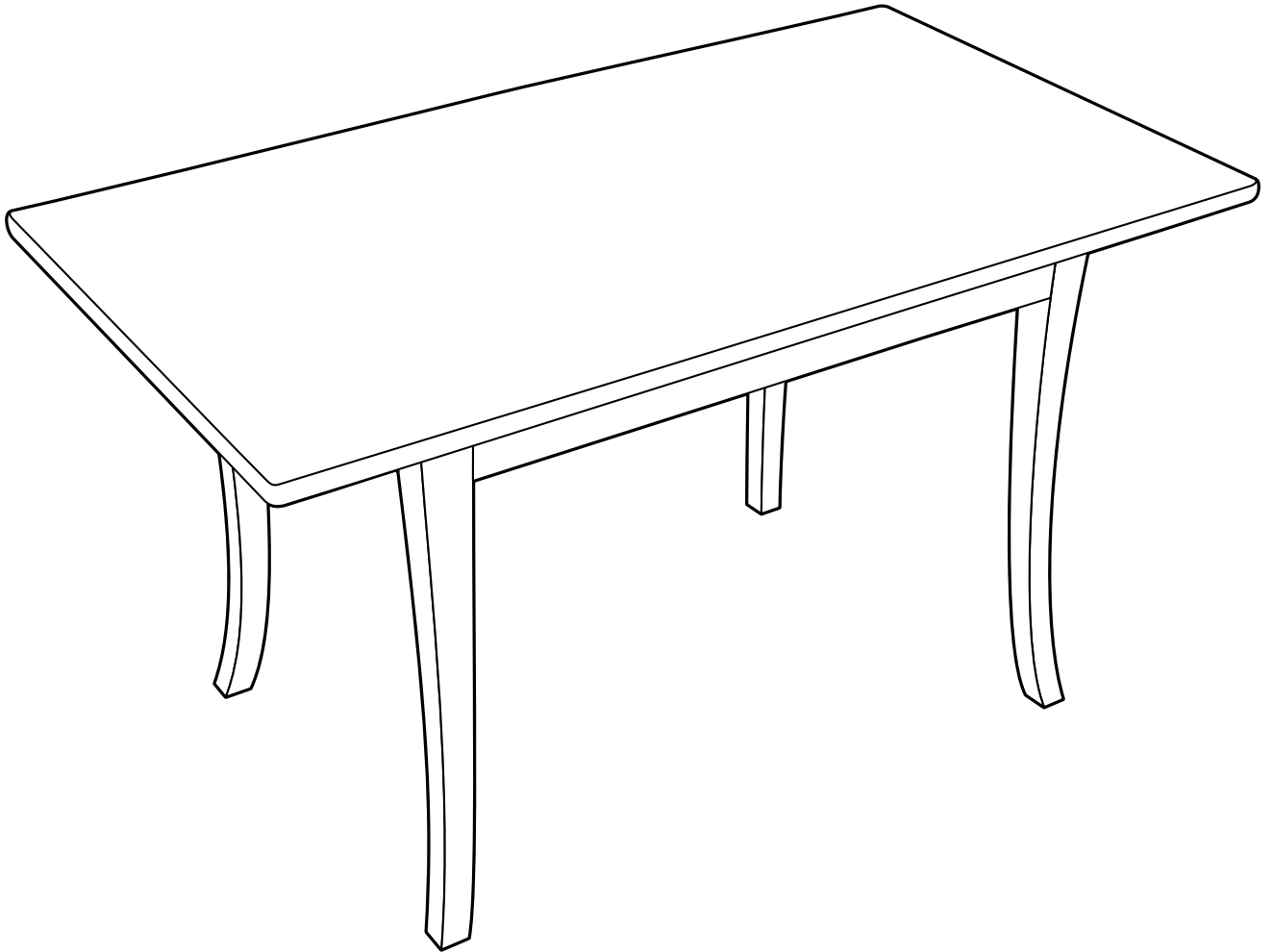




WOODWORKS: ADVANCED PROJECT 2009-2010
CURVY COFFEE TABLE



This simple-but-elegant piece contains several details that will challenge even advanced woodworkers. From long dovetail joints to legs shaped with a band saw, there are plenty of opportunities to take your skills to a higher level. And when it's all assembled, you'll learn more about applying and using stains and finishes to protect the wood and keep it looking beautiful.

