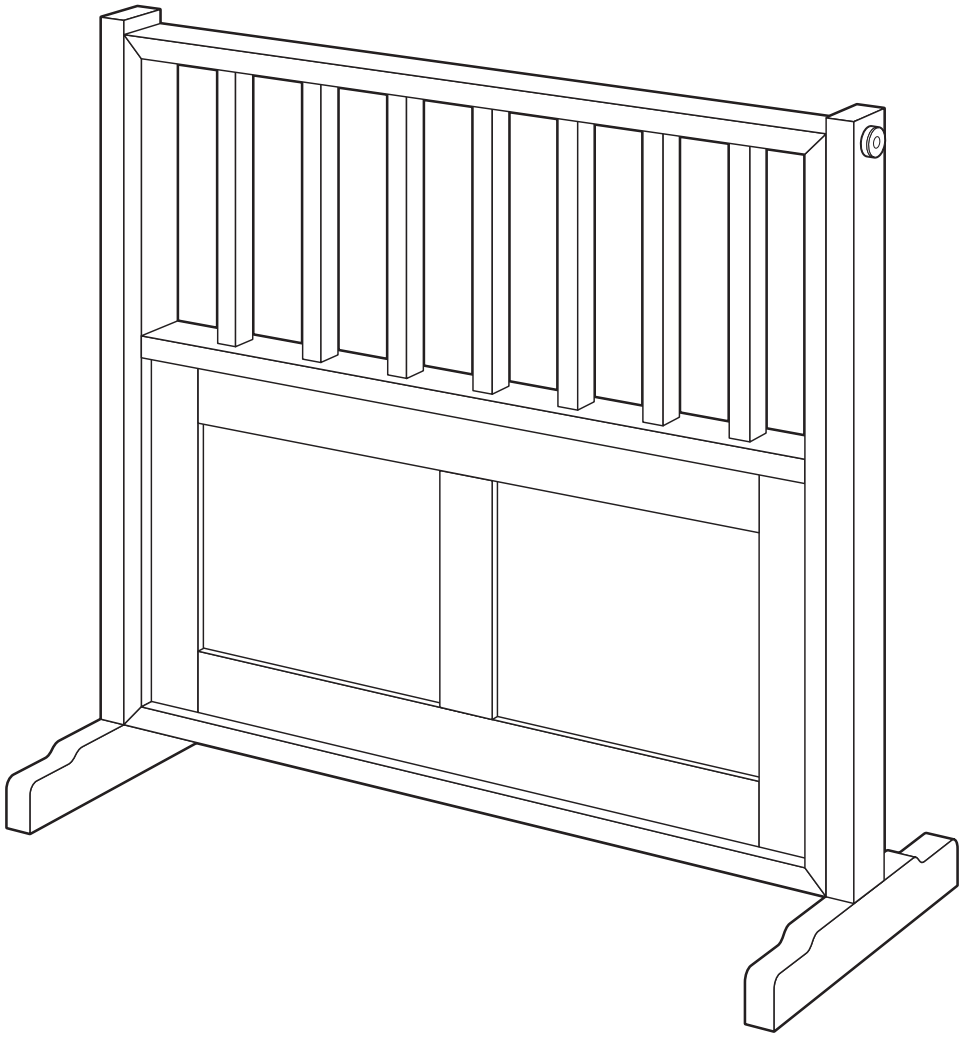
MINWAX®

WOODWORKS PROJECT PLANNER: 2015-2016 ADVANCED PROJECT

PET GATE



To own a dog is to love him, but as any owner will tell you, there's a bit more to it than that. Man's best friend loves to wander around the house, especially ever-curious puppies. When locking Fido in his crate is not an option, this stylish and functional pet gate is the perfect solution. This design can be sized to fit doorways wide or narrow, and its recessed panels, topped by solid oak balusters, make it a great-looking piece of furniture. Building one will require advanced woodworking skills to work with tenoning and doweling jigs, to make "table-saw tenons" and to work through all the other steps to a handsome finished piece. 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
– Mallet
– Doweling jig and ¼" and ½" drill bits

