J. T. NESDALL.

METALLIC STAIR STRUCTURE.

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1,075,156.

Patented Oct. 7, 1913.

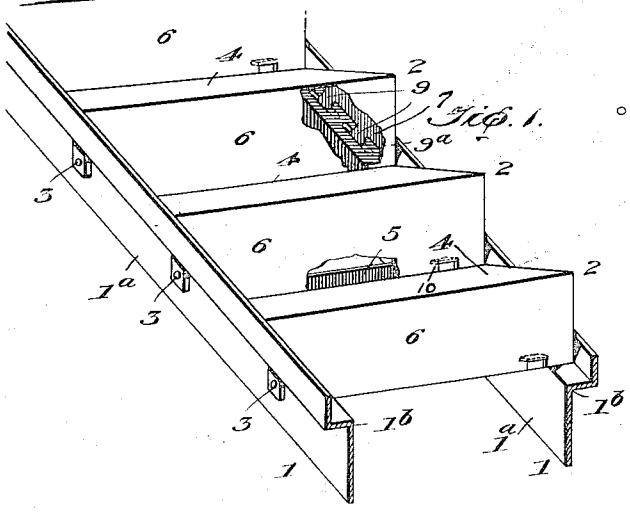


Fig. 1.

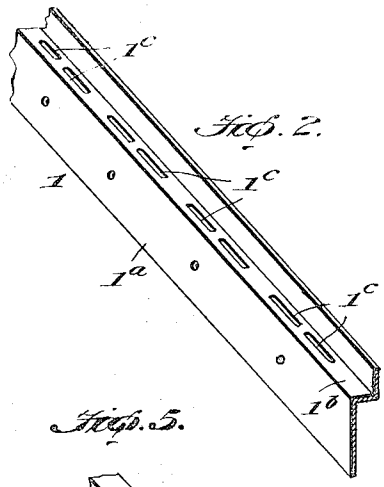


Fig. 2.

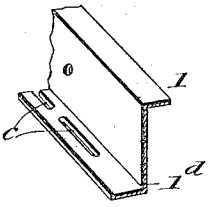


Fig. 5.

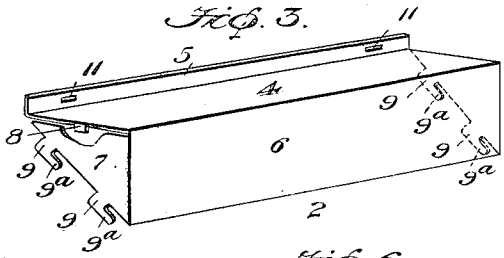


Fig. 3.

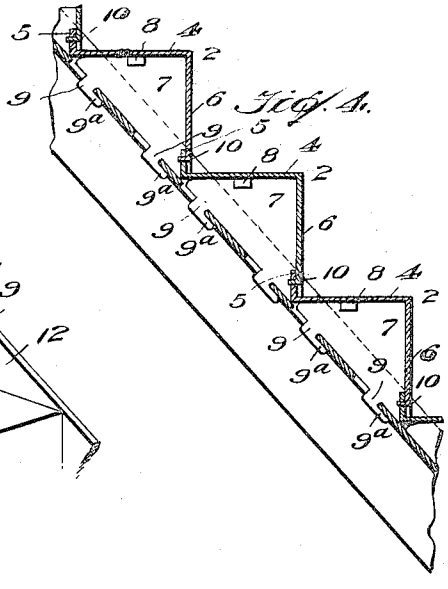


Fig. 4.

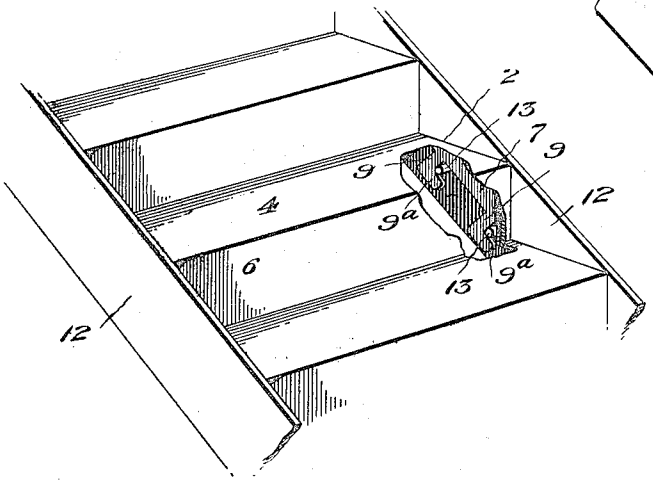


Fig. 6.

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UNITED STATES PATENT OFFICE.

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METALLIC STAIR STRUCTURE.

