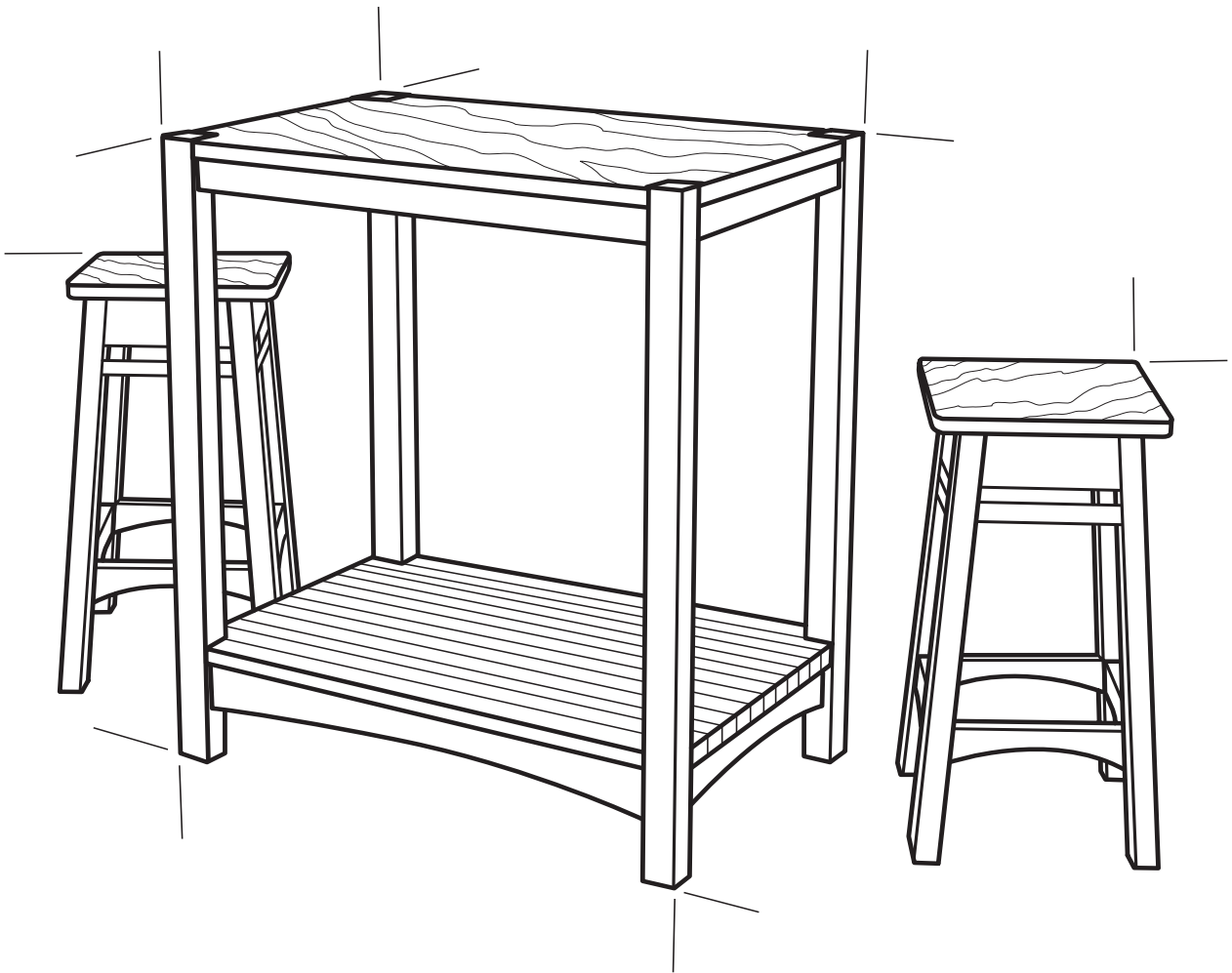




WOODWORKS: ADVANCED PROJECT 2004-2005 SNACK BAR AND STOOLS



A stylish, all-purpose table that goes great with a pair of sturdy stools. This versatile table is perfect for schoolwork, small projects and board games.

If you haven't yet built your first table and chair set, you could do a lot worse than starting with this group. The simple lines of both pieces offer a pleasing style, but they'll also challenge you to be very precise with all your cuts and joinery. Meant for those with advanced skills, these projects will develop your skills in cutting compound angles, making mortise-and-tenon joints with a router and a table saw, making router-cut curves with a special jig, and more. And after you build these pieces, you'll learn more about applying stains and finishes to enhance the wood's natural beauty and ensure that it's well protected.