TOOLS REQUIRED

Hand Tools

- File
- Spokeshave
- Scraper-shave
- Smoothing plane
- Phillips-head screwdriver
- Block plane
- Bar clamps
- Chisel

Power Tools

- Table saw and dado head
- Band saw
- Mortiser
- Router table (for sliding dovetail)
- Jig saw
- Jointer
- Planer
- Drill
- Random-orbit sander

Miscellaneous

- Pencil
- Tape measure
- Safety glasses
- Carpenter's glue
- 120-, 150- and 220-grit sandpaper
- Clean, lint-free cloths
- Respirator
- Gloves for finishing
- Mineral spirits (for oil-based stains and finishes)
- Water-filled metal container with tight-fitting lid (for oil-based stains and finishes)
- 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)

WOOD FINISHING PRODUCTS

Recommended Finish

- Prep: Minwax® Water-Based Pre-Stain Wood Conditioner
 Stain: Legs & Top: Minwax® Water-Based Wood Stain Onyx
 Side rails: Minwax® Water-Based Wood Stain Spice
 Finish: Minwax® Polycrylic® Protective Finish (Gloss)

SHOPPING LIST

Wood Recommendation: Red Oak

Alternate Wood: Pine

Part	Name	Qty.	Th. x W x L
A	Top	2	1-1/2" x 5-1/2" x 36"
B	Leg	1	2" x 7-1/2" x 24"
C, D	Rails	1	3/4" x 5-1/2" x 24"
E	Cleats	1	1-1/2" x 4" x 18"
F, H	Holddowns & scrap corner blocks		
G	Keys		scrap dark wood, such as walnut or ebony

CUTTING LIST

Overall dimensions: 18-1/2"H x 32"W x 18-3/4"D				
Part	Name	Qty.	Th. x W x L	Notes
A	Top	1	1/2" x 18-3/4" x 32"	
B	Leg	4	1-5/8" x 1-5/8" x 18"	
C	Long rail	2	5/8" x 2-1/4" x 22-3/4"	(A)
D	Short rail	2	5/8" x 2-1/4" x 14-3/4"	(A)
E	Cleat	2	1-1/4" x 1-3/4" x 14-7/8"	(B)
F	Holddown	4	1/4" x 1-1/4" x 7-3/4"	
G	Key	4	1/4" x 5/8" x 1-3/16"	(C)
H	Corner block	8	7/8" x 7/8" x 2"	

- Notes: (A) Length includes tenons, which are 7/8" long.
 (B) Make one or two extra pieces to test router setup.
 (C) Cut from 12"-long blank.

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

Make the Top

1. Start by making the top (A, see Fig. 1). Use a band saw to resaw the 1-1/2" stock into four boards of roughly equal thickness, then joint and plane them to 1/2" thick. True the edges on the jointer and then glue and clamp the four pieces together. After the glue dries, sand the top flat and cut it to the exact size.

2. Rout two dovetailed grooves across the bottom of the top (see Fig. 2). First, install a 1/2" dovetail bit and a 1/2"-dia. template guide in your router. To guide the router, build a jig composed of two 1/2"-thick by 3"-wide plywood strips that are about 28" long (the rails) and two strips of the same material that are about 7" long (the end pieces). Assemble the jig by screwing the end pieces to the underside of the ends of the rails, using two 5/8"-thick spacers to fix a consistent gap between the rails. The router-bit and template-guide setup will make a groove that's exactly the same width as this gap. Draw cut lines along the underside of the top corresponding to the locations of the two dovetail grooves. To get the router depth just right, clamp the jig over a piece of scrap and make test cuts. When the depth is set, clamp the top to the work surface to ensure that it's flat. Then clamp the jig exactly over the cut lines and proceed with the routing.

Woodworker's Tip: Another way to secure the jig to the work piece is to use double-sided tape. After drawing the cut lines, fasten strips of the tape to the top, keeping them outside the lines. Expose the other sticky side, then carefully position the jig over the cut lines and press it onto the tape.

