June 12, 1945. W. Y. COCKEN, JR 2,377,994

STAIR STRUCTURE

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Fig. 1.

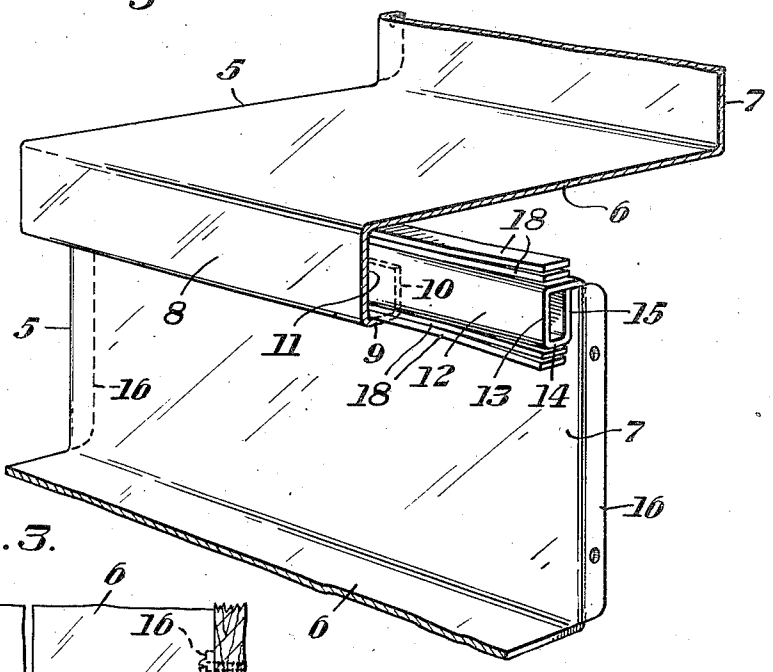


Fig. 3.

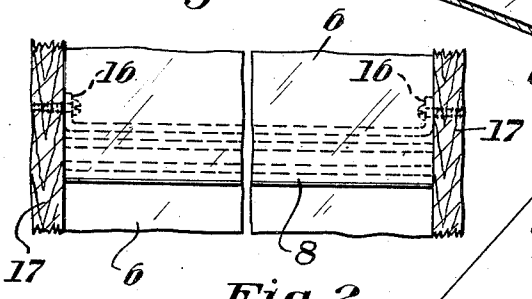


Fig. 2.

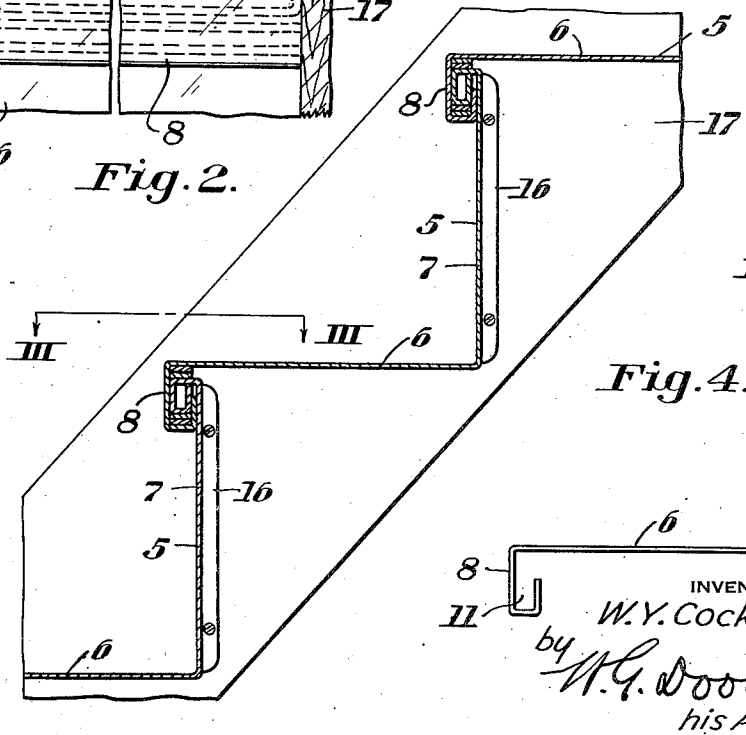
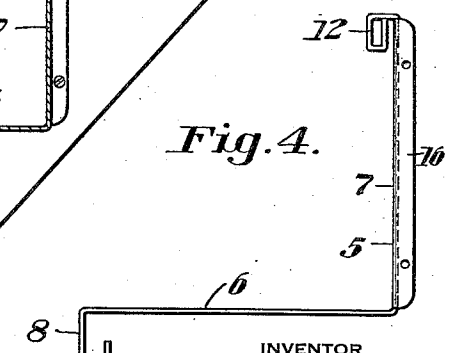


