

Owing to the restricted width available, the straight flight stair shown is the only type which can be adopted; an excess in the preferred maximum number of steps in a flight (see requirement 5, p. 80) is unavoidable. Useful storage accommodation is afforded when, as shown, the space under the stairs is utilized as a cupboard. The foot and head of the stair are approximately 1-ft. from the living-room and bedroom No. 1 doors respectively (see requirement 10, p. 82).

Enlarged plan, longitudinal and cross-sectional elevations of the stair are shown at D, C and E.

CONSTRUCTION OF STEPS.—Owing to the limited going of the flight, the minimum width of tread (9-in. going¹, see p. 82) has been adopted, and it will be seen that only fourteen steps can be provided if requirement 10 is complied with. As the height from floor to floor is 8-ft. 9-in. (see C), the rise of step equals $\frac{8\text{-ft. } 9\text{-in.}}{14} = 7\frac{1}{2}\text{-in.}$ This proportion of step agrees with rule 1, *i.e.*, 9-in. + (2 × 7½-in.) = 24-in.

The nominal thickness of the treads should not be less than 1¼-in.² and that of the risers is usually 1-in. The enlarged detail at F shows one good method of connecting the treads to the risers, both edges of the latter being tongued into the grooved treads and screwed (preferably) as shown, or nailed. The nosing, as previously explained (p. 82), should not project more than the thickness of the tread. This simple nosing—the square edges are just sand-papered—is all that is necessary for this type of stair; if the stair, having nosings as shown, is not to be carpeted, it is advisable for the treads to be of hardwood (such as teak or oak) and not softwood, as the edges are apt to be damaged; incidentally, as felt pads are usually used to protect a carpet, such relatively sharp upper edges do not damage a carpet. Another good method of jointing treads and risers is shown at E, Fig. 35, where the treads are tongued at their inner edges into the risers; this also shows an alternative simple nosing. Another nosing is shown at D, Fig. 31, a scotia or cavetto mould being used; as this moulding is fitted into the grooved tread, there is no need for the riser to be tongued; alternatively, the top outer edge of the riser is tongued to fit the grooved tread, and the moulding is just glued and sprigged to the tread. A common nosing is the half-round, such as is indicated in Fig. 39. A cheap and second-rate method of jointing is shown at P, Fig. 30; here the members are just butt-jointed and nailed together, hence any shrinkage of the risers and especially the treads, results in unsightly gaps occurring through which dust passes.

The treads and risers are supported by two 14-in. by 1½-in. wall strings which are securely plugged to the walls (see C, D, E and detail at G). A 2 to 3-in. wide margin is provided and, as shown at G, the upper edge of the string is rounded and rebated to provide a simple but effective finish between it and the

¹ This 9-in. going has also been adopted in most of the illustrated examples on account of the restricted size of drawing sheet.

² Wood treads of stairs for offices, etc., subjected to heavy traffic are sometimes 1½ to 2-in. thick.

plaster. As the width of the stair is 3-ft., it is desirable to use an intermediate support in the form of a 4-in. by 3-in. (or 2-in.) bearer or carriage-piece; this is birdsmouth notched and nailed to a short fillet at the foot (or it may be continued through the floor and notched to a deep conveniently placed floor joist) and similarly secured to the wall plate at the head. In order that the carriage-piece may afford the maximum support, 1-in. thick short pieces of wood (often pieces of floor board), called *rough brackets*, and shaped as shown at C, are nailed to the sides with their upper edges cut square and brought tightly up to the underside of the treads to which they are nailed; these brackets are fixed alternately to the bearer as shown (see also C, Fig. 31). As an alternative to these brackets, triangular blocks are nailed on the upper edge of the carriage as shown at A and G, Fig. 38. In the illustrated examples, the inner edges of the treads or risers (depending upon the type of joint) are shown resting upon the carriages, but sometimes the latter are slightly notched to receive the steps.

In addition to strengthening a stair, these carriage-pieces serve as an intermediate fixing for the laths when, as in this case, the soffit is to be plastered (see C and E). It is a common practice, especially in inferior work, to omit these intermediate bearers, even when the width of the stair is 3-ft., and as a result the stairs creak owing to the deflection, and defects in the plaster arise.³

The wall strings are shown to be 14-in. by 1½-in. (see C). This width is necessary if the soffit is plastered and the laths are to be nailed to the lower edges of the string (see E). An alternative form of construction is shown at A, B and C, Fig. 31, where narrower strings (11-in. or 10-in. by 1½-in.) are employed, together with two additional 4-in. by 2-in. bearers. These narrow strings, without the two additional bearers are adequate if the soffit is not plastered.

The ends of the treads and risers are housed into the wall strings, the amount of housing varying from ¾ to ⅝-in.—usually ½-in. (see G, Fig. 30). The grooves, trenches or housings to receive these ends are tapered and are of sufficient width to permit of the insertion of tapered wedges, preferably of hardwood. These wedges (see L, Fig. 31), after being dipped in glue, are driven in from the back. The tread wedges thus bring the treads tightly against the upper cuts of the housings, and the riser wedges cause the faces of the risers to fit tight against the outer vertical housing (see G, Fig. 30, C, D and H, Fig. 31, F, Fig. 32, etc.).

Additional rigidity is obtained by the provision of small triangular blocks, termed *glue blocks*, which are glued in at the inner angles formed between the treads and risers. These are spaced at 3 or 4-in. apart (see C, F and G, Fig. 30, and A, B, C and D, Fig. 31, etc.). They are also glued to the strings and treads, and occasionally at the angles between the risers and the strings.

The construction of the upper floor at the landing is shown at C, D and E. The ends of the joists being supported on a wall plate. The 1¼-in. thick nosing

³ If no intermediate bearer is provided and the soffit is to be plastered, the laths are not fixed transversely but are parallel to the pitch and are nailed direct to the inner edges of the steps, as shown by broken lines in Fig. 33.