HOW-TO-BOOKLET #3058
HANGING DOORS

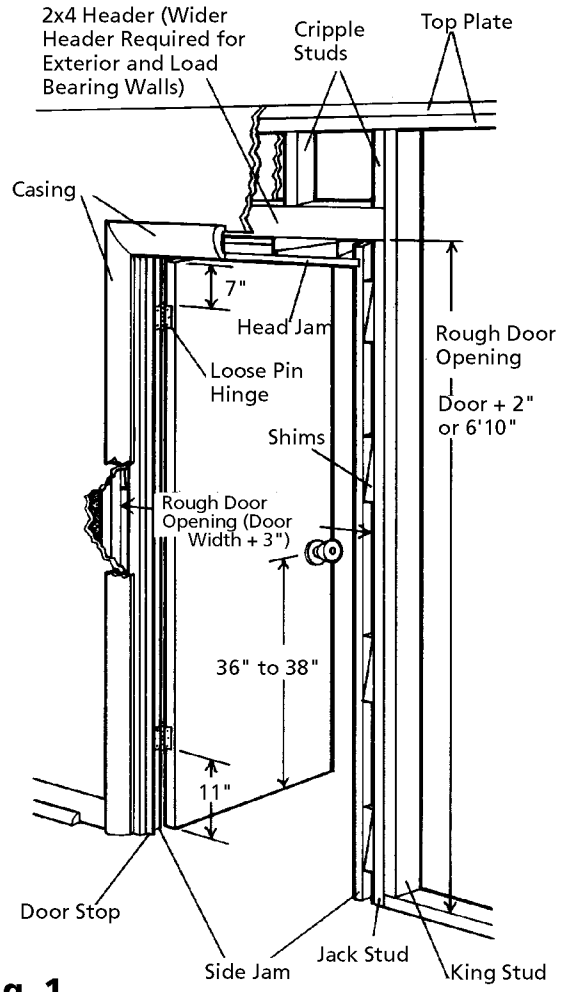


Fig. 1

Frame out the rough door opening as shown above.

TOOL & MATERIAL CHECKLIST

- ❑ Door
- ❑ Casing
- ❑ Paint/Stain
- ❑ Wood Shims
- ❑ Jamb Set
- ❑ Hinges
- ❑ Door Knob (Lockset)
- ❑ 4d and 10d Finishing Nails

Read This Entire How-To-Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above.

Most doors nowadays come prehung. This means that the door jamb is completely assembled and the door is already hinged to the jamb. But you may desire a more customized appearance, or you may be installing an old door taken from a home that is being torn down. Or you may simply prefer to hang your own door. This booklet tells you how. For prehung doors, see How-To Booklet #3128: Prehung Doors.

SAFETY FIRST

When operating power tools, always follow the manufacturer's directions. Keep saw blades sharp to avoid ragged cuts and saw kickbacks. Wear a dust mask, goggles, and other protective clothing as necessary. Never operate or even plug in power tools when children are around. Never operate power tools under the influence of alcohol or any other type of drug.

TYPES AND SIZES OF DOORS

Doors come in a variety of widths and styles. They are as small as 18" to 24" wide for closets, (smaller for specialty applications), and as wide as 36" to 42" for exterior doors. Double door designs are, of course, wider. Although most doors are 6'8" high, other heights are available for specialty or custom applications.

The most common type of interior door is a hollow-core unit made up of a wood frame along the edge, cardboard or wood strip webbing in the middle, and a thin wood surface such as lavan or a thin non-wood surface. Non-wood doors come in a variety of finish materials, many of which simulate wood. Hollow-core doors are lightweight and easy to maneuver, but are not recommended where soundproofing is needed, such as bedrooms.

Solid-panel doors are made of wood or wood products, steel with wood or foam cores, insulated hardboard, or insulated wood. Solid-panel doors are normally used as exterior doors, particularly if insulated, but can also be used inside if preferred. They generally cost more than hollow-core doors, and can be much heavier. Because of their weight they are more difficult to work with. Most solid-panel doors, in fact, require two workers to install.

Common door styles range from flush (smooth surface) to multi-panel insets in the center section(s). Inset panels on exterior doors can be plain, carved, or glazed. Cost can range from just a few dollars to thousands of dollars for a custom door.

SELECTING AND PURCHASING MATERIALS

Doors can be purchased pre-drilled for the lockset (this term refers collectively to the latch-bolt assembly, trim, and handles, knobs, or levers). This will save extra drilling and sawing. Once you know the width of the door you want, build the rough opening 3"wider and 2" higher. The rough opening should be framed as shown in **Fig. 1.** The extra space around the door is needed for the door jamb and for shimming the door to perfectly plumb.