TOOLS REQUIRED

Hand Tools

- Handsaw
- Wood rasp and file
- Sanding block
- Bar clamps
- Vise
- Spokeshave or drum sander

Power Tools

- Table saw
- Bandsaw
- Miter saw
- Plunge router
- Belt and orbital sanders

Miscellaneous

- Safety glasses
- 120-, 150- and 220-grit sandpaper
- Clean, lint-free cloths
- Respirator
- Gloves for finishing
- Mineral spirits (for oil-based finishes)
- Water-filled metal container with tight-fitting lid
- Minwax® Wood Finish™ Stain Brush or other good quality, natural bristle brush (for oil-based stains and finishes)
- Minwax® Polycrylic® Brush or other good quality, synthetic bristle brush (for water-based stains and finishes)
- Carpenter's glue
- Double-faced tape

SHOPPING LIST

Table	
Item	Quantity
8/4 legs	1 pc. 7-1/2" x 36-1/2"
4/4 rails	1 pc. 7-1/2" x 60"
5/4 slats	4 pcs. 7" x 36"; 1 pc. 2" x 36"
5/4 top	4 pcs. 6-1/4" x 36-1/2"
1-1/4" flathead woodscrews	45
Stool (material for one stool)	
Item	Quantity
5/4 legs, stretcher	1 pc. 4" x 24"; 1 pc. 4" x 36"
5/4 seat	1 pc. 11-1/2" x 11-1/2"
4/4 rails, tenons	1 pc. 5" x 36"
1-1/4" flathead woodscrews	4

Recommended Wood: Oak

Alternate Wood: Birch

WOOD FINISHING PRODUCTS

Recommended Finish

Table

- Prep: Minwax® Pre-Stain Wood Conditioner (if using soft or porous wood)
- Stain: Top and slats – Minwax® Wood Finish™ Sedona Red*
 Legs – Minwax® Wood Finish™ Golden Oak*
- Finish: Minwax® Helmsman® Spar Urethane Satin

Stool

- Prep: Minwax® Pre-Stain Wood Conditioner (if using soft or porous wood)
- Stain: Top – Minwax® Wood Finish™ Sedona Red*
 Legs – Minwax® Wood Finish™ Golden Oak*
- Finish: Minwax® Helmsman® Spar Urethane Satin

Alternate Finish

- Prep: Minwax® Pre-Stain Wood Conditioner (if using soft or porous wood)
- Stain/Finish: Minwax® Polyshades® Classic Oak Satin (or your choice of 9 Minwax® Polyshades® colors in satin or gloss)

CUTTING LIST

Table					
Key	Part	Pcs.	Thickness	Width x Length	Notes
A	Leg	4	1-3/4"	1-3/4" x 36-1/8"	
B	Upper rail-end	2	3/4"	2" x 22-1/2"	3/8" x 1-1/4" x 1" tenon
C	Upper rail-side	2	3/4"	2" x 34-1/2"	3/8" x 1-1/4" x 1" tenon
D	Lower rail-end	2	3/4"	3" x 22-1/2"	3/8" x 2-1/4" x 1" tenon
E	Lower rail-side	2	3/4"	3" x 34-1/2"	3/8" x 2-1/4" x 1" tenon
F	Stretcher	1	3/4"	3/4" x 2" x 21-1/2"	
G	Slat	11	1"	1-13/16" x 36"	
H	End slat	2	1"	1-3/4" x 32-3/8"	
J	Top	1	1"	24" x 36"	
Buttons		12, see Fig. 1 for dimensions			
Plugs		30, 3/8" dia., store-bought or made with a plug cutter			
Stool					
Key	Part	Pcs.	Thickness	Width x Length	Notes
A	Leg	4	1-1/4"	1-1/4" x 23-1/16"	cut both ends at 85° compound angle
B	Upper rail	4	9/16"	3-1/2" x 6-5/8"	5° ends
C	Lower rail	4	9/16"	1-1/4" x 7-1/32"	5° ends
D	Stretcher	4	7/8"	2" x 9-3/32"	mark exact length against actual leg /rail assembly
E	Seat	1	1"	11-1/4" x 11-1/4"	1/2" radius corners
Loose tenons		24, sized to fit their respective mortises			
Buttons		4, see Fig. 1 for dimensions			

*Or your choice of 20 Minwax® Wood Finish™ Stain colors.

BEFORE YOU BEGIN

Good craftsmanship begins and ends with good work habits, so make the following steps part of your routine workshop practice. If you have any doubts or questions about how to proceed with a project, always discuss them with your shop instructor.

- Carefully and fully review plans and instructions before putting a tool to the project lumber.
- Work sensibly and safely. Wear safety goggles when doing work that creates flying chips and sawdust; wear the appropriate respirator whenever making sawdust or working with thinners or other solvents.
- At the end of every work session, clean up your shop area and put away all portable tools.

CUTTING AND ASSEMBLY PROCEDURE

Constructing the Table

1. Cut legs and rails (A, B, C, D, E) to size as shown in Fig. 1. The lengths given include the tenons.

Woodworker's Tip: *Make one extra leg as a test piece for your router mortising, and a couple of extra rails as test pieces for cutting tenons. These extra parts don't have to be full length.*

2. Lay out the mortise locations on the legs. Stand up the legs and double check to make sure there are two rights and two lefts (Fig. 2).

3. Cut the leg mortises, using a plunge router. If you clamp a couple of pieces together, they become a more stable surface for the base of the router.

4. Use a plunge router to cut slots in the upper rails for the 12 tabletop buttons.

5. Cut tenons on the ends of the rails. Use the miter gauge and table saw set up with a dado blade. You can use the saw fence for quick repeatability on these cuts. To do that safely, you must clamp a block to the fence just in front of the dado blade. Then set the fence to the appropriate position, using the block as the stop that determines the length of the tenon. Use your test rails to set the height of the dado blade, and test the tenon for a sliding fit in the mortises.