Dovetailed Cleats

3. Make cleats (E) from a stiff hardwood that resists splitting. Maple is ideal. Make one or two extra pieces to test your router-table settings.

4. Shape the cleats; dovetailed key on the router table (see Figs. 3 & 4). Set the height of the router bit so that the key is a paper-thickness shallower than the grooves in the tabletop. (You don't want the cleat to drag against the bottom of these grooves when you insert it.) Adjust the router table's fence until the cleat fits right. Remove the cleats from the tabletop.

5. Finish the top by shaping a shallow curve on the long sides of the tabletop (see Fig. 5). Bend a 3'-long stick to form the curve. Cut the curve using a jig saw or band saw. Round over the top and bottom edges of the top using a router. Use a smaller roundover bit on the top's upper edge (see Fig. 2). Use a file to soften the top's four corners.

Shape the Legs

6. Make a pattern for the legs (D) from 1/4"-thick wood. Mill the leg blanks and trace around the pattern on two adjoining sides (see Fig. 6).

7. Mill mortises before band sawing the legs. Begin by routing grooves for the tenon's haunch (see Fig. 7). Deepen the mortises with a mortising machine.

8. Cut the legs on the band saw. Saw one side first, then turn the leg 90°. Lay the pattern on the leg and mark the portion of the curve that was removed by sawing. Saw the other side.

9. Hold the leg between dogs on a workbench in order to smooth the band sawn surfaces. Begin by planing 4" to 6" of the upper end of each leg's outer face. File or cut a 1/8"-wide chamfer all around the leg's foot as you work on each face.

10. Smooth the lower half of the leg's outside face using a spokeshave. You won't be able to get down into the lowest section of the curve, however. Use a scraper-shave to smooth this area, or a file or some coarse sandpaper wrapped around a convex block.

11. Smooth the legs' inside faces. Mark the point where the curve starts. Begin forming the convex surface below this point with a smoothing plane. Don't plane the upper part of the leg, where the mortise is. That section must remain flat and square to make a tight joint with the rail. Use a spokeshave on the leg's lower section.

12. Round over the legs' outside corners using a router (see Fig. 7).

Make the Rails

13. Mill the rails (C and D) as square stock. You'll taper their front edges later on. Cut the rails' tenons using the table saw and a dado set. Hold the rails against a sub-fence attached to a miter gauge. Clamp a stop block to the miter gauge to set the tenon's length. Note that the tenons are offset, relative to the rail's thickness (see Fig. 8). Raise the dado set to cut all the tenons' outside faces first, then lower the blade to cut the inside faces.

14. Cut haunches on the tenons with a band saw using a fence and miter gauge. Use the same method to rip the lower half of the tenon. Crosscut this piece with the band saw, too, but cut 1/32" away from the tenon's shoulder. Use a chisel to pare the shoulder.

15. Taper the outside faces of all four rails (see Fig. 8). Assemble two legs and a rail without glue. Plane the rail more or less flush with the legs.

16. Round over the lower edge of all the rails (see Fig. 8).

17. Rout slots for the tabletop holddowns (F) inside the long rails using a plunge router and a fence (see Fig. 1).

Assemble the Table

18. Glue the short rails to the legs. Lay the assembly on your bench and scrape and sand the rails until they're flush with the legs. Glue the rest of the table together and scrape and sand the long rails flush.

19. Make corner blocks (H) and glue them into each corner of the base. There's no need for clamps; just apply a thin film of glue to each block and rub it up and down in position until it sticks.

20. Fasten the top to the base. Make holddowns (F) and drill and countersink screw holes in them. Turn the top upside down and slide in the cleats. Place the base on the top and fasten the holddowns to the cleats.

21. Make keys (G) to fit the grooves. Use the same router table setup you used to make the cleats. Glue the keys in the grooves. The front edge of each key should be even with the table's edge. There should be a 1/8" gap between the key and the rail so the top can contract in a dry season.

22. Disassemble the table to do the staining and finishing, then reassemble it.

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.

23. Finish-sand all surfaces starting with 120-grit sandpaper and finishing with 220-grit paper. Dust off the piece and wipe it carefully with a clean, lint-free cloth lightly dampened with mineral spirits.

