
- Jig saw
- Drill/driver
- Clamps
- Combination square
- Belt sander
- Wood rasp or coarse wood file

Shopping list

- ☐ (2) 2 × 10 in. × 6 ft. pine
- ☐ (2) 2 × 8 in. × 6 ft. pine
- ☐ (2) 2 × 6 in. × 14 ft. pine
- ☐ (4) 2 × 6 in. × 8 ft. pine
- ☐ (2) 2 × 6 in. × 6 ft. pine
- ☐ (2) 1 × 4 in. × 6 ft. pine
- ☐ (2) 4-in. lag screw hooks
- ☐ Galvanized deck screws (1½-, 2½-in.)
- ☐ Latex primer
- ☐ Exterior latex paint

Art Deco Hammock Stand



Art Deco Hammock Stand Cutting List

Part	No.	Size	Material
A. Leg sections	6	1 1/2 x 9 1/4 x 24 in.	Pine
B. Outer base	2	1 1/2 x 5 1/2 x 158 in.	"
C. Base ends	2	1 1/2 x 7 1/4 x 31 1/2 in.	"
D. Inner base	1	1 1/2 x 7 1/4 x 68 in.	"
E. Center support	2	1 1/2 x 5 1/2 x 61 in.	"
F. Upper support brace	2	1 1/2 x 5 1/2 x 36 in.	"
G. Lower support brace	2	1 1/2 x 5 1/2 x 26 in.	"
H. Outer supports	4	1 1/2 x 5 1/2 x 57 in.	"
I. Support trim	4	3/4 x 3 1/2 x 30 in.	"

Art Deco Hammock Stand: Step-by-step

Built completely from standard dimension pine lumber, this unique hammock stand is made up of three subassemblies—one center support, two angled uprights and three legs. The foundation of the project is its base, which forms a “sandwich” around the uprights. Gaps in the inner layer of the base function as mortises for holding the angled uprights in place. The uprights and feet are designed to fit into and around the base without the need for mechanical fasteners.

BUILD THE LEGS

1 Cut the six leg blanks to length from 2 × 10 stock.

2 Refer to the *Leg Sections* drawing, page 109, to draw leg profiles on the leg blanks (See **Photo A**).

3 Fasten pairs of leg blanks together. Apply moisture-resistant glue between each pair of leg blanks, and fasten the workpieces with countersunk 2½-in. galvanized deck screws (See **Photo B**). Be sure to keep the screws clear of your layout lines.

4 Cut the three legs to shape. Use a band saw or a jig saw and long wood-cutting blade to cut the leg profiles. *NOTE: If you prefer, you could also cut each of the six leg pieces to shape before fastening*



PHOTO A: Cut six leg blanks to size. Then use a compass and combination square to lay out the shapes of the legs on the leg blanks.



PHOTO B: Fasten pairs of leg blanks together with the layout side facing out. Use glue and countersunk screws to attach the parts. Cut the three legs to shape with a band saw or a jig saw, and smooth the cut edges.

them into pairs, but the parts will match more closely if they are cut together. Be careful not to cut the notch for the base too wide. The completed hammock stand will be much sturdier if the base fits snugly into the legs, and you can widen the notch slightly, if necessary, when test-fitting the components later before final painting.

5 Fill the leg screw holes with wood putty or auto body filler. Sand the surfaces and ease the edges, then coat the legs with latex primer.

BUILD THE BASE

6 Cut the two outer base pieces, base ends and the inner base to length. Scribe radiused corners on the outer base and base end pieces with a compass. Then mark the 45° angled ends on the base ends and the inner base. Cut the pieces to shape.

7 Paint the base parts with latex primer. Priming the parts now, while they are still separate and accessible, provides the best weather protection. Sand the surfaces and edges well before applying the primer.

8 Fasten the inner base to the one outer base piece with screws. Center the inner base on the outer base, with the bottom edges flush. For now, tack the inner base in place by driving two screws through it and into the outer base.

9 Attach the base ends. *NOTE: The hammock stand uprights will friction-fit between the inner base and the base ends, "mortise" style. To guarantee enough room for the uprights, lay three scrap pieces of 2 × 6 edge-to-edge on the ends of the inner base. Leave an additional ¼-in. space to allow for ease in inserting and removing the angled*



PHOTO C: Fasten the inner base and base ends to one outer base. Center the inner base on the outer base. Be sure to leave enough room between the inner base and base ends for the uprights. Use spacers and add ¼ in. Attach the parts with 2½-in. galvanized deck screws.



PHOTO D: Lay the other outer base piece on top of the base assembly and drive screws through it to attach it to the inner base pieces. Countersink pilot holes for the screws so you can conceal them with wood putty or auto body filler.



PHOTO E: Lay out and cut parts for the uprights. Each piece is angled to 45° on one end and has a radiused corner on the other end. A power miter saw will cut the angled ends accurately and quickly.

uprights. With this spacing determined, fasten both base ends to the outer base with 2½-in. galvanized deck screws. Remove the 2 × 6 spacers.

10 Complete the attachment of the inner base by driving in the remaining screws (**See Photo C**).

11 Install the other outer base piece. Lay the outer base in position over the base ends and inner base, with the bottom edges flush. Drill countersunk pilot holes and attach the outer base with 2½-in. galvanized deck screws (**See Photo D**).

12 Fill screw holes in the outer base pieces, sand the surfaces smooth and spot-prime the screw locations.

BUILD THE ANGLED UPRIGHTS

13 Cut the center supports, upper and lower support braces, outer supports and the support trim pieces to size and shape. First cut the various blanks to length, as specified in the *Cutting List*, page 108. Mark the radiused corners on the support trim pieces with a compass. All these pieces have one corner cut at either a 5-in. or a 3-in. radius, and the other end cut at a 45° angle. Cut the angled ends with a power miter saw, circular saw or on a radial-arm saw (**See Photo E**). Then cut the curved profiles with a jig saw.

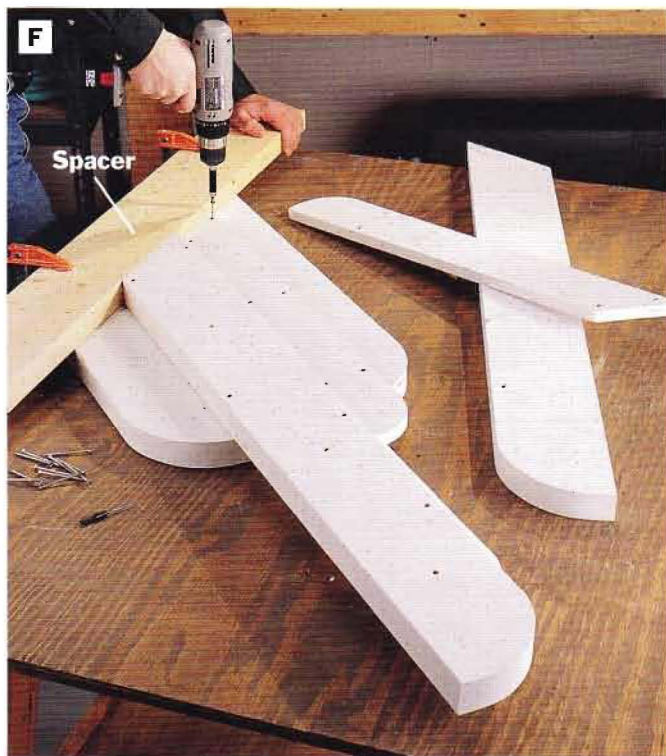


PHOTO F: Prime the parts for the uprights, and use a scrap 2 × 6 as a spacer to offset the outer upright parts from the center three support pieces. Drive screws through the outer pieces to build each upright.

14 Prime the parts for the uprights. Be sure to sand the curved ends and ease sharp or rough edges before priming. Prime all part surfaces.

15 Assemble the uprights. On your worksurface, lay one center support between an upper and a lower support brace, as shown in the *Center Pieces* diagram, page 109. Clamp a scrap 2 × 6 board across the supports so that its lower edge is flush with the angled ends of the parts. Position the outer support and the support trim on top of the center support assembly, with their bottom angled ends tight against the top of the clamped 2 × 6. Drill countersunk pilot holes and attach the outer pieces to the center, upper and lower supports with galvanized deck screws (**See Photo F**). Stagger the screws so the outer pieces lock the three inner supports together. Unclamp the partially assembled upright, turn it over, and complete the assembly by positioning and attaching the other outer support and trim piece. Again, use the 2 × 6 as a spacer. Follow the same steps to build the second angled upright.

FINISHING TOUCHES

16 Before final painting, test-fit the uprights in the base. If the leg notches are too snug to fit around the base, enlarge them slightly with a wood rasp or a

coarse file. The angled uprights may also need to be sanded slightly to slide easily into their mortises in the base, and the fit will get tighter once the wood is covered with paint. A belt sander will make quick work of this task. Sand the bottoms of the uprights just until the uprights slide easily into the base.

17 Fill remaining screw holes, and spot-prime any raw wood or wood filler, especially those areas you sanded in Step 16. Topcoat the base and angled supports with exterior latex enamel paint, using masking tape to protect adjoining areas of contrasting color (See **Photo G**). As you can see, we used a color scheme of grays and blues, to give the hammock stand a “silver streak” look. But you can easily substitute colors of your choice to suit your taste or to complement other outdoor furniture.

18 Install the 4-in. lag screw hooks 8 in. from each end of the base. Drill $\frac{1}{4}$ -in.-dia. pilot holes for the hooks. It may help to wedge a wrench or a screwdriver in the curved portion of the hook and use it as a lever to twist the hooks into the base.

19 Hang the hammock. Assemble the uprights into the base. Install the hammock by stretching it from hook to hook with the rope running between the outer supports on the angled uprights (See **Photo H**). The end ropes should be short enough so that the hammock hangs taut without weight. *NOTE: You'll probably need to adjust and retighten the hammock ropes as the hammock and ropes stretch from use.*



PHOTO G: Mask off those hammock parts that you want to paint in contrasting colors. Use wide tape and “burnish” the edges of the tape with your fingernail where paint colors meet to keep one color from bleeding into the other as you paint. Paint one color at a time and allow it to dry.



