Aug. 7, 1928. 1,679,570

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STAIR STRUCTURE

Original Filed Dec. 22, 1924

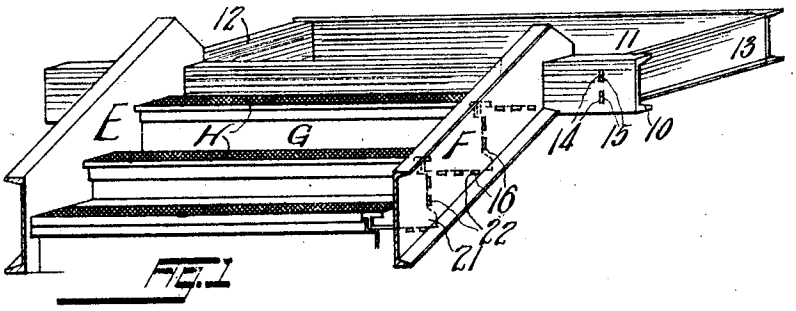


FIG. 1

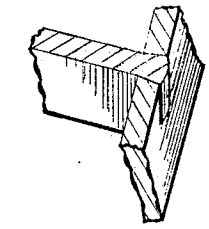


FIG. 4

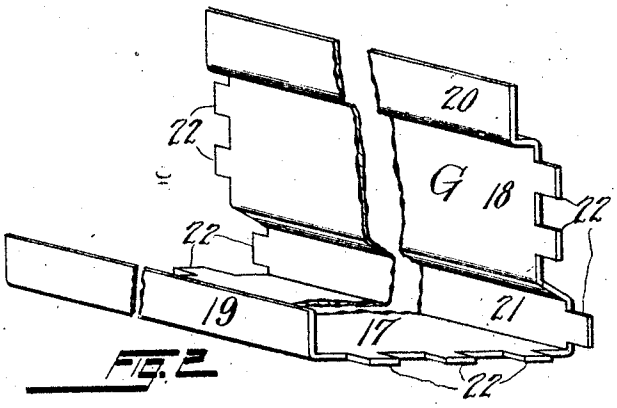


FIG. 2

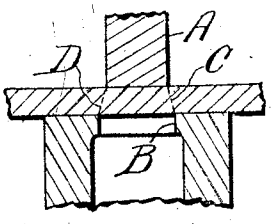


FIG. 5

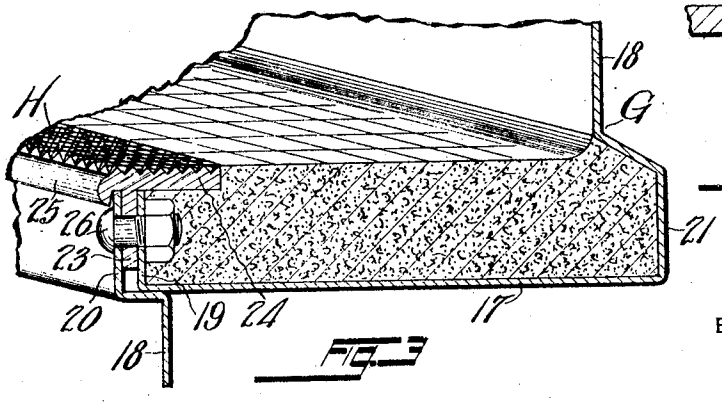


FIG. 3

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STAIR STRUCTURE.

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My invention relates to the construction of stair-ways generally and to details of structure particularly.

In stair-way structures, as previously made, considerable fitting of parts was required when the parts were first made in the shop and considerable work was required when the work was assembled in the field such as forming a casing for the poured floor or locating the wear plates and other similar operations. The above resulting in unnecessary expense in such structures. The present invention aims to eliminate the expense mentioned above and provide a better and more economical structure.

One of the objects of my invention is a simple and inexpensive stair structure in which the parts thereof are simple and easily made and in which these parts are easily assembled.