Power Tools

– Table saw
– Drill press
– Miter saw
– Drill
– Orbital sander
– Pneumatic nail gun

Miscellaneous

– 3/4" Forstner bit
– Tenoning jig for table saw
– Tape measure
– Pencil
– Wood glue
– Assorted clamps
– Straight edge
– Safety glasses
– Sandpaper, 100-, 150-, 220-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

SHOPPING LIST

Recommended Wood: Red or White Oak

Parts	Material	Quantity
A, B	5 x 4 x 6 solid oak	4
C	¼" oak plywood	(1) ¼ sheet
D, E, F, G, H, I, J	1x6 solid oak	8

OTHER MATERIALS

– ½" smooth dowel, 2 pcs at 3"
– ¼" x 1" dowel, 14 pcs
– 2½" #10 flathead woodscrews (B through G into D), 4
– 1½" #10 flathead woodscrews (B into top of G, G into H, G into I), 10
– 1¼" #10 flathead woodscrews (H into F, I into F), 2
– 2 threaded inserts and 1" threaded leg levelers with padded ends
– 4 self-stick rubber protectors (for bottom of feet)

CUTTING LIST (for a 32" wide doorway)

Part	Name	Dimension	Quantity
A	Feet	12" x 2" x 1"	2
B	Legs	24 ½"x 2" x 1"	2
C	Panels	11"x 9 5/8" x ¼"	2
D	Panel stiles	12 7/8" x 2" x ¾"	2
E	Panel center stile	9 5/8" x 2" x ¾"	1
F	Panel rails	23 ¼" x 2" x ¾"	1
G	Frame sides	24"x 2"x ¾"	2
H	Frame top & bottom	28"x 2"x ¾"	2
I	Frame middle rail	TK" x 2" x ¾"	1
J	Balusters	8 7/8" x ¾" x ¾"	7

WOOD-FINISHNG PRODUCTS

Recommended Products

Prep: Minwax® Pre-Stain Wood Conditioner
Stain: Minwax® Wood Finish™, Espresso
Finish: Minwax® Fast-Drying Polyurethane, Semi-Gloss

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 Figs. 1 and 2 for overall guidance. Use a table saw to rip the feet, A, to 2˝ wide. Use a miter saw to cut them to length.

2. Use a table saw to rip the 1x6 oak to 2" wide strips for parts D through I. Then rip the offcut material to ¾" x ¾" for the balusters, J.

3. Use a table saw to rip the ¼" oak plywood to 11". Plan the cuts so the grain runs with this dimension.

4. Cut the legs, B, to length. Find the center at one end by drawing diagonal lines from corner to corner. Place a self-centering doweling jig over this center point and drill a ½" hole 2" deep. See Fig. 3. This hole will accept a ½" dowel to be set in the foot.

5. See Fig. 4 to lay out the shape of the foot. Drill the 3/8" inside radius of the foot with a ¾" Forstner bit. Use a backer block clamped to the length of the foot, as shown, to keep the drill bit from wandering.

6. One way to cut the top of the foot along the 1 5/8" line is to set it up vertically in a table-saw tenoning jig. See Fig. 5. Set the saw blade to the correct height, about 3". This can also be done with a band saw. Then cut the remaining curves on the foot with a band saw or a jigsaw.

7. Use a drill press to drill a ½" x 1" deep hole in the top center edge of the foot. This will accept the ½" dowel that joins the leg and foot. Then sand the curves with a disc or drum sander to make them smooth. Make sure not to sand the edges where the leg meets the foot. You can use a router with a round-over bit in lieu of sanding the edges.

8. Cut the panel frame stiles and rails–D, F and E–to length. Then use the table saw to cut ¼" wide, 3/8" deep grooves on the inside edges. These grooves will accept the panels and the tenons you'll be making on the ends of E and F in the next step. See Fig. 6.