6. Round the corners of the tenons with a rasp and file, and miter the ends of the tenons.

7. Use the patterns shown in Fig. 3 to make template jigs for the curves on the lower rails. Make the template out of 1/4" plywood and fasten a guide handle to it as shown in Fig. 4.

8. Cut the curves in the lower rails on a shaper or table-mounted router. Secure the work pieces to the jigs with double-faced tape.

9. Lay out and drill the screws and plug holes on the two lower side rails (E). They should be centered on the length.

10. Dry-assemble the table, using clamps to snug up all the joints. Lay stretcher material in position, mark it and cut to fit between the rails.

11. If everything fits in the dry-assembly, start gluing. Begin with one long side, then the other. When these are dry, glue the end rails and clamp snug. Check for square by measuring the diagonals and adjust clamp compression as needed to produce right angles. Screw the stretcher in place, and sand the plugs smooth.

12. Glue together the boards for the top (J), then smooth the panel as needed with belt and orbital sanders.

13. Cut the top to size then notch the corners using the table saw technique shown in Fig. 5. It requires attaching a tall fence to the miter gauge and clamping the assembled top to it. A spacer block clamped to the fence lets the off-cuts fall safely away from the blade.

14. Insert the buttons into the kerfs on the upper rails. Test-fit the top on the table base, and drill screw holes through the buttons and into the top. Use a stop on your drill bit to prevent accidentally drilling all the way through.

15. Cut the slats (G, H) to size. Drill them for plugs, then drill screw clearance holes in each. Sand and ease all edges.

16. Lay out the slats on the rails, using shims to keep the spacing identical. Drill pilot holes through the clearance holes. Screw on the slats, glue in the plugs and then cut and sand the plugs flush.

Woodworker's Tip: *If you plan to finish the slats a different color from the legs, it's easier to drill holes in the bottom of the rails and screw on the slats from below. This way, the slats can be stained before being attached. Be sure to drill the holes before cutting the curves in the lower rails.*

Constructing the Stool

1. Cut the legs, rails and stretchers (A, B, C, D) to width and rough length, then cut the compound angled ends on the legs. Notice that the edges of the rails and stretchers are cut at a 5° bevel. Don't cut the angled ends on the rails and stretchers yet.

Woodworkers Tip: *Use one piece for both upper and lower rails, and rip to make the two pieces. This will give you a good grain match. Also, it's a smart idea to have an extra leg and a couple of rail pieces to set up and practice your mortises. They can be cut from 2x4 lumber so you don't waste good wood.*

2. Lay out the locations for the mortises as shown in Figs. 6 and 7, then prop up all four legs to make sure the mortises face each other when the legs are in their proper orientation.

3. Mortise the legs, using a plunge router fitted with an edge guide. It helps to clamp a couple legs together so the router has a wider surface to slide on.

4. Trim the ends of the rails, using a stop on the fence of your miter saw to be sure each set of four is exactly the same length. Cut the ends of each of the stretchers to the same 5° angle.
5. Mortise the ends of the rails and stretchers by clamping them side-by-side vertically in a vise, with the ends flush. Clamp a block next to them to help support the base of the router. Then plunge-rout the mortises.
6. Clamp the rails between a pair of legs, put a stretcher in position, then mark it for the final cut as shown in Fig. 9. Make the other three stretchers to this length as well.
7. Make the loose tenons as shown in Fig. 6. Begin by machining the stock to the appropriate thickness for a sliding fit in the mortises you routed. Then rip the material to width, and with a round-over bit in the router table, make two passes to round the edges.
8. Dry-assemble two legs with the rails and stretchers in place to test your joints.
9. Use the dimensions shown in Fig. 8 to lay out the curve at the bottom of the stretchers (D). Cut them on the bandsaw with the table tilted 5°; smooth the curve with a spokeshave or drum sander.
10. Make four buttons to the dimensions shown in Fig. 6. Cut mortises on the inside surface of the upper rails for the buttons that secure the seat to the frame.
11. Next, cut mitered ends on the tenons as shown in Fig. 7. These angles don't have to be exact, so a handsaw or bandsaw is an easy way to cut them.
12. Do all finish sanding and round over all edges.
13. Glue up two legs with their stretcher and rails. Keep the assembly flat. You may want to use angled blocks to help keep the clamps from slipping, as shown in Fig. 10. Use a 1"-wide block to keep the upper and lower rails properly spaced.
14. Glue the other pair of legs, and when they're dry, glue the two assemblies together. This should be done with the stool sitting upright on a flat surface.
15. Cut the seat to size, round the corners, then round over the edges. Sand and attach the buttons that hold it to the rails with the woodscrews.

NOTE: If you decide to two-tone stain, it's best to stain and finish the seat and legs separately, then assemble.

