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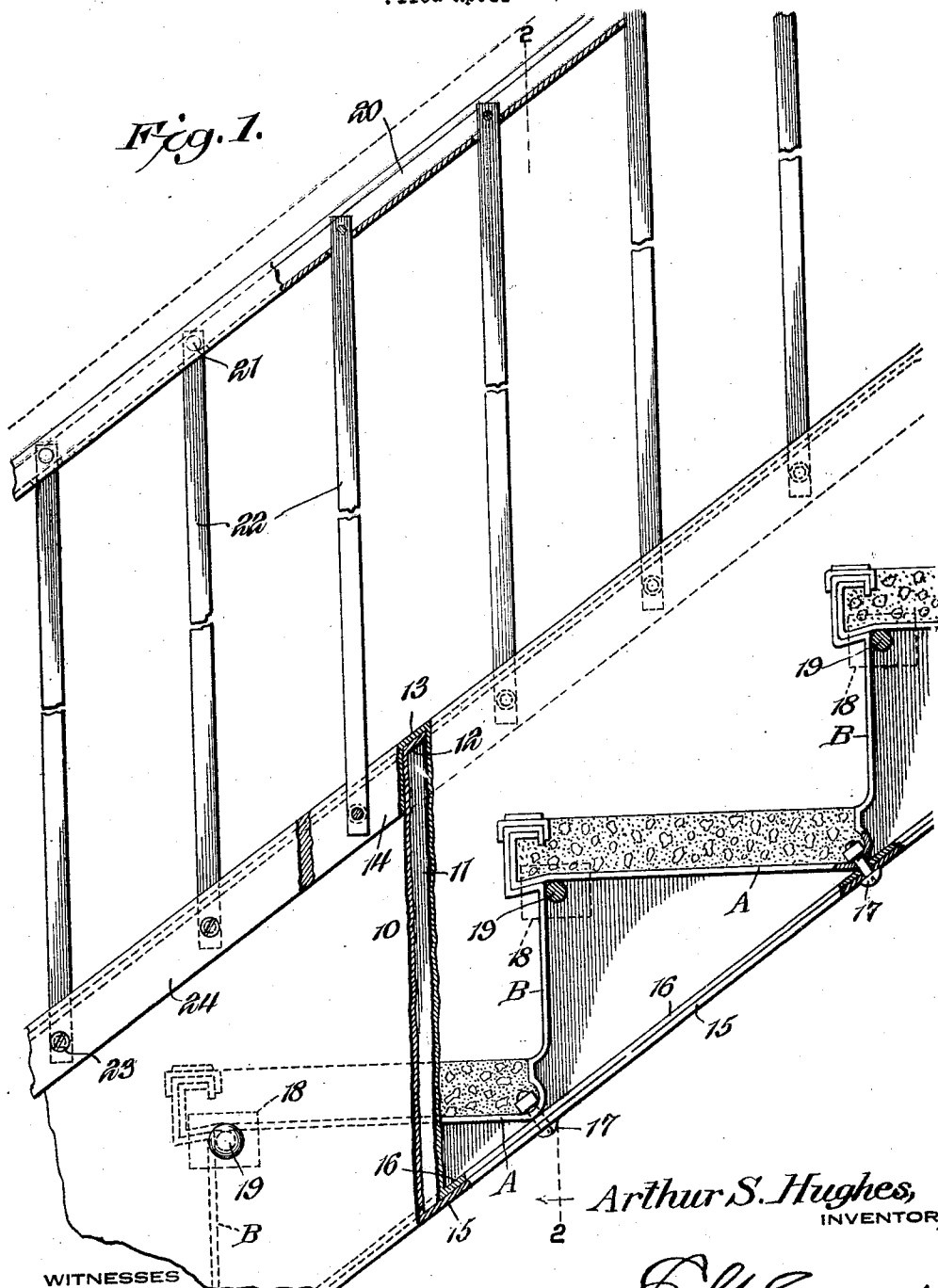
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A. S. HUGHES

PRESSED STEEL STRINGER

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2 Sheets-Sheet 1



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PRESSED-STEEL STRINGER.

Application filed April 24, 1922. Serial No. 556,191.

To all whom it may concern:

Be it known that I, ARTHUR S. HUGHES, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented new and useful Improvements in Pressed-Steel Stringers, of which the following is a specification.