Fig. 4.



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STAIR STRUCTURE

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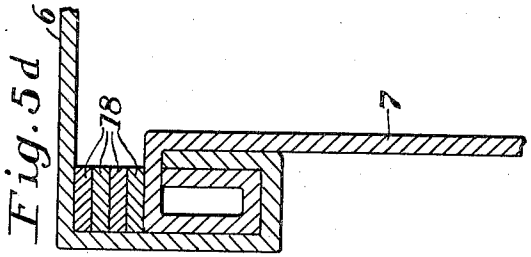

Fig. 5d

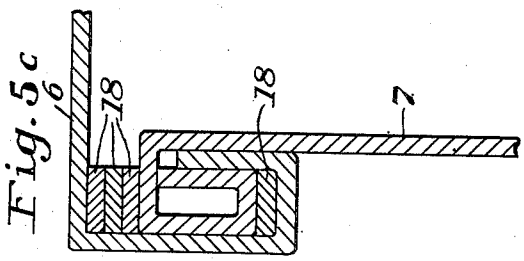

Fig. 5c

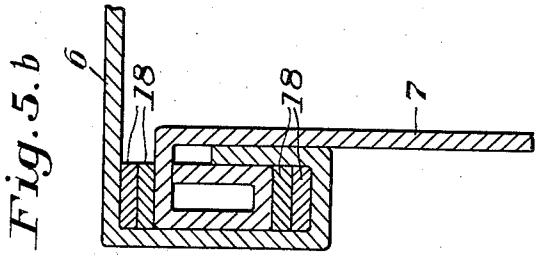

Fig. 5b

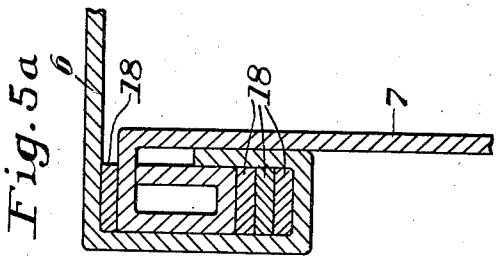

Fig. 5a

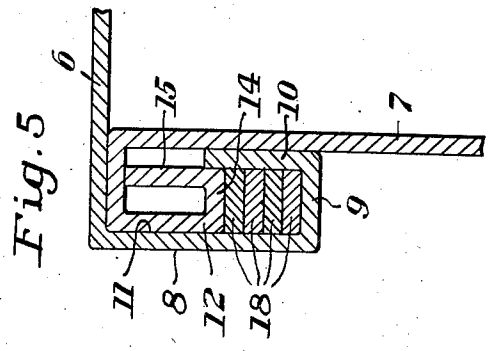

Fig. 5

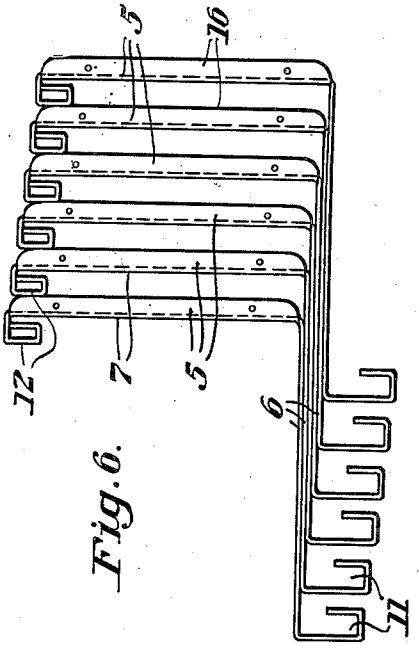

Fig. 6.

