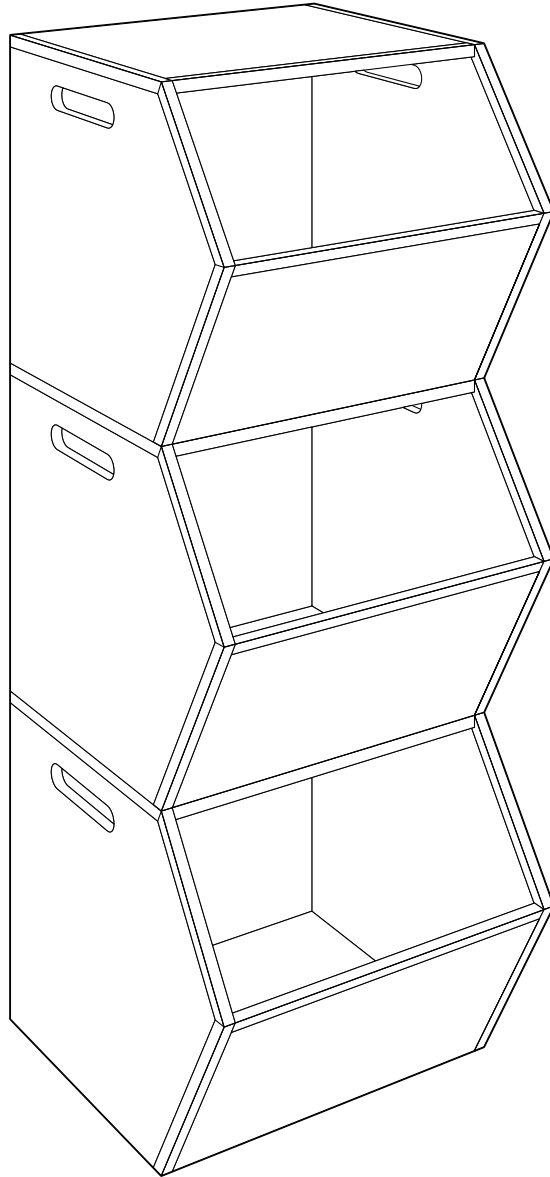




## WOODWORKS PROJET PLANNER: 2015-2016 INTERMEDIATE PROJECT RECYCLING TOWER



Households produce lots of recyclable material. Paper, plastic, bottles, metals, they all need to be separated and stored until they're brought to the curb. This recycling tower is a good-looking, easy-to-build way to organize all your recycling. Make one or several; put one in the kitchen or home office; or stack three out in the garage. With its angled shape, hand-hold cutouts and mitered edge sticks this project is just right for woodworkers with intermediate skills. You'll get practice in laying out and cutting angles, precision mitering and more, and after you build it, you'll learn more about applying stain and using clear finishes to protect the wood and keep it looking beautiful.

## TOOLS REQUIRED

### Hand Tools

- Adjustable square
- Hammer
- Bevel gauge

### Power Tools

- Table saw
- Jigsaw
- Miter saw
- Drill
- Router with round-over bit
- Orbital sander
- Pneumatic nail gun

### Miscellaneous

- Tape measure
- Pencil
- Wood glue
- Assorted clamps
- 1 1/4" drill bit
- Straight edge
- Nail set
- Finish nails
- Safety glasses
- Sandpaper, 100-, 120-, 150-grit
- Sanding block
- Gloves for finishing
- Good-quality natural-bristle brush  
(for oil-based stains and finishes)
- Mineral spirits, for cleanup of oil-based products
- Clean, lint-free cloths
- Respirator
- Paint scraper

## WOOD FINISHING PRODUCTS

### Recommended Products

Prep: Minwax® Pre-Stain Wood Conditioner (oil-based)  
 Stain: Minwax® Gel Stain, Mahogany  
 Finish: Minwax® Helmsman® Spar Urethane (oil-based), Semi-Gloss

## SHOPPING LIST

**Recommended wood:** Solid birch and birch plywood

Parts	Material	Quantity
A, B, C, D, E	1/2" birch or plywood	(1) 28"x48" piece
E, F, G, H	1x6 solid birch	(1) 24" piece

## OTHER MATERIALS

- 4 rubber non-skid table-leg tips (for bottom of bins when they're stacked)