STAINING AND FINISHING

Woodworker's Tip: *Though you may be tempted to cut short your sanding, preparation and application time, don't do it. These tasks are very important steps in obtaining a high-quality finish. Remember, it is the finish, just as much as the fit and smoothness of the parts that will have great bearing on how people judge your craftsmanship. To ensure an excellent result, follow the steps listed in this section and also the instructions the finish manufacturer puts on its products.*

FINISHING TIPS

- Test the stains and finishes you are planning to use on scraps of wood. On the back of the scrap, mark the stain/finish combination and the type of wood. Allow all samples to dry thoroughly before making your final finish selection. Save your samples for quick reference on future projects.
- All stains and finishes must be allowed to dry thoroughly between coats. Remember that drying times can vary due to humidity and other climatic conditions.
- If you have some leftover stain or finish, wipe the can rim so that stain or finish in the rim won't dry out and prevent the lid from forming a tight seal.
- Brushes used for oil-based finishes must be cleaned with mineral spirits.

Recommended Finish

16. Apply the Minwax® Wood Finish™ you've chosen to the interior surfaces using a natural bristle brush and a clean, lint-free cloth following the directions on the can. The brush will help you get the stain into the many inside corners and other tight spots. Allow the Wood Finish™ to set for about 5 to 15 minutes, then wipe off any excess. To achieve a deeper color, you may apply a second coat after 4 to 6 hours, repeating the application directions for the first coat. Allow the stain to dry for 24 hours before applying the protective clear finish.

Woodworker's Tip: *When wiping off stain, make certain that your last wipe with the cloth goes with the grain of the wood.*

17. Using a good quality, natural bristle brush, apply Minwax® Helmsman® Spar Urethane Satin following the directions on the can. Allow the piece to dry for at least 6 hours before applying the second coat.

18. The following day, sand all surfaces very lightly with 220-grit or finer sandpaper using with-the-grain strokes. Dust off and wipe all surfaces with a cloth lightly dampened with mineral spirits. Apply the second coat of Helmsman® Spar Urethane. For added protection, apply a third coat to the table top.

Alternate Finish

19. Prepare the wood as you did in the recommended finish.

20. Apply Minwax® Polyshades® following the directions on the can. Use a good quality, natural bristle brush suitable for use with polyurethane. Stir the can contents thoroughly before starting and periodically repeat stirring during your work session. Allow the first coat to dry overnight.

21. The next day, rub all surfaces with a fine steel wool (grade 000 or finer) using with-the-grain strokes. Dust off and wipe all surfaces with a cloth dampened with mineral spirits. Apply a second coat of Polyshades® and set the pieces aside to cure overnight. To achieve a deeper color, you may apply a third coat after 4 to 6 hours, repeating the application directions. Allow the project to cure for several days before using it.

Woodworker's Tip: *If you achieve the desired color on the first or second coats of Polyshades®, simply apply a clear coat of Minwax® Fast-Drying Polyurethane or Minwax® Wipe-On Poly for added protection.*

PRODUCT SAFETY

For your safety and the safety of those you work with, always read the safety warnings, which manufacturers print on their labels, and follow them to the letter. Typical safety advice and instructions will contain information such as the following:

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Informations Center at 1-800-424-LEAD (in US) or contact your local health authority.

When using oil-based wood finishing products:

CAUTIONS: CONTAINS ALIPHATIC HYDROCARBONS. Contents are COMBUSTIBLE. Keep away from heat and open flame. **VAPOR HARMFUL.** Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, do not induce vomiting. Call Poison Control Center, hospital emergency room, or physician immediately.

NOTICE: Reports have associated repeated and prolonged occupational exposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.

When using water-based wood finishing products:

CAUTIONS: Use Only With Adequate Ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

WARNING: Contains Alkyl propanols, ethylene glycol, n-methyl pyrrolidone. **VAPOR HARMFUL.** Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

DO NOT TAKE INTERNALLY.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, call Poison Control Center, hospital emergency room, or physician immediately.

DELAYED EFFECTS FROM LONG-TERM OVEREXPOSURE.

Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

KEEP OUT OF REACH OF CHILDREN.

SAFE DISPOSAL OF RAGS AND WASTE.

Please be mindful of the safe way to dispose of rags and other waste. Rags, steel wool and other waste products soaked with oil finishes or solvents may spontaneously catch fire if improperly discarded. Place rags, steel wool and other waste immediately after use in a water-filled metal container. Tightly seal and dispose of the waste materials in accordance with local trash removal regulations. Be sure to keep the waste out of reach of children.