If the framing is already in place and you are just installing the door, measure the distance between the jack studs. The maximum width of the door will be 5" to 7" less than this distance. If the rough opening is not wide enough for the door you want, the frame will need to be removed on one or both sides and reworked. If there is more than a 7" space, add studs on either or both sides as necessary to cut down the width of the opening. Keep in mind that the door should clear the jambs by 1/8" at the top and sides and 3/8" at the bottom (more over a carpet).

Measure the distance from the floor to the bottom of the header. It should be between 81" and 83" for a standard 6'8" doors.

Since doors at different heights are a little more difficult to find, and are often more expensive, you may need to adjust the framing as necessary to make a standard height door fit. Check with you building material supplier for what is available before you do anything. If you need a shorter door, a standard height door can be cut to fit, but do not use a door that's pre-drilled for a lockset if the door is going to be cut down more than 2". Also, do the cutting on the bottom. If it's a hollow-core door, save the outer frame piece and attach it to the new bottom. If you need a taller than standard door, be prepared to pay more.

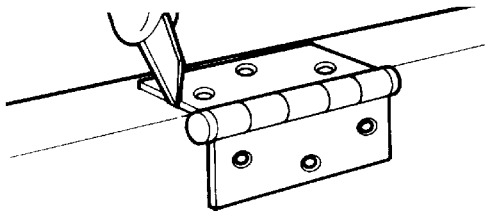
Purchase the door, a jamb kit of the proper size, the style of casing (trim) you prefer, and the necessary hardware. Determine the amount of casing needed by multiplying the height of the rough opening by 4 and the width by 2 and adding the numbers together. Add a couple of inches to allow for waste. If the door you purchase is pre-drilled for a lockset and hinges, it is intended for a right-hand or left-hand swing opening. This means if the door opens toward you and the knob will be on the right side, it is a right-handed door, and vice versa. Be sure to select the proper opening for you application. Store the door flat on a level surface. Do not stand on edge.

HANGING THE DOOR

Setting the Hinges on the Door. Set the top hinge in place on the edge of the door, 7" from the top of the door. The barrel of the hinge should be 1/4" (this may vary with the type of hinge used) from the edge of the door and should be on the inside, the side to which the door will swing open. Holding the hinge firmly in place, carefully mark the outside edge with a sharp utility knife (**Fig. 2**). Cut about 1/8" deep into the wood as you make the outline. Repeat the process for a bottom hinge at 11" from the bottom of the door. Most doors require a third hinge centered between the first two, though some interior doors have only two.

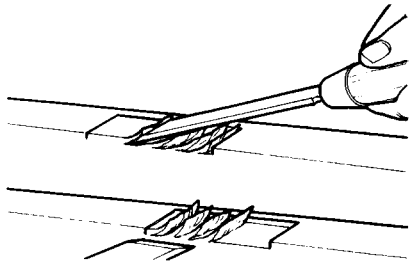
Cutting The Mortises on the Door. The outlines mark the edges of the "mortises" for the hinges. These are finished by chiseling with a sharp wood chisel of roughly the same width as the mortise and a rubber or wood mallet. Cut down to a depth equal to the thickness of the hinge leaves. Make a series of small chisel cuts across the mortise outline with the bevel of the chisel blade pointing down (**Fig. 3**). Then remove these small cuts with the chisel, beveled edge pointing up. You may want to practice first on scrap lumber if you are not experienced with this type of work.

Fig. 2



Use a utility knife to mark the hinge mortise outline.

Fig. 3



Make chisel cuts with the beveled edge down, then clear out the mortise with the beveled edge up.

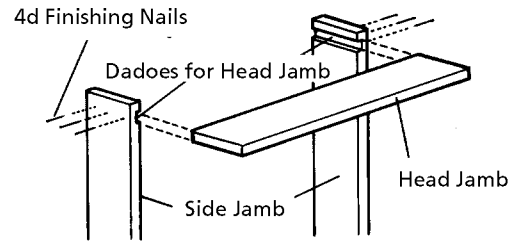
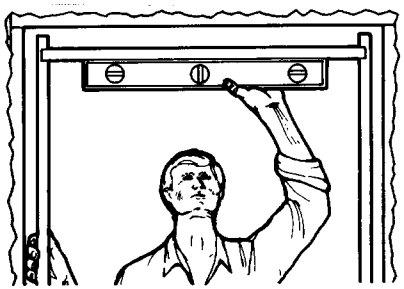


Fig. 4

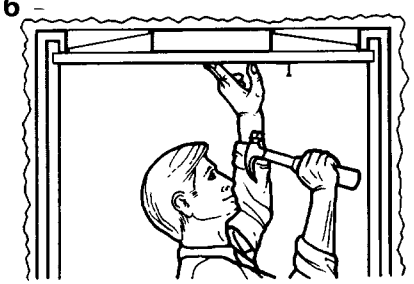
The jamb assembles with 4d finishing nails.