PHOTO H: Hang the hammock. Stretch the hammock ropes over the center support on each upright and pull the hammock until taut. Tie off the hammock securely to the lag screw hooks.



Sun Lounger

You'll find this handsome lounge chair perfect for relaxing outdoors, whether your preference is lying in the sun and working on your tan or enjoying shady summer breezes with the company of a good book. The back adjusts to four positions, so you're sure to be able to find the one that suits your mood and activity. The foot section also is adjustable for even greater versatility and comfort.

Vital Statistics: Sun Lounger



TYPE: Lounge chair

OVERALL SIZE: 24W by 80³/₄L by 14¹/₂H (38H with the back raised)

MATERIAL: Cedar, hardwood dowel

JOINERY: Butt joints reinforced with galvanized deck screws, stainless-steel bolts, washers and nuts

CONSTRUCTION DETAILS:

- Back rest adjusts to four positions by means of a pivoting back brace
- Foot rest is adjustable or removable

FINISHING OPTIONS: Penetrating UV protectant sealer, exterior paint or leave unfinished to weather naturally to gray

Building time



PREPARING STOCK
0 hours



LAYOUT
2-3 hours



CUTTING PARTS
3-4 hours



ASSEMBLY
3-5 hours



FINISHING
2-3 hours

TOTAL: 10-15 hours

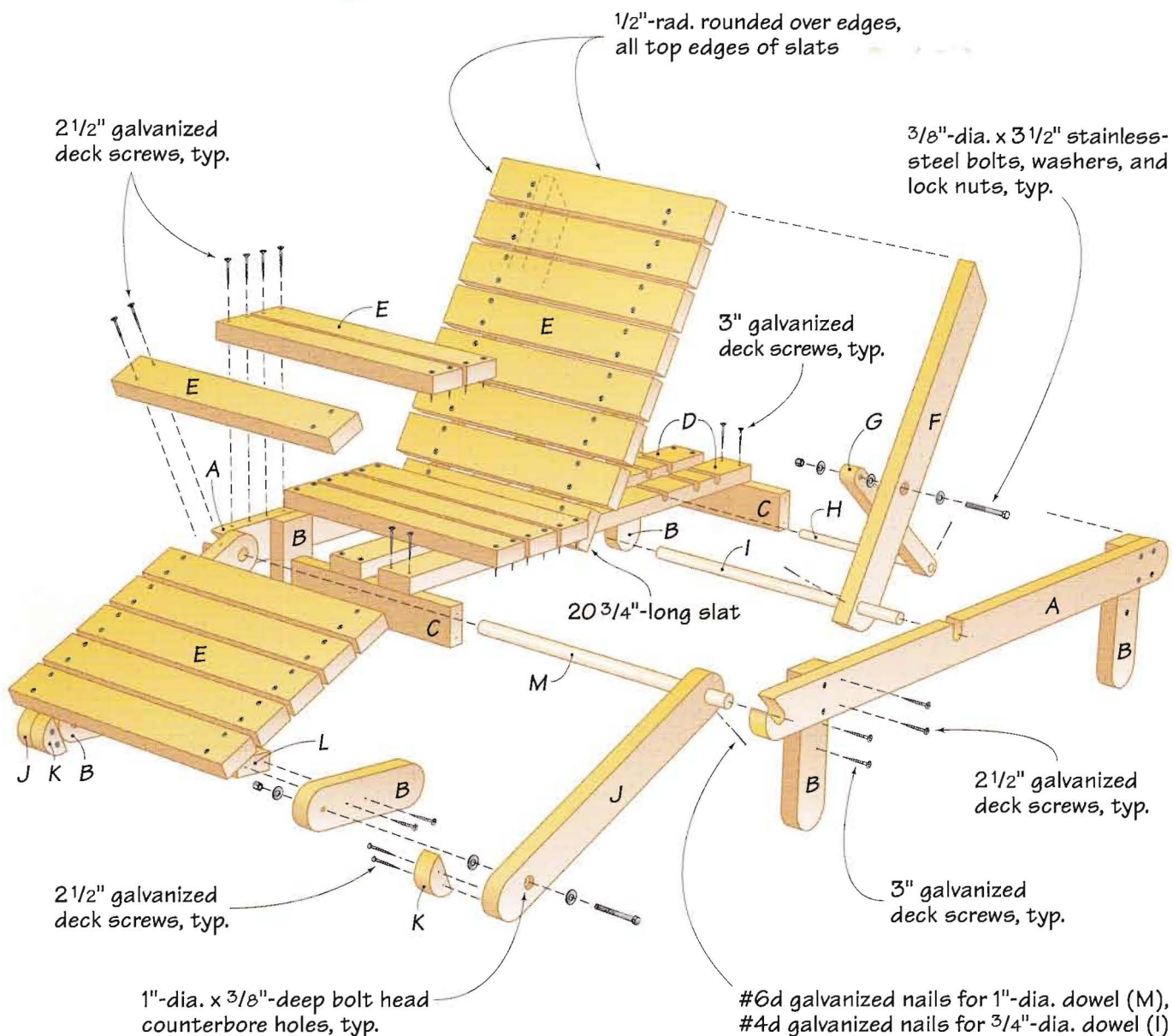
Tools you'll use

- Circular saw, power miter saw or radial-arm saw
- Router with ¹/₂-in. roundover bit, ³/₄-in. core box bit
- Jig saw
- Drill/driver
- Clamps
- Sockets
- Combination square
- Bevel gauge

Shopping list

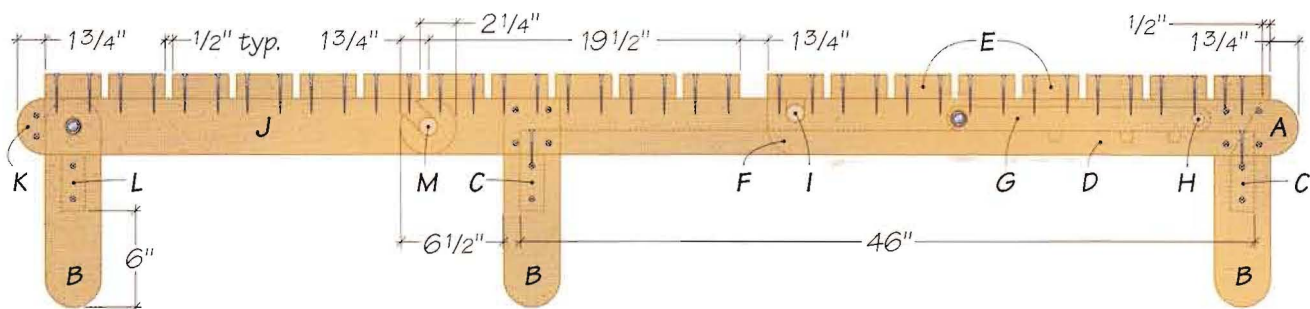
- ☐ (11) 2 × 4 in. × 8 ft. cedar
- ☐ (2) 1-in.-dia. × 3-ft. hardwood dowels
- ☐ (1) ³/₄-in.-dia. × 3-ft. hardwood dowels
- ☐ (4) ³/₈ × ³/₂-in. stainless-steel bolts (12 washers, 8 nuts)
- ☐ Galvanized deck screws (2¹/₂-, 3-in.)
- ☐ Galvanized nails (#6d, #4d)
- ☐ UV protectant sealer

Sun Lounger

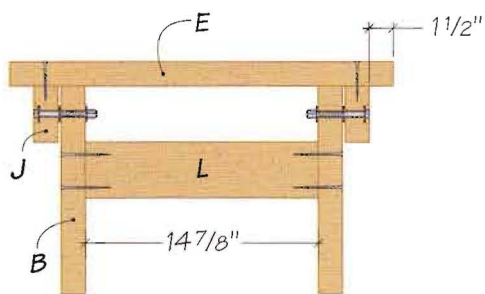


Sun Lounger Cutting List

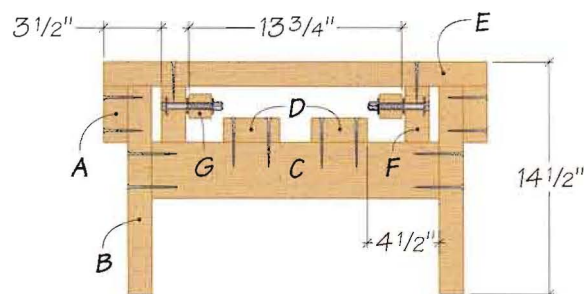
Part	No.	Size	Material	Part	No.	Size	Material
A. Seat rails	2	1 1/2 x 3 1/2 x 56 1/4 in.	Cedar	H. Adjustment dowel	1	3/4 in. dia. x 13 3/4 in.	Hardwood
B. Legs	6	1 1/2 x 3 1/2 x 13 in.	"	I. Back rest dowel	1	1 in. dia. x 24 1/2 in.	"
C. Seat stretchers	2	1 1/2 x 3 1/2 x 18 in.	"	J. Foot rest rails	2	1 1/2 x 3 1/2 x 27 1/2 in.	Cedar
D. Back supports	2	1 1/2 x 3 1/2 x 46 in.	"	K. Leg stops	2	1 1/2 x 3 1/2 x 1 3/4 in.	"
E. Slats	19	1 1/2 x 3 1/2 x 24 in.	"	L. Foot rest stretcher	1	1 1/2 x 3 1/2 x 14 7/8 in.	"
F. Back rails	2	1 1/2 x 3 1/2 x 31 in.	"	M. Foot rest dowel	1	1 in. dia. x 24 1/2 in.	Hardwood
G. Adjustment braces	2	1 1/2 x 1 1/2 x 16 1/2 in.	"				