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FIG 1. TABLE DETAILS

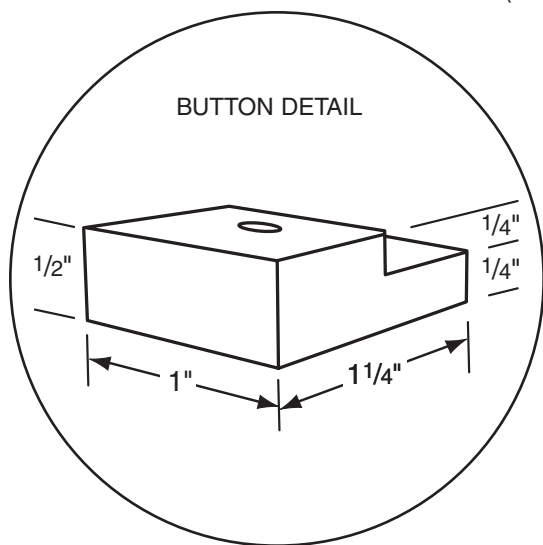
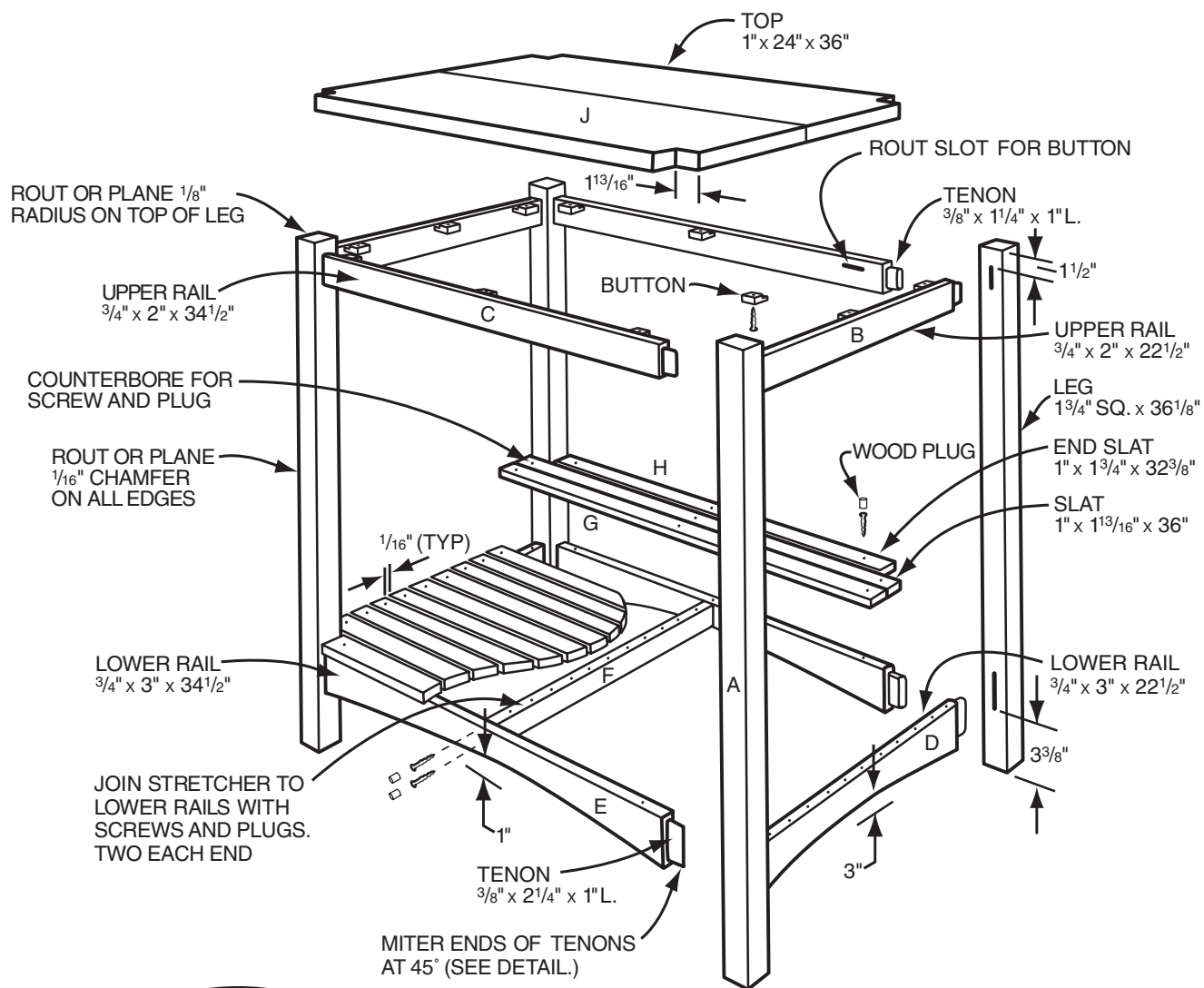


