

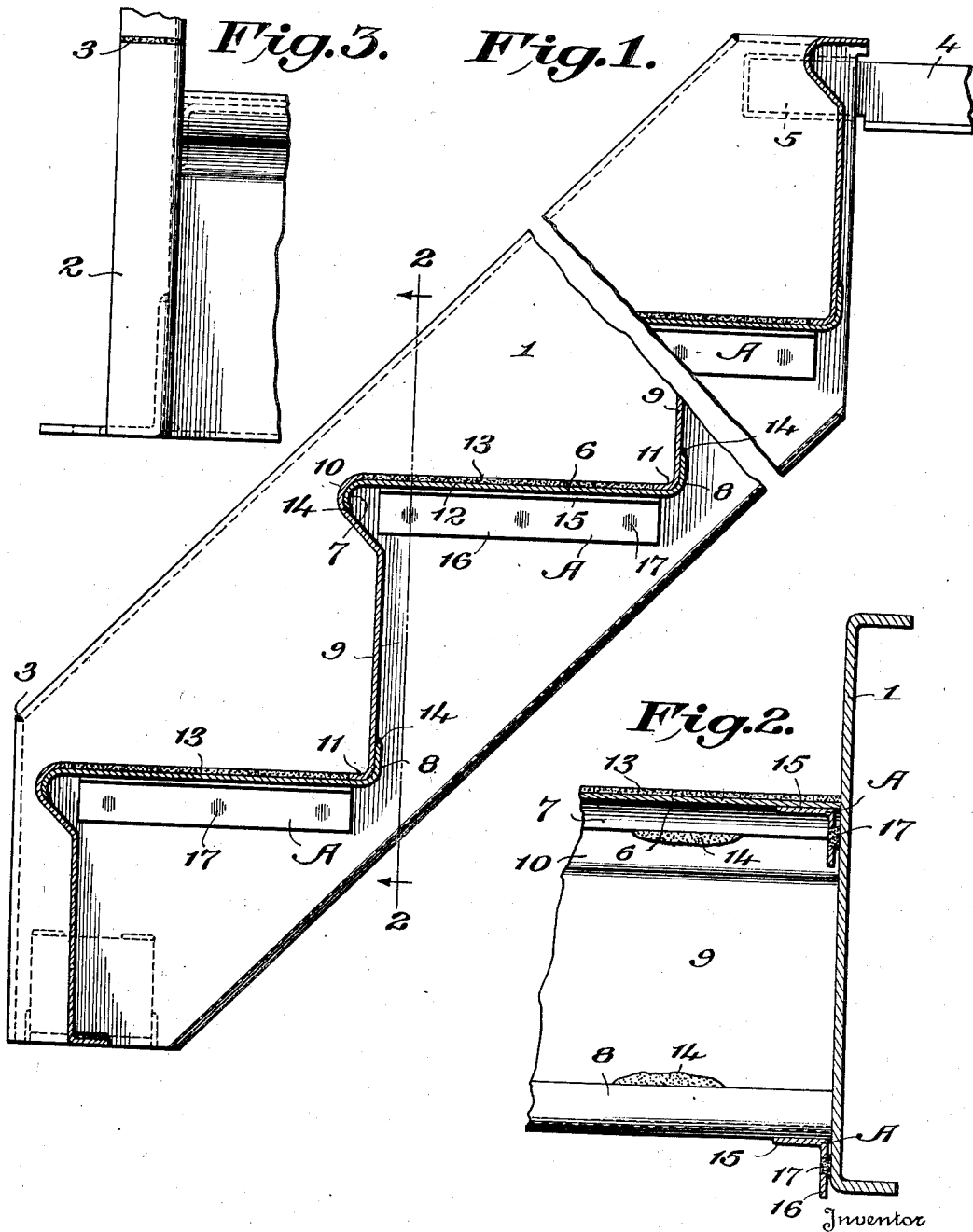
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METAL STAIRCASE

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METAL STAIRCASE

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4 Claims. (Cl. 189—43)

This invention relates to metal staircases of the type used in homes or industrial buildings, on shipboard or other places where a strong and durable fireproof stairway is required.

Primarily the present invention provides a rigid and stable metal staircase wherein the tread members of the steps carry angle members whose vertical legs are suitably spaced from the stringers and secured thereto by a plug weld, which shrinks upon cooling and draws the said vertical flange or leg toward the stringer to thus unite the steps including the treads with the stringers under tension.

A further object of the invention is to provide tread members having front and rear edge portions which mate or nest with complementary parts with the riser sections and which also cooperate to provide a recess or cavity for receiving a suitable tread material which may be renewed from time to time if desired. In that connection, the invention contemplates the use of tread members and riser sections which may be readily made by pressing, rolling or braking operations and readily assembled with facility to provide a stairway in which all of the parts are held together by welding.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawing in which:

Figure 1 is a partial vertical sectional view of a staircase embodying the present improvements.

Figure 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Figure 3 is a detail elevation of a portion of the lower step and the bottom end of the stringer.

Similar reference characters designate corresponding parts throughout the several figures of the drawing.