Woodworker's tip: *The best way to center these grooves is to run the pieces twice through a table saw with the blade set very slightly higher than 3/8˝. Start with a test piece and set the rip fence so the cut is ¼˝ from the wood face. Run the piece through, turn it end for end and run it again. Check how the ¼˝ panel fits into the resulting groove. If it's too loose or too tight, adjust the rip fence accordingly to narrow or widen the groove. When it's just right, cut all the grooves.*

9. Cut tenons on the ends of E and F on the table saw using a dado blade and a miter gauge. The tenons will be 3/8" long by ¼" thick so as to fit snugly into the grooves you previously made. See Fig. 7.

Woodworker's Tip: *The best way to center the tenons is to set the dado at ¼˝ high. Start with a test piece against the miter gauge and make a pass over the dado. Flip the piece over and make another pass, and then test the tenon's fit in the groove. If it's too tight, raise the dado slightly; if it's too loose, lower the dado slightly. When the tenon thickness is just right, cut the tenons for E and F. For safety when cutting tenons with a dado blade on a table, don't push the workpiece along the fence; that can create a kickback problem.*

10. Cut the plywood panels, C, to their final size.

11. Assemble the panel frame from parts D, E and F. First, dry-fit all the parts together and lightly clamp them, then check that the frame is square by measuring across the diagonals. Then take it all apart. Use glue only on the tenons and slip the panels into their respective grooves, then clamp the assembly together as shown in Fig. 8.

12. Clean up excess glue after it dries and trim the panel to make it square. You will use it to size the gate frame.

13. Cut the gate frame parts G, H and I to their final length, referring to both the Cutting List and the actual finished dimensions of the panel; note that all the ends are mitered. Before assembling the gate frame, select one of the H pieces as the top piece that, along with part I, will receive the dowels for the balusters, part J.

14. Using the dimensions shown in Fig. 2, lay out the dowel holes on the underside of H and the top of I, centering them on the 2" face. Use a doweling jig to drill the ¼" dowel holes. They should be just over ½" deep to accept the dowels.

15. With the dowel holes drilled, assemble the gate frame as shown in Fig. 1. Use the squared-up panel frame during the assembly to keep the gate frame square. Apply glue sparingly at each miter joint to prevent squeeze-out and clamp the four pieces together. To secure the corners, first shoot two brads into each through the G pieces. Then bore and countersink holes for the single woodscrew at each corner. Make sure not to allow any glue to adhere to the panel frame.

16. Remove the panel frame from inside the gate frame and sand all parts at this point with 100-grit paper.

17. Set the panel frame back inside the gate frame and put the middle rail, I, where it goes, right on top of the panel frame. Measure for and cut the balusters, J, to length. Find the center of each end by drawing diagonals from corner to corner and use the doweling jig to drill the ¼" dowel holes just over ½" deep.

18. Dry-fit I and J into the gate frame and set the panel frame in place to make sure it fits tightly under I. If it's right, remove the panel frame. Glue the ¼" dowels into place on H and I, put the balusters, J, where they go and then put I in place. Before the glue dries, turn the balusters as needed to make them square to the edges of H and I. Clamp this assembly and then fasten the ends of I to G using two countersunk woodscrews on each end, as shown in Fig. 1.

19. Sand the entire gate, starting with 100-grit and working your way through 220-grit. You can also use a router with a round-over bit on some of the edges in lieu of easing the edges with sandpaper.

20. This is a good time to stain and finish the different gate components. It's easier to get a nice even finish with them disassembled. You can apply the final coat of finish after the gate is assembled. See steps 24 though 26.

21. Glue the ½" dowels into the feet, A, only. Since the foot is prefinished, you can just wipe off any excess glue with a damp rag or a sponge. Make sure that the fit of the dowel on the leg, "B", is fairly snug. The dowel will not be glued into the leg so that the foot can be rotated flat for storage.

22. Put the panel frame back inside the gate frame, making sure to center it front to back. See Fig. 1 for how it's fastened with woodscrews covered by wood plugs. The screws that fasten the legs, B, to G are long enough to go into the sides of the panel frame, D, and thus hold it in place. After driving the screws, glue in the wood plugs, tap them flush with the surface and wipe away any excess glue. You can spot-sand, stain and finish the tops of the plugs.

23. As shown in Fig. 1, drill holes near the top of B for the threaded inserts that will receive the threaded levelers used to secure the gate to the door opening. Drive in the inserts flush with the surface. You can now proceed with the final finishing.

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 finish of your choice.

RECOMMENDED STAIN AND CLEAR FINISHES

Prep: Minwax® Pre-Stain Wood Conditioner
Stain: Minwax® Wood Finish™, Espresso
Finish: Minwax® Fast-Drying Polyurethane, Semi-Gloss

24. Before applying Minwax® Wood Finish™, apply oil-based Minwax® Pre-Stain Wood Conditioner, following the directions on the can. Applying a pre-stain wood conditioner will help to ensure even absorption of stain and prevent blotchiness.

25. Before use and occasionally during application, stir Minwax® Wood Finish™.

26. Apply the Minwax® Wood Finish™ color you have chosen using a brush or 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™ stain to sit for about 5 to 15 minutes, and 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 clear protective finish.

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

27. Apply Minwax® Fast-Drying Polyurethane according to the directions on the can. After the first coat is dry, sand the surface lightly to smooth and prepare it for the second coat.

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

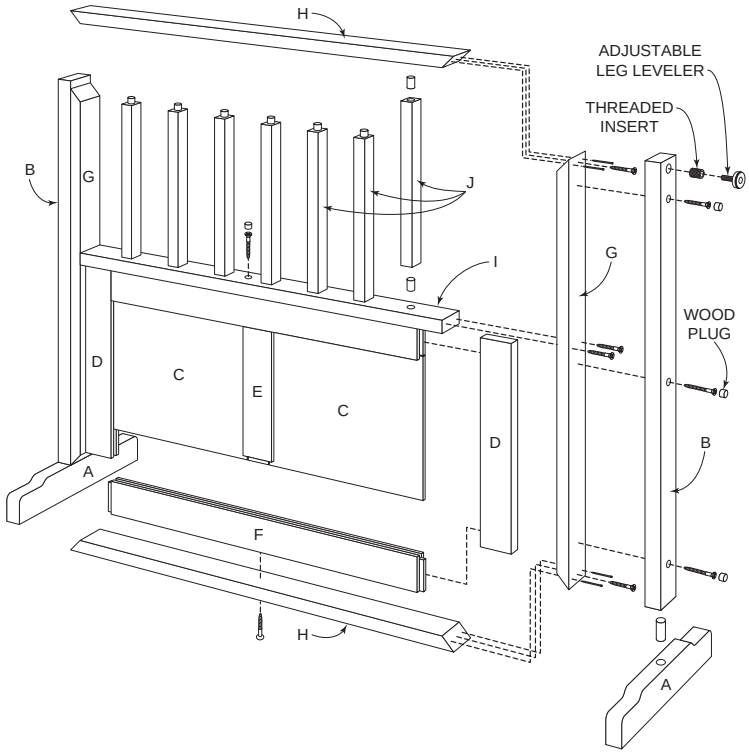


FIG 2. DIMENSIONS AND DETAIL

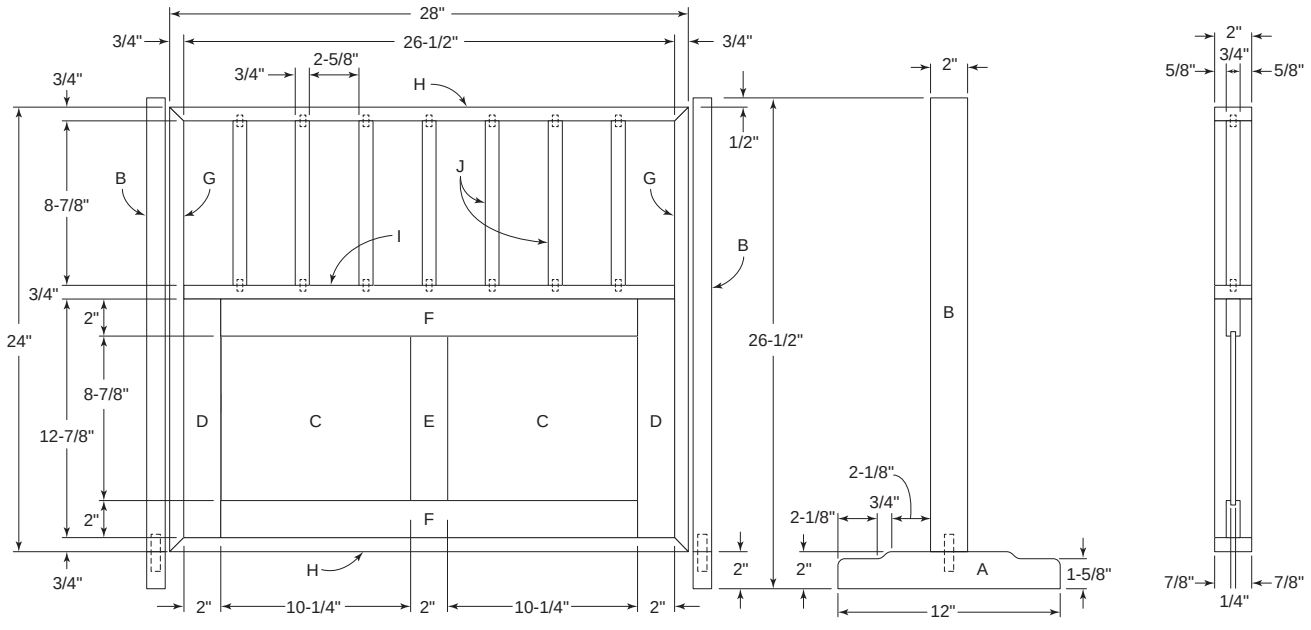


FIG 3. *A DOWELING JIG IS THE BEST TOOL FOR DRILLING DOWEL HOLES STRAIGHT, CENTERED AND SQUARE TO THE WORKPIECE.*

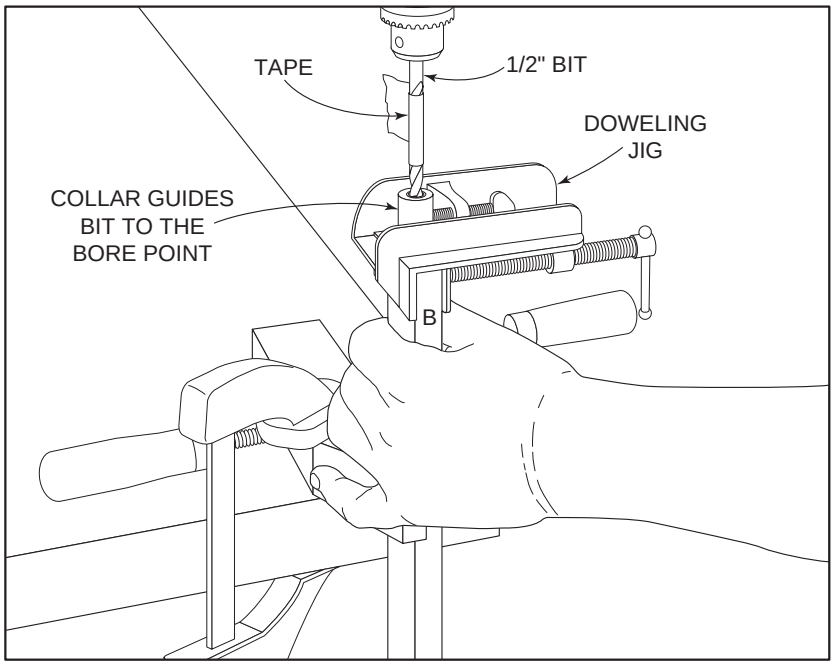
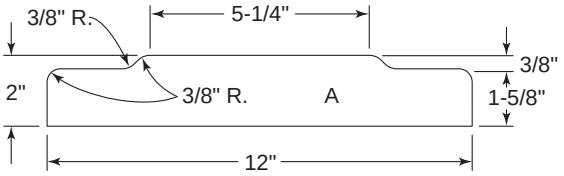


