

or *haunchion*, and its object is to increase the strength of the tenon at its root and prevent twisting of the post. The stub mortice made to receive the haunch is called the *haunching*. Note, the horns are not removed until the wedging has been completed, otherwise the driving in of the wedges would split the narrow portion of the head above the haunch.

(c) *Draw Pinned Slot Mortice and Tenon Joint* (see K, Fig. 44).—This joint is sometimes used for large frames. The mortice is continued to the end of the head. A hole is bored through the *cheeks* (sides) of the mortice, the tenon of the post is inserted, a point J on a 45° line from the centre of the hole is pricked on the tenon, the post is removed, with J as centre a hole is bored through the tenon, the latter is again placed in correct position between the cheeks, and finally the dowel is glued and driven into the holes to draw the shoulders of the joint together and the side of the tenon against the inner end of the mortice.

This is a good joint for external work for the following reason: Glue may soften if water gains access to it,¹ and in order to make the joints of external framing water-tight and durable it is customary to use paint composed of a mixture of red lead, white lead and boiled linseed oil as a jointing material instead of glue. As wedges set in paint are apt to become loose and fall out, they are sometimes dispensed with and the draw pinned joint adopted.

(d) *Double Tenon Joint* (see K, Fig. 46).—This joint, which consists of double tenons, is usefully employed between members of large size, it being more effective than a single tenon in bringing the shoulders of the tenon tight up against the adjacent member. The combined thickness of a pair of single tenons should equal that of a single tenon.

A temporary piece of wood is nailed across the lower ends of the posts to prevent distortion of the frame before it has been finally fixed in position.

METHODS OF FIXING FRAMES.—A door frame may be fixed in position either (a) during the construction of the walling, or (b) after the walling has been completed.

(a) Such frames are said to be *built-in*. When the brickwork (or masonry) has been built to ground-floor level, the door is placed in position according to the plan, plumbed, and maintained temporarily in this position by an inclined strut (nailed to a joist and to the head). The brickwork is now proceeded with, the jambs being constructed close to the posts of the frame. Creosoted wood slips or *pallets* (see H and Q, Fig. 44) are built in *dry* at the bed joints of each jamb at about 2-ft. intervals with one near the foot and one near the head. The weight of the brickwork makes these pallets secure. Nails are driven through the posts into the pallets after the heads (which may have splayed horns) have been bonded in and there is no likelihood of disturbing the newly built walling. Wrought iron straps (see P) are occasionally used instead of pallets; these straps are screwed to the posts in positions which will coincide with the bed joints of the brickwork, when they are well bedded in mortar.

This is a common method of fixing frames. It is not adopted in first class work as the frame is liable to be damaged during building operations and lime,

¹ This does not apply to "waterproof glue," which is now available.

etc. is apt to stain it. The arrises of the frame may be protected by lightly nailing wood strips to it. Frames are bedded in mortar as the jambs are being constructed and afterwards pointed in *mastic* (a mixture of red lead and linseed oil) to exclude rain and draughts.

External woodwork should be *primed* before being fixed. Priming is the first coat of paint which is applied to the timber.

(b) The second method of fixing frames, and one which is adopted in better-class work, consists of plugging (see p. 72) the bed joints of the brick or stone jambs after the whole of the brickwork has thoroughly set. The 3 or 4-in. deep holes to receive the plugs are formed with the *plugging chisel* (see 38, Fig. 67) and hammer at 2-ft. intervals (see above), the hardwood plugs (see F, Fig. 51) are driven in with their projecting edges cut off to a vertical plane (a plumb-line being used for this purpose) so that the clear distance between the plugs in opposite jambs equals the overall width of the frame. The frame is then placed in position and securely nailed to the plugs and to the lintel. The fixing of the frames is deferred until the building is nearing completion in order to minimise the risk of damage to the woodwork. They are well bedded in mortar and pointed in mastic as before described.

Additional rigidity is given to the frame if a $\frac{3}{4}$ or 1-in. square or $\frac{1}{2}$ -in. diameter round galvanised wrought iron dowel, 2 to 3-in. long, is partly driven into the bottom end of each post before fixing. The projecting ends are inserted in mortices cut in the step and secured with red lead mastic or grouted cement (see A and R, Fig. 44). Alternatively, hollow cast iron shoes may be adopted (see L, Fig. 46 and p. 92).

CLASSIFICATION OF DOORS.—The following types of doors will be described: (a) ledged and battened, (b) ledged, braced and battened, (c) framed, ledged and battened, (d) framed, ledged, braced and battened, and (e) panelled.

Sizes.—The sizes of doors vary considerably, the following standard sizes being in greatest demand: 6-ft. by 2-ft., 6-ft. 4-in. by 2-ft. 4-in., 6-ft. 6-in. by 2-ft. 4-in., 6-ft. 6-in. by 2-ft. 6-in., 6-ft. 6-in. by 2-ft. 8-in., 6-ft. 8-in. by 2-ft. 8-in., 6-ft. 10-in. by 2-ft. 10-in. and 7-ft. by 3-ft.

In accordance with tradition, the proportions of an internal door of a house are based upon the height of the room, the height of the door being equal to one quarter the height of the room plus 4½-ft. and the width being equal to the height of the door less 4-ft. A satisfactory size of door for the modern drawing or dining room is 6-ft. 8-in. by 2-ft. 8-in., and that for bedrooms, box-rooms, larders, water-closets, etc., is 6-ft. 6-in. by 2-ft. 6-in. External doors should be larger than internal doors in order that they may conform with the scale of the building, and those of a house are often 7-ft. by 3-ft.

(a) LEDGED AND BATTENED DOOR (see A, B and C, Fig. 44).—This consists of vertical boards or *battens* which are secured to horizontal pieces called *ledges*. The boards vary from 4 to 7-in. (nominal) wide and $\frac{3}{4}$ to 1½-in. thick. Those in "narrow widths" give a more satisfactory appearance if the door is small, and the shrinkage which occurs is correspondingly reduced. Four forms of joints between boards (known as *match-boarding*) which are adopted are shown at