FIG 2. MORTISE AND TENON DETAIL

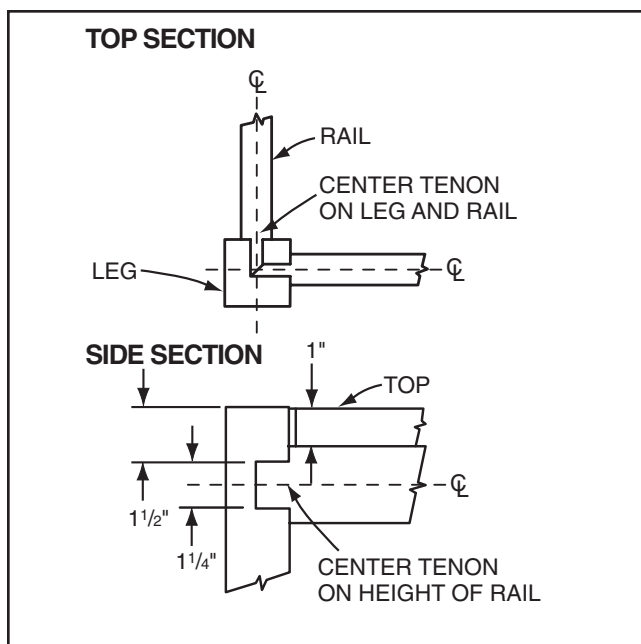


FIG 3. CUTTING TEMPLATE OF LOWER RAILS

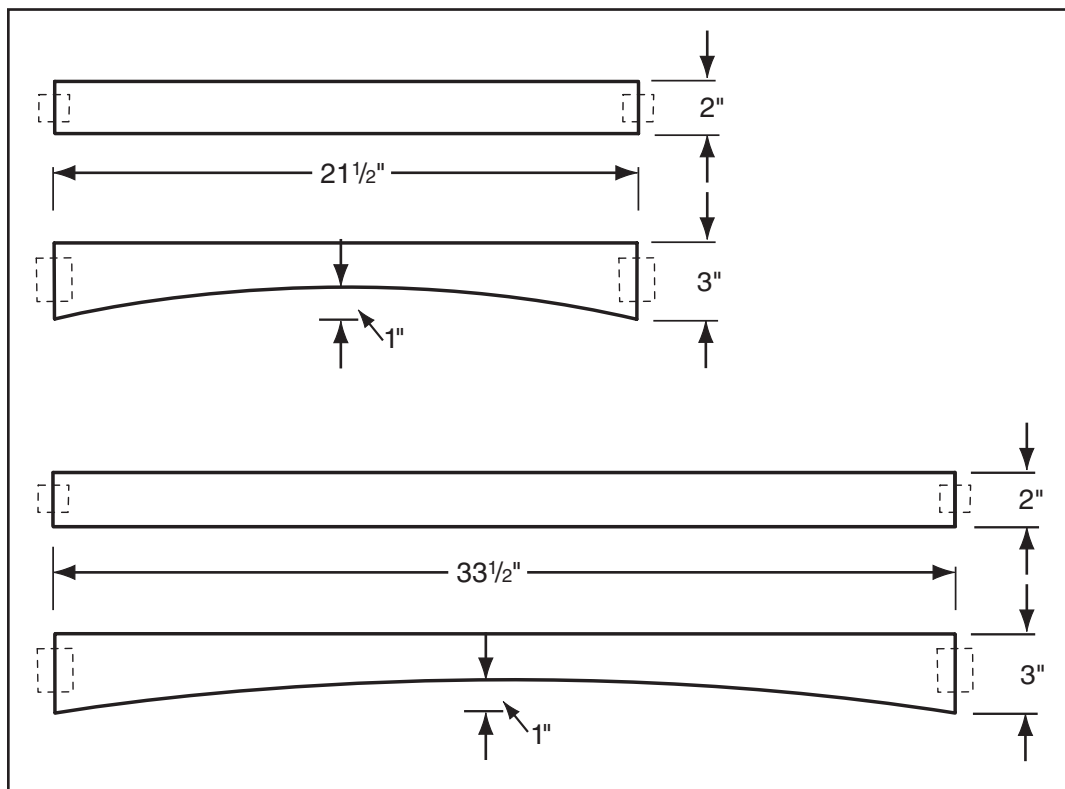


FIG 4. ROUTING A CURVE