## CUTTING LIST

Part	Name	Dimension	Quantity
A	Side	15 3/4" x 13 1/2"	2
B	Bottom	11"x15"	1
C	Top	11"x15"	1
D	Front	8 1/2"x15"	1
E	Back	13"x15"	1
F	Side panel top-edge pieces	1/2"x 1/2" x 12"*	2
G	Side panel upper front-edge pieces	1/2"x 1/2" x 8 1/2"*	2
H	Side panel lower front edge pieces	1/2"x 1/2" x 10"*	2
I	Front panel edge piece	1/2"x 1/2" x 15 1/2"*	1
J	Top panel edge piece	1/2"x 1/2" x 15 1/2"*	1

\* Approximate length, cut to fit

## 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. 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

1. See Fig. 1 for overall guidance. Use a table saw to rip the sides, A, to 15 3/4".
2. Use a table saw to rip the plywood top, bottom and front—B, C and D—to 15". You'll be cutting the back, E, a little later.
3. Use a table saw to rip the 1x6 solid wood into 1/2" x 1/2" pieces for parts E, F, G and H. For small work like this, always use a push stick to keep your hands away from the blade.
4. Use a table saw with the aid of a crosscut sled to cut the 15 3/4" wide pieces to 13 1/2" tall. See Fig 2. The stop block clamped to the sled fence ensures exactly duplicate cuts.
5. To lay out the front angles of the sides, see Fig. 3. Start by measuring up 7 7/8" from the bottom and make a mark with a pencil on the front edge. Measure 11 1/4" along the top edge and make a mark. Measure 11" along the bottom edge and make a mark. With a straight edge, draw lines that connect those marks with the mark at 7 7/8" from the bottom.
6. To make these angle cuts on a miter saw, copy the top angle with a bevel gauge. Transfer that angle to the miter saw by putting the gauge against the fence and adjusting the swing of the saw until the blade is parallel with the gauge. See Fig. 4. To save a little time and ensure identical cuts, stack the two sides together and cut them both at the same time. Repeat this procedure to cut the bottom angle.
7. Using the sled on a table saw, cut the top piece to its final dimension.
8. The bottom piece has an angle cut where it meets the front piece. Use the bevel gauge to copy the bottom angle from the side panel and transfer it to the table saw, adjusting the saw blade tilt until it's perfectly parallel with the bevel gauge. Set the bottom piece on the sled—make sure the sled is out of the way of the blade—and make the cut.
9. Leave the table saw blade angle where it is and make the angle cuts on the bottom edge of the front piece. The top edge is a square cut.
10. To lay out the hand holes in the sides, use the dimensions shown in Figs. 3 and 5. You will be using a 1 1/4" spade or Forstner bit to drill the ends of the holes, so find and mark the center of each hole and do the drilling.

**Woodworker's Tip:** To minimize tear-out on the back of the piece that you are drilling, put a piece of wood, a backer, under the workpiece and drill all the way through it and into the backer.

11. Use a jigsaw to connect the two holes you drilled.

**Woodworker's Tip:** When cutting veneer plywood, you can minimize splintering or chip-out by first scoring the plywood with a sharp utility knife where the cut will be made. Use a straight edge to guide the knife along the cut line.

12. Sand the inside and the edges of the hand hole to make it user friendly. If you have a router with a round-over bit fitted with a guide bearing, you can use it to ease the edges uniformly for a nice look as well as a comfortable grip.

13. To cut the solid wood edge pieces, F, G AND H, to their respective lengths and angles, start by determining the angles where F and G meet and where G and H meet. These wide angles have to be bisected in order for the angle cuts to meet perfectly. The method for this is shown in Fig. 6. You can do the layout work right on the panel, drawing lines lightly in pencil so they'll be easy to sand away later. Copy each bisected angle with the bevel gauge and use it to set up the miter saw as you did in Step. 6, shown in Fig. 4. Make test cuts first to make sure the sticks meet just right. When you are pleased with the fit, make the cuts on the actual workpieces.

14. To finish the stick cutting, the other end of F is a square cut. The other end of H is cut at the same angle as the bottom edge of D. The top face of the front panel edge piece, I, is beveled at the same angle you found for where G and H meet. The top panel edge piece, J, is square all the way around.

15. Before gluing and nailing the edge pieces to the plywood, make one last check that they all fit together. Start with F and G by applying glue to the plywood edges and putting the sticks right where they go. When they're properly positioned, use a pneumatic pin nailer to fasten them.