Recommended Finish

24. Before applying Minwax® Water-Based Wood Stain to a hardwood or softwood, apply Minwax® Pre-Stain Water-Based Wood Conditioner following the directions on the can. Applying the conditioner will help to ensure even absorption of stain and prevent blotchiness that can occur with some woods. After 1 to 5 minutes, wipe off all excess

conditioner using a clean, soft cloth. Wait 15 to 30 minutes, then use 220-grit or finer sandpaper to sand off any "whiskers" raised by the conditioner. Proceed to the staining within 2 hours.

25. Apply the Minwax® Water-Based Wood Stain you've chosen to the wood using either a nylon/polyester brush or a cloth. Allow stain to penetrate no longer than 3 minutes. While stain is still wet, wipe off all excess with a clean cloth that's been lightly dampened with stain. Allow the piece to dry for 2 hours before applying a second coat, if desired. Let the piece dry overnight before applying the protective clear finish.

Woodworker's Tip: *Minwax® Water-Based Wood Stain is available in 6 wood-tones, a White Wash Pickling Stain, 60 custom-mixed colors, and 8 bold Accents™ colors. This means that you are not limited to just traditional wood colors (pine, oak, walnut, etc.). Instead, you can pick and apply a color to complement the décor of the room in which the coffee table will be placed. For this reason, make sure you look over all of the Minwax® color charts or go to minwax.com before making your final selection.*

26. After allowing the piece to dry overnight, apply Minwax® Polycrylic® Protective Finish following the directions on the can. Stir the can contents thoroughly before starting and periodically repeat the stirring during your work session.

27. Working a small area at a time to maintain a wet edge, apply the first coat. Work quickly and make the final strokes in each newly finished section using with-the-grain brushstrokes.

28. Allow the finish to dry a minimum of 2 hours. Then sand lightly with 220-grit or finer sandpaper wrapped around a soft backup block. Thoroughly dust off and wipe all surfaces with a cloth lightly dampened with water.

29. Repeat steps **26** and **27** to apply the second and final coat.

Alternate Finish

30. Before applying Minwax® Wood Finish™, apply Minwax® Pre-Stain Wood Conditioner following the directions on the can.

31. Apply the Minwax® Wood Finish™ you've chosen 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 inside corners. 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 4–6 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. This way, any stain you might miss during wipe-off will be visually minimized by the wood grain.*

Applying Fast-Drying Polyurethane

32. Apply Minwax® Fast-Drying Polyurethane following the directions on the can. Use a good quality, natural-bristle brush. Allow the first coat to dry overnight.

33. The next day, sand all surfaces 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 a second coat of polyurethane and set the piece aside to cure overnight.

34. The following day, sand all surfaces lightly with 220-grit sandpaper. Dust off and wipe the piece with a cloth lightly dampened with mineral spirits and apply the third and final coat of polyurethane.

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 Information Center at 1-800-424-LEAD (in U.S.) 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, 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.

DANGER: Rags, steel wool, other waste soaked with this product, and sanding residue may spontaneously catch fire if improperly discarded. Immediately place rags, steel wool, other waste soaked with this product, and sanding residue in a sealed, water-filled metal container. Dispose of in accordance with local fire regulations.

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FIG 1.