Referring to the drawing, it may be observed that the staircase includes opposite stringer members which are similar but opposite hand, and therefore only one of them is shown. These stringer members designated generally as 1 are preferably of channel formation as will be apparent from Figure 2, and the lower end thereof may be closed by a suitable flange 2 welded as at 3 to the upper flange of the stringer. The upper end of the stringer is provided with an

anchor or tie member 4 which is preferably of angular formation having one leg of the angle cut away as indicated at 5 and welded to the inside face of the stringer. The angular body 4 of the tie member may be provided with suitable openings to assist in anchoring the stringer to the upper floor of the building.

Each of the steps carried by the stringers comprises a tread member and a riser section. Referring first to the tread member it will be observed that the same includes a body portion 6 having an outwardly and downwardly curved front edge 7 and an upwardly directed heel flange 8. Each of the risers comprises a plate portion 9 provided at its upper edge with an outwardly and inwardly directed toe flange 10 which is curved on an arc of longer radius but having the same axis as the arc describing the flange 7 of the tread so that these parts may be nested together and the toe flange 10 of the riser masks the front flange of the tread. The lower edge of the riser 9 is formed with an outwardly directed flange 11. When the treads 6 and risers 9 are assembled to form a step, it will be observed from Figure 1, that the thickness of the metal of the risers, at the terminal edges of the flanges 10 and 11, provides a recess or cavity 12 for receiving suitable tread material 13 which may be a mastic composition, linoleum, rubber or any other desired tread material. The tread members 6 and the riser sections 9 are united by suitable welds 14 located at spaced intervals along the edges of the overlapped portions 8 and 9, respectively, of the treads and risers, and also along the inner edges of the nested flange portions 7 and 10 respectively of the treads and risers. In practice, the treads and risers forming the individual steps have their end portions in abutting relation with the vertical side walls of the stringers 1 and the completed steps are firmly and rigidly united with the stringers in the manner now to be described.

Referring to Figure 2 it will be observed that each of the tread members 6 is provided at its underside with an attaching member designated generally as A and including an upper flange portion 15 welded to the underside of the metallic tread 6 and a vertical flange 16 spaced inwardly of the edge of the tread so as not to come in contact with or engage the face of the stringers. In practice, the leg 16 of the angle member A is spaced approximately $\frac{1}{2}$ of an inch inwardly of the edge of the tread and the face of the stringer. It will be observed from Figures 1 and 2 the legs 16 of the angle members are

provided with suitable openings to receive the welding material 17. When the united treads and riser members forming the steps are clamped between the metallic stringers, the weld metal 5 17 is deposited by electric arc, oxy-acetylene or other welding method within the openings provided in flange 16. This molten weld metal fuses with the surface of stringer 1 and edge of opening in flange 16, thus forming a plug weld, usually 10 filling the hole. As the weld cools and shrinks the flange 16 of the member A will be drawn toward the stringer members and, thus, the edges of the treads and risers and the inner faces of the stringer members which abut will be firmly 15 and rigidly united under tension and thus stabilize the entire structure, and, at the same time, form a firm and tight union between the steps and the stringers. Although a plug weld has been shown and described, the same result may 20 be obtained by a rivet weld. In the latter case the stringer as well as the flange 16 are provided with pre-punched registering openings and when the welding is done, one side is backed up by a copper block and the finished job results in a 25 rivet of deposited metal which passes through both members instead of one.

From the foregoing it will be apparent that the present invention provides a simple and practical 30 staircase construction wherein the treads and risers are directly in surface contact at both the toe and heel of the tread, thereby obtaining the benefit of the reinforcing effect of closely nesting parts while at the same time providing a recess or trough for the tread material. Moreover, 35 when the treads and risers are united in step formation, they are rigidly united and connected under tension with the stringers in such a way as to form a drum tight connection therebetween.

We claim:

- 40 1. A staircase, including, in combination, metallic stringers, step units formed by interfitting metallic tread and riser sections having their

side edges abutting the stringers, a member carried by the tread and spaced from the face of the stringer, and means connecting said member and stringer comprising a weld which shrinks upon cooling, thereby to draw the edges of the step 5 units against the stringers under tension.

2. A staircase, including, in combination, metallic stringers, step units formed by interfitting metallic tread and riser sections, and means for 10 securing said steps rigidly to the stringers, said means including angle members having their horizontal legs welded to the undersides of the treads at a point inwardly of the side edge of the tread so as to space the vertical legs of the 15 angles away from the sides of the stringers, and plug welds connecting the said vertical legs to the stringers under tension due to shrinking of the weld upon cooling.

3. A staircase, including, in combination, metallic stringers, step units each including a tread 20 having its side edges abutting the stringers, a member carried by each end of each tread and spaced from the face of the adjacent stringer, and means connecting each member and adjacent stringer and comprising a weld which 25 shrinks upon cooling, thereby to draw the edges of the step units against the stringers under tension.

4. A staircase, including, in combination, metallic stringers, step units each including a tread 30 having its side edges abutting the stringers, and means for securing said treads rigidly to the stringers, said means including angle members having horizontal legs welded to the undersides of the treads at points inwardly of the side edges 35 of the treads so as to space the vertical legs of the angles away from the sides of the stringers, and plug welds connecting the said vertical legs to the stringers under tension due to shrinking of the welds upon cooling.

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