1,075,150. Specification of Letters Patent. Patented Oct. 7, 1913.

Application filed August 2, 1911. Serial No. 641,965.

To all whom it may concern:

Be it known that I, JOHN T. NESDALL, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Metallic Stair Structures, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to stair structures, and particularly to that class in which the elements are, for the most part, constructed of sheet metal.

The object of the invention is to provide a stair structure in which the concomitants are comparatively few in number, but which are so constructed as to be capable of rapid and convenient assemblage.

Another object of the invention is to construct the component elements in such form that they may be cheaply and readily manufactured; and, when so formed, may be assembled without the employment, necessarily, of skilled labor.

With these and other objects in view, the invention, in one aspect, consists of a series of stair-components, one of which includes supporting-stringers provided with stair-securing means, and another component including a series of stair-units, each unit comprising, preferably, a one-piece tread and riser, on one of which elements is formed an extension bent to engage the inner face of the other element, and which bent extension carries means which are adapted to coöperate with the stair-attaching means aforementioned, whereby the stair-units may be readily and securely interlocked with the stringers.

In still another aspect of the invention, the same includes, as one of the components, a pair of metallic stringers, each of which is angulated and the angular portion provided with elongated slots to constitute stair-securing means; and, as another of the components, a series of stair-units, each comprising an integral tread, riser and end-pieces, the latter bent to position their upper edges beneath the lower face of the tread in proximity to the outer ends thereof, and which end-pieces are provided with interengaging means adapted to be interlocked with said stair-securing means on the stringers; the tread, in each instance, being provided with an elongated upstanding flange adapted to engage against the rear face of the proximate riser.

The invention resides, in one or another of its aspects, in the novel combination and construction of the parts, all as hereinafter more fully described and claimed.

In the accompanying drawings, I have illustrated exemplifications of some of the preferred embodiments of my invention. It is to be understood, however, that these may be varied to a considerable degree (so long as the underlying principles are retained) and be within the spirit of my invention.

In these drawings: Figure 1 is a view in perspective of a stair-structure embodying one form of my invention; Fig. 2 is a fragmentary view, in perspective, of one of the stringers constituting a component of the structure; Fig. 3 is a view in perspective of one of the stair-units detached from the stringers, and showing the same as including a combined riser and tread and end-pieces; Fig. 4 is a view similar to Fig. 1, of a modification of the stair-structure; in this instance the same including means carried by the riser and a flange formed on the tread, whereby each stair-unit may be interlocked with its proximate stair-unit in addition to being interlocked with the stringer; Fig. 5 is a view in perspective of a modified form of the stringer; and Fig. 6 is another modification illustrating a different embodiment.

Referring to the drawings, the numeral 1 designates, generally, one component of the structure which, in this instance, is the stringer; and 2 the component which comprises the stair-unit.

In the form of stringer illustrated in Figs. 1 and 2, preferably and as shown, the same comprises a body-portion 1^a and an angulated portion 1^b. In the latter portion are provided apertures 1^c, these being, and as shown, elongated slots for a purpose presently to be explained.

In Fig. 5, I have illustrated a modified form of stringer: In this instance, the angulated portion 1^d is formed at the lower part of the stringer. This modified form of stringer may be used where its form would be better adapted to the exigencies than would be that illustrated in Figs. 1 and 2. Usually, a pair of the stringers are employed, as shown, and these are held in spaced relation by bolts 3, though other

equivalent forms of devices may be utilized, if desired.

The stair-unit 2 comprises, in one aspect of the invention, a plurality of portions, each integral with the other, including a tread 4, an upstanding elongated flange 5 formed at the rear edge of the tread and bent at approximately right angles to the surface of the tread, as shown, and a riser 6. At the extremities of each riser and integral therewith but non-integral with the tread are end-pieces or wings 7, these being bent approximately at right angles to the surfaces of the riser in order to position the upper edges of the end-pieces directly beneath the lower surface of the tread 4, whereby said end-pieces become supporting-elements for the tread. It is to be understood, of course, that the end-pieces could be formed as extensions of the tread 4 and be bent at right angles to its surfaces so that one edge of the end-pieces would bear against the inner face of the riser 6. To prevent the end-pieces from having any movement inwardly beneath the tread 4, the latter may be provided with lugs 8 formed by bending a portion of the edges of their ends downwardly. The end-pieces 7 are provided with one or more lugs 9, and these preferably carry an extension 9^a. It will now be understood that these lugs 9 are adapted to be inserted in the elongated apertures 1^c in the stringers. The extensions 9^a provide for an interlocking of the lugs 9 with the stringers, and by these means, the stair-units are securely interlocked with the stringers.