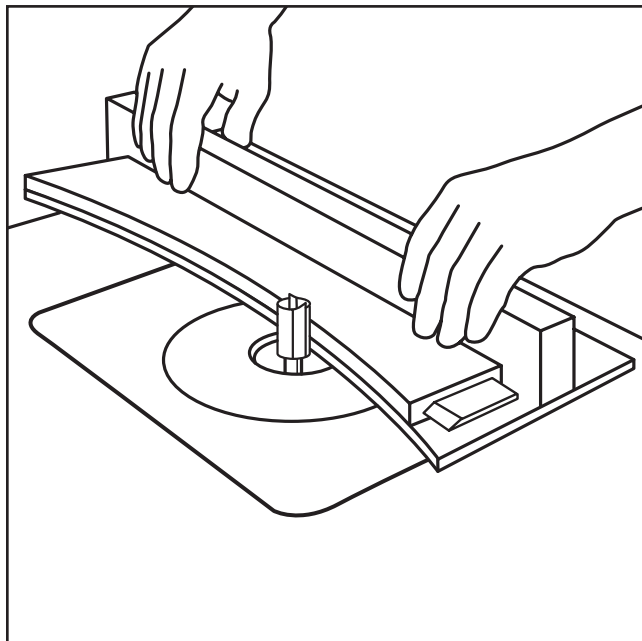


FIG 5. NOTCHING THE TOP

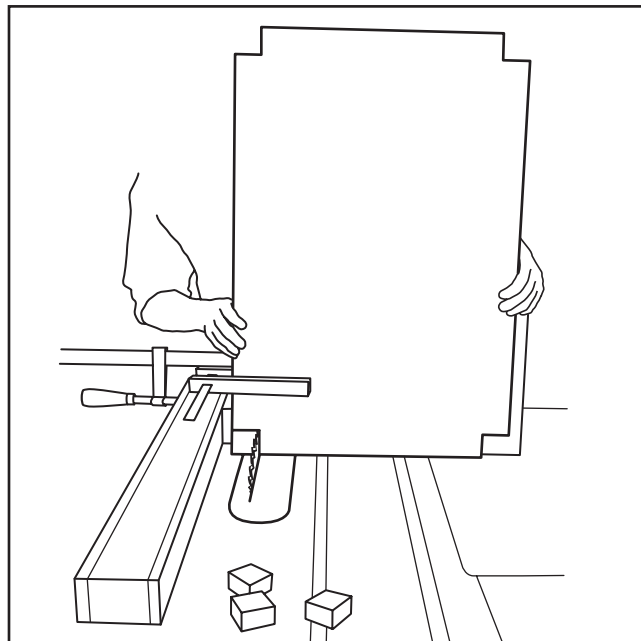


FIG 6. STOOL DETAILS

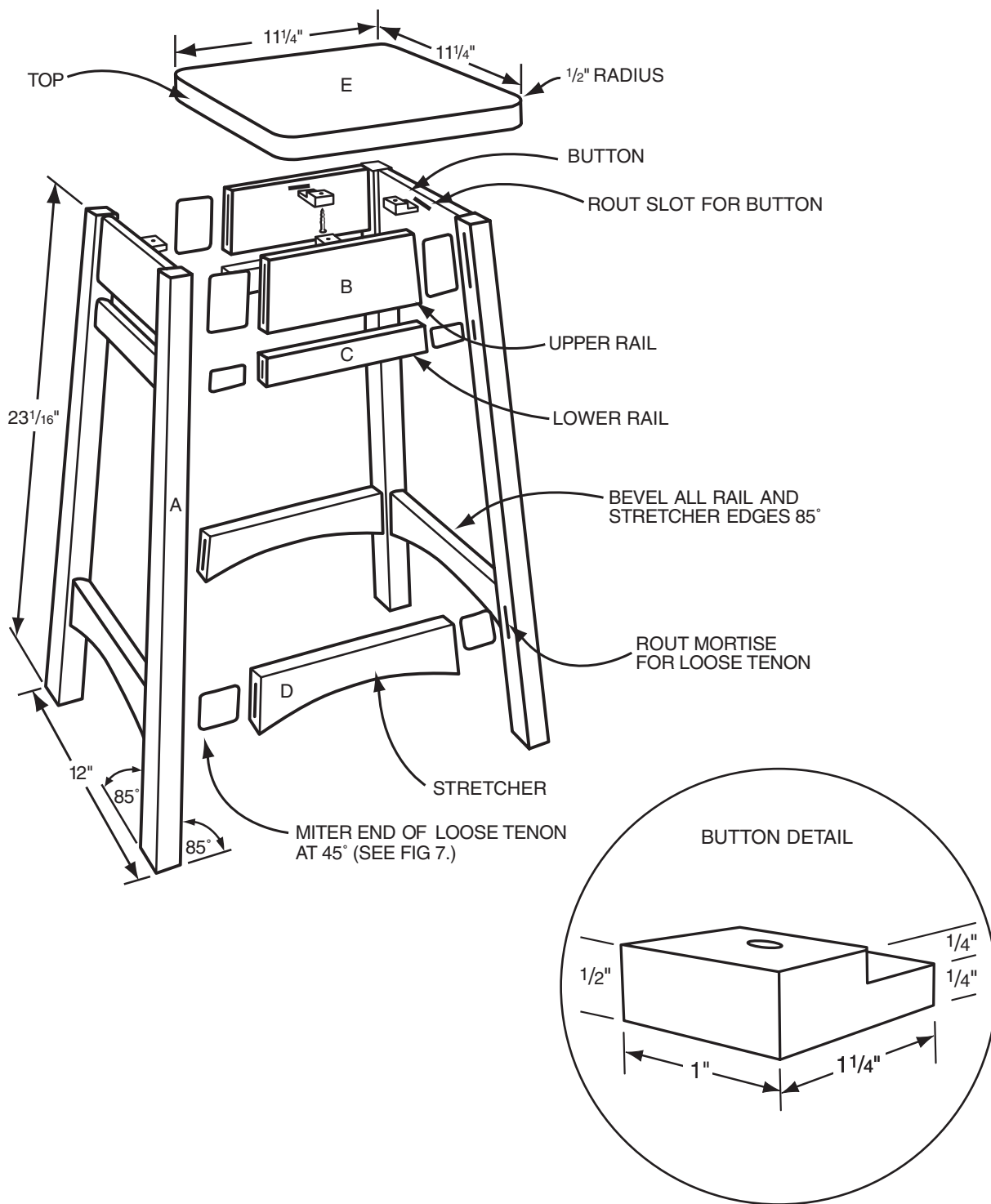


FIG 7. ELEVATION AND SECTIONS