Another object is an easily made but effective joint between the parts of a structure.

Another object is a joint which does not weaken the jointed members materially.

Another object is to support the wear plate on the tread and riser sections to eliminate the cost of embedding this plate in the poured floor and to prevent it from coming loose.

Another object is to provide means on the tread and riser sections to form and to retain the poured floor to eliminate the cost of building a frame for the poured floor and of securing the wear plate to the poured floor.

My invention is illustrated in the accompanying drawing in which Fig. 1 is a general perspective view, embodying my invention and showing the metal portion of a platform and the upper portion of a stair-way supported thereon; the poured step-floor is shown on the lower step thereof.

Fig. 2 is a perspective view of a tread and riser section, on a larger scale, and showing the lugs on the ends thereof.

Fig. 3 is a partial sectional perspective view, on a larger scale, showing the wear plate and the relation thereof to adjacent stair sections and to a poured step-floor.

Fig. 4 is a partial sectional view, typically showing the joints of the present invention.

Fig. 5 is a sectional view, on a larger scale, showing a punch and die arrangement for punching the taper holes in the present stair structure.

Similar reference characters refer to similar parts throughout the views.

The platform shown is composed of the beams 10, 11, 12 and 13; the beam 10 is the front or stair supporting beam.

As seen in Fig. 1, the platform requires no corner angles or other similar means for jointing the beams to each other; thereby saving considerable time and material.

The beams 10 and 11 have the openings 14 in the webs thereof and the beams 12 and 13 have the lugs 15 on each end thereof and extending through the respective openings 14; all of the lugs enter these openings from the smaller ends thereof.

I prefer to taper these openings 14 as seen in Fig. 4 and, in order to save the cost of tapering these openings after they are punched, I use the punch and die arrangement shown in Fig. 5 where it is seen that the punch A is of the same size as the small end of the openings and the hole B in the die is of the same size as the large end of the openings. When this punch and die operates on a sheet of metal, this metal breaks on the lines C and D, thereby producing the taper openings without any additional work.

When the beams are assembled with the lugs 15 in the openings 14, I may rivet the ends of the lugs into the openings, similar to a countersunk rivet, or I may fill the space between the lugs and the walls of the openings with spelter or other similar material and braze the lugs into the openings, or I may weld the lugs into the openings and thereby fill the space between the lugs and the walls of the openings.

The riveted joint referred to produces a rigid joint which is easily made without additional parts.

The brazed joint referred to also produces a rigid joint and has the additional advantage of having the lugs semi-molecularly united to the walls of the openings.

The welded joint referred to also produces a rigid joint and has the additional advantage of having the lugs molecularly united to the walls of the openings.

Either of these joints produces good results; one type of joint may be found advantageous in one case while another type will be found more advantageous in another case. A judicious section of joints for particular structures will produce better results than heretofore.

The riveting and brazing and welding operations referred to are well known in the art and appear to require no detailed

description here. In the welding operation, I prefer to weld electrically and use a heavy electrode (similar to a dolly bar in riveting) and apply it to the outer end of the lugs and, by pushing inward on this electrode, I upset the metal of the lug in the opening and thereby not only fill the opening but also weld, or molecularly unite, the metal of the lug to the metal of the walls of the opening.

A typical joint, as just described, is shown in Fig. 4; no reference characters appear in this view because it is typical and applies to platforms as well as to stairs or other structures.

The stair structure shown comprises the stringers E and F and the stair sections G.

The stringers E and F are supported on the top of the front beam 10 and may be secured thereon or thereto by a joint similar to the one shown in Fig. 4 or by other means. The web of each of the stringers is provided with the openings 16.

Each of the stair sections G is composed of the tread portion 17 and the riser portion 18. The tread portion 17 has the upwardly extending flange 19 on the front end thereof. The riser portion 18 has the upwardly and forwardly extending offset flange 20 at the upper edge thereof and the rearwardly extending depression 21 at the bottom thereof.