This invention relates to stringers used in stair building, and has for its object the provision of a stringer formed of a plurality of sections or sheets secured together and interlocked; whereby to provide what might be termed a laminated structure which will possess maximum strength with minimum weight.

Ordinarily, stringers used in stair building are formed of a single piece of angular formation provided with flanges which define seats for sustaining the stair risers and treads. The great disadvantage of such a construction is the excessive thickness and consequent great weight because of the necessity of using comparatively thick material in order to possess the requisite strength. To provide a lighter structure with even greater strength, I have designed the present invention, which contemplates the provision of the separate angularly formed pieces or sheets having interlocking flanges which define seats for the stair risers and treads and to which are secured the balusters.

Another object is the provision in a stair structure of a baluster mounting which permits adjustment for maintaining the balusters in vertical position regardless of the slant or incline which may be given to the stringers.

The construction, mounting and operation of the structure will be readily comprehended from a study of the description taken in conjunction with the accompanying drawings, though it is to be distinctly understood that the detailed disclosure is merely an exemplification of a preferred embodiment of the invention, and that I reserve the right to adopt other variations and make such modifications as will widen the field of its usefulness, provided always that such changes involve no departure from the salient features or spirit of the invention, or the scope of the appended claims.

In the drawings:

Figure 1 is a side elevation of a stair construction embodying my invention, parts being broken away and in section;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1;

Figure 3 is a fragmentary plan view with the balusters in section;

Figure 4 is a view similar to Figure 2 but showing a modified form of the invention.

Referring more particularly to the drawings, and especially to Figures 1 to 3, inclusive, I have shown the stringers as being formed of two metallic members or sheets 10 and 11, which are of angular formation and which when secured together define a laminated or box-like structure. The member or section 10 is formed at and along its upper edge with a right angular inwardly extending flange 12, which fits against the inner or lower side of a right angular outwardly extending flange 13 formed on the section 11, an interlocking engagement being effected by the formation of a second flange 14 on the section 11 which extends downwardly parallel with the body portion thereof. By this construction the upper portion of the section 11 constitutes, in effect, a channel which entirely receives the upper flanged edge of the section 10. The lower edge of the section 10 is formed with a right angular inwardly extending flange 15, upon which rests and is engaged therewith a similarly extending flange 16 formed on the lower edge of the section 11. The superposed flanges 15 and 16 which extend inwardly from the member 11 define a seat for supporting the threads A and risers B of the stairs structure, bolts 17 being provided which pass through the flanges 15 and 16 and through the junctures of the treads with the risers. The treads and risers illustrated are of peculiar formation having a specific interlocking feature but the details are not described, as this structure is made the subject matter of a companion application.

As Figure 2 shows, the flange 12 bears against the section or member 11 and hence spaces the two sections or members from each other. It is preferable to provide other means for this purpose and I make use of a plurality of angularly shaped spac-

ing members 18, which are disposed between the sections 10 and 11 at predetermined intervals, and through openings of which are passed stay bolts 19, which likewise pass through the sections 10 and 11, said bolts being located at such points as to support the forward edges of the undersides of the stair treads, as illustrated in Figure 1. These stay bolts therefore serve not only to support the steps of the stairway but also operate to secure the sections 10 and 11 of the stringers together in firmly clamped relation against the opposite sides of the spacers 18.

The hand rail 20 is pivotally connected, at 21, with the upper ends of the balusters 22, which have their lower ends pivotally mounted upon bolts 23, which pass through the flanges 14 and engage portions of the sections 10, these bolts thus providing additional securing means for the sections 10 and 11. Disposed outwardly of the balusters and covering the lower ends are strips 24, through which the bolts 23 pass, and which provide a certain degree of additional reinforcement as well as improve the appearance of the structure. Where desired for ornamental purposes, a moulding strip of special design may be substituted for the strip 24. The hand rail 20 may, of course, be formed in any one of a variety of ways, though I have illustrated it as being of the specific construction disclosed in my application, Serial Number 472,787. A feature of the baluster construction shown is that, regardless of the slant or inclination of the stairs, the balusters may be adjusted so as to remain always in a vertical position.

