

Feb. 6, 1968

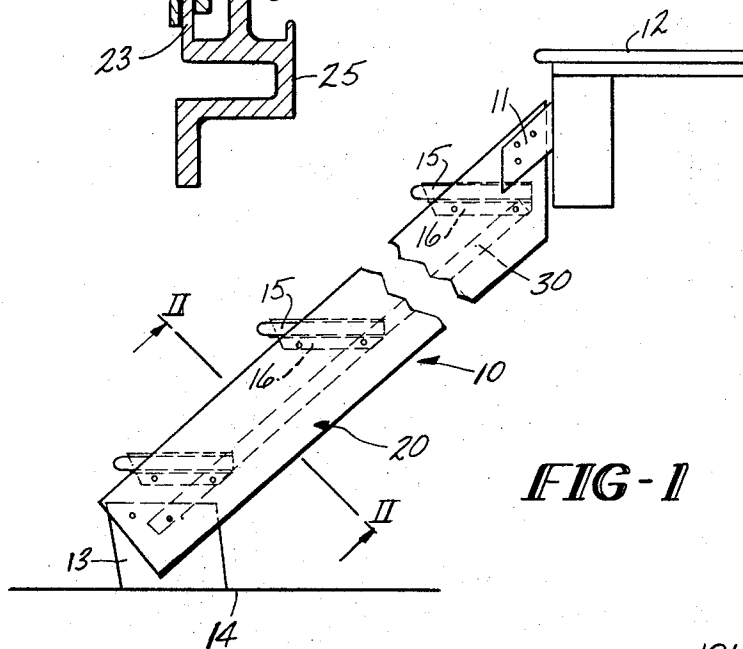
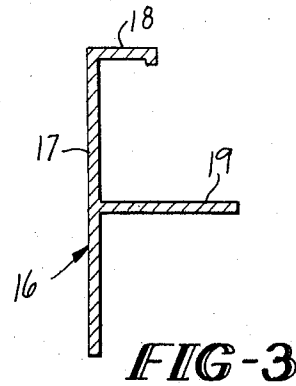
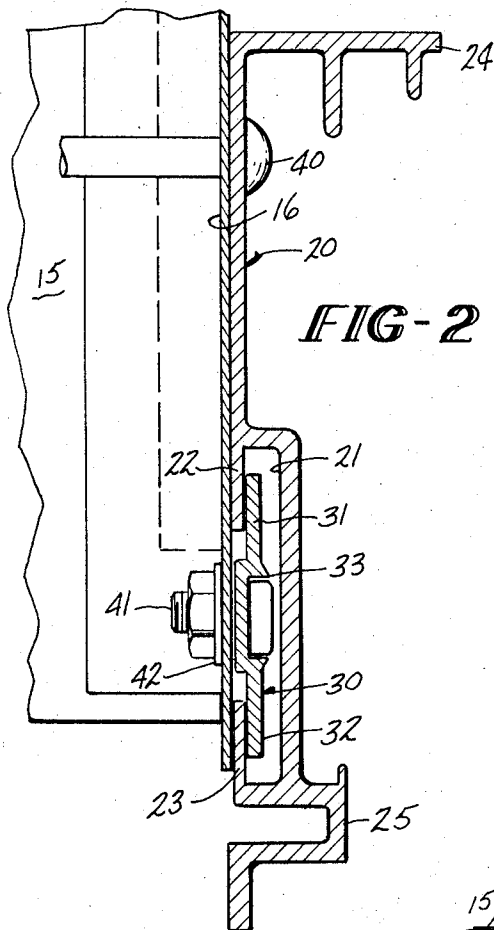
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3,367,444

