

[72] Inventor **George L. Cornell**
Harrison, Ark.
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 [73] Assignee **Ozark Metal Products, Inc.**
Harrison, Ark.

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Primary Examiner—Frank L. Abbott
Assistant Examiner—Leslie A. Braun
Attorney—Kinzer, Dorn and Zickert

[54] ADJUSTABLE STAIRS

2 Claims, 4 Drawing Figs.

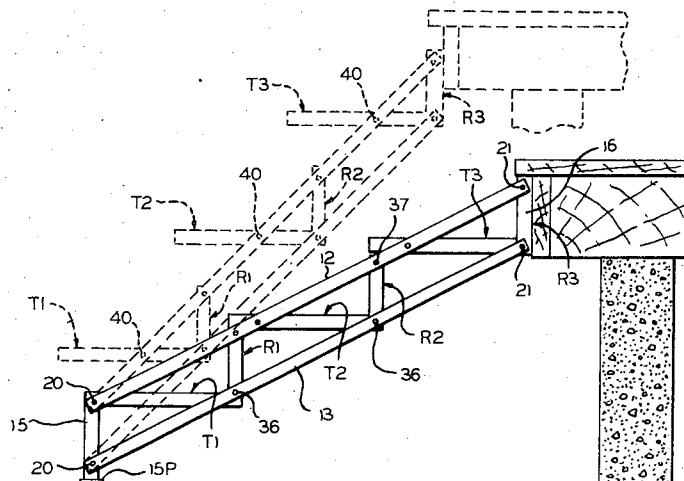
[52] U.S. Cl..... **52/183,**
52/188, 52/191
 [51] Int. Cl..... **E04f 11/06**
 [50] Field of Search..... **52/182-186,**
191, 188

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ABSTRACT: Adjustable stairs are presented by side supports each including a pair of longitudinal stringers and a pair of end links transverse thereto, the four being pivotally joined as a parallelogram. The stair tread and riser span the supports and are pivotally connected thereto, preferably at the angle where the tread and riser meet. The stairs can therefore be manipulated as a flexible assembly to meet the pitch angle required, whereafter the side of the tread is fastened to the stringers to produce a fixed relationship.