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STAIR STRUCTURE

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Fig. 8.

Fig. 7.

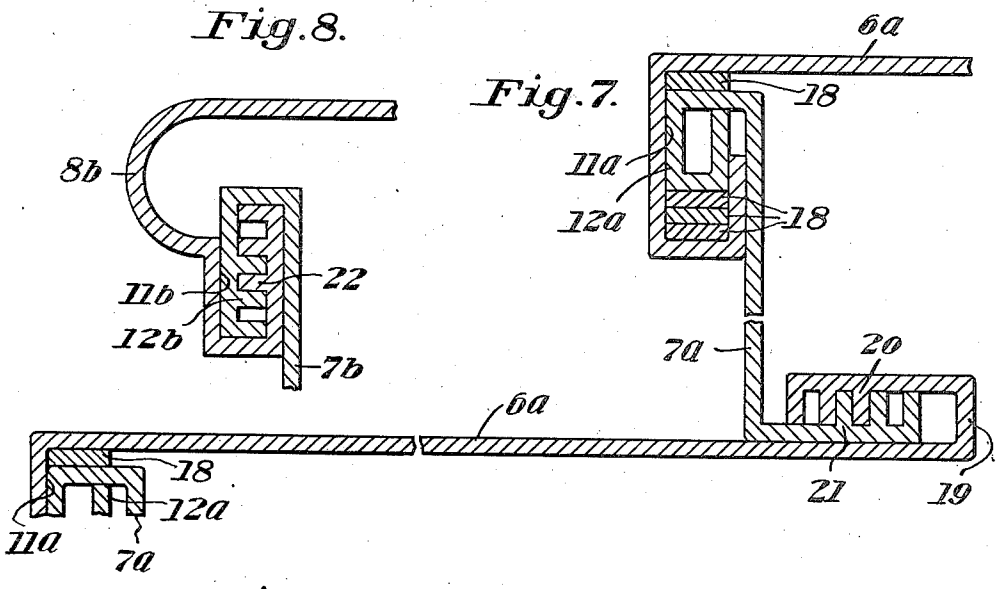


Fig. 9.

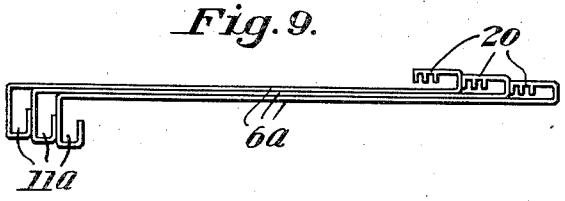


Fig. 11.

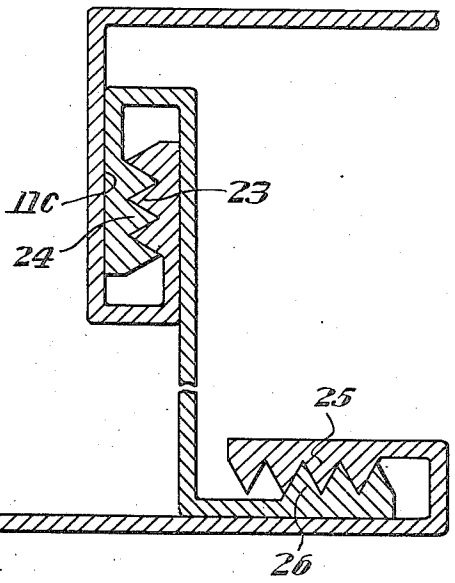
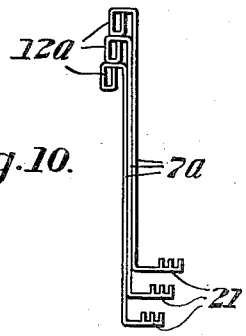
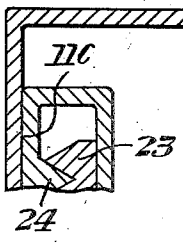


Fig. 10.





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Patented June 12, 1945 2,377,994

UNITED STATES PATENT OFFICE

2,377,994

STAIR STRUCTURE

William York Cocken, Jr., Pittsburgh, Pa.