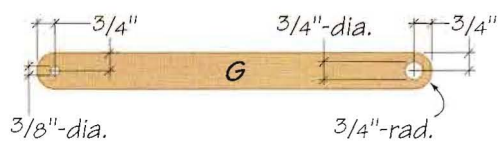
SIDE VIEW



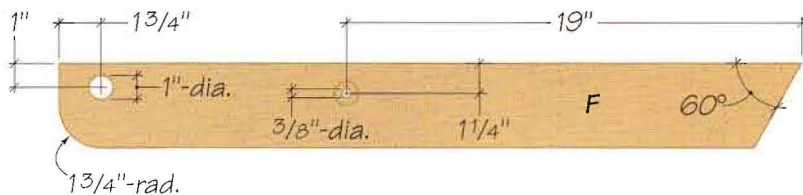
FOOT END VIEW



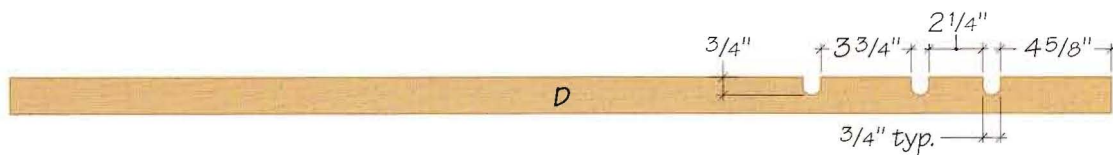
HEAD END VIEW



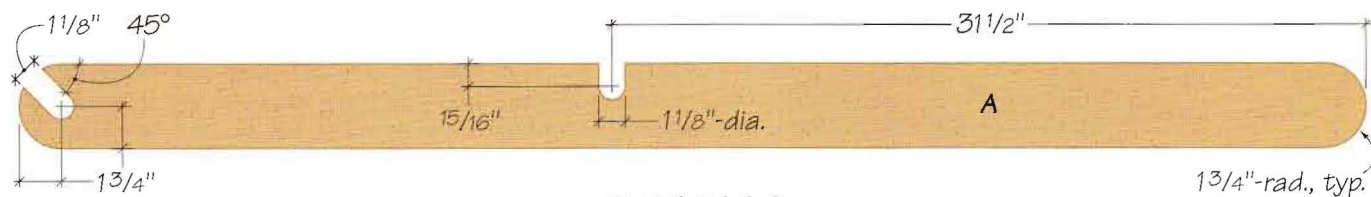
ADJUSTMENT BRACES



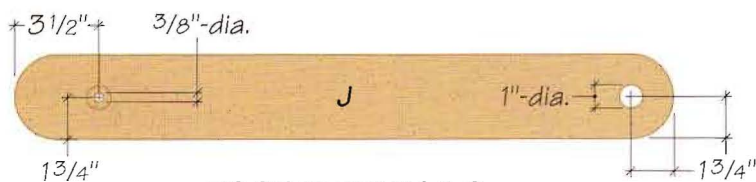
BACK RAILS



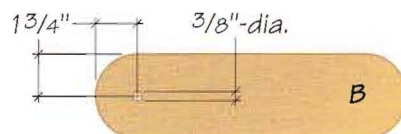
BACK SUPPORTS



SEAT RAILS



FOOT REST RAILS



FOOT REST LEGS

Sun Lounger: Step-by-step

The lounge chair is made up of three sections: a stationary seat, an adjustable back rest and an adjustable foot rest. The seat section provides the basic structure and is built first. All the parts, except for the dowels, are made from cedar 2 × 4s.

SHAPE THE SEAT RAILS

1 Crosscut the long seat rails to length. Draw a 1¾-in. radius on both ends of each rail. Find the centerpoint of each radius by using a combination square and marking a 45° line from both corners at each end. Position your compass at the intersection of these lines and draw the radius. Cut out the curves with a jig saw, and sand the cut edges smooth.

2 Cut notches for the foot rest dowel and the back rest dowel. The notches are made by first boring 1⅝-in.-dia. holes, then cutting a slot from these holes to the top edge of each rail. Start with the foot rest dowel notches. Using the centerpoint you established on the ends of the rails in Step 1, bore a 1⅝-in.-dia. hole. Draw two 45° lines to connect the hole to the top corner of the rails. Cut along these lines to form the foot rest notches (**See Photo A**). Form the back rest notches by measuring 31½ in. from the ends of the rails opposite the foot rest notches. The center-



PHOTO A: Cut notches in the seat rails for back rest and foot rest dowels by boring 1-in.-dia. holes in the rails first, then cutting through the rails to the holes to form the notches. The foot rest notch (shown) is angled 45° on the seat rail, while the back rest notches are perpendicular.

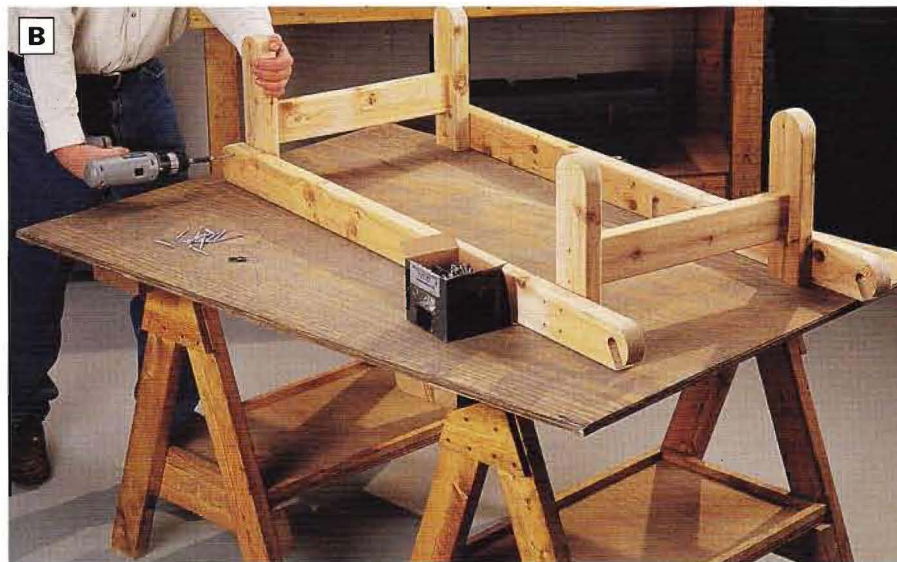


PHOTO B: Fasten the leg assemblies to the seat rails with 2½-in. galvanized deck screws. Be sure the foot rest notches on the seat rails face down on your worksurface when you fasten the legs to the rails. Check the leg assemblies with a square to be sure they are perpendicular to the rails before driving the screws.

point for the 1⅝-in.-dia. hole is 15/16 in. from the top edge of the rails. Drill the holes, then form the notches by drawing a pair of lines from each hole perpendicular to the top edge of the rails. Cut along the lines to form the two notches.

BUILD & ATTACH THE LEG ASSEMBLIES TO THE SEAT RAILS

3 Cut the six legs to length. Draw and cut 1¾-in. radii on both ends of the two foot rest legs and on one end of the four seat section legs.

④ Cut the seat stretchers to length. Mark the stretcher locations on the inside faces of the four seat section legs. Center the stretchers on the width of the legs. The top edges of the stretchers are $3\frac{1}{2}$ in. down from the square ends of the legs. Clamp the parts together and fasten the legs to the seat stretchers with countersunk 3-in. galvanized deck screws.

⑤ Attach the leg assemblies to the seat rails. Fasten one leg assembly $6\frac{1}{2}$ in. from the ends of the rails with the foot rest notches using $2\frac{1}{2}$ -in. deck screws. Attach the second leg assembly so the span between the outside faces of the seat stretchers is 46 in. (See Photo B).

INSTALL THE BACK SUPPORTS

⑥ Measure and cut the two back supports to length.

⑦ Rout the three back rest grooves in each back support. Refer to the measurements on the *Back Supports* drawing, page 117, to determine the groove locations. Clamp the back supports side by side so you can mark and gang-cut slots on both supports at one time. Then rout the grooves with a $\frac{3}{4}$ -in. core box bit. Cut the slots in multiple passes to keep from overloading the router bit (See Photo C).

⑧ Attach the back supports to the tops of the seat stretchers. Leave a $4\frac{1}{2}$ -in. space between the supports and the legs (See *Head End View*, page 117) to allow ample room for the back rails and adjustment braces. Align the ends of the back supports so they are flush with the outside faces of the seat stretchers. Drill pilot holes, and fasten the parts with 3-in. galvanized deck screws (See Photo D).



PHOTO C: Gang-rout notches in the back supports to ensure that the notches will line up perfectly on both pieces. Use a $\frac{3}{4}$ -in. core box bit, and cut the notches in several passes of increasing depth. We clamped a short T-square style straightedge jig to guide the router when cutting.

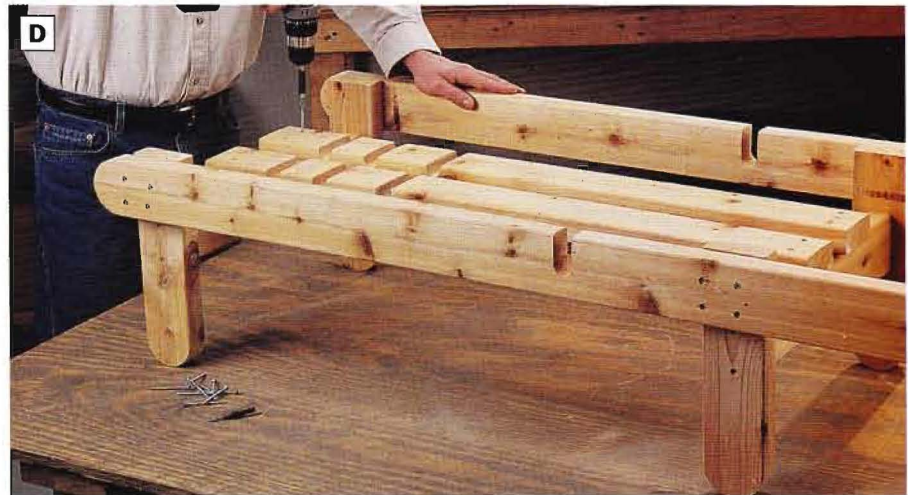


PHOTO D: Fasten the back supports to the seat stretchers. Leave $4\frac{1}{2}$ -in. spaces between the back supports and the legs to provide clearance for the chair back rails and adjustment braces.