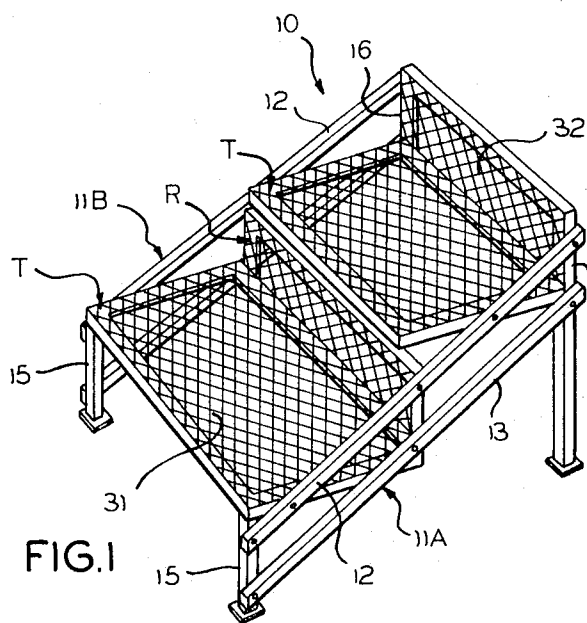


FIG. 1

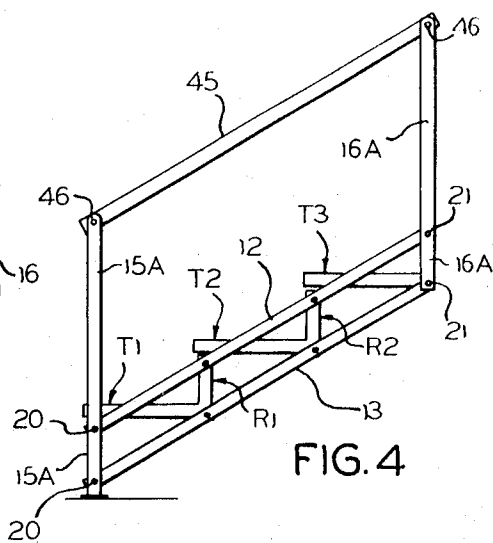


FIG. 4

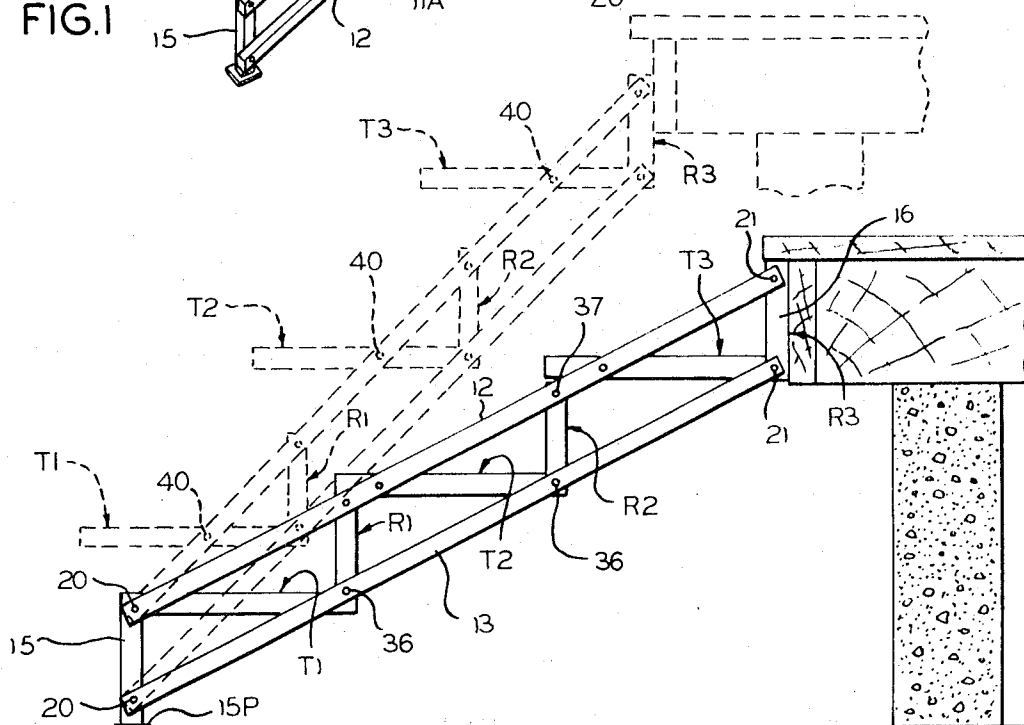


FIG. 2

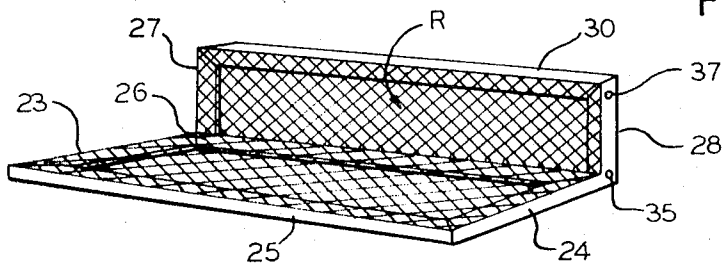


FIG. 3

INVENTOR
GEORGE L. CONNELL

BY *Linger, Barn and Zickert*
ATTORNEYS

ADJUSTABLE STAIRS

This invention relates to an adjustable stairway.

The primary object of the present invention is to furnish adjustable stairs for use with mobile homes, cottages, campers and so on, particularly in terms of an inexpensive metal construction compared to more costly custom-built stairs. Specifically, the object of the invention is to construct the stairs with side supports in the form of adjustable parallelograms with stair treads and risers supported therebetween on pivot points in such a fashion as not to interfere with but to actually participate in the adjustment, whereby the parallelograms can be extended (for a greater height) or retracted (for less of an angle) as the case may be without interference from the tread and riser. Thus, the pitch or angle of the stairway may be easily adjusted to fit the need, and then the stair tread may be permanently secured.

Another object of the present invention is to construct the stairs for rugged, weatherproof use and yet sufficiently light in weight as to be easily transported.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawing which, by way of illustration, shows preferred embodiments of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be made as desired by those skilled in the art without departing from the present invention.

In the drawings:

FIG. 1 is a perspective view of one embodiment of the invention;

FIG. 2 is a view of another embodiment of the invention showing adjustments which are possible;

FIG. 3 is a perspective view of a preferred form of tread and riser one-piece assembly; and

FIG. 4 is a view of yet another embodiment. One embodiment of the adjustable stairs of the present invention is illustrated at 10 in FIG. 1, including a pair of spaced, opposed side supports 11A and 11B in the form of parallelograms. Each side support comprises parallel, longitudinal stringers 12 and 13 and a pair of parallel end links 15 and 16, transverse thereto. The end links 16 are at the forward end of each side support, and in fact the lower ends thereof, when the stairs are in use, will be at ground level, or a level equivalent thereto. In the same sense of orientation it will be observed that the stringers 12 are the upper ones of the pair of each set.

The side supports thus afforded are spaced apart by a width corresponding to the width of the stair tread T. The sides of the tread T are permanently fixed to the upper stringers 12 as hereinafter described, and in the preferred construction each of the stair treads T has a riser R extending upward from the rear edge thereof.

The end links 15 and 16 are pivotally connected at their opposite ends to the stringers 12 and 13 so that the four members together represent a flexible, articulated assembly capable of being adjusted to meet the required pitch at the installation site as shown in more detail in FIG. 2.