ADJUSTABLE STAIRWAY

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2 Sheets-Sheet 1



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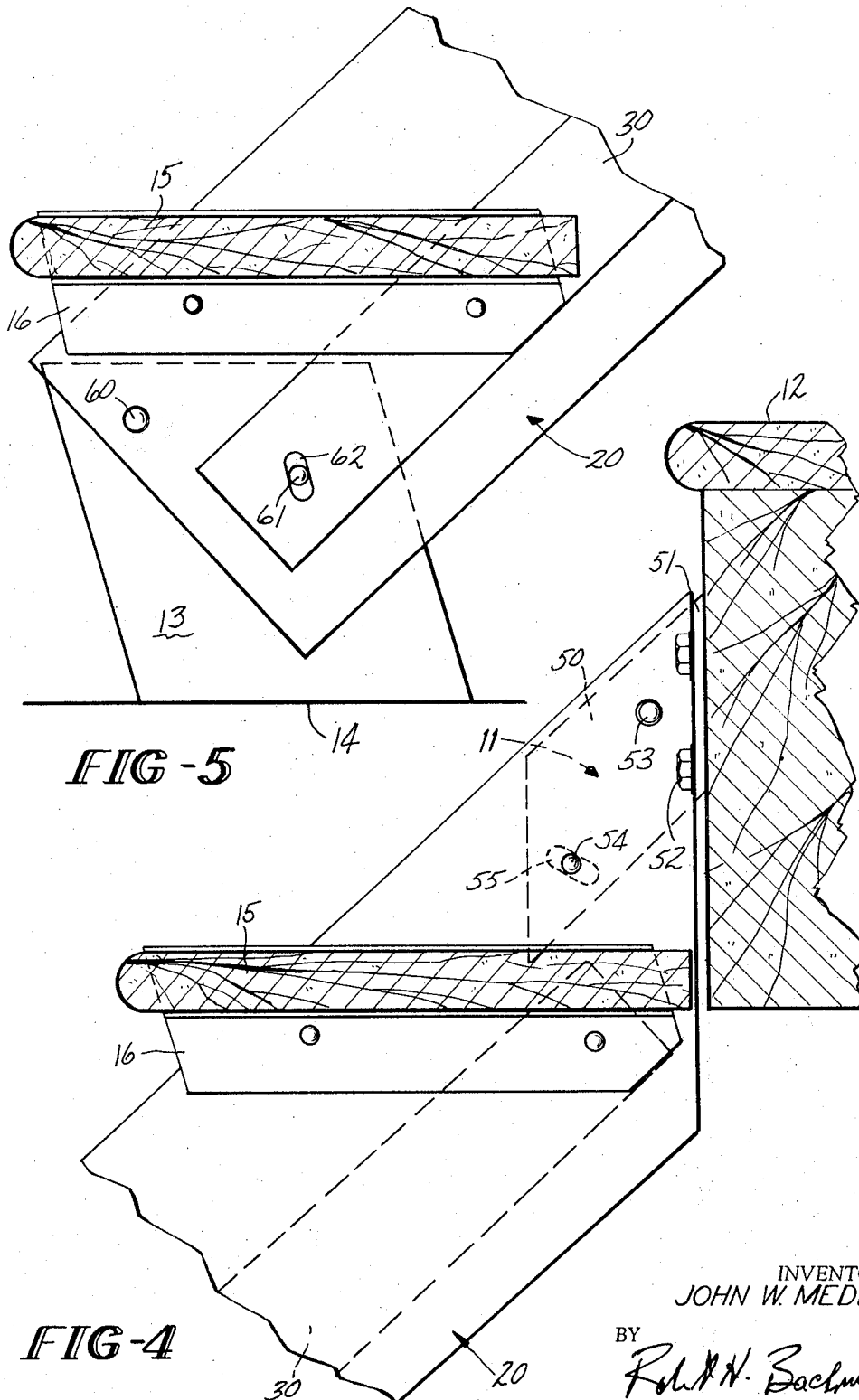


FIG-4

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3,367,444

ADJUSTABLE STAIRWAY

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ABSTRACT OF THE DISCLOSURE

The instant invention relates in general to stairways, and more particularly to a stairway having treads which may be simultaneously adjusted to a desired angle.

In such fields as the home construction industry, where the requirements for a particular stairway may vary, it has been considered necessary to either make available a wide variety of stairway models, or to construct a stairway at the site of the intended use. Exemplary of such an application is the familiar basement stairway in a home, wherein the characteristics of the stairway must be varied in accordance with varying ceiling heights for the basement.

According to the instant invention, a prefabricated stairway device is provided, the stairway having provision for simultaneously adjusting the angular disposition of the treads thereon, so that the stairway may be appropriately modified for a wide variety of installations.

Previous attempts at providing units with treads which may be suitably adjusted have been found to be unsatisfactory for the use above indicated. For example, U.S. Patent 1,189,514, issued July 4, 1916, discloses a stairway having treads which may be adjusted. The construction there shown is not adapted for permanent installation as a stairway or the like, and is not of the reliability of the construction embodied in the instant invention.

Similarly, U.S. Patent 2,888,182, issued May 26, 1959, discloses a variable pitch stairway, wherein the treads are pivotally suspended from common stringers. This construction is a quite complex one, and also is not suited to the permanent installation contemplated for the instant invention.