PHOTO E: Cut the 19 seat slats to length, and ease the top edges and ends of each slat with a $\frac{1}{2}$ -in. roundover bit in the router. We used a plywood jig clamped to the benchtop to "frame" each slat on all sides and hold it steady while routing. This way, the slats require no further clamping.



PHOTO F: Screw the five seat slats to the seat rails. Determine and mark the positions of the end slats first, then space the remaining three slats evenly between the end slats. If the slat space is consistent on your chair, use a scrap spacer to make spacing easy when fastening the parts.



PHOTO G: Bore a 1-in.-dia. hole through each back rail for the back rest dowel and a $\frac{3}{8}$ -in.-deep counterbore for the heads and washers of the adjustment brace pivot bolts.

CUT & ATTACH THE SLATS

9 Cut all the slats to length. Cut one slat $3\frac{1}{4}$ in. shorter than the others so it can fit between the seat rails when the back rest is inclined.

10 Rout a $\frac{1}{2}$ -in. roundover on the face edges of the slats. We made a plywood jig and clamped it to our worksurface to hold each slat steady for routing (See Photo E).

11 Attach the five slats that make up the fixed seat of the chair to the seat rails. First mark the positions of the two end slats. Locate the edge of the slat closest to the foot rest notch by measuring $1\frac{3}{4}$ in. from the foot end of the seat rails and marking a line. Then measure $19\frac{1}{2}$ in. from this line to locate the edge closest to the back rest notch. Space the remaining three slats evenly between the end slats. *NOTE: The spacing between the slats will vary, depending upon the width of your slat stock. What is most important is that all the slats fit between the marks you've just drawn on the seat rails.* Fasten the slats to the rails with $2\frac{1}{2}$ -in. deck screws (See Photo F).

BUILD THE BACK REST

12 Rip and crosscut the two adjustment braces to size, and cut $\frac{3}{4}$ -in. radiuses on both ends of each part. Drill one end for a $\frac{3}{8}$ -in.-dia. pivot bolt and the other end for the $\frac{3}{4}$ -in.-dia. adjustment dowel. Bore the holes at the centerpoints you established for marking the end radiuses.

13 Cut the back rails to length, then miter-cut one end at a 60° angle. Cut a $1\frac{3}{4}$ -in. radius on one corner of the other end of the rails with a jig saw as shown in the *Back Rails* drawing, page 117.

14 Bore holes in the back rails for the back rest dowel and adjustment brace pivot bolts. Refer to the *Back Rails* drawing, page 117, for locating these hole positions. Clamp each rail to your work surface. Bore a 1-in.-dia. hole through the radiused ends of the rails for the back rest dowel. Using the same bit, drill a $\frac{3}{8}$ -in.-deep counterbore for the pivot bolt head and washer (See Photo G).

15 Drill a $\frac{3}{8}$ -in.-dia. hole through the back rails for the adjustment brace pivot bolts in the center of the counterbores you drilled in Step 14 (See Photo H).

16 Install the adjustment dowel in the adjustment braces. Cut the $\frac{3}{4}$ -in.-dia. dowel to length, and fasten the dowel into the holes in the adjustment braces with 4d galvanized finish nails.

17 Attach the slats to the back rails. On the seven full-length slats, drill a line of countersunk pilot holes $4\frac{1}{4}$ in. from each end. On the short slat, drill the pilot holes $1\frac{1}{8}$ in. from each end. Attach the end slats first. Align the short slat so it is even with the radiused ends of the back rails, and overhang the upper slat $\frac{1}{2}$ in. beyond the angled ends. Make sure these two slats are square with the rails and that the inside faces of the rails are 14 in. apart. Screw these first two slats in place. Then space and attach the six intermediate slats evenly between the end slats.

18 Cut the 1-in.-dia. back rest dowel to length. Slide it through the holes in the back rails, overhang the ends evenly and fasten the dowel in place with a 6d galvanized nail at each end (See Photo I). Drill pilot holes to keep the nails from splitting the dowels.



PHOTO H: Drill $\frac{3}{8}$ -in.-dia. holes through the back rails, centered on the 1-in.-dia. counterbore holes. These holes will house pivot bolts for the adjustment brace that supports the chair back and holds it in one of three positions.



PHOTO I: Tack the back rest dowel in place on the back rest rails with #6d galvanized finish nails. Drive the nails through the rails and into the dowels. To keep the dowels from splitting, drill a pilot hole for the nails first.



PHOTO J: Install the adjustment brace to the back rest with bolts, washers and nuts. Place a washer on either side of each adjustment brace. Thread two nuts on each bolt and tighten the nuts against one another to lock them together, yet allow the adjustment brace to swing freely.

19 Secure the adjustment brace assembly to the back rest rails with bolts, washers and double nuts (**See Photo J**). Leave enough play when tightening the nuts against one another so the brace assembly swings freely.

ASSEMBLE THE FOOT REST

20 Cut the foot rest rails to length, then round off both ends with $1\frac{3}{4}$ -in. radiuses.

21 Bore holes through the foot rest rails for the foot rest dowel and the leg pivot bolts. Locate the centerpoints for the holes using the *Foot Rest Rails* drawing, page 117. Drill a 1-in.-dia. hole through one end for the foot rest dowel. Using the same bit, drill a $\frac{3}{8}$ -in.-deep counterbore in the other end for the pivot bolt head and washer.

22 Make and attach the two leg stops. Cut $1\frac{3}{4}$ -in. radiuses on both ends of a piece of 2×4 cedar scrap, then cut off these two semi-circles (**See Photo K**). Fasten the leg stops to the pivot bolt ends of the foot rest rails with screws.

23 Drill the $\frac{3}{8}$ -in.-dia. holes for the pivot bolts. Clamp a foot rest leg in place beneath a rail on your work-surface. Drill a $\frac{3}{8}$ -in.-dia. hole through the center of the counter-bore in the rail and through the leg (**See Photo L**). Repeat the process for the other rail and leg.

24 Cut the foot rest stretcher to length and fasten it to the legs. Center the stretcher on the width of the legs, and position the bottom edge 6 in. from the bottoms of the legs. Drill countersunk pilot holes and fasten the parts with $2\frac{1}{2}$ -in. galvanized deck screws.

25 Attach six slats to the foot rest rails. Drill countersunk pilot holes



PHOTO K: Cut $1\frac{3}{4}$ -in. radiuses on either end of a section of 2×4 cedar. Cut off these curved ends with a power miter saw or radial-arm saw. The pieces will serve as leg stops on the foot rest. Cutting short workpieces from longer stock keeps your hands a safe distance from the blade.



PHOTO L: Drill holes through the foot rest rails and the legs. The parts will attach with bolts so the legs can pivot on the rails.

$2\frac{1}{4}$ in. from each end of the slats. Attach the end slats first. Locate one slat $1\frac{3}{4}$ in. from the leg ends of the short rails. Set the other end slat $2\frac{1}{4}$ in. from the dowel-hole ends of the rails. Make sure the framework is square. Then fasten the intermediate slats evenly between the end slats.

26 Cut and attach the foot rest dowel to the rails with 6d finish nails. The dowel should overhang the rails evenly on both sides.

27 Attach the leg assembly to the foot rest rails with $\frac{3}{8}$ -in.-dia. bolts, washers and double nuts (See **Photo M**).

FINISHING TOUCHES

28 Ease all chair edges thoroughly with sandpaper (See **Photo N**). Stain and/or seal as desired. We applied a clear exterior sealer to highlight the beauty of the cedar, but this project could be stained, painted or left unfinished.



PHOTO M: Attach the foot rest stretcher to the legs with $2\frac{1}{2}$ -in. deck screws, then join the leg assembly to the foot rest with bolts, washers and double nuts.



PHOTO N: Set the back and foot rests in place on the seat, and test the action of the parts. Then sand all exposed surfaces of the chair with medium-grit sandpaper. If you sand in an enclosed place, wear a particle mask. Cedar dust can be irritating to your nose and lungs.



Utility Cart

A sturdy, well-designed utility cart can make your lawn and garden work safer, more efficient and maybe even more enjoyable. Our cart is easy to construct from basic materials but rugged enough to give you years of hard-working service. The large, 14-in. wheels enable this cart to roll easily over bumpy ground, even while loaded to the brim with garden supplies and tools. When not in use, just stand it on end or lay it on its side against your garage or shed wall until you need it next.

Vital Statistics: Utility Cart



TYPE: Utility cart

OVERALL SIZE: 30W by 78L by 28H

MATERIAL: Exterior plywood, treated lumber

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Dimension lumber and exposed screws for ease of construction
- Notches in cart back and crosspiece for carrying tools
- Broad wheel base for stability
- Large wheels for ease of moving heavy loads over uneven ground
- Handles cut into profiles at the ends to provide comfortable grip

FINISHING OPTIONS: Leave unfinished or topcoat with penetrating UV protectant sealer or paint if cart is stored outside

Building time



PREPARING STOCK

0 hours



LAYOUT

1-2 hours



CUTTING PARTS

2-4 hours



ASSEMBLY

2-4 hours



FINISHING

1-2 hours (optional)