Thus referring to FIG. 2, a low level or small pitch installation is shown in solid lines, whereas a high level or large pitch angle installation is shown in dotted lines. The construction differs from that in FIG. 1 only in the number of treads and the length of the stringers; therefore like reference characters are used. Considering first the low level installation it may be noted that the end bars or links 15 are provided with pads 15P which engage some solid support, such as the ground. The fore ends of the stringers 12 and 13 are pivotally joined to the front link 15 by suitable pins 20, and at their upper or rear ends the stringers 12 and 13 are similarly connected pivotally to the rear links 16 by pivot pins 21. The assembly thus described is fully articulated, and the spacing between the stringers 12 and 13 is determined by the distance separating the pins 20 which is the same as the distance separating the pins 21.

In the embodiment shown in FIG. 2 there are three stair treads T1, T2 and T3. Similarly there are three risers R1, R2

and R3. The treads and risers thus afforded are of the construction shown in FIG. 3, each tread including a frame constructed from a pair of side angle bars 23 and 24 joined and spaced by a transverse front angle bar 25, the ends being welded or otherwise fixedly secured one to another. The length of the angle bar 25 represents the spacing between the parallelogram side supports. The rear ends of the tread side members 23 and 24 are joined by a rear angle bar 26.

Extending upward from the rear angle bar 26 are a pair of vertical angle bars 27 and 28 presenting the height of the riser, and the top of the riser is defined by a top transverse angle bar 30. Again, the ends of the angles are welded to afford a rigid construction.

The tread support and the riser face or stop are preferably constructed from expanded metal as shown by the reference characters 31 and 32 in FIG. 1.

The tread and riser thus afforded represents a rigid one-piece structure, and the angle or corner where the two meet is provided with openings as 35, FIG. 3, through which a suitable bolt may be passed. Similar openings are provided in the two lower stringers as 13. Bolts are then passed through the aligned openings, joining each one-piece tread and riser assembly to the lower stringer of each side support. Each bolt becomes a pivot pin 36, FIG. 2. The pivot pins 20 and 21 may also be bolts.

Openings 37 for additional bolts are provided at the upper end of each of the side bar risers 27 and 28, FIG. 3. Similar openings are provided in the upper stringers 12, enabling bolts 37, FIG. 2, to be passed therethrough whereby the side bars of the risers are pivotally joined to the stringers just as the end links 15 and 16 are pivotally joined to the stringers. Resultantly, the assembly shown in solid lines in FIG. 2 may be readily shifted to a larger pitch angle shown by dotted line, one manifest difference being that the vertical distance separating the tread surfaces becomes larger. After the desired adjustment has been made, openings 40 may be drilled through the tread side bars 23 and 24, whereby additional bolts may be passed therethrough to rigidify the stair structure. The upper end links or bars may be attached to the floor structure of the quarters having the entrance rendered accessible by the stairs of the present invention. As will be apparent from FIG. 2 the top or upper riser R3 will in all instances fit flush against the floor joist.

Another embodiment of the invention is shown in FIG. 4 in which the only essential change is that the end links may be of extended height, 15A and 16A, at each side of the assembly so that a hand rail 45 may be supported at the upper ends thereof. Thus the end links 15A and 16A are pivotally connected to the elongated stringers precisely in the manner described above, and in fact like reference characters are used to identify like parts and connections in FIG. 4. Consistent with the desired adjustable feature, the opposite ends of the hand rail 45 are pivotally connected by pivot pins 46 to the upper ends of the handrail supports 15A and 16A.

Hence while I have illustrated and described preferred embodiments of the present invention it is to be understood that these are capable of variation and modification.

I claim:

1. Adjustable stairs comprising a pair of opposed side supports the lateral spacing of which characterizes the width of the stairs and each constructed from a pair of spaced parallel stringers and a pair of vertical end links, one stringer being a lower stringer and the other an upper stringer, the end link for each support being respectively connected pivotally to the front end of the stringers of the related support so that each side support may be an adjustable parallelogram, the lower ends of the links extending below the lower stringer to serve as support of the stairs at ground level, and at least one tread and riser stair assembly spanning the side supports, said stair assembly including a horizontal tread and a vertical riser joined together as a rigid one-piece member, the top of the riser is connected pivotally to the upper stringers of each side support, and said assembly is pivotally connected to each lower

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stringer at the angle between the tread and riser the opposed sides of the front of the tread being connected to the upper stringers to lock the stairs in adjusted position and the riser of the topmost stair assembly having means for attachment to a supporting structure.

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2. Adjustable stairs according to claim 1 wherein the vertical riser and the tread are constructed from angle bars affording a metal framework, the tread support and the riser face being expanded metal fastened to the framework.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,626,438

Dated December 7, 1971

George L. Connell

It is certified that an error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

"Inventor: George L. Connell".

Signed and sealed this 13th day of June 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents