

plate (when the lock is of the mortice type—see H), and the lever stump now occupies the upper portion of the recess L when the levers have rotated downwards. To unlock the door, the operations are reversed, the key forces the levers upwards and the bolt into the lock in the direction of arrow "1," whilst the lever stump passes from recess L to the upper portion of recess K after the levers have dropped.

(2) The latch bolt is operated either by the handle or by the action of the bevelled end of the bolt upon the staple or bent "lug" of the striking plate (see H) when the door is being closed. The handles usually consist of two knobs, one of which is permanently fixed to one end of a steel *slotted spindle* and the other is loose. The spindle is passed through a *rose plate* (which is screwed to the face of the door) and through the bush and *follower* of the lock (see X). There are various devices for securing the opposite or "loose" knob, an effective one being shown at J' and X' and consists of a small metal *key* which is pivoted by a countersunk screw let into the end of the loose knob; the second rose plate is passed over the projecting end of the spindle, the loose knob is fitted over it and pressed against the rose plate until the latter is brought tightly up against the face of the door, when the key is then dropped into one of the slots in the spindle; each rose plate is now screwed to the door to make the handles secure. Observe at J that one of the *feather springs* acts upon one end of the latch bolt and this causes the opposite end to protrude. The follower acts upon the *crank roller*; the latter is fitted to the *crank* which is pivoted at the *crank stump* at one end and the other end bears upon a projection on the end of the latch bolt. To open the door when the lock bolt is disengaged, the handle is turned to cause the follower to bear upon the crank roller which in turn causes the crank to rotate and operate upon the latch bolt and move it horizontally in the direction of arrow "2" until it is clear of the striking plate. When the knob is released the feather springs force the crank and bolt to assume their original positions.

A further reference to mortice locks is made on p. 103.

(c) FRAMED, LEDGED AND BATTENED DOOR.—This is similar to type (d), described below, with the exception that the braces are omitted. The door tends to become distorted because of the absence of the braces, and it is in little demand for this reason.

(d) FRAMED, LEDGED, BRACED AND BATTENED DOOR (see A, B, C and D), Fig. 46. This is superior to any of the foregoing types and consists of a framing (which must not be confused with the door frame) strengthened by ledges, braces and battens. The framework consists of a *top rail* which is morticed and tenoned into two vertical members called *stiles* or *styles*. The *middle* and *bottom rails* or ledges are morticed and tenoned into the stiles and the braces are either housed into the rails at about 1½-in. from the stiles (see B) or are taken into the corners and tenoned into the stiles (see A). The former is the stronger construction, although the method shown at A is often adopted because of its better appearance. *These braces must incline upwards from the hanging post* (see p. 90). The battens may be jointed as explained on p. 88, where reference is made to the joints shown at S and T, Fig. 46. The upper ends of the battens are let into the top rail (see section VV at M), the side battens are tongued into the stiles (see S and T) and the lower ends of the battens *completely cover the bottom rail*¹ as shown at A, B and C.

Details of the various joints are shown in Fig. 46. That at K shows the joint between the post and head of the large (5-in. by 4-in.) frame. It is

¹ The practice, sometimes adopted, of making the bottom rail the same thickness as the framing and letting the lower ends of the battens into it is unsound, for water will lodge on the rail and rot both it and the bottom of the battens.

double-tenoned to ensure a tight fit at the shoulders (see p. 87). M shows the haunched tenon joint between the top rail and the stile, and the housing of the brace as indicated at G.

The middle rail has a *pair of single tenons*¹ and is notched to receive the lower end of the top brace (see N) and the top end of the lower brace. As the rail is comparatively thin, it is not advisable to form these tenons as previously described, but rather to make them flush with one face, when they are called *barefaced tenons*.

The bottom rail has also a pair of single barefaced tenons (see O). The lower tenon may be haunched like that shown at M.

The tenons are dowelled or pinned, in addition to being wedged. These dowels are of hardwood and are from ¾ to ½-in. diameter (see M, N and O). One is inserted through each tenon and at a distance from the shoulders of at least twice the diameter of the dowel to prevent the wood from splitting when the pin is driven in.

The framed, ledged, braced and battened door is a very suitable type for external use and it is particularly suited for factories, warehouses, farm buildings and buildings in which the doors are subjected to rough treatment. That shown in Fig. 46 is typical of the type used for farms. The figure also includes a portion of the roof details.

Preparation of Door.—The sequence of operations in framing this door are briefly: The rails are fitted loosely into the stiles, the braces are placed in position, the battens are accurately fitted and slipped into the grooves of the stiles and top rail, the tenons are wedged and pinned (a cramp being used as described on p. 106 to tighten up the joints), and the battens are nailed to the rails and braces.

The door frame should be securely fixed as explained on p. 87. The feet are shown secured by dowels. Alternatively the door posts may be fitted with *cast iron shoes* (see L). These provide a good method of fixing and also protect the lower ends of the posts from damage such as may be caused in factories, farmsteads and similar buildings. The ends of the posts are shaped, painted and fitted tightly into the shoes which are then screwed to the posts. The frame is now fixed with the dowels let into the mortices previously formed in the step and run in with lead or cement.

Hanging and Fastening of Door.—Heavy wrought iron Scotch T-hinges are sometimes used for hanging this type of door (see p. 88). Alternatively, ¼-in. thick wrought iron *strap hinges* or *bands and gudgeon hooks* are used for this purpose, especially for large doors (see P, Fig. 46). One end of the strap is bent to form an eye. Two straps are required and are secured by ¾ or ½-in. diameter bolts which are passed through the rails and battens. The door is

¹ These are sometimes called "double tenons," although this description is not quite correct. A double tenon joint (as shown at K, Fig. 46) has both tenons in the *thickness* of the member, whilst a member having a pair of single tenons has both tenons formed in its *width*.