TOTAL: 6-12 hours

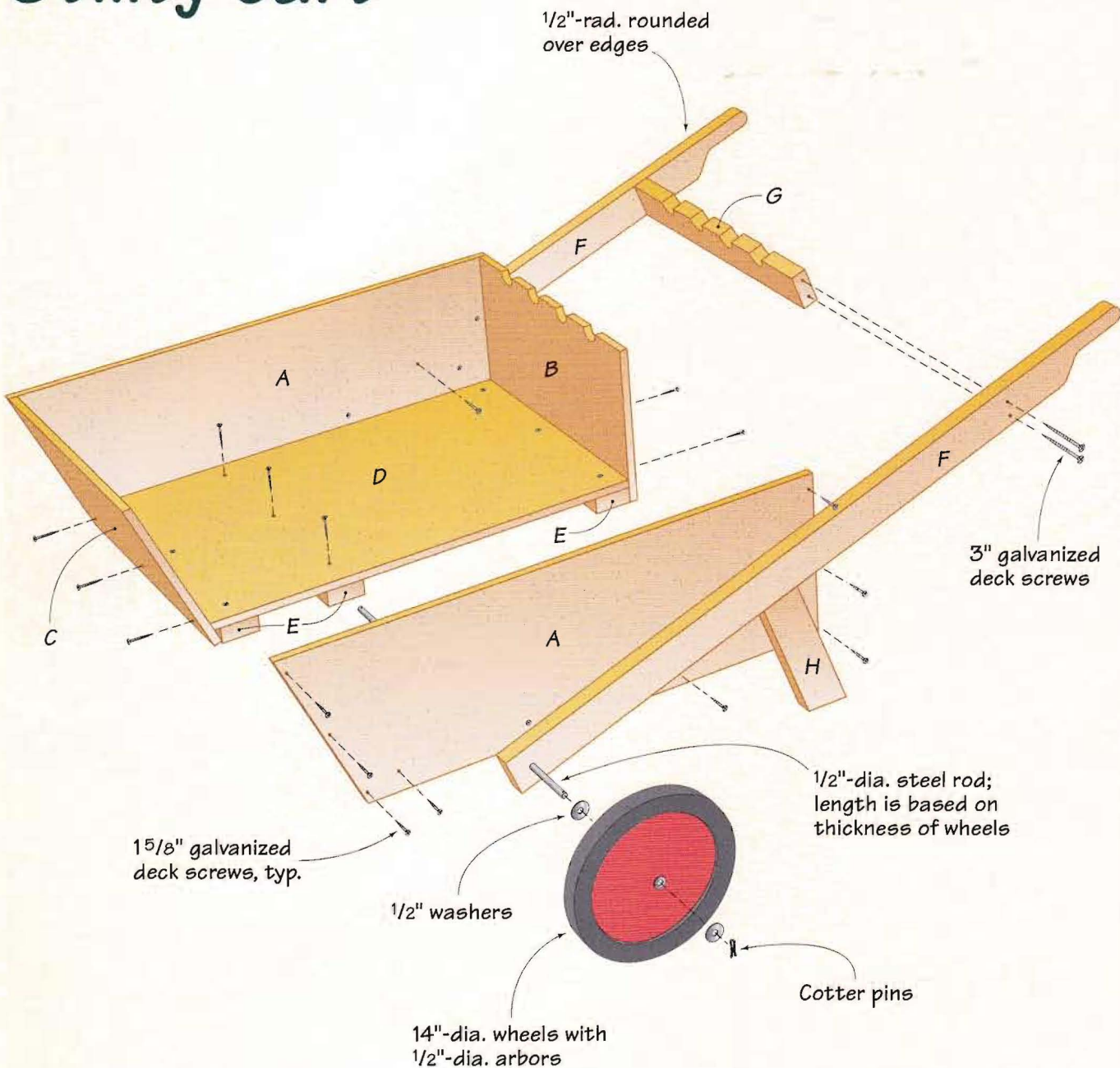
Tools you'll use

- Circular saw
- Jig saw
- Drill/driver
- Drill press
- Right-angle drill guide
- Router with 1/2-in. roundover bit
- Combination square
- Clamps

Shopping list

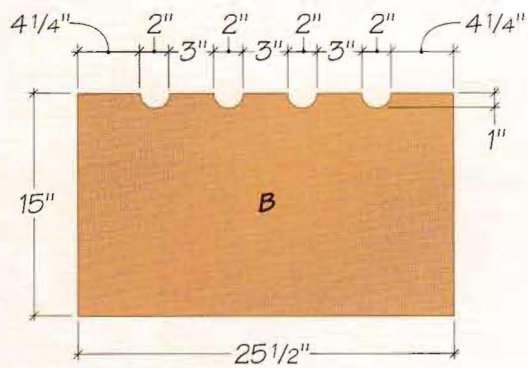
- ☐ (1) 3/4 in. x 4 ft. x 8 ft. exterior plywood
- ☐ (3) 2 x 4 in. x 8 ft. treated lumber
- ☐ Galvanized deck screws (1 5/8-, 2-, 3-in.)
- ☐ (1) 1/2-in.-dia. x 36-in. steel rod
- ☐ (4) 1/2-in. washers
- ☐ (2) 14-in.-dia. wheels with 1/2-in. arbors
- ☐ (2) Cotter pins
- ☐ UV protectant sealer

Utility Cart

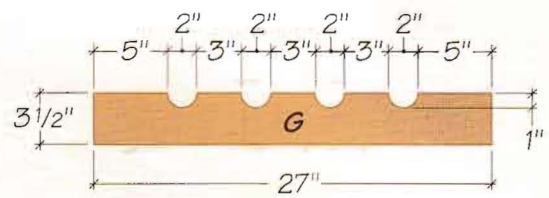


Utility Cart Cutting List

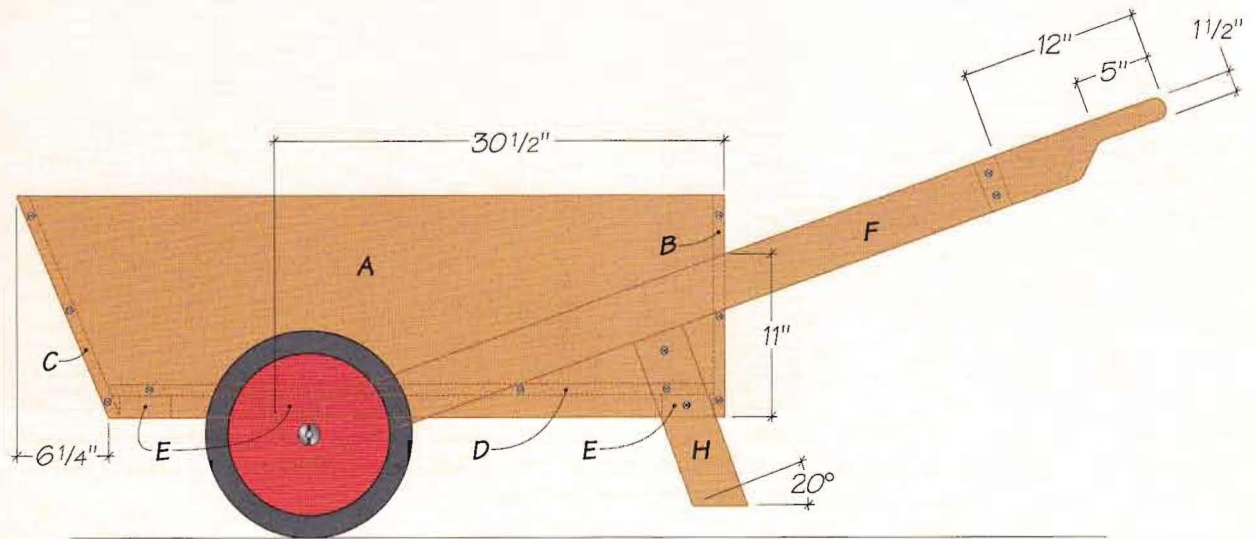
Part	No.	Size	Material	Part	No.	Size	Material
A. Sides	2	3/4 x 15 x 48 in.	Exterior plywood	E. Struts	3	1 1/2 x 3 1/2 x 25 1/2 in.	Treated lumber
B. Back	1	3/4 x 15 x 25 1/2 in.	"	F. Handles	2	1 1/2 x 3 1/2 x 64 in.	"
C. Front	1	3/4 x 16 1/4 x 25 1/2 in.	"	G. Crosspiece	1	1 1/2 x 3 1/2 x 27 in.	"
D. Bottom	1	3/4 x 25 1/2 x 41 1/4 in.	"	H. Legs	2	1 1/2 x 3 1/2 x 13 in.	"



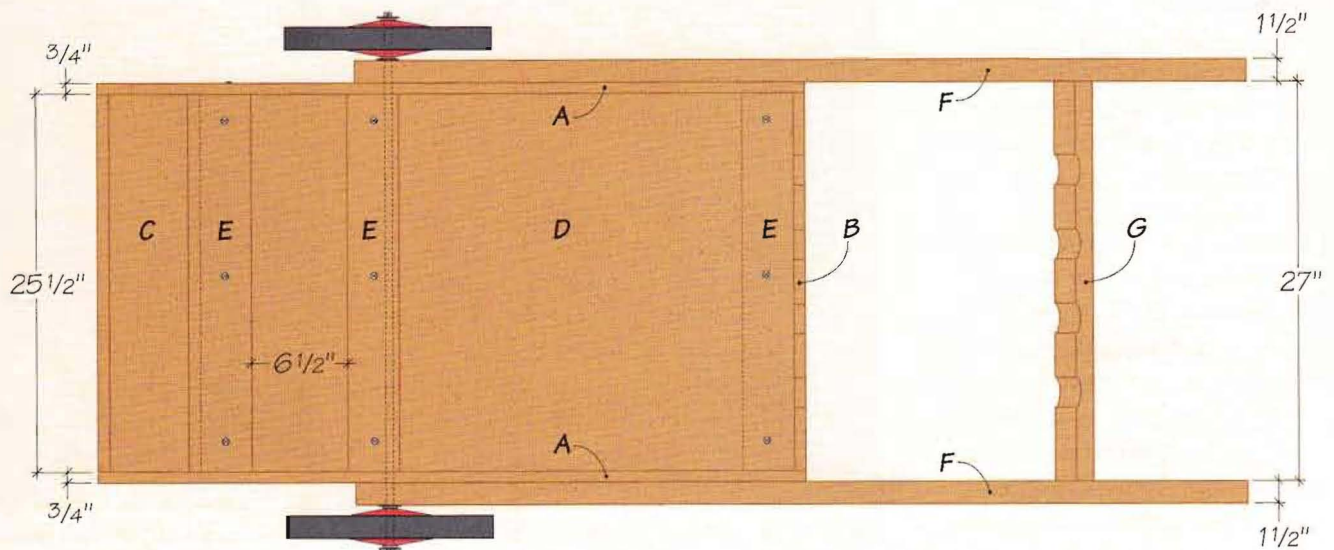
NOTCHES IN BACK



NOTCHES IN CROSSPIECE



SIDE VIEW



TOP VIEW

Utility Cart: Step-by-step

BUILD THE BOX

The cart box is constructed of $\frac{3}{4}$ -in. exterior plywood, which resists delaminating when exposed to moisture. The front of the box is angled for easy dumping, and the bottom is reinforced with three recessed 2×4 struts.