Fig. 5



Make sure the jamb is perfectly level in the opening.

Fig. 6



Use 8d casing nails to secure the jamb.

If you are experienced with a router, cutting the mortises can be much easier. You may want to make a homemade jig or, better, use a mortise template kit to ensure uniform, professional-looking cuts.

Assembling the Door Jamb. The head jamb goes into the dado (groove) cut into each side jamb (**Fig. 4**). Slide the head jamb into place and fasten with 4d finishing nails. Set the assembled jamb in the rough opening to test for fit. There should be sufficient room on the top and sides for shims to level the door. You may need to trim the bottom edges of the side jambs.

Cutting the Mortises on the Jamb. A helper is needed to assemble the door into the jamb. Lay the jamb on the floor and place the door in it. Shim the door all the way around so that the space between the jamb and the door is from 1/16" and 1/8". The important factor is that the space is even all the way around. Mark the mortise locations on the jamb. Remove the door and cut the mortises in the jamb in the same manner as before.

Installing the Door Jamb. Set the jamb into place, centering it in the opening at the top. Carefully level the jamb (**Fig. 5**) and check to be sure that the sides fit correctly at the bottom. Insert wood shims as necessary at the top. Cedar shakes will also work, but are usually more expensive.

Slide the shims together until you get a snug fit. Nail up through the jamb, shims, and into the header with an 8d casing nail (**Fig. 6**). Do not drive the nail all the way in at this time. Check the top with the level again. It is critical that you get the top perfectly level. Add shims and nail about every 12" along the top.

Level the hinge side of the door frame and secure with three nails, one at the top, and at the bottom, and one in the center. Use shims as before and DO NOT drive the nails all the way in. Do not secure the other side at this time. Install the hinges in the mortises on the door and jamb. Pre-drill pilot holes for the screws, then drive the screws flush with the surface of the hinge leaves.

Hanging the Door. Get someone to help you set the door in place. Insert the pins only partially into the hinges. Close the door and test for fit. The door should close easily and there should be an even seam on the top and sides. Also, the door should not swing open or closed on its own. Carefully level and secure the lockset side of the door jamb in the same manner as before. Check the fit again. If the fit is not correct, the frame is not perfectly level. Check all sides with a level and adjust as necessary to get the correct fit. When pulling a nail out, be sure to use blocking so that you don't damage the door jamb. For jambs that bow or curve, move the shims to make the shim assembly thicker or thinner, or add shims as necessary. Once the door is perfectly level and the seam is even all the way around, seat the hinge pins firmly. Drive the nails almost flush but do not strike the wood.

Installing the Lockset. Virtually all locksets come with compete installation instructions, including a template and tool list. Follow the manufacturer's instructions when installing the hardware you have selected. Close the door and check for fit. The door should be flush with the edge of the jamb all the way around on the inside, the side to which the door swings open. If not, move the lockset strike plate as necessary to get a flush alignment.

Installing the Door Stop. With the door fitting properly, close it and draw a line for the door stop on the jamb, along both sides and the top of the door (**Fig. 7**). Cut and nail the stop into place with 4d finishing nails. Do not drive the nails all the way in yet. Check to see if the door fits flush against the stop. If not, adjust as necessary. Once satisfied with the fit, nail close but do not strike the wood.

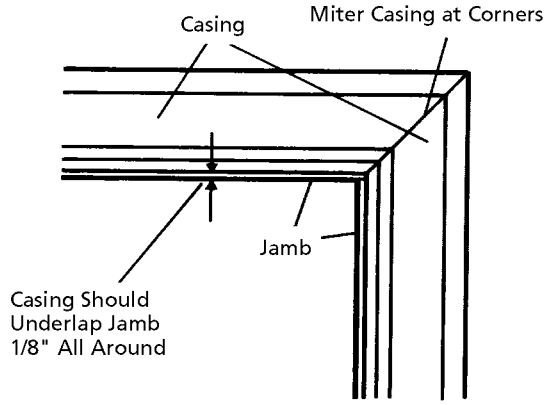
The door should fit evenly and open and close with no binding. If there are problems, you can sand the door with a plane or with sandpaper. Remember to plane with the grain. You should not need to plane much. If so, the fit of the jamb may need adjusting.