Each end of each of the stair sections G is provided with the lugs 22 disposed in the openings 16 when the stair is assembled and the joint is finished as previously described in connection with the platform.

When the sections G are assembled between the stringers E and F, the flange 20 of each section G is spaced from the flange 19 of the adjacent section as seen in Fig. 3.

Each of the wear plates H (Fig. 3) has the leg 23 extending into the space between the flanges 20 and 19 and has the head 24 resting on the edges of these flanges. In order to provide a finish for the stair treads, I provide the rounded flange 25 to obscure the joint between the wear plate and the upper edge of the flange 20. The top of the head 24 is serrated to prevent slipping and the wear plate H is held in position by the bolts 26 passing through the flanges 20 and 19 and through the leg 23.

When the sections G are assembled between the stringers and the wear plates are in place, the step-floor, concrete or otherwise, can be poured without any preliminary frame or other structure since the flanges 20 and 19 define the floor in front, the stringers on the sides, the risers on the back, and the wear plates on the top.

After the step-floor is poured, it remains in position without extra means because the stringers prevent it from moving sidewise, the flanges 20 and 19 from moving forward, the depression 21 from moving either backward or upward, and the head 24 from moving upward.

It is believed that the foregoing illustration and description will enable others to fully understand my invention.

I am aware that stair structures have been made with treads and risers secured to stringers and with a poured floor, therefore, I do not claim such features broadly, but one piece tread and riser sections with the wear plate supported on these sections, the joints illustrated and described, and the poured floor defined and held in position without extra parts, is new in the present invention.

I am also aware that modifications may be made in the formation as well as in the arrangement of parts, within the scope of the appended claims; therefore, without limiting myself to the precise construction and arrangement of parts shown and described,

I claim:—

1. In combination, a pair of stringers, one piece step sections between said stringers, each of said sections comprising a riser portion and a tread portion, each of said riser portions having an upwardly extending offset flange at the upper end thereof, each of said tread portions having an upwardly extending flange to confine a floor material, the front end of said tread portions resting on the horizontal portion of the offset flanges of the adjacent riser sections, the upwardly extending flanges of adjacent step sections spaced apart, a removable wear plate resting on the ends of said flanges and having a leg disposed in the space between said flanges, and a bolt passing through said flanges and through said leg and having the nut thereof embedded in the floor material.

2. A stair structure having a pair of stringers and step sections between the same and a wear plate supported on and confined laterally by said step sections; said wear plate being adapted to be moved vertically out of said step sections while the other parts of the stair structure remain in the normal positions thereof.

3. A stair structure having a pair of stringers, step sections between said stringers, the outer end of each of the tread portions of said step sections supported on the upper end of the adjacent ones of the riser portions of said step sections, a poured floor on said tread portions, and a wear plate supported on and confined laterally by said step sections and partly embedded in said poured floor; said wear plate adapted to be moved vertically out of said step sections while said poured floor and said step sections remain in the normal positions thereof.

4. A stair structure having a pair of stringers, one piece step sections between said stringers and each comprising a riser

portion and a tread portion, the outer end of each of said tread portions supported on the upper end of the next lower one of said riser portions, said outer and said upper ends being spaced apart laterally, the space between said ends being open at the top, and a wear plate having a leg extendable into said space vertically and confined therein laterally.

5. A stair structure having a pair of stringers and step sections between the same and a wear plate supported on a portion of one of said sections and on a portion of the section adjacent to said one section and removable vertically from the stair structure while said sections remain in the normal positions thereof.

6. A stair structure having a pair of stringers, step sections between said stringers, each of the riser portions of said sections having an offset and upwardly extending flange on the upper end thereof, each of the tread portions of said sections having an upwardly extending flange resting on the offset portion of said flange on the riser portions vertically, said flanges being spaced apart laterally and substantially parallel with each other longitudinally of the stair structure, and a wear plate having a leg extendable into the space between said flanges and resting vertically on the upper edges of said flanges.

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