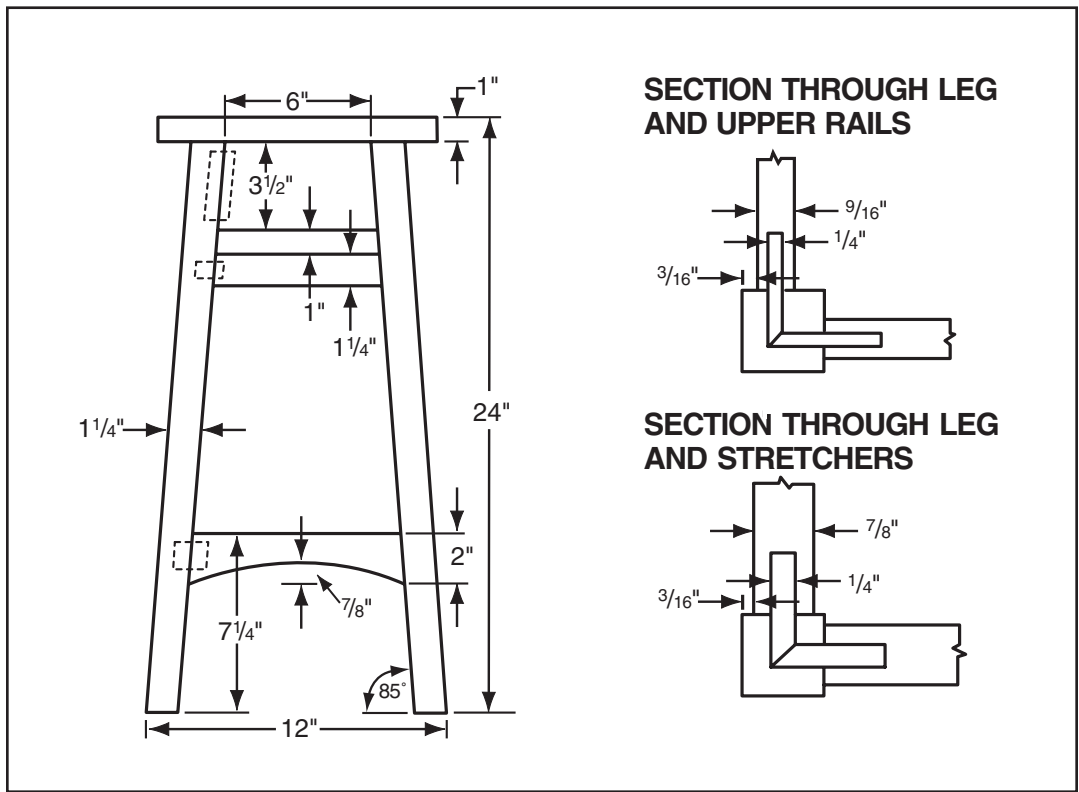


FIG 8. DIMENSIONS FOR ALL RAILS

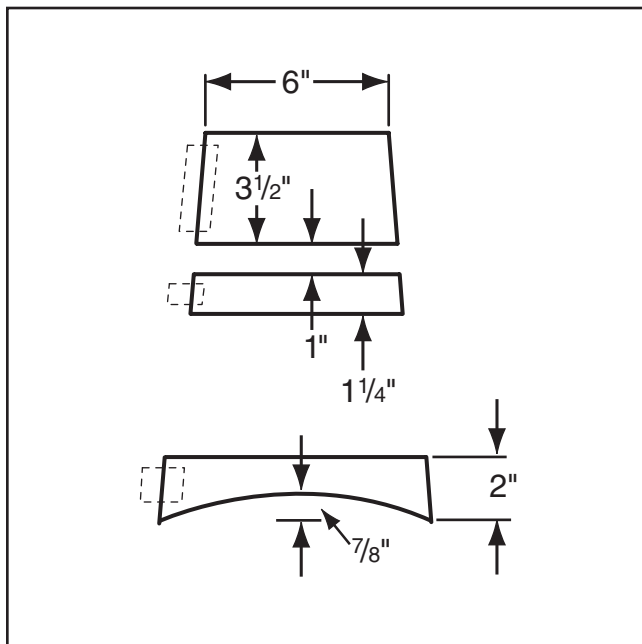


FIG 9. MARKING THE STRETCHER

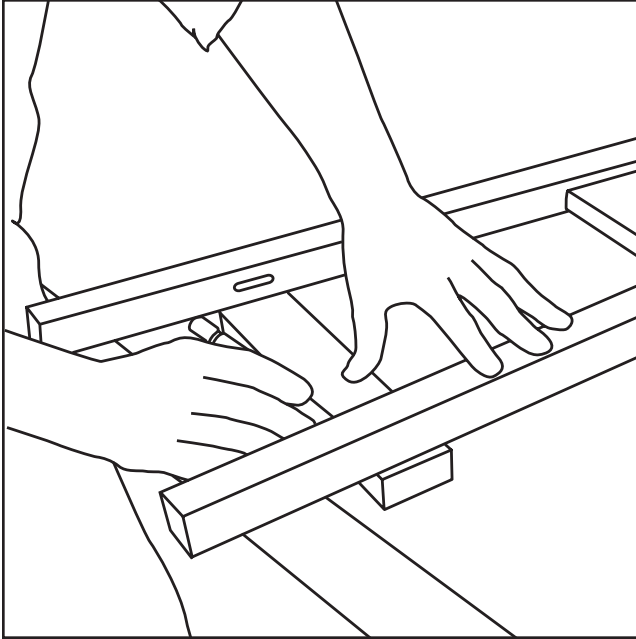


FIG 10. ANGLED CLAMPING