FIG 4. *TO DRILL THE INSIDE RADIUS OF THE FOOT, PLACE A BACKER STICK AS SHOWN TO KEEP THE DRILL BIT FROM WANDERING.*



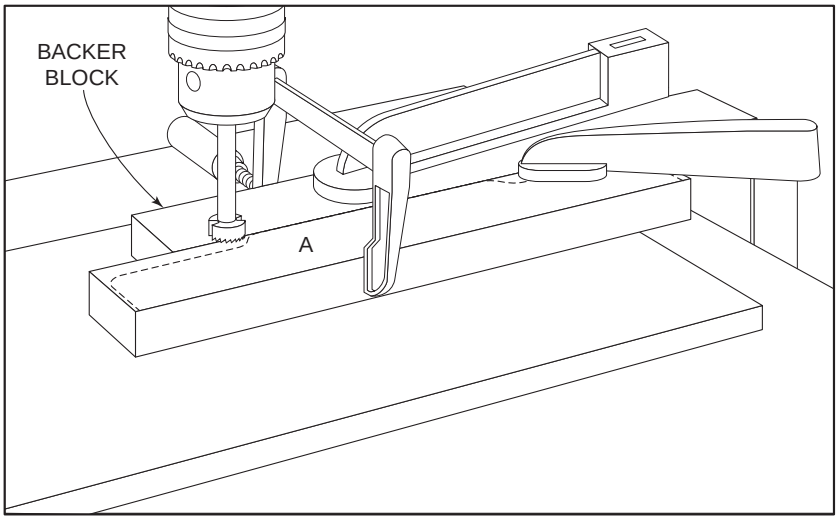


FIG 5. *TO CUT THE TOP OF FOOT TO THE 1-5/8" WIDTH, SECURE IT IN A TABLE-SAW TENONING JIG AS SHOWN. SET THE BLADE TO THE RIGHT HEIGHT, ABOUT 3", AND MAKE THE CUT.*

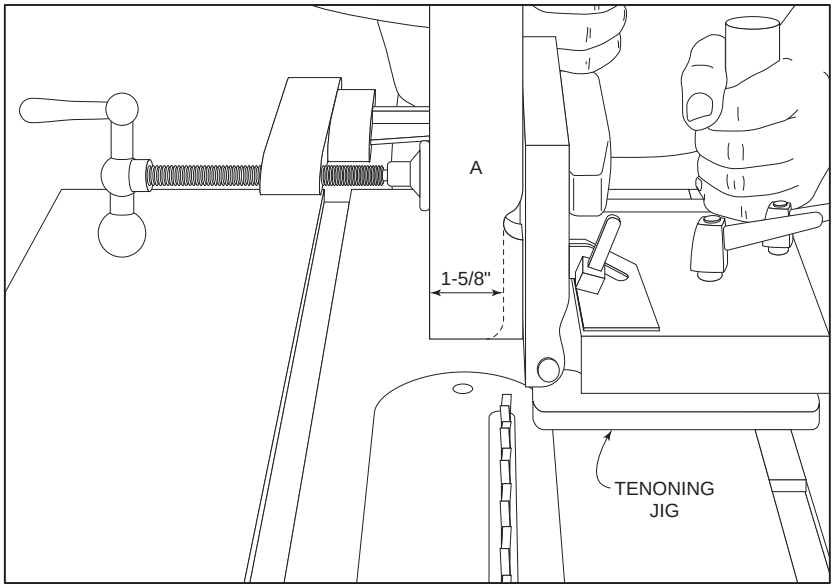


FIG 6. *TO CENTER THE PANEL GROOVES, RUN THE WORKPIECES TWICE THROUGH THE TABLE SAW WITH THE RIP FENCE SET TO ALLOW A ¼" REVEAL FROM THE PANEL TO THE FRAME FACE. PUSH THE PIECE THROUGH ONCE, TURN IT END FOR END AND PUSH IT THROUGH AGAIN.*