It has been found that the above disadvantages may be obviated, in a relatively simple and inexpensive manner of construction, by providing in general a pair of stringers each adapted at one end thereof for pivotal connection to a first supporting surface, a plurality of tread members pivotally connected between the stringers, a slide means joining the tread members whereby pivotal movement of one of the tread members is translated to the remainder of the tread members, and means for securing one of the tread members in a predetermined angular disposition with respect to the stringers, thereby simultaneously securing the remainder of the tread members in the desired predetermined angular disposition.

Accordingly, it is a primary object of this invention to provide a stairway wherein the treads thereof may be simultaneously adjusted to a desired angular position.

It is a further object of this invention to provide such a stairway which is simple in construction and inexpensive in cost.

It is a still further object of this invention to provide a stairway device comprising in general the elements indicated above.

Further objects and advantages will become apparent to those skilled in the art as a detailed description of a particular embodiment proceeds with reference to the drawings which form a part hereof, and in which:

FIGURE 1 is a side view of an exemplary installation

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of a stairway in accordance with this invention, many of the details being deleted for the sake of clarity;

FIGURE 2 is a fragmentary cross-sectional view of the stairway of FIGURE 1, taken along the line I—I thereof;

FIGURE 3 is a cross-sectional view through one of the elements of the stairway of FIGURE 1;

FIGURE 4 is an enlarged cross-sectional view of the upper portion of the stairway illustrated in FIGURE 1; and

FIGURE 5 is an enlarged cross-sectional view of the lower portion of the stairway illustrated in FIGURE 1.

Referring now to FIGURE 1 of the drawings, there is depicted an exemplary installation of a stairway according to the instant invention, illustrated generally as 10. The stairway 10, various details of which are deleted in FIGURE 1 for the sake of clarity, includes a connection means 11 at one end thereof for connecting one end of the stairway device 10 to a first supporting surface, such as a structural portion of a floor 12, and a second connecting means 13 at the other end for engaging a second supporting surface, such as a basement floor 14. Along the length of stairway device 10 are a plurality of tread members 15, which are pivotally adjustable in a manner to be indicated shortly.

The stairway device 10 comprises in general a pair of stringers, a pair of slide means, and the tread members 15. The precise construction may be seen in FIGURE 2, which is a partial cross-sectional view taken along the line II—II of FIGURE 1 and illustrating in particular the connection of one of the tread members 15 to the remaining construction of the stairway. It is to be understood that the construction of FIGURE 2 is an illustration of one side of the stairway illustrated in FIGURE 1, the opposite side being a mirror image of that shown in FIGURE 2.

Each of a pair of stringers 20 includes an open-sided pocket 21 along the full length thereof for accommodating a slide means 30, to be discussed in detail shortly. Forming the open side of the pocket 21, along the full length thereof, are two flanges 22 and 23. The stringer 20, which is for example of a metal extrusion, may further include, as at the upper end 24 or lower end 25, any desired appurtenances for mating with other structural members, such as columns in a wall, or sheets of insulation. Various of the details of the stringer 20 as illustrated in FIGURE 2 are deleted in FIGURES 1, 4, and 5 for the sake of clarity.

Confined within the pocket 21 is a slide means 30, slidable within the pocket 21 by engagement with flanges 22 and 23 of wing members 31 and 32. The slide means 30 extends for substantially the full length of slot 21, as is best illustrated in FIGURE 1. Like the stringer 20, the slide means 30 may be a metal extrusion.

Considering now the connection between the two stringers 20, and the connection of each of the tread members 15 to the remaining construction of the device, reference is first had to a tread retainer 16 depicted in general in FIGURE 1 and the cross-section thereof depicted more specifically in FIGURE 3. As depicted in FIGURE 3, the tread retainer 16 comprises a relatively long side portion 17 and portions 18 and 19 extending transversely from the side portion 17, between which a tread 15 may be appropriately secured. Referring again to FIGURES 1 and 2, it may be seen that the two stringers 20 are joined together by a fastening means 40 extending through appropriate apertures in the stringers 20 and in the side portion 17 of the tread retainers 16. Appropriate tensioning of the fastening means 40, which may for example be a nut and bolt, interconnects the two stringers 20 and provides one point of attachment for the tread member 15. As can best be seen in FIGURE 2, a

second point of attachment for the tread member 15 is accomplished by a fastening means 41 extending through appropriate apertures in the slide means 30 and lower end of the side portion 17 of tread retainer 16. Fastening means 41 may, for example, take the form of a nut and bolt, with a lock washer 42 employed if desired, the bolt 41 being appropriately secured against rotation in a groove 33 of sliding means 30. Alternatively, a rivet may be employed in place of the nut and bolt illustrated.