**Woodworker's Tip:** If you don't have a pneumatic nail gun, predrill the edge pieces before you nail them with a 1/16" bit. Then use 3-penny finish nails to do the fastening, and after predrilling, place the nail in the hole, align the piece on the plywood and use a small hammer to drive the nail. Set the nails just below the surface with a nail set.

16. Now glue and fasten H, I and J in their respective locations. Be sure to dry-fit first, glue and nail second. When the glue is dry, fill all nail holes with Minwax® Stainable Wood Filler.

**Woodworker's Tip:** Some excess glue will probably squeeze out of the plywood/edging seam. A good way to clean it up is to wait until it starts to set up, no more than 15-20 minutes. Then it will be easy to scrape it off with either a dull chisel or a putty knife. If you try to wipe off wet glue with a damp cloth, you can push the glue into the pores of the wood and make it difficult to stain later.

17. Sand all pieces so that the edge pieces are flush with the plywood. Be careful not to sand through the veneer on the plywood.

18. There is one plywood piece left to cut, the back, E. To ensure a tight fit, dry-assemble the top, side, front and bottom, holding them together with a few clamps. Check that the assembly is square, measure the opening for the back and cut the plywood to size. Cut it perfectly square to help ensure the whole assembly is square.

19. To assemble the pieces, apply glue to the meeting edges and lightly clamp them all together as shown in Fig. 7. Position the clamps so you'll be able to shoot in 18-gauge brads at the ends and in between. Start with the sides, bottom and back, and finish with the top and front. Scrape off excess glue after a few minutes.

**Woodworker's Tip:** It can be helpful to use painter's tape to mask off any areas where glue will squeeze out. This will make clean-up easier. Also, leaving the back off until after the interior is finished will make it easier to finish.

## 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 an impact on how people judge your craftsmanship. To ensure excellent results, follow the steps listed in this section and the instructions the wood finishing manufacturer puts on its products.

### FINISHING TIPS

- Test the stain and clear protective finish you are planning to use on an inconspicuous area of the project or on scraps of wood to verify desired color and look.

- All stains and clear protective finishes must be allowed to dry thoroughly between coats. Remember that drying times can vary due to temperature, 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.

#### **Before You Stain**

Carefully sand the parts in the direction of the grain. Start with 100-grit sandpaper, proceed to 150-grit and finish with 220-grit. Remove all the sanding dust. Then proceed with the stain and clear protective finish of your choice.

#### **RECOMMENDED STAIN AND CLEAR FINISH**

Prep: Minwax® Pre-Stain Wood Conditioner (oil-based)

Stain: Minwax® Gel Stain, Mahogany

Clear Protective Finish: Minwax® Helmsman® Spar Urethane (oil-based), Semi-Gloss

20. Before applying Minwax® Gel Stain, apply Minwax® Pre-Stain Wood Conditioner (oil-based), following the directions on the can. Using a pre-stain wood conditioner will help to ensure even absorption of stain and prevent blotchiness.

21. Before use and occasionally during the application, stir Minwax® Gel Stain until creamy.

22. Evenly apply a liberal amount of the Minwax® Gel Stain with a brush or rag. Wait 3 minutes and, using a clean rag, wipe with the wood grain to remove any excess stain. Allow Gel Stain to dry for 8 to 10 hours. To darken the color, apply additional coats of Minwax® Gel Stain following the directions above. Allow the stain to dry for 24 hours before applying the clear finish.

23. Apply a thin coat of Helmsman® Spar Urethane, using a high-quality natural-bristle brush. Stir well before and occasionally during use. Let dry for at least 4 hours, then sand entire surface lightly with very fine sandpaper (220-grit) to ensure an even finish and proper adhesion of additional coats. Apply a second coat following the directions above.

#### **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.

**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 a 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.

**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.

#### **When using oil-based wood finishing products:**

**DANGER! HARMFUL OR FATAL IF SWALLOWED. COMBUSTIBLE! VAPOR HARMFUL. IRRITATES EYES, SKIN AND RESPIRATORY TRACT.**

**CAUTION: 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.

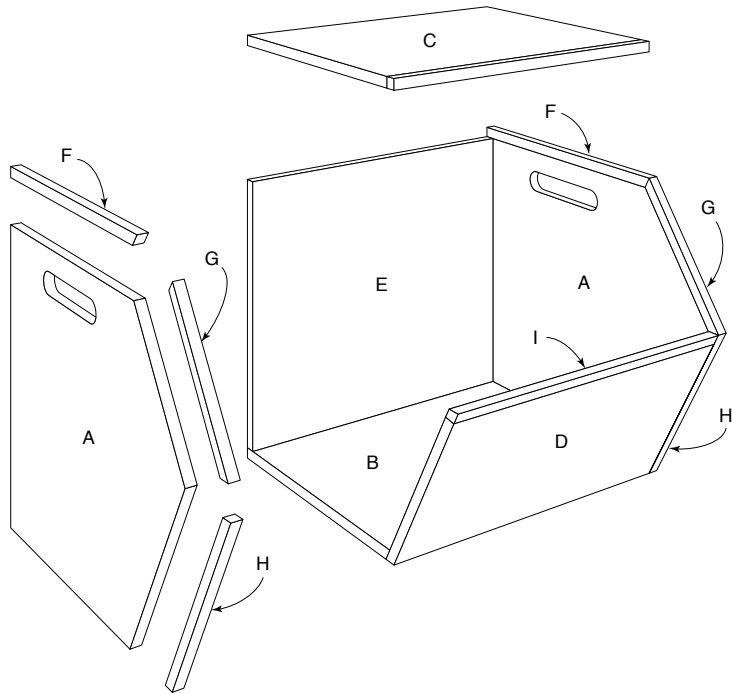
**FIRST AID:** In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, do not induce vomiting. Call Poison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

**DELAYED EFFECTS FROM LONG-TERM OVEREXPOSURE.** Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

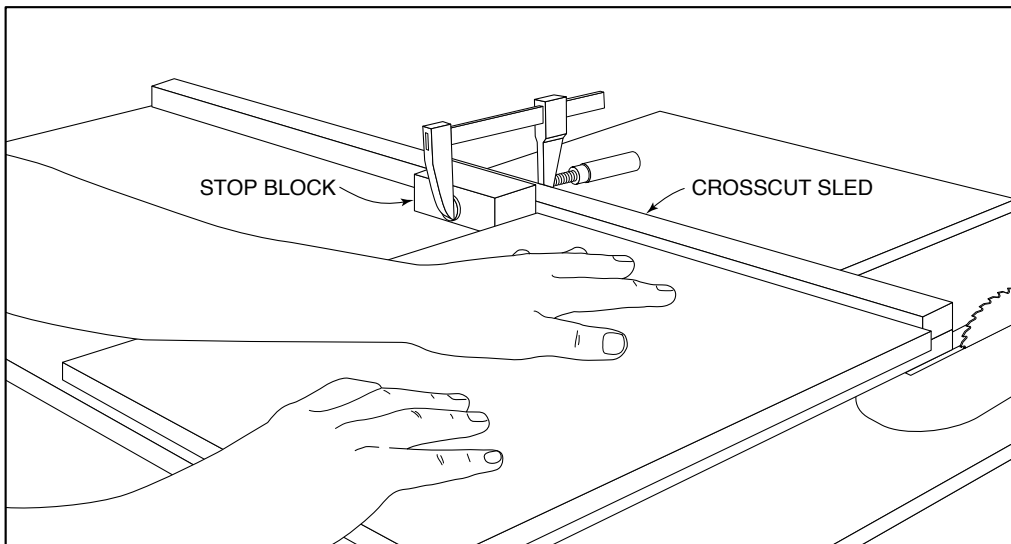
**WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. **DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.**