1 Cut the box sides, back, front and bottom pieces to the sizes given in the *Cutting List*, page 134. Use a circular saw or jig saw guided against a clamped straight-edge to cut the parts. Lay out all the parts on the plywood sheet before cutting any workpieces to ensure that you will cut the sheet efficiently and minimize waste.

2 Mark and cut the four notches for tool handles in the top edge of the back piece. Refer to the *Notches in Back* drawing, page 135, for spacing the notches. Cut out the notches with your jig saw (See Photo A).

3 Cut the three struts to length and attach them to the bottom piece. Position the front strut $1\frac{1}{2}$ in. back from the front edge of the bottom, the center strut $6\frac{1}{2}$ in. away from the front strut, and the rear strut flush with the back edge of the bottom. Apply moisture-resistant wood glue to the struts, drill countersunk pilot holes through the bottom, and fasten

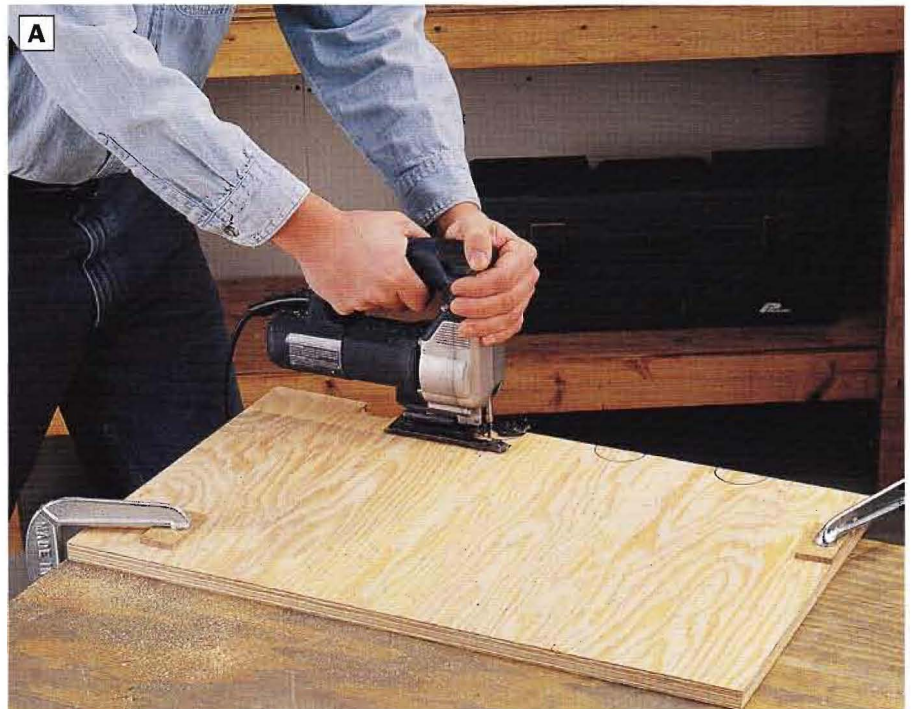


PHOTO A: Lay out and draw four 2-in.-dia. semicircular tool notches in the top edge of the cart back. Cut out the notches with a jig saw. Clamp the workpiece to your bench to hold it steady while you make the notched cuts.

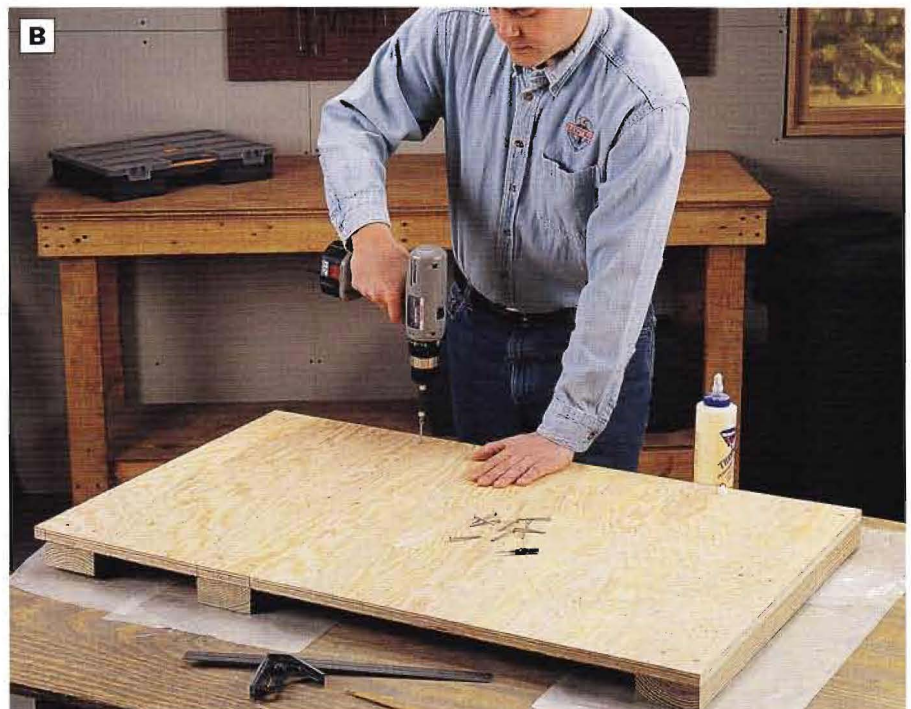


PHOTO B: Cut and install the three struts to the cart bottom with moisture-resistant wood glue and 2-in. galvanized deck screws. For maximum strength, use at least six screws to fasten each strut to the bottom panel.



PHOTO C: Build the cart box. Fasten the cart back to the bottom, then screw the sides to the back and bottom. Install the cart front last. Strengthen the joints with glue when you attach the parts.

the struts with $1\frac{5}{8}$ -in. screws (**See Photo B**).

4 Lay out and cut the angled front ends of the side pieces. Make a mark along the bottom edge of each side piece $6\frac{1}{4}$ in. from one end. Draw a straight line from these marks to the corner of the top edge. Cut along these angled lines.

5 Bevel-cut the top edge of the front piece. Set the base of your circular saw to $22\frac{1}{2}^\circ$, and trim along the top edge so it will be flush when fastened between the angled front edges of the sides. The bottom edge will be hidden, so there's no need to bevel-cut it to match.

6 Bevel-cut the front edge of the bottom piece.

7 Assemble the box with glue and $1\frac{5}{8}$ -in. galvanized deck screws. Drill countersunk pilot holes in the sides, front and back. First, attach the back to the bottom, driving screws through the back and into the back strut. Next, attach the sides to the bottom and the back (**See Photo C**). Align the bottoms of the sides with the bottoms of the struts. The back edges of the sides overlap the back. Finally, attach the front to the bottom and sides, making sure that the angled edge is flush with the top edges of the sides.



PHOTO D: Mark and cut the grip profiles on the handles. Ease the sharp edges on the grips by rounding them over with a router and $\frac{1}{2}$ -in. roundover bit.

ATTACH THE HANDLES, LEGS & CROSSPIECE

The handles, legs and crosspiece are made of treated lumber. When handling chemically-treated lumber, it is a good idea to protect your skin by wearing work gloves. Also, work in a well-ventilated area when cutting this wood.

8 Cut the handles to length from 2×4 stock.

9 Shape the grips on the handles. Following the *Side View* drawing, page 135, mark the grip profiles and cut the shapes with your jig saw. Use your router with a $\frac{1}{2}$ -in. roundover bit to ease the sharp edges on the grips (**See Photo D**). This step can also be done with a rasp and sandpaper, or a handheld belt sander if you don't have a router.

10 Position and attach the handles. Mark the location of the handles on the box sides by measuring from the back corner up 11 in. and forward $30\frac{1}{2}$ in. Draw a straight line between these points on both sides. Drill a line of pilot holes $1\frac{3}{4}$ in. down from these lines, and countersink the holes from inside the box. Position the handles so the top edges align with the diagonal marks on the cart. Apply moisture-resistant wood glue, clamp the first handle in place, and attach the



PHOTO E: Mark the locations of the handles on the cart box, and install the handles with moisture-resistant wood glue and 2-in. galvanized deck screws. Clamp the handles in place as you attach them.

handle with 2-in. screws. Flip the box over, and clamp and attach the second handle (**See Photo E**).

11 Cut the legs to length, then cut the bottom ends of the legs at a 20° angle. Position the legs on the cart sides so the top ends of the legs rest against the bottom edges of the handles, and the back edges of the legs align with the bottom back corners of the back struts. Fasten the legs with glue and screws.

12 Cut and attach the crosspiece. Cut the crosspiece to length. Mark the tool-handle notches by aligning the crosspiece flush with the top edge of the cart back and tracing the profile. Cut the notches with a jig saw. Clamp the crosspiece in position, 12 in. from the upper ends of the handles. Drill countersunk pilot holes, and screw the crosspiece in place with 3-in. galvanized deck screws (**See Photo F**).

INSTALL THE WHEELS

Wheels can be purchased in a variety of sizes. Keep in mind that wheel diameter will affect the overall height of the cart and the length of the legs. The legs should be short enough so that the cart leans back slightly when at rest; this ensures that the legs won't



PHOTO F: Clamp the crosspiece in position between the handles, drill countersunk pilot holes through the parts, and fasten the crosspiece to the handles with 3-in. galvanized deck screws.

be snagging on the ground as you go over bumps or down hills. Also, larger wheels will navigate uneven ground much more smoothly than will small wheels. We found 14-in. wheels to be a convenient size and readily available at our local building center.

