Nov. 9, 1965 H. A. BEST 3,216,160

PRECAST CONCRETE STEP

Filed April 11, 1963

Fig. 1.

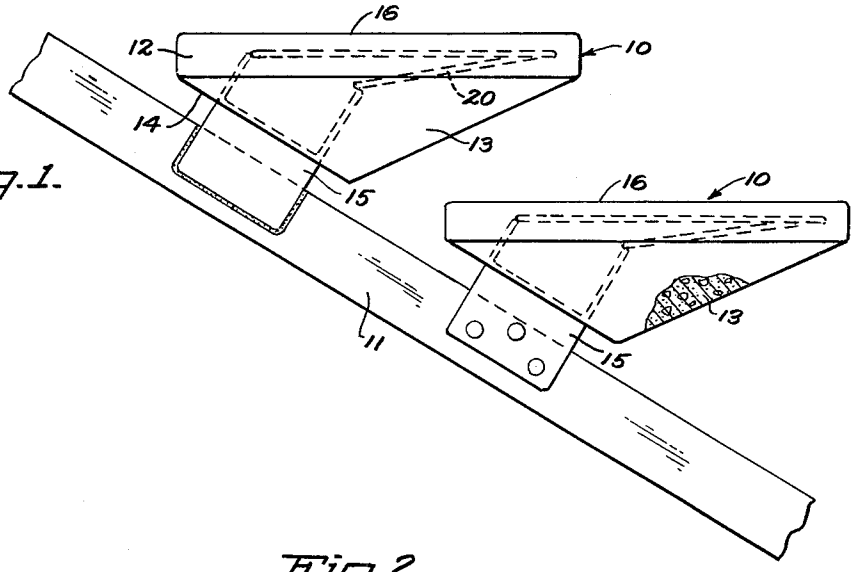


Fig. 2.

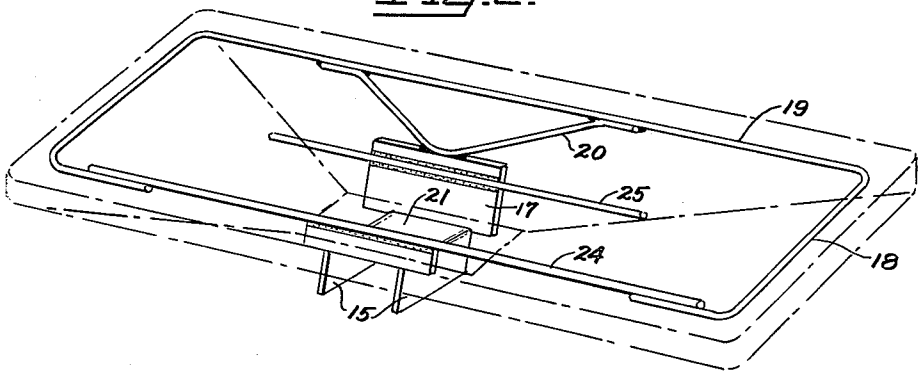
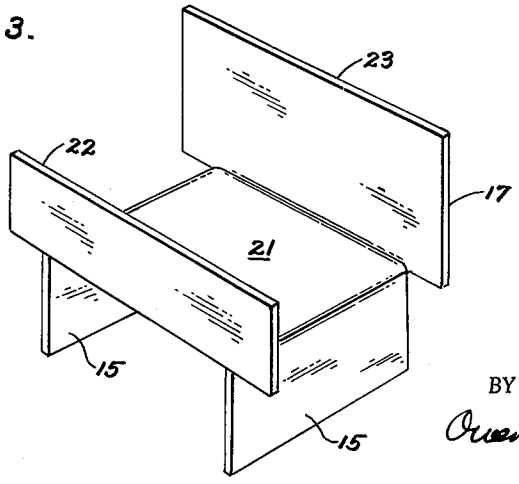


Fig. 3.



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PRECAST CONCRETE STEP

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This invention relates to precast reinforced concrete building components and more particularly to an improved precast concrete step or tread for use with various types of buildings.

Precast reinforced concrete steps are now preferred for many types of modern buildings including apartment houses and office buildings not only because of their inherent strength characteristics, but also because they are often more attractive and less expensive than steps made of other materials. Generally, such steps are first cast to a predetermined shape and then are attached at spaced apart intervals to a suitable building support structure such as a sloping beam to form a stairway.

One principal object of my invention is to overcome a problem which arose relating to the installation of such precast concrete steps on a sloping beam of a building to form a stairway. Essentially, the problem was to provide a precast step that could be easily moved and adjusted into its properly aligned and level position during its installation, so that despite the degree of slope of the supporting beam or the individual shape of the step, the upper tread surfaces of all of the steps of the stairway could readily be made perfectly level.

Another object of my invention is to provide an improved precast reinforced concrete step structure that can be installed rapidly into its precise location with a minimum amount of labor and without the need for special tools.

Still another object of my invention is to provide a precast reinforced concrete step that has particularly high strength characteristics when fixed to a sloping beam in accordance with the invention.

More specifically, an object of my invention is to provide a precast reinforced concrete step having integral attaching means connected to the internal reinforcing members of the step but extending outwardly from the concrete and adapted to fit over the sides of a sloping beam to which it will be attached.

Another object of the invention is to provide a precast reinforced concrete step structure that is not only easy to install but which is particularly well adapted for ease and economy of manufacture.

Other objects, advantages and features of the invention will become apparent from the following detailed description of a preferred embodiment presented in accordance with 35 USC 112.

In the drawings:

FIG. 1 is a view in elevation showing a portion of a stairway formed by a precast reinforced concrete step embodying the principles of the present invention;

FIG. 2 is a view in perspective of a reinforced concrete step according to the invention;

FIG. 3 is an enlarged view in perspective showing an attaching member that is partially embedded in the step to facilitate its installation.