**CONFORMS TO ASTM D-4236. Contact a physician for more health information.**

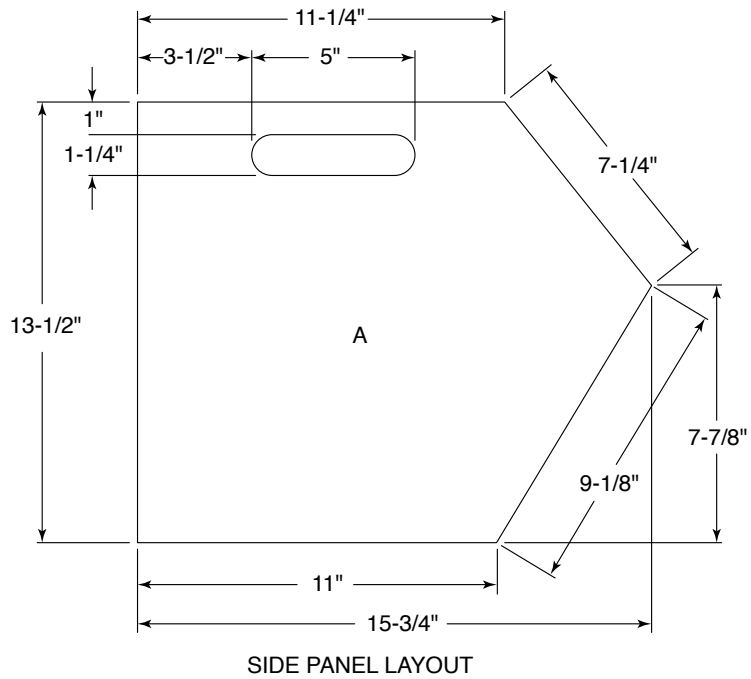
**FIG 1.** EXPLODED VIEW



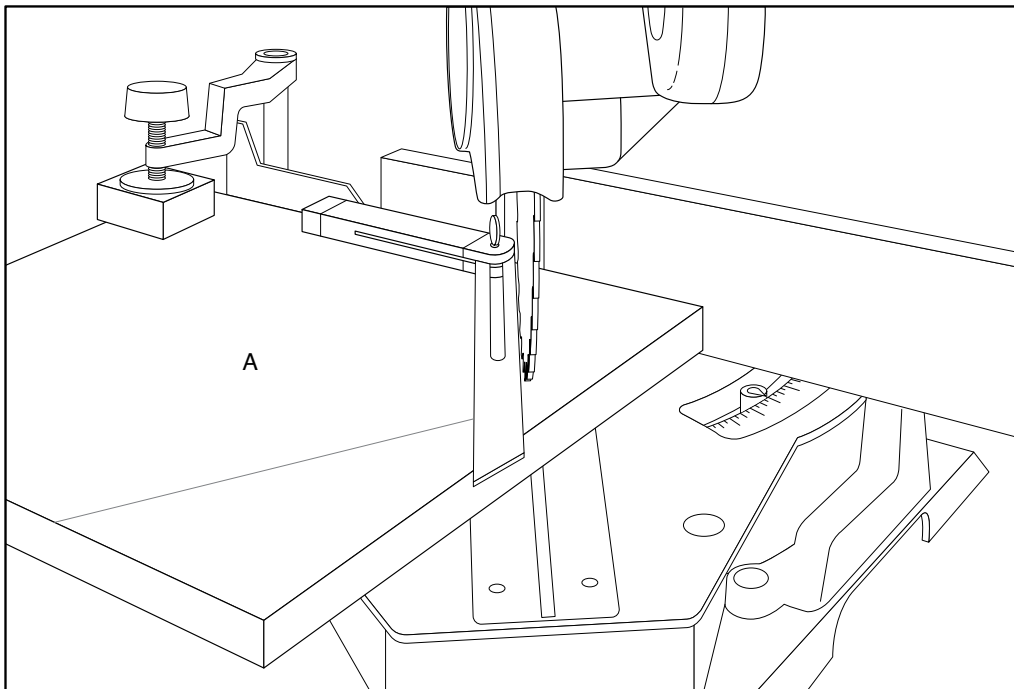
**FIG 2.** USING A CROSSCUT SLED MAKES THE WORK OF CUTTING LARGE PANELS MUCH EASIER. THE SLED SLIDES THROUGH THE SAME GROOVE IN THE SAW TABLE AS A MITER GAUGE, BUT BECAUSE IT HAS A MUCH WIDER FENCE, IT CAN HANDLE WIDE PANELS WITH EASE.