Application December 10, 1942, Serial No. 468,453

5 Claims. (Cl. 189—43)

This invention relates to improvements in stair structures and more particularly to metallic stair structures embodying a plurality of step units comprising tread and riser elements either made as integral members or in two or more parts and having cooperating locking and adjusting means.

My invention contemplates a stair structure made up of stair units of the character specified in which the units are self supporting and interlocking, and capable of use for assembling on the job without the special measuring, preparation of shop drawings and other work to predetermine the exact height of the riser elements and the width of the tread elements required under varying story heights and spaces to be occupied by the steps.

Another object of my invention is the provision of step units that may be economically fabricated, transported, and readily positioned in assembled relationship.

In the accompanying drawings, which illustrate applications of my invention:

Fig. 1 is a perspective view of a portion of a stairway embodying my invention and particularly showing two combined riser and tread elements together with a plurality of spacers in assembled position;

Fig. 2, a vertical sectional view through a portion of a stairway embodying my invention;

Fig. 3, a horizontal sectional view on the line III—III of Fig. 2;

Fig. 4, a detail of the step unit comprising both the riser and tread elements formed as an integral member;

Figs. 5, 5*a*, 5*b*, 5*c* and 5*d*, are views diagrammatically showing different arrangements of the spacer elements to provide for variation in story height;

Fig. 6, an elevational view showing several of the elements of the form of Fig. 1 nested together as assembled for shipping;

Fig. 7, an elevational view showing a modified form of riser and tread construction;

Fig. 8, a detail sectional view particularly showing the nose of the tread portion modified;

Fig. 9, shows an assembly of several of the tread portions of the form of Fig. 7 arranged for shipping;

Fig. 10, a view similar to Fig. 9, showing the riser portions in assembled position for shipping; and

Fig. 11, an end elevational view of a still further modification.

Referring to the drawings and first to the form of Fig. 1, the step unit as illustrated and as preferred designated 5, comprises a tread element 6 and a riser element 7 formed as an integral member. The tread portion or element 6 is formed with a nose 8 having an inwardly projecting horizontal wall 9 and a vertically extending wall 10, thus forming a channel-like chamber 11. The upper portion of the riser element 7 is formed with a terminal portion adapted to fit into the channel-like chamber 11 of an adjacent step unit. The said riser terminal portion 12 as shown includes a depending vertical extending wall 13, a horizontal wall 14 and an upwardly extending vertical wall 15. The riser element, if desired may be provided with a flanged portion 16 adapted to secure the step unit to a supporting member, as a stringer 17 by screws 17*a*. Other methods for attaching the step units to stringers or supporting members may be followed, as by the employment of the usual angles or clips, lag screws or brackets or by welding the units to the supports.

A characteristic and important feature of my invention resides in the adjustability of the step units whereby to conform to any condition of story heights to which the stair is to be associated, also as to conform to the desired widths of the treads of the stair.

In the diagrammatic views of Figs. 5, 5*a*, 5*b*, 5*c*, and 5*d*, I illustrate the manner of locking the units together as well as the means employed for effecting the change in riser heights. As shown, 18 designate stiffening spacer elements of a character capable of being applied between the upper surface of the riser terminal portion 12 and the under side of the nose portion of the tread element or applied both above and below the terminal portion of the riser, or all below said terminal portion.

A convenient and expeditious manner of assembling the units is to secure a unit to a supporting structure and then position the adjacent unit to be joined thereto, so that its terminal portion may be passed laterally or slid into the channel-like chamber 11 of the secured unit from the free end thereof. It will be understood that the spacer elements employed may likewise be positioned relatively to the terminal portion 12 and the chamber or space 11.

It is evident that the step units embodying my invention may be made up of a plurality of tread and riser elements instead of having the unit formed as an integral structure of the form of Fig. 1, and that the coacting locking means of the said elements may be modified and somewhat differently arranged from that shown by Fig. 1,

without departing from the scope of my invention.

Thus, I have shown by Figs. 7, 8 and 11 modified forms of units all however including tread and riser elements, interlocking means, and adjusting means for varying riser heights as well as tread widths.