It will now be appreciated that the stringers 20 are effectively interconnected by the fastening means 40, each of which provides a first point of attachment for each of the tread members 15. The tread members 15 each having a second point of attachment to the slide means 30, it will be evident that as one of the tread members 15 is moved to a desired angular disposition with respect to the stringers 20, the remaining tread members 15 are simultaneously also moved to an identical angular disposition. When one of the tread members is oriented in the appropriate angular disposition, thereby simultaneously orienting the remaining tread members in identical angular dispositions, all such tread members may be secured against rotation by tightening one or more of the fasteners 41, or the slide means 30 may be secured in a manner to be indicated shortly.

Clearly, the tread members 15 are to be adjusted in a position which renders them substantially horizontal, the angular disposition with respect to the stringers 20 varying with the distance between the supporting surfaces 12 and 14. For standard basement heights, it may be advantageous to mark upon an inner surface of the stringer 20 a series of indicia corresponding to the appropriate position of a tread member 15 for a given basement height. Such indicia may be applied in any desirable way, as for example by a decal or the like.

Referring now to FIGURE 4 of the drawings, there is illustrated in detail the connection of the upper portion of the stairway 10 to a supporting surface 12. A connection 11 in the form of an L-shaped plate having one leg 50 in contact with an outer face of the stringer 20 is effected by means of a fastening means 53 extending through appropriate apertures in the leg 50 of connection 11 and through the stringer 20. As a second point of connection, the leg 50 may be provided with a slot 55 for registry with an appropriate aperture in stringer 20 for receiving an appropriate fastening means 54, thereby allowing for movement of the stringer 20 in adjusting for the varying basement heights.

Considering now FIGURE 5, there is illustrated in detail the engagement of the lower portion of stairway 10 with a supporting surface 14. Extending through the stringer 20 and through a portion of a suitably shaped base plate 13 is a fastener 60. As a second point of attachment, a suitable fastener 61, such as a nut and bolt, extends through a groove 62 in the base plate 13 and through a suitable aperture in the slide means 30, thereby allowing the base plate 13 to pivot to insure flush engagement with the supporting surface 14. When the fastening means 41 of FIGURE 2 comprises a rivet, the tread members may be secured in their desired angular disposition by tightening the fastener 61 after the base plate 13 is brought into flush engagement with supporting surface 14. Such securing of the slide means 30 against movement

effectively secures each of the tread members 15 in the desired angular disposition.

As will be apparent to those familiar with the art, ancillary structure, such as hand rails, may be added to the instant stairway device as required.

It is to be understood that the invention is not limited to the illustrations described and shown herein which are deemed to be merely illustrative of the best modes of carrying out the invention, and which are susceptible of modification of form, size, arrangement of parts and detail of operation, but rather is intended to encompass all such modifications which are within the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A stairway of the character described, comprising (A) a pair of stringers each adapted at one end thereof for pivotal connection to a first supporting surface, said stringers including an open sided pocket along substantially the full length thereof, said open sided pocket having flanges for accommodating a slide means,
- (B) a plurality of tread members pivotally connected between said stringers,
- (C) slide means adjacent said stringers extending substantially the full length thereof, said slide means confined within said pocket and in sliding engagement with said flanges, said slide means further joining said tread members whereby pivotal movement of one of said tread members is translated to the remainder of said tread members, and
- (D) tread retaining means for securing at least one of said tread members in a predetermined angular disposition with respect to said stringers, thereby securing the remainder of said tread members in said predetermined angular disposition.
2. A stairway according to claim 1 wherein said pair of stringers are interconnected by fastening means extending through said tread members.
3. A stairway according to claim 1 wherein the means of paragraph (D) comprises means securing said slide means against movement.
4. A stairway according to claim 1 further including at least one base member for engaging a second supporting surface, said base member being pivotally connected to one of said stringers.
5. A stairway according to claim 4 wherein said base member is additionally connected to one of said slide means, said base member including means for securing said slide means against movement, said last mentioned means defining the means for securing at least one of said tread members in a predetermined angular disposition with respect to said stringers.

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