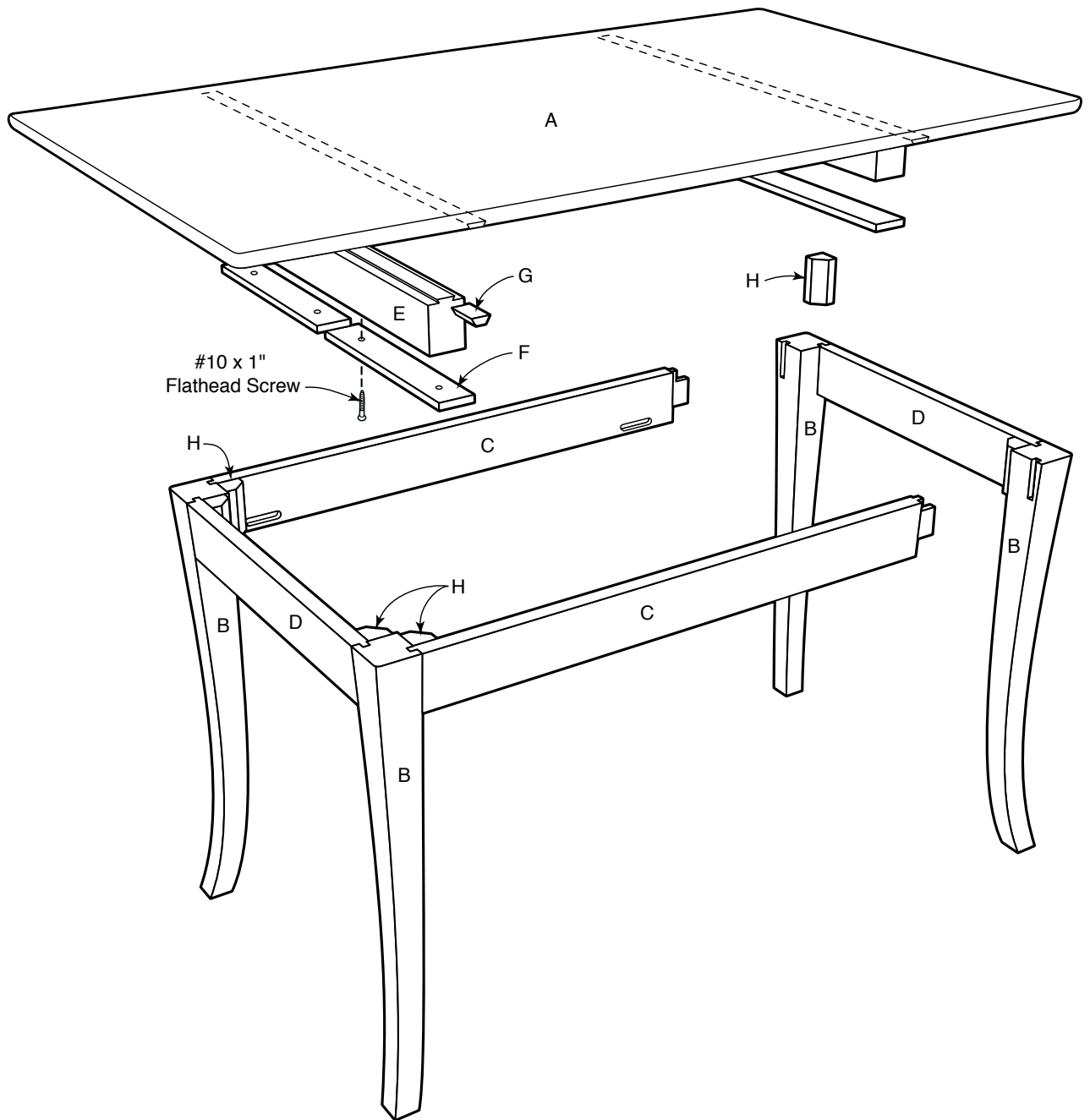


FIG 2.

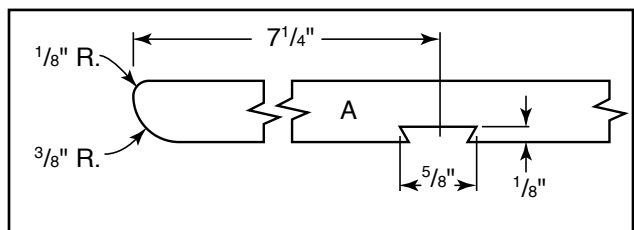


FIG 3.