In Figure 4 I have shown a modification, though the fundamental principle of using a plurality of sections or members for the stringer construction remains the same. In this particular form the outer section or sheet 26 of the stringer is formed at its upper edge with an outwardly extending flange 27, which engages against the underside of a similarly extending flange 28 formed on the inner section 29. The lower edges of the sections 26 and 29 are flanged, as shown at 30 and 31, respectively, in exactly the same manner as in the first described form. The same spacing elements 18 and stay bolts 19 are used, as previously described, and the general mounting is identically the same. There is another variation, however, between this and the first form, as in this instance the superposed flanges 27 and 28 must be provided with openings through which pass the balusters 22, the latter being, however, held in position by means of the bolt 23 as in the first form, the finishing strip 24 being likewise employed. In both forms of the invention, the stringer is made up of two members or

sections having top and bottom flanges which are superposed and form closures for the top and bottom of the stringer, the sides of the stringer being held in spaced relation by independent means.

From the foregoing description and a study of the drawings, it will be apparent that I have provided a novel stringer construction, which will have the advantage of possessing great strength and rigidity while minimizing the weight, as it is possible to construct it of thinner material than could possibly be employed in the construction of the ordinary stringer, the provision of the plurality of sections or members arranged in spaced relation having the spacing elements secured between them insuring these advantages. It is also to be observed that the baluster mounting associated with the stringer is of such a nature as to permit ready adjustment, depending upon the inclination at which the stringers are disposed.

What is claimed is:

1. A stringer formed of a pair of members, each member having angular flanges at its upper and lower edges, the members being fitted together with the flanges placed one upon the other so that a hollow box-like structure is formed which is closed at the top and bottom by said flanges.

2. A stringer formed of a pair of members, each member having right angular flanges at its upper and lower edges, the members being fitted together with the flanges placed one upon the other so that a hollow box-like structure is formed which is closed at the top and bottom by said flanges, the lower flanges being extended beyond one side of the stringer to form a seat for the connection and support of stairs thereto.

3. A stringer formed of a pair of members, each member having angular flanges at its upper and lower edges, the members being fitted together with the flanges placed one upon the other so that a hollow box-like structure is formed which is closed at the top and bottom by said flanges, and spacing means arranged interiorly of said structure and bearing against said members.

4. A stringer formed of a pair of members, each member having angular flanges at its upper and lower edges, the members being fitted together with the flanges placed one upon the other so that a hollow box-like structure is formed which is closed at the top and bottom by said flanges, the flanges at the top extending at right angles to said members in opposite directions, and a second flange extending downwardly from the right angular flanges of one of said members, so as to form an interlocking engagement between said members at the top.

5. A stringer formed of a pair of members, each member having along its bottom edge right angular flanges, one of said

flanges being longer than the other so as to close the space between the said members at the bottom, and both flanges extending beyond the side of the member having the shorter flange and being superposed forming a seat along one side of the stringer, which seat is made up of two thicknesses of metal, said seat constituting a support for stairs.

6. A stringer formed of a pair of spaced members, one member having a right angular inwardly extending flange at its upper edge, and the other member having at its upper edge a right angular outwardly extending flange, which embraces the inwardly extending flange of the first-mentioned member, and a second flange extending downwardly from the outwardly extending flange of the second-mentioned member and forming an interlocking connection between the two members and also closing the space between said members at the top.

7. A stringer formed of a pair of flanged members secured together with the flanges in interfitting engagement to form a hollow structure, and spacing means remote from and independent of said flanges disposed between the flanged members and connected therewith to prevent inward collapsing.

8. A stringer formed of a pair of members formed at their longitudinal edges with

flanges disposed in contacting relation with the body portions of the members arranged in spaced relation to define a hollow structure, which is closed at the top and bottom by said flanges the flange at the upper edge of one member defining a channel receiving the adjacent flange of the other member, and the flanges at the lower edges of both members projecting beyond the inner side of said structure at an angle thereto to form a seat.

9. The combination of a pair of stringers, each stringer consisting of a pair of flanged members secured together with the flanges in engagement to form a hollow structure, angularly shaped metallic spacing elements disposed between said members remote from the flanges, and stay bolts passing through said members and said spacing elements.

10. The combination of a pair of stringers, each stringer consisting of a pair of flanged members secured together with the flanges in engagement to form a hollow structure, spacing elements disposed between said members remote from the flanges, and stay bolts passing through said members and said spacing elements.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

ARTHUR SHERIDAN HUGHES.