In assembling the components of the structure, the elongated flanges 5 are positioned back of the inner face of the proximate riser simultaneously with the insertion of the lugs 9^a on the end-pieces into the apertures 1^c in the stringers. In some instances, it may be desirable to provide for the interlocking of one stair-unit with its proximate units: To this end, lugs 10 may be provided on the riser 6 to engage in apertures 11 formed in the upstanding flanges 5.

In the foregoing, I have described the stringer-component of the structure as being angulated, and with means in the angulated portion thereof into which the stringer-engaging means (carried by the stair-units) are adapted to interlock: In Fig. 6, however, I have illustrated a somewhat different form of stringer, the same including a member 12 which is not angulated; but which is provided with outstanding lugs or posts 13 with which the lugs 9 on the stair-units are adapted to engage and interlock. These lugs or posts 13 may be formed by punching out a suitable portion of the metal of the stringer 12 to provide an outstanding surface; or these may be in the form of headed posts suitably secured in the stringer, as may be found desirable.

By reason of the simplicity of the parts and the fact that the several portions of the stair-unit which constitute respectively the tread, riser and end-pieces, are all preferably formed in one piece, the end-pieces being formed integral with the risers but non-integral with the tread, and as the two essential components of the structure are preferably made of sheet metal, it will be recognized that each of these components may be stamped out of sheet metal with great facility and at a comparatively low cost. Then, when thus stamped out, they are immediately ready to be assembled. This is easily and conveniently accomplished and without the employment of skilled labor. Essentially, the invention resides in these two components, comprising, in the one instance, a pair of stringers provided with stair-securing means, and, in the other instance, a series of stair-units adapted to be interlocked with the stringers and, to this end, provided with stringer-engaging means; the several units comprising, as an integral structure, a tread, a riser and end-pieces, the latter preferably formed as angulated extensions of the riser and adapted to underlie and be engaged by the lower face of the tread; and, moreover, the series of stair-units are adapted to be interconnected with each other, as by means of the upstanding flange formed on the tread and adapted to engage the inner vertical face of the riser.

Obviously, the particular form of stair-securing means provided on the stringers, and of the stringer-engaging means formed on the stair-units, may be varied; and, therefore, I do not limit myself to the precise construction of these features that are herein illustrated. In fact, I wish it to be understood that I do not limit myself herein to the details, except in so far as the same may be specified in the claims.

Having thus described my invention, its construction, its mode of use and application, etc., what I claim and desire to secure by Letters-Patent is:

1. A stair-structure including, as components, a stringer and a combined riser and tread, said riser being provided at its ends with angulated end-portions bent at approximately right angles to and extending away from the faces of the riser and in parallelism with each other and with the stringers and having their upper edges underlying and engaging the lower face of the tread approximately throughout its width to support the same.

2. A stair-structure including, as components, a plurality of stringers, and a combined riser and tread, said riser being provided at its ends with angulated end-portions bent at approximately right angles to and extending away from the faces of the riser and in parallelism with each other and

with the stringers and having their upper edges underlying and engaging the lower faces of the tread approximately throughout its width to support the same.

3. A stair-structure including, as components, a plurality of stringers, a combined riser and tread, said riser being provided at its ends with angulated end-portions bent at approximately right angles to and extending away from the faces of the riser and in parallelism with each other and with the stringers and having their upper edges underlying and engaging the lower faces of the tread approximately throughout its width to support the same, and interengaging means carried by the stringers and end-extensions to effect an interlocking of the riser and tread to the stringers.

4. A stair-structure including, as components, a pair of stringers, and a series of stair-units, each of which includes a combined riser and tread, the riser being provided at its ends with angulated end-portions or wings bent at approximately right angles to and extending away from the faces of the riser and in parallelism with each other and with the stringers and having their upper edges formed non-integral with, and extending in an approximately horizontal direction and along, the lower face of the tread and in immediate contact therewith to support said tread.

5. A series of stair-components, one of which includes supporting-stringers provided with stair-securing means, and another of the components including a series of stair-units, each of which comprises a one-piece tread and riser, one of which carries extensions bent to form end-pieces extending in parallelism with each other and with the stringers, said end-pieces being formed non-integral with said other unit and extending in an approximately horizontal direction and along the lower face of said other unit and in direct contact therewith to support the same, said end-pieces also carrying means adapted to coöperate with the stair-attaching means on the stringers.

6. A series of stair-components, one of which includes supporting-stringers provided with stair-securing means, and another of the components including a series of stair-units, each of which comprises a one-piece tread and riser, one of which carries extensions bent to form end-pieces extending in parallelism with each other and with the stringers, said end-pieces being formed non-integral with said other unit and extending in an approximately horizontal direction and along the lower face of said other unit and in direct contact therewith to support the same, said end-pieces also carrying means adapted to coöperate with the stair-attaching means on the stringers, said tread being provided with an upstanding flange adapted to engage with the inner face of the proximate riser.

