

at C except that the packing pieces would be indicated by broken lines at each bolt, as shown at J.

The ends of the lintels have a 6-in. wall-hold and are bedded on mortar so as to ensure a level and firm bearing. Lintels afford a ready means of securing the heads of door and window frames (see p. 100).

Brick Lintels.—As is implied, a brick lintel is a horizontal member consisting of bricks which are generally laid on end and occasionally on edge. It is a relatively weak form of construction and is quite unsuited to support heavy loads. They should therefore be used to span small openings only (unless they are to receive additional support as explained later) and the span should not exceed 3-ft.

In recent years this type of lintel has been used extensively, and failures have occurred either because adequate precautions have not been taken in their construction or the spans have exceeded a reasonable limit. A common failure is due to shear along the vertical joints which results in one or more bricks dropping below the normal level.

A section and part elevation of a brick lintel are shown at A and B, Fig. 12. Cement mortar should be used, and pressed bricks having a frog on each bed are better than wire-cuts. The term *joggled brick lintel* is sometimes applied to this type when bricks having frogs are used, the joggle or notch being formed by the widened joint at each frog; the joggle assists in resisting the sliding or shearing action to which the lintel is subjected.

The lintel is constructed on a temporary wood support known as a turning piece (see p. 83); mortar is spread over the lower, back and front edges of each brick before being placed in position; when all of the bricks have been laid, grout (see p. 2) is poured through the holes which have previously been formed at the top until each frog is completely filled with the liquid mortar; M, Fig. 12, shows a section through a brick-on-end lintel with the frog and the hole at the top indicated by broken lines. If grouting is not adopted care must be taken to ensure that the joints are properly filled and flushed with mortar.

The depth of the lintel depends upon the size of the opening and the appearance required; it varies from 4½ to 9-in. For the sake of appearance it is essential that the top of the lintel shall coincide with a horizontal joint of the general walling (see A and G, Fig. 12), otherwise a partial course of brickwork would be required between the top of the lintel and the bed joint of the wall above it; *such a split course is most unsightly*. A common depth is that which is equal to two courses of the adjoining brickwork (see G); one end of each brick is carefully removed (usually with a hammer and bolster—see 35, Fig. 19) and the bricks are placed in position with the cut ends uppermost; the grouting operation is facilitated as the frogs are exposed at the top.

An alternative method of forming the two ends of a brick lintel, and one which has a somewhat stronger appearance, is shown at F in the elevation A, Fig. 12.

Brick lintels are sometimes known as “soldier arches,” presumably because of the upright appearance of the bricks. This is a misnomer, for such does not

comply with the requirements of a true arch as defined on p. 22. Incidentally great care should be taken to ensure that each brick is placed absolutely vertical as the appearance is spoilt if one or two of them show a departure from the vertical, however slight. Examples of such an “arch” are shown at A, Fig. 46, and B, Fig. 56.

Supports for Brick Lintels.—Additional support must be provided if a brick lintel is required for a greater span than 3-ft. Alternative methods of such reinforcement are shown in section at K, L, M and N, Fig. 12. At K a 3-in. by ¾-in. steel flat bar (see Fig. 77), having a 6-in. bearing at each end, is used. For spans exceeding 6-ft. it is recommended that one of the following should be used: (a) a steel angle (see Fig. 77) having 6-in. bearings as shown at L and in detail W, Fig. 56, or (b) purpose-made bricks supported by a reinforced concrete lintel as indicated at N or (c) a reinforced brick lintel which is illustrated at M. The latter consists of a ¾-in. diameter steel rod which is threaded through the bricks before they have been grouted; each end of the rod is bedded 6-in. into the wall; the bricks used for this purpose are holed during the moulding process before being burnt, the centre of each hole being approximately 1½-in. from the underside of the lintel. The exposed surfaces of the above flat bar and angle may be rendered inconspicuous by painting them to conform with the colours of the bricks; alternatively they may be completely covered by the door and window frames; the soffit or underside of the concrete lintel at N between the brick lintel and the door frame may be covered by bedding ½-in. thick tiles to the concrete as shown.

It is a common practice for small spans to bed brick lintels directly upon the heads of the door and window frames; such frames should be set back for not more than 1-in. from the external face of the wall (see C, Fig. 46).

Stone Lintels or Heads.—These are rectangular blocks of stone of varying thickness and depth; the latter should be at least 9-in. It should course with the adjacent brickwork as shown at O, Fig. 12. Additional examples are shown in Figs. 22, 24, 60 and 63.

Concrete Lintels.—A suitable mix of concrete consists of 1 part Portland cement, 2 parts sand and 4 parts gravel or broken brick or stone of ¾-in. gauge. The lintel may be cast *in situ* (in position) or precast (formed and allowed to set before being fixed); the former is cast in a wood mould (with 1¼ to 1½-in. thick bottom and sides) which is removed when the concrete has set. The precast method is more often employed as the lintels can be formed in the wood moulds well in advance to allow them being sufficiently matured for fixing when required and the construction of the walling above them may be continued immediately after fixing. As concrete is comparatively weak in tension, the use of plain concrete lintels should be limited to spans not exceeding 3-ft., otherwise failures may occur which are usually due to shear and which may produce fractures such as that indicated by the broken line U at Q, Fig. 12. If this span is to be exceeded, the lintel must be strengthened by using mild steel bars or some other form of steel reinforcement. A simple type of reinforced concrete