

as shown at B for the insertion of a mortice lock. An alternative form of hardwood edging to that at E is shown in the detail F. The finished thickness of both types of door is  $1\frac{3}{4}$ -in.

**TYPES OF PANELLED DOORS.**—Several designs of panelled doors are shown at A to H (inclusive), Fig. 48. The members of the frame not already mentioned include the *muntin*, which, at C, is the short vertical piece between the bottom and middle rails. Note in every case: (1) the stiles are continuous from top to bottom, (2) the top, bottom, middle and intermediate rails are joined to the stiles and (3) the muntins are joined to the rails (see later).

The nominal thickness of the framing may be  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ ,  $1\frac{3}{4}$  or 2-in., depending upon (1) the size of door, (2) the situation (external doors are usually thicker than those fixed internally), (3) the type of lock to be used (a minimum thickness of  $1\frac{1}{2}$ -in. is necessary for mortice locks), (4) the thickness of the panels and (5) the size of the panel mouldings.

The panels may be *solid* (as shown at J, R and V, Fig. 48) or they may consist of *laminated wood*<sup>1</sup> such as plywood and laminboard (see N and A', Fig. 48). The minimum thickness of solid panels is  $\frac{1}{2}$ -in. (nominal), whereas that of plywood consisting of three veneers (termed "3-ply") is from  $\frac{3}{8}$  to  $\frac{1}{4}$ -in.

**Treatment of Panels.**—The finishes which may be applied to panels are many and varied. The panels may be finished with simple or intricate mouldings, or they may be left plain without mouldings. Elaborate mouldings may harbour dust and are difficult to keep clean. They may be expensive to produce, especially if mitred by hand (see later). As will be explained, most doors are now machine-made, and in their manufacture it is the aim to eliminate as far as possible labours performed by hand.

The following are the various panel finishes:—

**Square.**—No mouldings are provided, the edges of the framing next to the panels being left square (see J and K, Fig. 48, and D, Fig. 54); J shows the corner slightly rounded by sand-papering and is called "pencil-rounded." The panels are known as *square sunk* or *flat* (see E, F and H, Fig. 48). Chamfered edges, as shown at L and M, are an alternative. These finishes are much in evidence, and, provided the panels are well proportioned, such simple treatment has much to commend it.

**Solid or Stuck Moulding.**—The mouldings are "stuck" (meaning "worked") on the edges of the framing. Various examples are shown at L to Y (inclusive), Fig. 48. Note that in most cases the width of each mould is equal to the depth

<sup>1</sup> A detailed description of the manufacture and uses of plywood and similar veneered products is given in Vol. III. Briefly, plywood consists of three or more thin sheets of wood which have been carefully dried, glued, pressed and trimmed off. Columbian pine, birch, oak and maple are some of the timbers used. Round logs are cut into from 5 to 8-ft. lengths, steamed, and subsequently each is placed horizontally into a machine called a *rotary veneer cutter* which grips it at the ends. The machine rotates the log against the edge of a long knife which extends the full width of the machine and cuts the timber into a continuous sheet.

of the groove prepared to receive the panel (see the broken lines at R, S and Y); the operations of moulding and framing by machinery are simplified when this is observed.

The joints at the angles of solid mouldings are *scribed* to give 45° mitres or intersections. Scribing is the shaping of a moulding which is required to fit against a similar but continuous moulding. This is illustrated at C and D, Fig. 49, which shows a bottom (or intermediate) rail scribed to a stile. The latter has an ovolo (or quadrant) mould worked on it for its entire length and the shoulders of the rail are hollowed out to fit accurately over the ovolo mould on the stile. This is shown clearly on the plan at C which indicates the shaped end of the rail separated from the stile; this results in a 45° mitre as shown at D and E. This mould and the solid mouldings shown at L to U (inclusive), Fig. 48, can be machine-scribed and are therefore comparatively inexpensive; whereas those at V to Y (inclusive) can only be mitred by hand and are accordingly expensive.

**Planted Moulding.**—These are separate mouldings which are "planted" round the panels adjacent to the framing. Examples of these are shown at A', B', C' and D', Fig. 48. The mouldings are nailed to the framing and the *nails must not pass through the panels*, otherwise the panels will crack owing to the internal stresses set up when the timber shrinks. It is important to allow for the free movement of the panels (when the wood shrinks or expands) and there should be a space of from  $\frac{1}{16}$  to  $\frac{1}{8}$ -in. between each edge of the panel and the groove; the clearance in each of the examples shown in Fig. 48 is  $\frac{1}{16}$ -in. "Panel pins" (see F, Fig. 66) are used for fixing these moulds, as the small heads are inconspicuous and cause the minimum damage to the mouldings.

Planted moulds are formed with *mitred joints* at the angles (see A and B, Fig. 49), each adjacent end of the moulding being cut at an angle of 45°.

Planted mouldings which finish level with the face of the framing are called *flush mouldings* (see L, Fig. 51). Those which project beyond the face of the framing are called *bolection mouldings* (see F', G' and H', Fig. 48, P, Fig. 50, and K, Fig. 52); these are usually rebated over the edges of the framing to cover any shrinkage which may take place.

Occasionally the panels are made with one face flush with the framing; these are termed *flush panels* (see C, Fig. 48). A bead (see E') is usually formed on the vertical edges of the panel to render less conspicuous any openings which may occur if the panels shrink; these are called *bead butt panels* (C). If in addition a similar bead is worked on the horizontal edges of the panel, such are called *bead flush panels*.

**Raised Panels.**—The central portion of the panel is thicker than the edges or margin. That at H', Fig. 48, shows the panel chamfered from the edge of the moulding to leave a flat or "fielded" central portion; such is called a *raised and flat* or *raised and fielded* panel. That at P, Fig. 50, is known as a *raised, sunk and fielded* panel. Sometimes the edges of the sinking next to the central flat portion is moulded, when the panel is said to be *raised, sunk and moulded*.