7. A series of stair-components, one of which includes supporting-stringers provided with stair-securing means, and another of the components including a series of stair-units, each of which comprises a one-piece tread and riser, one of which carries extensions bent to form end-pieces extending in parallelism with each other and with the stringers, said end-pieces being formed non-integral with said other unit and extending in an approximately horizontal direction and along the lower face of said other unit and in direct contact therewith to support the same, said end-pieces also carrying means adapted to coöperate with the stair-attaching means on the stringers, said stringer being provided with an upstanding flange interlocking with its proximate riser.

8. A metallic stair-structure including, as one of the components, a pair of stringers and stair-securing means carried thereby, and, as another of the components, a series of stair-units each comprising an integral tread, riser and a plurality of end-pieces, the latter bent to present a considerable portion of their upper edges along the lower face of the tread and in immediate contact therewith, but non-integral with the same, whereby said end-pieces constitute a support for the tread at its ends and for the greater portion of its width, said end-pieces being provided with engaging means adapted to be interlocked with said stair-securing means on the stringers.

9. A metallic stair-structure including, as one of the components, a pair of stringers and stair-securing means carried thereby, and, as another of the components, a series of stair-units each comprising an integral tread, riser and a plurality of end-pieces, the latter bent to present a considerable portion of their upper edges along the lower face of the tread and in immediate contact therewith, but non-integral with the same, whereby said end-pieces constitute a support for the tread at its ends and for the greater portion of its width, said end-pieces being provided with engaging means adapted to be interlocked with said stair-securing means on the stringers, and an elongated upstanding flange on the tread adapted to engage the rear face of the riser.

10. A metallic stair-structure including, as one of the components, a pair of stringers and stair-securing means carried thereby, and, as another of the components, a series of stair-units each comprising an integral tread, riser and a plurality of end-pieces, the latter bent to position their upper edges beneath the lower face of the tread in proximity to the outer ends thereof and provided

with engaging means adapted to be interlocked with said stair-securing means on the stringers, and an elongated upstanding flange on the tread adapted to engage the rear face of the riser, said flange and riser being provided with co-acting means to interlock one with the other.

11. A metallic stair-structure including, as one of the components, a pair of angulated stringers and stair-securing means carried thereby, and, as another of the components, a series of stair-units each comprising an integral tread, riser and a plurality of end-pieces, the latter bent to position their upper edges beneath the lower face of the tread in proximity to the outer ends thereof and provided with engaging means adapted to be interlocked with said stair-securing means on the stringers.

12. A metallic stair-structure including in combination the following components: a pair of stringers having their upper portions angulated to provide a surface at right angles to the plane of the surfaces of the body of said stringers, said right-angled surfaces being provided with a series of apertures; and a series of stair-units interposed between and supported on said stringers, each unit comprising, as an integral element, a tread, a riser, and a plurality of end-portions, the latter bent at an angle to the surface of the riser and having their upper edges underlying the tread and provided with lugs adapted to interlock with the apertures in the stringers.

13. A metallic stair-structure including in combination the following components: a pair of stringers having their upper portions angulated to provide a surface at right angles to the plane of the surfaces of the body of said stringers, said right-angled surface being provided with a series of apertures, and a series of stair-units interposed between and supported on said stringers, each unit comprising as an integral element a tread, a riser, and a plurality of end-portions, the latter bent at an angle to the surface of the riser and having their upper edges underlying the tread and the lower edges thereof overlying said angulated portions of the stringers and provided with lugs adapted to interlock in the apertures in the stringers.

14. A metallic stair-structure including in combination the following components: a pair of stringers having their upper portions angulated to provide a surface at right angles to the plane of the surface of the body of said stringers, said right-angled surface being provided with a series of apertures; a series of transverse connecting-elements attached to the stringers; and a series of stair-units interposed between and supported on said stringers, each unit comprising as an integral element, a tread, a riser, and a plurality of end-portions, the latter bent at an angle to the surface of the riser and having their upper edges underlying the tread to support the same and their lower edges overlying the angulated portions of the stringers and provided with hook-shaped lugs adapted to interlock in the apertures in the stringers.

15. A stair-structure including, as components, a pair of stringers and a combined riser and tread, said riser being provided at each of its ends with an angulated side-portion bent at approximately right angles to and extending away from the rear face of said riser and in parallelism with the other and with the stringers, the upper edges of said side-portions extending in an approximately horizontal direction beneath and in direct contact with the lower face of said tread but non-integral therewith, the outer faces of said end-pieces occupying a position approximately in a plane with the edge of the tread.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. NESDALL.

Witnesses:

CECILIA C. KILCLINE,

GUSTAVE H. STOUTENBERG.