Adding the Door Casing (Trim). Finish the installation by installing casing around both sides of the door (**Fig. 8**). The edge of the casing should be offset approximately 1/8" from the edge of the jamb (**Fig. 9**). For a professional-looking finish, miter the casing in the corners. Measure and miter one side piece. Tack it into place with a couple of 4d finishing nails. Drive the nails in only far enough to hold the trim in place. Next measure and cut the top piece, then the other side. Adjust the pieces as necessary to get a good fit, then secure with 4d finishing nails every 16". Repeat for the opposite side of the door. For exterior doors, be sure to add weatherstripping.

Finishing the Door. Use two nail punches, one for 10d and one for 4d nails, to set all the nails slightly below the surface of the wood (**Fig. 10**). For doors to be painted, fill the holes with wood putty and paint after the putty is dry. For doors to be stained, stain first then fill the holes using a matching color stick.

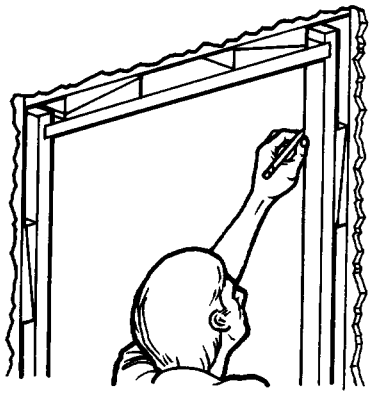
- Sand lightly before finishing, and between coats. Make sure the surface is clean and dry.
- Apply the finish as soon as the door is fitted. Make sure that the entire door, including the top and bottom edges, receives at least two coats of paint, varnish or sealer after the door has been fitted and before hanging.
- Avoid finishing too soon after a rain or damp weather, and during periods of higher than average humidity. Allow ample time for wood to dry before applying finish.
- Some species of wood contain a chemical which reacts unfavorably with certain finishes. Where possible, the surface should be tested for such unfavorable reaction. Application of a sealer before finishing will usually prevent this difficulty.
- Give doors a sealer coat to prevent undue absorption of moisture before final finishing.
- Apply at least two coats of a good grade of oil-based mixed paint, varnish or lacquer and follow the manufacturer's instructions carefully. Do not use a water-thinned paint unless an oil-based prime coat is first applied. The full beauty of wood is best emphasized by use of stain or semi-gloss finish.

Fig. 9



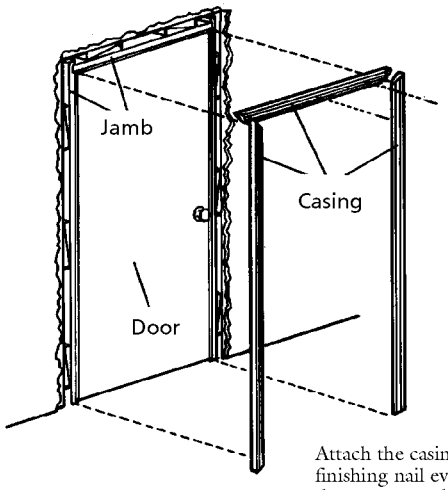
The casing should be offset approximately 1/8" from the edge of the jamb.

Fig. 7



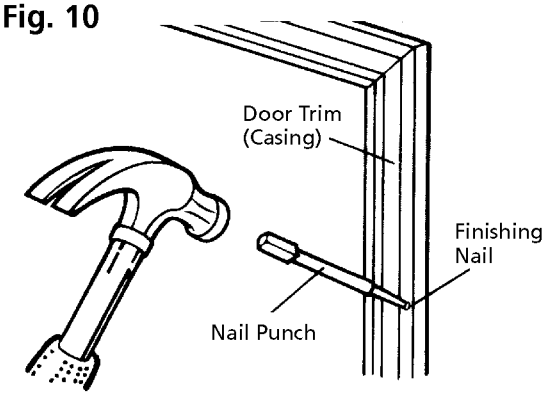
Draw a line for the door stop on the top and sides of the jamb.

Fig. 8



Attach the casing with a 4d finishing nail every 16" all the way around.

Fig. 10



Use nail punches to set all nails below the surface prior to finishing.