

hung by passing the eyes of the straps over the pins or gudgeons which are welded to *back plates* bolted to the frame. Sometimes doors are not provided with frames and are hung by engaging the eyes of the straps in gudgeon hooks smithed to wrought iron *lugs* (see Q). The lugs are secured to the stonework, mortices being cut to receive them. After insertion, the lugs are well caulked with lead and the reason for the dovetail shape and ragged surface is to give a greater key for the lead and increase its holding power. The heavy *cast iron hinge* (see w, Fig. 45) is another type of fastening used for very large doors. A pair of these hinges are bolted to the door and the pins on them engage in sockets fixed to the frame.

Butt hinges (see y, Fig. 45) are often used for hanging this type of door. The flanges or *wings* of the hinges are made of either cast iron, malleable iron or steel, and they increase in $\frac{1}{2}$ -in. units from 1 to 6-in. long. The *knuckle* consists of a central pin which passes through alternate eyes of each wing to form five segments. The wings have countersunk holes to receive the heads of the screws used to secure the wings to the door and frame.

The door is hung by butt hinges in the following manner: It is fitted into the frame and trimmed so as to leave a uniform clearance of $\frac{1}{16}$ -in. (see p. 88). The door is removed and one wing of each hinge is screwed to the edge of the hanging stile. This is done by forming slight housings in correct position on the stile to receive a wing of each hinge which is screwed to the door. The door is again placed into the opening, wedged temporarily (p. 88), and brought to the required position. The housings for the free wings are marked on the post, the door is removed and the housings are formed. The door is placed finally in position and the wings of the hinges are screwed to the post (see k, Fig. 52). In order that the door shall swing freely, the centre of the pin of the top hinge should be $\frac{3}{16}$ -in. beyond the face of the door and that of the bottom hinge should be $\frac{1}{4}$ -in. clear.

A description of the *skew butt hinge* shown at z, Fig. 45, and its application is given on p. 103.

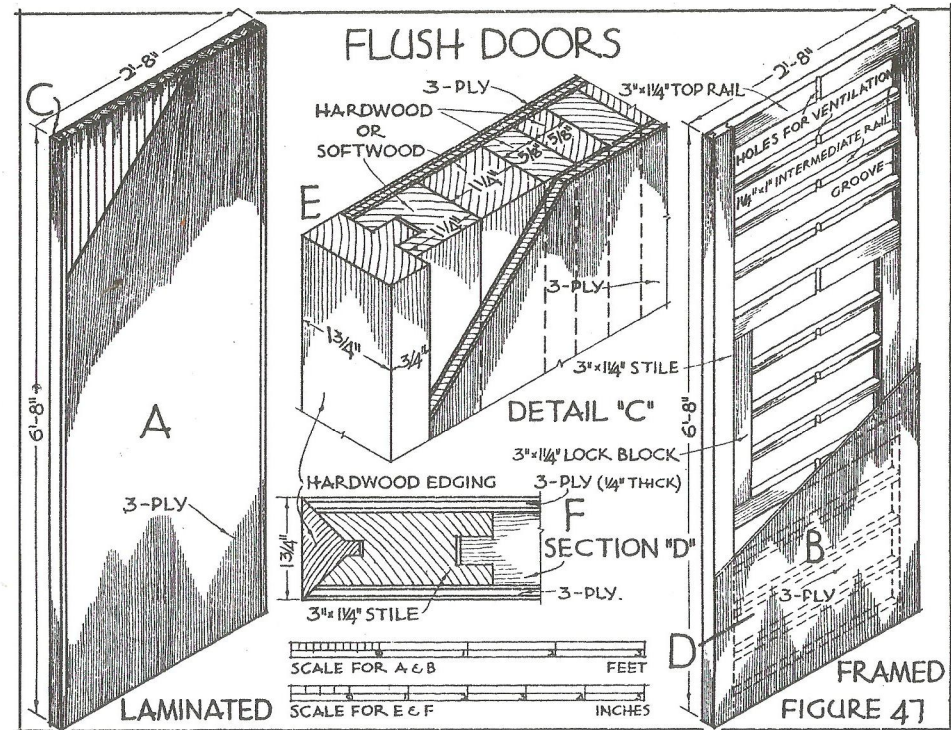
Hardware.—That for this door may be as previously described. If provision is required (for purposes of ventilation, etc.) to enable the door to be kept slightly open and yet secure from unauthorized entry from the outside, then a *door chain* as shown at v, Fig. 45, may be fixed on the inside. This fitting may be either of malleable iron, brass or bronze. The plate to which the slotted shoot is attached is screwed in a horizontal position to the inside face of the door, and the staple to which the chain is fastened is screwed to the post. The free end of the chain is in the form of a stud which may be inserted in the slot at the end farthest from the staple only when the door is closed. The door may be opened to a maximum of 4 or 5-in., when the stud is passed along the slot, and the stud cannot be removed from the outside.

(e) **PANELLED DOOR** (see Figs. 48, 50, 51, 52 and 54).—A panelled door consists of a framing or rim which is grooved on the inside edges to receive one or more panels.

Within recent years a new type of door has been developed called the *flush door*.¹ Two of the many varieties of flush door are shown in Fig. 47. That

¹ An extended description is given on pp. 68, 70 and 71. Vol. III.

at A is called a *laminated flush door* and consists of a core of strips of wood glued together under great pressure and faced on each side by a sheet of three thin layers or *veneers* of wood, called *plywood* (see p. 95), which is also glued under pressure to the core. Sheets of plywood can be obtained up to 8-ft. in width, and therefore a flush door has the appearance of a single panel. As shown at E, the core consists of $1\frac{1}{4}$ -in. wide softwood strips or $\frac{5}{8}$ -in. wide hardwood strips. These strips are arranged with the grain alternating, as shown; this reduces



shrinkage and distortion. A hardwood edging is fixed to cover the core and the edges of the plywood; this prevents the latter from being damaged, particularly at the striking edge. A laminated flush door is heavy and requires much material, and another type, called a *framed flush door* (see B, Fig. 47), has been evolved and is extensively used. It consists of a wood frame comprising stiles, top and bottom rails, and thin intermediate rails, and this frame is covered on both sides by sheets of plywood. The 3-in. deep top and bottom rails are tenoned to the stiles, and the thin (1-in.) intermediate rails are stub-tenoned to the stiles. The joints of the framing are glued and cramped, and the plywood sheets are glued to the framing under great pressure. Lock blocks are provided