

this, the metal windows are fixed in wood frames the total cost exceeds that of ordinary wood casements with frames. Unless steel windows have been rust-proofed, they corrode very rapidly and assume an ugly appearance because of the resulting damaged paintwork. Improper fixing of the glass will cause the lower rail of the sash to jam on the bottom of the frame, and a strained sash will result in the development of leaks between it and the frame.

Some standard heights and widths of metal windows are given in Fig. 28. These are the overall sizes of the frames, as indicated in B and C. These units can be coupled together to form composite windows of large size having metal mullions, transomes, etc. Such a window may also consist of several standard metal frames and sashes fixed in a wood surround with wood mullions and, if required, wood transomes. There are also special types of metal windows suitable for schools, hospitals, commercial buildings, etc. These, together with leaded lights and metal doors, are detailed in Vol. IV.

STAIRS

The materials used in the construction of stairs are stone, steel, wrought iron, cast iron, reinforced concrete, reinforced brickwork, and wood. The former type has been detailed in Chapter III, Vol. II, and the latter will be considered here.

A stair is a set of steps leading from one floor to another. A continuous series of steps forms a flight, and there may be two or more flights, separated by flat portions called landings, between two floors. A stair, together with the part of the building accommodating it, is known as the staircase. The horizontal portion of a step, called a tread, is usually connected to a vertical riser and these are supported by inclined boards termed strings.

TERMS.—The following definitions of terms are arranged in alphabetical order for ready reference. Some of them are amplified in later paragraphs.

Apron, Apron Lining or Fascia (see G, Fig. 32, and C, G, M and N, Fig. 36) is a board which covers the trimmer, etc. joist of a landing, providing a suitable finish to it and the adjacent plaster.

Balusters (see Figs. 29, 32, 33, 34, 36 and 38) are short vertical bars which support the handrail and protect the open side or sides of a stair.

Balustrade or Banister.—An *open* balustrade comprises the balusters, handrail, string and newels (if any) (see Figs. 29, 32, 33, 34 and 36). A *solid* balustrade consists of panelling in lieu of balusters (see M, Fig. 29, Fig. 35, H and O, Fig. 36 and Fig. 37).

Bearers.—Inclined 4-in. by 2-in. or 4-in. by 3-in. members which support the steps and to which the laths of a plastered soffit are nailed. Those which serve as intermediate supports are also called *carriage-pieces, rough carriages, rough strings* (as they are not dressed) or *spring-trees* (see Figs. 30, 31, 32, 36 and 38). The short supporting members placed immediately below winders (see p. 80 and Fig. 38) are also called bearers.

Blocks are fixed to the upper edges of bearers and provide additional support to the treads (see Fig. 38). The term is also applied to the small pieces of wood of triangular section which are glued to the inner angles between treads and risers or strings (see F, Fig. 30, Figs. 31, 32, etc.).

Brackets or Rough Brackets are more commonly employed and serve the same purpose as blocks, the 1-in. thick pieces of wood being nailed alternately to the sides of the bearers (see Figs. 30, 31, 32 and 36).

Bull-nosed Step.—See "Steps."

Caps.—See "Newels."

Cappings are cover mouldings planted on the upper edges of strings (see F, Fig. 32, and J and K, Fig. 34), handrails (see D, Fig. 35), panelling (see B and C, Fig. 35) and newels.

Carriages.—See "Bearers."

Commode Step.—See "Steps."

Cover Fillets are small members fixed to the underside of outer strings and trimmers to provide a satisfactory finish to the adjacent plaster (see G, Fig. 32, N, Fig. 34 and M and N, Fig. 36).

Curtail Step.—See "Steps."

Dancing or Balancing Steps.—See "Steps."

Dog-leg Stair.—See p. 87.

Drop.—See "Newels."

Easing is a curved upper portion connecting two strings of different inclinations or a string with a skirting (see C, Fig. 30 and B and G, Fig. 38).

Flier.—See "Steps."

Flight.—A continuous set of steps extending from floor to floor, or floor to landing, or landing to landing.

Going or Run of a step is the horizontal distance between the faces of two consecutive risers (see F, Fig. 30, D, Fig. 31 and F, Fig. 32) and the going of a flight is the horizontal distance between the face of the bottom riser of the flight and that of the top riser.

Handrails, provided to afford assistance and a safeguard, are fixed at a convenient height to walls (see C, H and J, Fig. 30) or at the top of balustrades (see Figs. 32, 33, 34, 35, 36, 37 and F, Fig. 39); they should be of a satisfactory size and shape to enable them being easily grasped by the hand; of the many designs, the simple *mop-stick handrail* illustrated at F, Fig. 39, is one of the most effective.

Headroom is the height measured vertically from the line of nosings (see p. 79) to the lower outer edge of the apron (see C, Fig. 30) or to the soffit of a flight immediately above it. This should not be less than 6-ft. 6-in.

Landing is a platform between two flights provided to serve as a rest and, when required, to make effective provision for turning a stair; it also denotes the portion of the floor adjacent to the top of a stair. A *quarter-space landing* is one on which a quarter-turn has to be made between the end of one flight and the beginning of the next (see Figs. 29, 36 and 37). If the landing extends far