13 Locate and drill the axle holes. Mark 45° lines from the bottom corners of the handles using a combination square. Drill ½-in.-dia. axle holes through the handles where the lines intersect. *NOTE: Be sure the holes clear the bottom of the center stretcher, especially if you've modified the position of the handle, based on the wheels you are using for the cart* (**See Photo G**).

14 Cut the axle rod to length. If your wheel hubs are 1½ in. thick, as ours were, the correct axle length will be 34½ in. If the hubs of your wheels are thicker or thinner, you will need to adjust the axle length accordingly. The axle needs to extend beyond the cart on each side ¾ in. plus the thickness of the hub to accommodate the washers and cotter pins.

15 Drill holes through the axle for the cotter pins. Make a wooden cradle by cutting a groove into the face of an 8- to 12-in. piece of 2 × 4 with two passes of

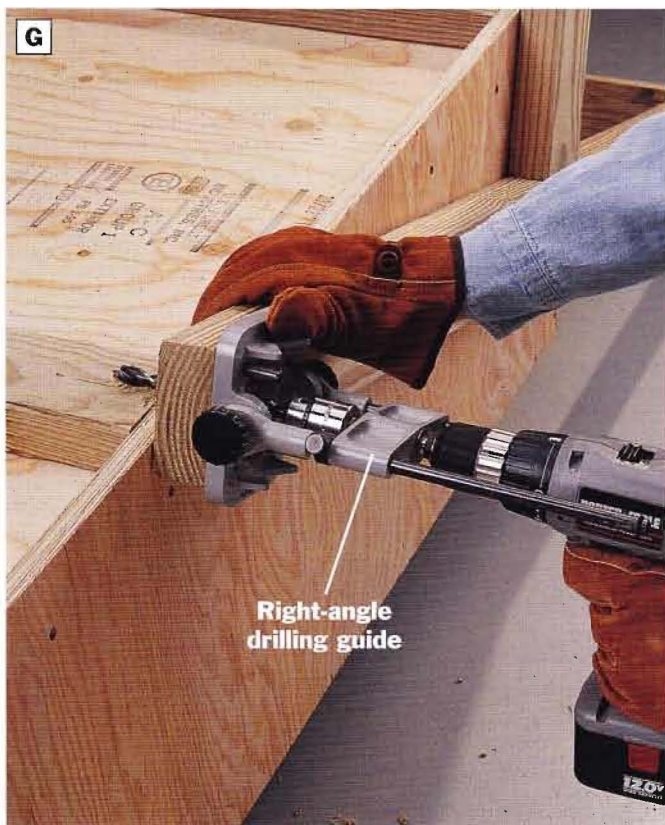


PHOTO G: Mark locations for the axle near the bottom ends of the handles. Then drill $\frac{1}{2}$ -in.-dia. holes through each handle. A right-angle drilling guide will ensure straight holes.

your saw set at a 45° angle. Fasten the grooved 2×4 to a larger piece of $\frac{3}{4}$ -in. scrap to serve as a clamping surface. Clamp this “cradle” to your drill press table to support the axle while you drill it. Drill a $\frac{1}{8}$ -in.-dia. hole $\frac{1}{2}$ in. in from each end of the axle rod (See **Photo H**).

16 Install the wheels. Slide the axle and wheels in place, positioning a washer on either side of each wheel. Secure the wheels by inserting cotter pins through the axle holes and bending the ends around the axle (See **Photo I**).

FINISHING TOUCHES

17 The exterior plywood cart box and treated lumber parts will hold up well to the knock-about use you’re going to give this cart, and they require no special finish. However, if you’ll store this cart outside where it is exposed to the elements, it’s a good idea to give the cart a coat of primer and paint or penetrating wood sealer to protect the plywood parts. Otherwise, they could delaminate over time. *TIP: Treated lumber is often too damp to paint when you buy it. Allow the treated wood parts on the cart several weeks to dry thoroughly before painting.*



PHOTO H: Cut a V-shaped notch in a scrap of 2×4 to help steady the axle as you drill holes for cotter pins. Fasten the notched cradle to another scrap, and clamp the jig to the drill press table.



PHOTO I: Install the axle, washers and wheels on the cart. Slip cotter pins through the holes on each end of the axle, and secure the wheels by bending the ends of the cotter pins around the axle.

Basic Garden Bench

Garden benches come in many varieties, from rustic and casual to refined and formal. This casual bench is built from cedar, employing exposed screws in a construction style that's surely within the range of most weekend woodworkers. Like many of our plans, this project can be easily adapted. By simply changing the finish to bright paint or modifying the profile of the back, you'll have the perfect project to suit your personal taste or setting. It's a piece of furniture that can withstand the elements year-round and, after weathering outdoors for a bit, will look as

natural in your garden as the primroses and petunias.



Vital Statistics: Basic Garden Bench



TYPE: Garden bench

OVERALL SIZE: 24 $\frac{1}{2}$ D by 59 $\frac{1}{2}$ L by 36H

MATERIAL: Cedar

JOINERY: Butt joints reinforced with galvanized deck screws

CONSTRUCTION DETAILS:

- Wide seat and modestly angled back ensure comfort
- Gentle contoured design on the back slats can be easily adapted to other shapes
- Exposed screws enhance rustic, outdoor appearance
- Assembly of three substructures—back, seat and leg/arm assemblies—simplifies construction

FINISHING OPTIONS: Penetrating UV protectant sealer or leave unfinished to weather naturally to gray

Building time



PREPARING STOCK
0 hours



LAYOUT
2-4 hours



CUTTING PARTS
2-4 hours



ASSEMBLY
4-6 hours



FINISHING
2-3 hours

TOTAL: 10-17 hours

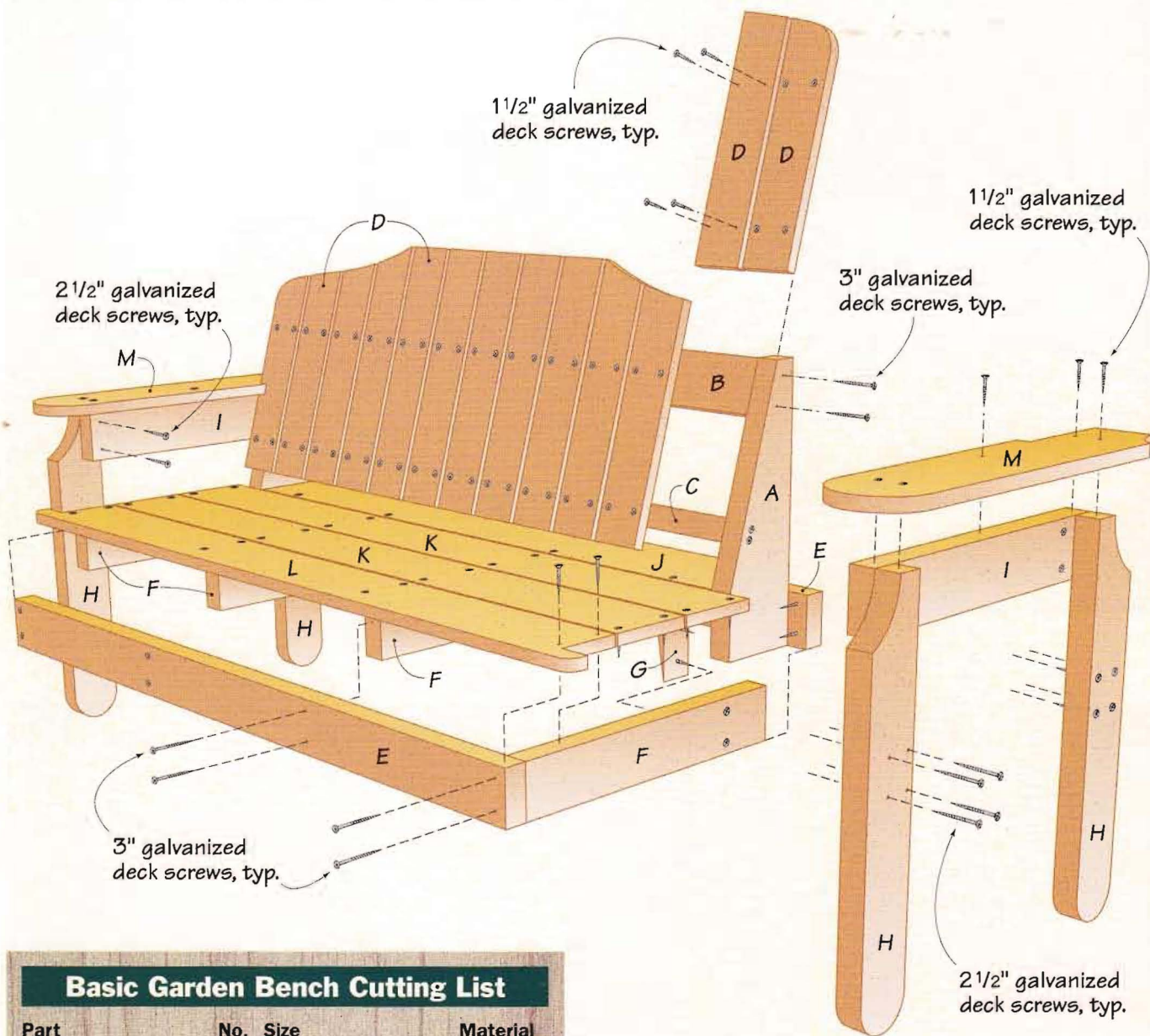
Tools you'll use

- Circular saw or power miter saw
- Jig saw
- Drill/driver
- Clamps
- Combination square
- Carpenter's square

Shopping list

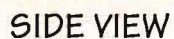
- ☐ (1) 2 × 6 in. × 4 ft. cedar
- ☐ (5) 2 × 4 in. × 8 ft. cedar
- ☐ (1) 2 × 2 in. × 4 ft. cedar
- ☐ (1) 1 × 8 in. × 4 ft. cedar
- ☐ (2) 1 × 6 in. × 8 ft. cedar
- ☐ (1) 1 × 6 in. × 6 ft. cedar
- ☐ (3) 1 × 4 in. × 8 ft. cedar
- ☐ Galvanized deck screws (1 $\frac{1}{2}$ -, 2 $\frac{1}{2}$ -, 3-in.)
- ☐ UV protectant sealer