Referring now to the form of Fig. 7, the tread element 6a of this form is shaped at one end to provide a channel-like chamber 11a, adapted to receive a terminal portion 12a of the riser element 7a as well as the spacers 18, and at its opposite end and on the opposite surface of the tread with an interlocking portion 19, the latter having a toothed or ribbed portion 20 either formed integral with the portion 19 or on a separate part attached thereto. In this form the riser element 7a in addition to its terminal portion 12a is provided with a toothed or rib portion 21 adapted, when the said elements are assembled, to coact with the portion 20 of the tread element and be assembled to vary the widths of the treads.

It will be noted that the construction just described provides for both a change in riser heights and in tread widths and also provides for a convenient and efficient method of assembling said elements to form a step unit as they may be positioned in the manner described in assembling the units of the form of Fig. 1.

In the form of Fig. 8 the nose portion 8b of the tread is rounded and is formed to provide a channel-like chamber 11b, with a wall of said chamber having spaced apart ribs 22. This chamber 11b is adapted to receive a ribbed terminal portion 12b of the riser element 7b. It will be understood that this ribbed terminal portion may be positioned within the chamber so as to vary the riser heights.

The form of Fig. 11 is somewhat similar to the form of Fig. 7, but in this form, I provide different means for adjusting the riser heights and slightly different means for the change in tread widths. As shown, in place of the spacer elements 18 I provide a wall of the chamber 11c with teeth 23, or a strip to be inserted therein with said teeth, and form coacting teeth 24 on the riser element or its terminal portion that is to be received in the chamber 11c; and provide teeth 25 and 26 on terminal ends of the tread and riser elements which are designed to coact to vary the width of the tread elements.

What I claim is:

1. In a stair construction, a plurality of step units comprising angularly related risers and treads, said risers having depending forwardly offset terminal portions at their upper edges, said treads having depending noses with inner vertical walls spaced from the treads providing channel-like chambers, said terminal portions being adjustably disposed in adjacent chambers with said vertical walls located between the adjacent terminal portions and risers, the height of each terminal portion being greater than the distance between the end of the corresponding inner vertical wall and the adjacent tread.

2. In a stair construction, a plurality of step units comprising angularly related risers and treads, said risers having depending forwardly offset terminal portions at their upper edges, said treads having depending noses with inner vertical walls spaced from the treads providing channel-like chambers, said terminal portions being adjustably disposed in adjacent chambers with said vertical walls located between the adjacent terminal portions and risers, the height of each terminal portion being greater than the distance between the end of the corresponding inner vertical wall and the adjacent tread, and a series of spacers having a collective thickness equal to the difference in dimension between the height of the terminal portion and the distance from the bottom of the chamber to the adjacent tread.

3. In a stair construction, a plurality of step units comprising angularly related risers and treads, said risers having depending forwardly offset terminal portions at their upper edges, said treads having depending noses with inner vertical walls spaced from the treads providing channel-like chambers, said terminal portions being adjustably disposed in adjacent chambers with said vertical walls located between the adjacent terminal portions and risers, and a series of teeth on said terminal portions and walls interengageable at different adjustment.

4. In a stair construction, a plurality of step units comprising angularly related risers and treads, said risers having depending forwardly offset terminal portions at their upper edges, said treads having depending noses with inner vertical walls spaced from the treads providing channel-like chambers, said terminal portions being adjustably disposed in adjacent chambers with said vertical walls located between the adjacent terminal portions and risers, said risers at their lower edges having inwardly extending flanges, and returned hooks on the adjacent edges of the treads in which said flanges are adjustably disposed.

5. In a stair construction, a plurality of step units comprising angularly related risers and treads, said risers having depending forwardly offset terminal portions at their upper edges, said treads having depending noses with inner vertical walls spaced from the threads providing channel-like chambers, said terminal portions being adjustably disposed in adjacent chambers with said vertical walls located between the adjacent terminal portions and risers, said risers at their lower edges having inwardly extending flanges provided with teeth, and hooks on the adjacent edges of the treads returned over said flanges having teeth interengaged with the first mentioned teeth to enable adjustment of tread width.

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