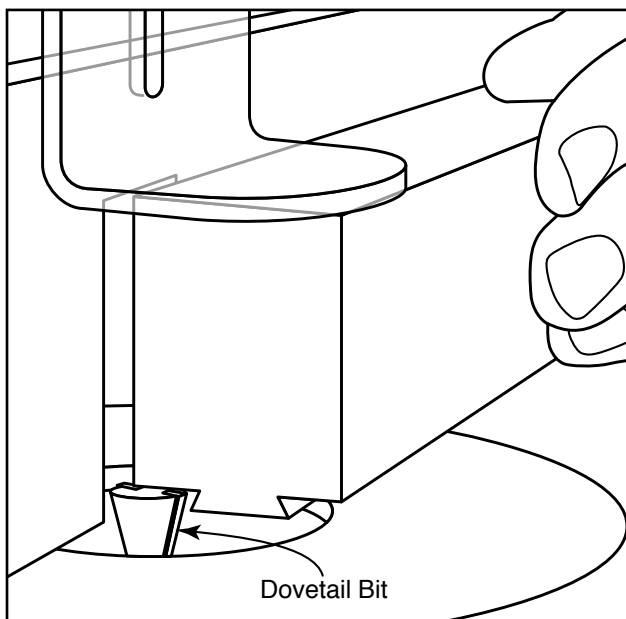


FIG 4.

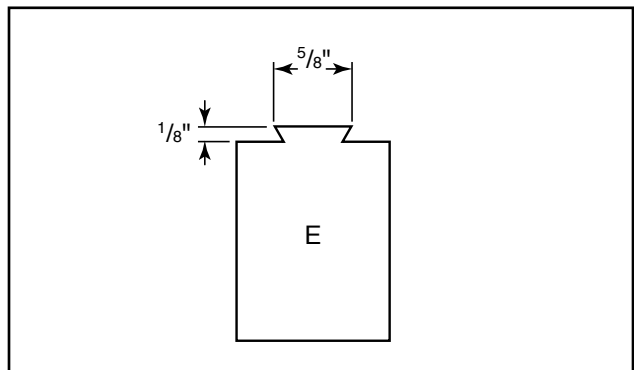


FIG 5.

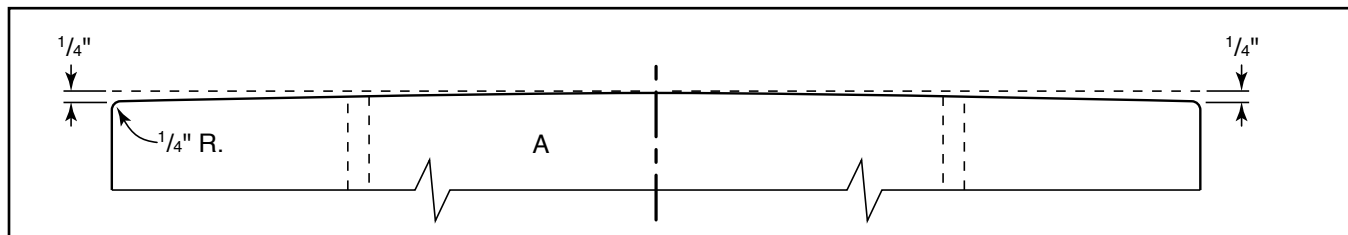


FIG 6.

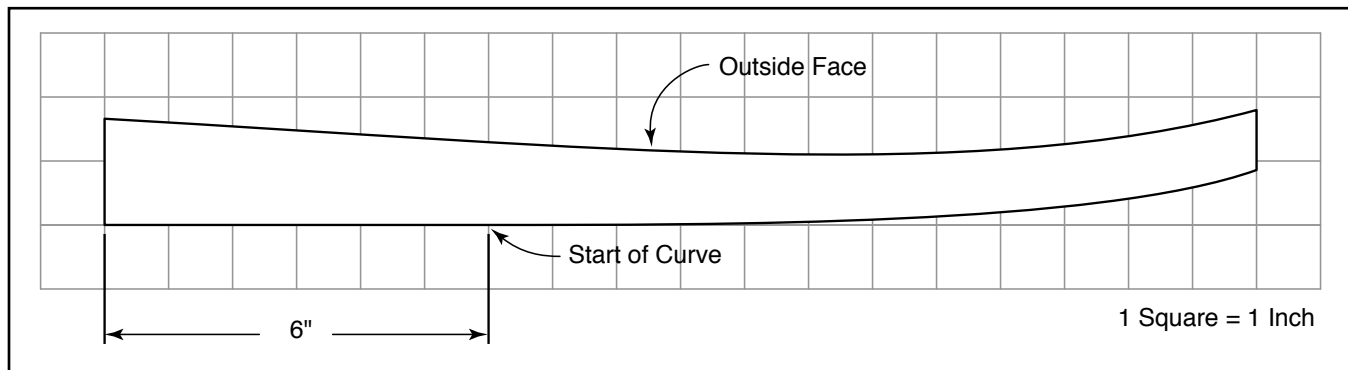


FIG 7.