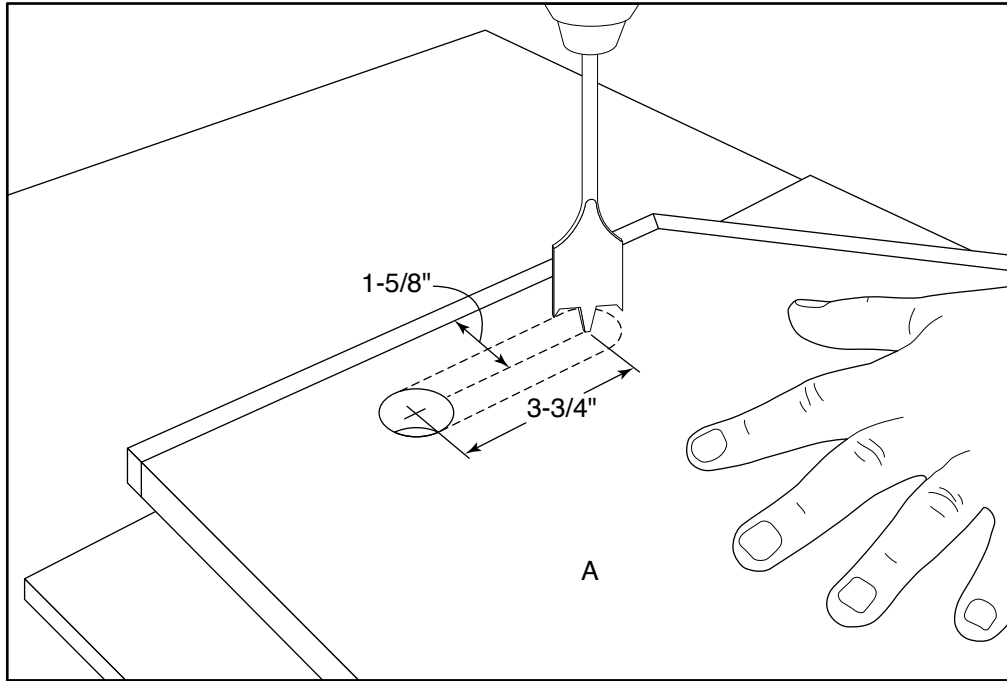
**FIG 3.** USE THESE DIMENSIONS TO LAY OUT THE END PANELS. THEY WILL GIVE YOU THE PRECISE ANGLES FOR THE FRONT UPPER AND LOWER FACES.



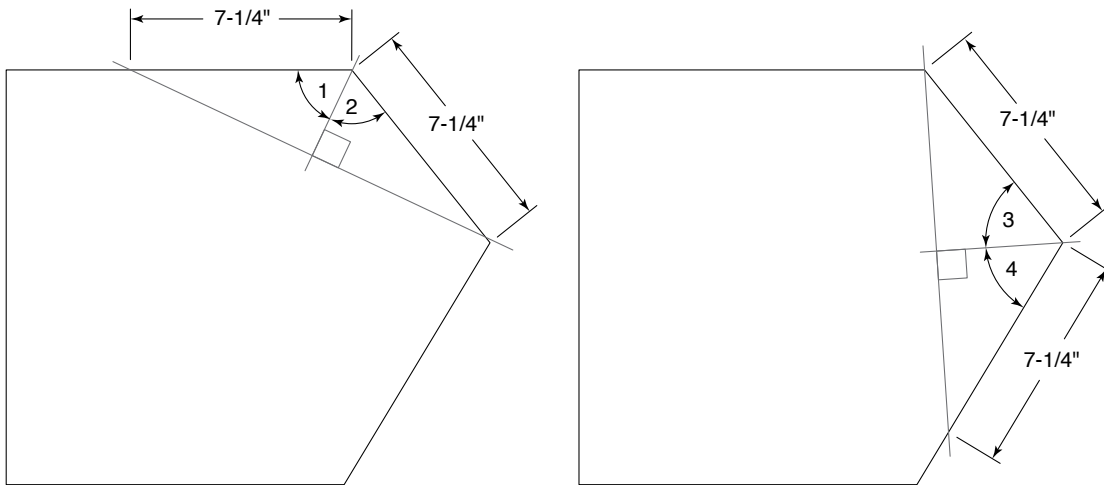
**FIG 4.** TO PRECISELY CUT THE END PANEL ANGLES ON A MITER SAW, COPY THEM FROM THE LAYOUT WITH A BEVEL GAUGE AND THEN USE THE GAUGE TO SET THE SAW ANGLE.



**FIG 5.** USE A 1 1/4" SPADE BIT TO MAKE THE RADIUSSES AT EACH OF THE HAND HOLDS THEN DRAW STRAIGHT LINES CONNECTING THE HOLES AND CUT THEM WITH A JIG SAW.



**FIG 6.** TO FIND THE ANGLES FOR THE ENDS OF THE G AND H EDGE PIECES, BISECT THE ANGLES USING THE METHOD SHOWN HERE. THIS WAY ANGLE 1 WILL EQUAL ANGLE 2, AND ANGLE 3 WILL EQUAL ANGLE 4, AND THE EDGE PIECES WILL MEET PERFECTLY.



**FIG 7.** AFTER APPLYING GLUE, CLAMP THE BIN PIECES TOGETHER AS SHOWN.