Referring to the drawings, FIG. 1 shows a pair of precast reinforced concrete steps **10** embodying the principles of the invention and attached to a central stringer beam **11** that provides the central support for a stairway made up of a plurality of the steps **10**. In a typical building construction utilizing the concrete steps **10**, a single central stringer beam **11** is used. It preferably has a channel cross-section and is installed at a predetermined angle forming the desired slope of the stairway. The height of the stairway from ground level or between floor

levels may vary with the type and design of the building, and this will result in the use of various slopes and of various pitches or spacing between stair treads.

Each stair tread **10** is precast in a form from a suitable mixture of cement and aggregate that provides the necessary strength as well as a clean attractive apearance. Within each tread is provided a unique pattern of steel reinforcement bars that gives it the necessary internal strength. As shown in FIG. 1, each tread **10** has an upper rectangular portion **12** having a substantially uniform thickness below which extends an inverted generally pyramidal shaped portion **13**. A rear sloping face **14** of the lower pyramidal portion **13** on each step **10** is formed preferably at an angle to the upper rectangular portion **12** that is generally equal to the slope angle of the central stringer beam **11** to which the steps are to be attached. However, it is not essential that these angles be equal because each step **10** is provided with a pair of external lug members **15** that extend outwardly from the sloping surface **14** and are spaced apart to fit over the central stringer beam **11**. These lugs thus provide a means for adjusting the position of the tread or step **10** on the stringer beam **11** so that it can be held in exactly the proper position with its upper surface **16** absolutely level as it is permanently fixed to the beam **11**.

As shown best in FIGS. 2 and 3, the lug members **15** are a part of an integral metal attachment shoe **17** which is adapted to be buried within the precast step or tread **10** and welded or otherwise attached to portions of an internal metal reinforcing member **18** within the step. The internal metal reinforcing member **18** has a shape generally similar to and is buried within the upper portion **12** of the tread, being spaced inwardly from the edge thereof. Welded to the front portion **19** of the reinforcing bar member **18** is a generally V-shaped reinforcing member **20** that extends at an angle downward into the lower portion **13** of the tread.

As shown in FIG. 3, the attachment shoe **17** is preferably formed from a flat piece of rolled steel of a suitable thickness and the external lug members **15** are bent to extend perpendicular to a central plate portion **21** that is adapted to lie flush with the rear face **14** of each step **10**. Extending from the opposite side of the plate portion **21** at right angles to the lug members **15** are a pair of parallel internal lug members **22** and **23** of different lengths. The first and shorter internal lug members **22**, as seen in FIG. 2, is welded to a rear portion **24** of the rectangular reinforcing member **18** in the upper tread portion **12** which is parallel to the front portion **19**. The longer internal lug member **23** of greater length is welded to the V-shaped reinforcing bar **20** that extends downwardly into the pyramidal portion **13** of the tread member **10**. An auxiliary reinforcement bar **25** may be welded to the second internal lug member **23** so that it extends longitudinally within the lower pyramidal portion **13** of the step to provide additional internal support.

When the step **10** is formed, the plate portion **21** of the attachment shoe **17** lies flush with the rear sloping surface **14** and the external lug members **15** extend perpendicular from it at a distance apart equal to the width of the central stringer beam **11** on which the steps **10** are to be attached. In attaching the steps to the stringer beam **10** they may be held in position manually or by a suitable jig or fixture while the external lug members **15** overlapping the opposite sides of the stringer beam are either welded or bolted thereto. During this installation procedure, the steps **10** may be tipped in any direction necessary to adjust their alignment or the level of the upper surface in the direction necessary.

From the foregoing it is apparent that my invention provides an improved concrete step structure. When in

use the major portion of the stress applied to each step is carried through the attachment shoe **17** internally to the reinforcement member **18** and the step is thus afforded an unusually high degree of strength and durability. The lug members **15** thus not only assure a strong attachment of the step **10** to a stringer beam **11**, but they also enable the step to be attached easily in the desired level position no matter what the slope of the stringer beam or the spacing between treads that is required.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A precast reinforced concrete step adapted to be attached to a sloping beam and to be spaced apart from other similar steps thereon to form a stairway, the improvement comprising: a body of solidified cementitious material having a substantially plane upper surface and an inclined surface on at least one lower side; a metal reinforcing bar member of a predetermined pattern buried within said body and having spaced apart portions extending longitudinally within said body; a metal attachment shoe having a pair of internal lug members extending within said step and welded to said spaced apart portions of said reinforcing bar member; and external lug members extending outwardly from said inclined surface on said body and thereby positioned for attachment to the sloping beam so that the upper surface of the step is in a true horizontal plane.

2. A precast reinforced concrete step adapted to be attached to a sloping beam and to be spaced apart from other similar steps thereon to form a stairway, the improvement comprising: a substantially rectangular shaped body of cementitious material having an upper portion with a plane upper surface and a tapered lower portion having an inclined surface on one side thereof; a metal reinforcing bar member embedded within said body, said bar member forming a closed rectangular loop in the upper portion of said body and sections of said loop being spaced inwardly from the edges of said body, a generally V-shaped reinforcing member having a first portion connected to one section of said loop in said upper portion with a second portion of said V-shaped reinforcing member extending downward into the lower portion of said body; an attachment shoe having a pair of internal lug members extending into and embedded within said body with one lug welded to said one section of said loop in the upper portion of said body and the other lug welded to the second portion of said V-shaped reinforcing member in the lower portion of said body; and a pair of external lug members extending outwardly from said lower body portion and being thereby positioned for attachment to the sloping beam so that the upper surface of the step is in a true horizontal plane.

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