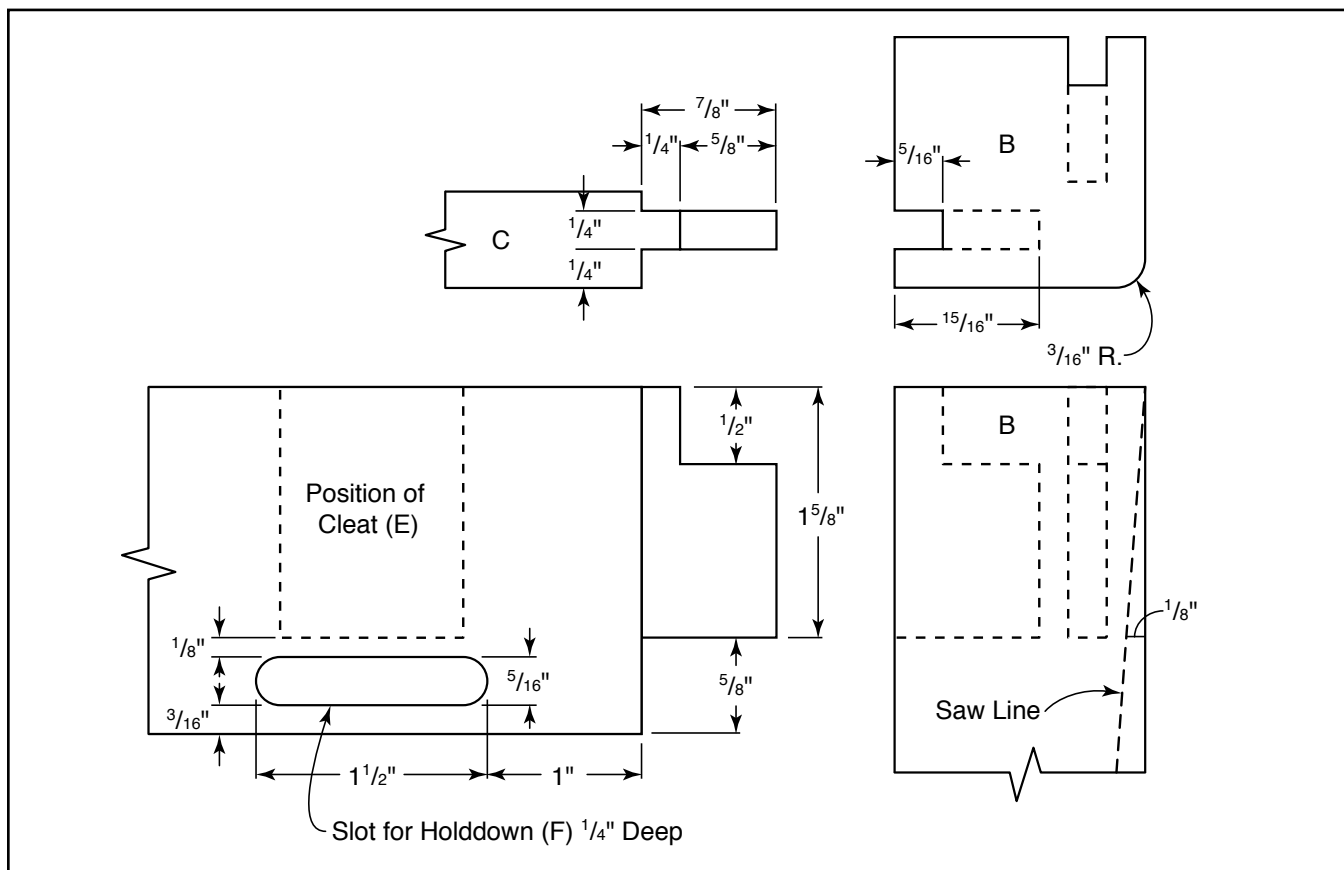


FIG 8.