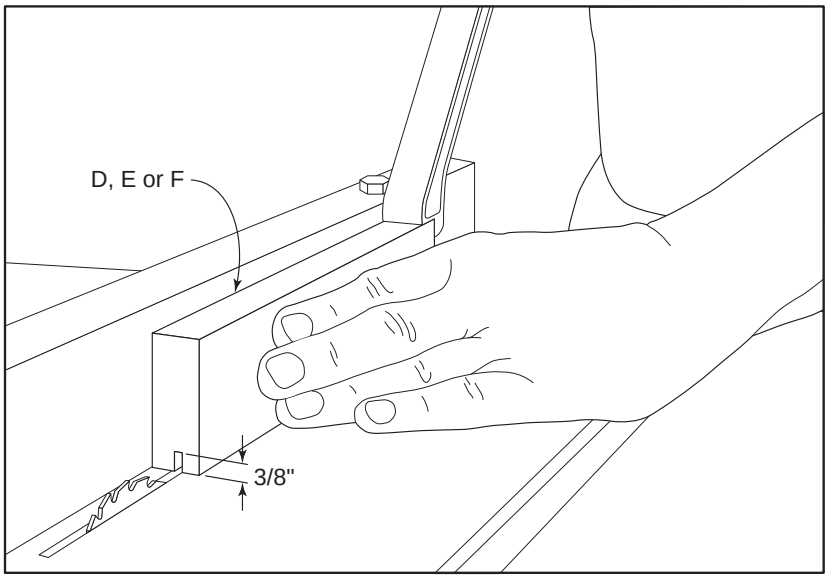


FIG 7. *A TABLE SAW FITTED WITH A DADO BLADE MAKES EASY WORK OF CUTTING TENONS. SET THE DADO ABOUT ¼" HIGH AND MAKE TWO PASSES, ONE ON EACH SIDE OF THE WORKPIECE.*

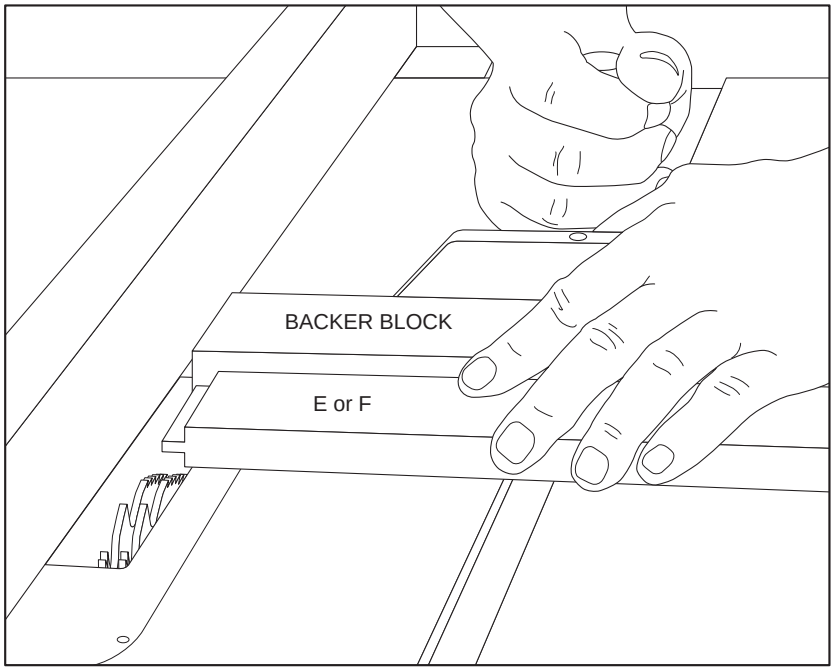


FIG 8. *IT TAKES SEVERAL CLAMPS TO PROPERLY CLAMP THE FRAME TOGETHER IN ORDER TO ENSURE IT'S SQUARE AND FLAT.*