Basic Garden Bench



Basic Garden Bench Cutting List

Part	No.	Size	Material
A. Back supports	2	1 1/2 x 5 1/2 x 18 in.	Cedar
B. Upper back rail	1	1 1/2 x 3 1/2 x 47 in.	"
C. Lower back rail	1	1 1/2 x 1 1/2 x 47 in.	"
D. Back slats	13	3/4 x 3 1/2 x 18 in.	"
E. Seat rails	2	1 1/2 x 3 1/2 x 53 in.	"
F. Cross braces	4	1 1/2 x 3 1/2 x 20 in.	"
G. Corner braces	2	1 1/2 x 3 1/2 x 16 in.	"
H. Legs	4	1 1/2 x 3 1/2 x 23 1/4 in.	"
I. Arm supports	2	1 1/2 x 3 1/2 x 19 in.	"
J. Rear seat slat	1	3/4 x 6 3/4 x 47 in.	"
K. Middle seat slats	2	3/4 x 5 1/2 x 53 in.	"
L. Front seat slat	1	3/4 x 5 1/2 x 57 in.	"
M. Arms	2	3/4 x 5 1/2 x 24 1/2 in.	"



Basic Garden Bench: Step-by-step

The styling of this bench is largely determined by the profiles of the shaped pieces—the back, arms and legs. With a little thought and planning, it's possible to change all these contours without affecting the basic construction methods or dimensions of the parts. Want to express yourself with something more whimsical? Let this be your chance.

BUILD THE BACK

1 Make the angled back supports. Cut the blanks to length from 2 × 6 cedar stock. Refer to the measurements on the *Back Supports* drawing, page 143, and mark the angles onto the back rests. Clamp each blank to your worksurface, and cut the angles with a jig saw (**See Photo A**).

2 Install the upper and lower back rails on the back supports. Cut the upper and lower back rails to length. Clamp the rails between the back supports flush with their angled edges. The bottom rail is located 3 in. up from the bottom corner of the angled portion, and the upper rail aligns with the top angle corner. Use long clamps to hold the rails in place between the back supports while you drill countersunk pilot holes. Attach the parts with 3-in. galvanized deck screws.

3 Make the back slats. Cut the slats to length from 1 × 4 stock. Lay one slat in position on the back frame and mark the center of both back rails on the slat. These marks will serve as reference points for locating the screws. Line up all the slats next to one another and extend the rail reference marks across the faces of all the slats.

4 Attach the back slats. Position the two end slats, holding their outer edges flush with the outer faces of the back supports, and attach them with countersunk 1½-in. galvanized deck screws. Clamp a straightedge

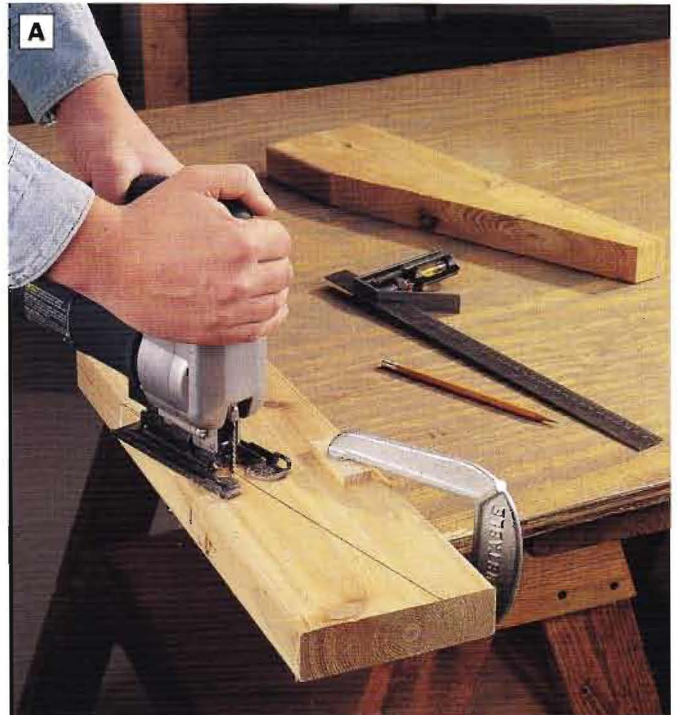


PHOTO A: Cut the back supports to length and lay out the angled edge on both supports. Clamp the supports to your worksurface and cut along the angled layout lines with a jig saw.



PHOTO B: Establish slat positions by attaching the end slats flush to the outer edges of the back supports, then clamping a straightedge across the bottom. Use a long ¾-in.-thick spacer to position the intermediate slats as you fasten them in place.

across the lower ends of the two slats to align the ends of the remaining slats. Use a long $\frac{3}{8}$ -in. spacer to establish consistent gaps between the slats, and fasten the slats to the rails with galvanized deck screws (See Photo B).

5 Cut the profile on the back slats. You can create your own unique contour for the back, or create a hardboard template of the pattern provided in the *Shaped Back Slats* drawing, page 143. After drawing your profile along the top edge of the back slats, clamp the back assembly to your worksurface and cut the profile with a jig saw (See Photo C). Sand the cut edges smooth.

BUILD & ATTACH THE SEAT FRAME

6 Cut the two seat rails and the four cross braces to length from 2×4 stock.

7 Assemble the seat frame. Clamp the cross braces in place between the rails, with the inner braces spaced $15\frac{1}{2}$ in. from the end braces. Drill countersunk pilot holes and fasten the rails to the braces with 3-in. galvanized deck screws (See Photo D).

8 Cut and attach the two corner braces. Cut the braces to length and miter-cut the ends to 45° (See Photo E). Position the braces inside the back corners of the seat frame, drill countersunk pilot holes near the ends of the braces and attach the corner braces with $2\frac{1}{2}$ -in. galvanized deck screws.

9 Fasten the back assembly to the seat frame. Stand the back assembly upright and inside the seat frame so the back supports butt against the back corners of the seat frame. Drill countersunk



PHOTO C: Once you've marked the profile (either your own design or the one we've provided in the drawings) on the back slat assembly, trim along the profile lines and smooth the cut edges.



PHOTO D: Begin assembling the seat by clamping the end cross braces between the seat rails and positioning the inner two braces $15\frac{1}{2}$ in. from the end braces. Fasten the rails to the braces with 3-in. galvanized deck screws.



PHOTO E: After cutting the two corner braces to length, miter-cut the ends to 45° . The corner braces will fit inside the seat frames between the rails and the end cross braces.



PHOTO F: Stand the back assembly inside the seat frame behind the corner braces. Drill countersunk holes through the end cross braces and attach the back to the seat frame with countersunk deck screws.



PHOTO G: Use a compass to lay out the rounded bottom ends of the legs. Make a small hardboard template to mark the top leg profile on all four legs. Then cut the leg profiles to shape.



PHOTO H: Clamp the leg assemblies to the seat/back assembly. The bottom edge of the seat frame should be $11\frac{3}{4}$ in. up from the bottoms of the legs and extend $\frac{1}{2}$ in. beyond the front legs.

pilot holes through the outer cross braces into the supports. Attach the seat frame to the back supports with $2\frac{1}{2}$ -in. galvanized deck screws (**See Photo F**).

BUILD & ATTACH THE LEG ASSEMBLIES

10 Make the legs. Cut the legs to length, then lay out the leg profiles (**See Photo G**) following either the *Legs* pattern provided on page 143 or your own personal design. Cut the legs to shape with your jig saw and sand the cut edges smooth.

11 Crosscut the arm supports to length and clamp them between the legs (be sure to orient the upper leg contours correctly). Drill countersunk pilot holes and attach the supports to the legs with $2\frac{1}{2}$ -in. galvanized deck screws. When you fasten these parts together, check the assemblies with a carpenter's square to be sure that the legs are perpendicular to the arm supports and are parallel with one another.

12 Fasten the leg assemblies to the seat frame. Clamp each leg assembly in place against the ends of the seat frame, so the bottom of the seat is $11\frac{3}{4}$ in. from the bottoms of the legs, and the front edges of the front legs are held back $\frac{1}{2}$ in. from the front of the seat frame. The arm supports should be positioned on the

inside, so they rest against the outside face of the back supports. Drill countersunk pilot holes and fasten the leg assemblies in place with 2½-in. galvanized deck screws driven through the legs into the seat frame (**See Photo H**) and through the arm supports into the back supports.

ATTACH THE SEAT SLATS & ARMS

13 Make and attach the seat slats. Rip the rear seat slat to width from 1 × 8 stock and cut it to length. Cut the middle slats to length from 1 × 6 stock. Cut the front seat slat to length, and notch the ends to fit around the front legs, as shown in the *Front Seat Slat* drawing, page 143. Sand the cut edges smooth. Lay the slats in position on the seat frame. The outside edge of the back seat slat should be flush with the back of the seat frame. Set the front slat so it notches around the front legs. Then space the two middle slats evenly between the outside slats. Drill countersunk pilot holes and attach the slats with 1½-in. galvanized deck screws (**See Photo I**).

14 Make and attach the arms. Cut the arms to length. Referring to the drawing on page 143, lay out the arm profiles and shape them with your jig saw. Note that you'll need to bevel-cut a portion of the arm rest notch at an angle to match the angle of the seat back. Sand the cut edges smooth. Position the arms on the tops of the leg assemblies, drill countersunk pilot holes, and fasten the arms with 1½-in. galvanized deck screws (**See Photo J**).

FINISHING TOUCHES

15 Sand all edges and surfaces well, and apply the finish of your choice—stain, paint or clear UV protectant sealer.



PHOTO I: Once the seat slats have been cut to length and, in the case of the rear slat, ripped to width, sand the slats smooth. Then drill countersunk holes and secure the slats to the seat frame with deck screws. The front slat will need to be notched and shaped before it is installed.



PHOTO J: Cut the arms to size and shape and fasten them to the arm supports with countersunk screws. You'll need to cut a small beveled notch on the back inside edges of the arms so the arms can butt tightly against the outermost back slats.