

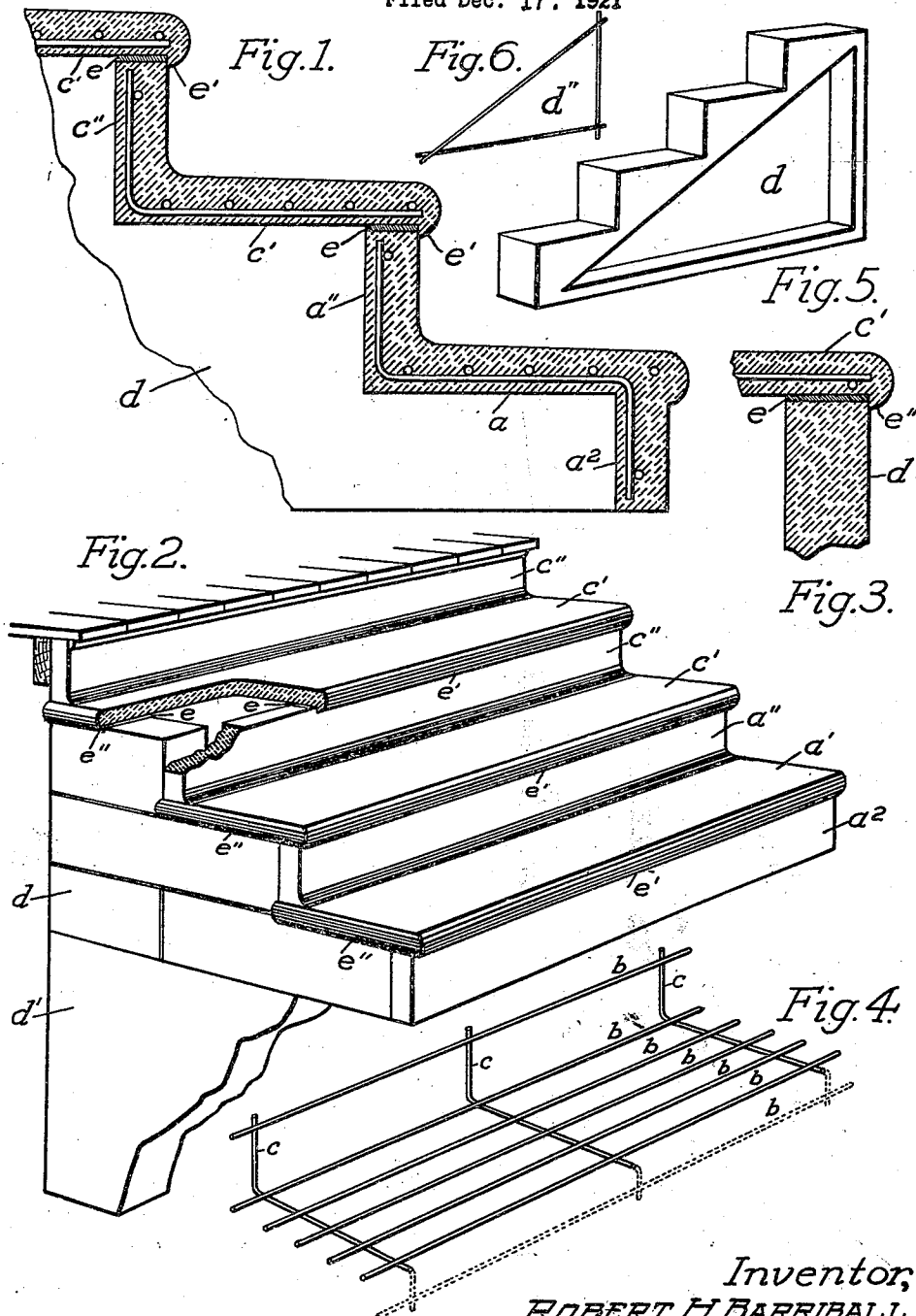
June 10, 1924.

1,497,058

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REINFORCED CONCRETE STAIRWAY OR STEPS

Filed Dec. 17, 1921



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UNITED STATES PATENT OFFICE.

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REENFORCED-CONCRETE STAIRWAY OR STEPS.

Application filed December 17, 1921. Serial No. 523,201.

To all whom it may concern:

Be it known that I, ROBERT H. BARRIBALL, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Re-enforced-Concrete Stairways or Steps, of which the following is a specification.

My invention relates to improvements in reenforced concrete stairway or steps, and has for its object the provision of a strong and durable stair structure which shall be adapted for long continued use out of doors without deterioration and the necessity for protecting against the elements.

Certain stair structures previously have been suggested, wherein concrete and metal elements are combined and bolted together to afford a fire-proof structure adapted for indoor use. However, experience has shown that a stairway which is partially or entirely constructed of metal is ill-adapted for out-of-door use, on account of the frequent necessity for protecting the metal against deterioration, or its liability to rust if unprotected for relatively short periods. Indeed, the metallic members of such a composite stairway are partly in critical and inaccessible locations, so that their protection is difficult, and their deterioration almost certain.

Accordingly, I have devised an improved and reenforced concrete stairway which eliminates all metallic supports or connections; is so constructed that the joints are all protected, and is built of easily handled sections which coact to reinforce and strengthen one another.

The structural features of my improvements and the particular advantages thereof may best be explained by making reference to the accompanying drawings, wherein:

Figure 1 is a vertical sectional view of the lower portion of a stairway or flight of steps embodying my invention.

Fig. 2 is a perspective view of said steps partially broken away in order to illustrate the concealed joints.

Fig. 3 is an enlarged fragmentary view in section of one of the concealed joints.

Fig. 4 is a perspective view of the reinforcement rods assembled for casting a stair section.

Fig. 5 is a rear perspective view of the preferred type of recessed concrete jack, and

Fig. 6 is a diagrammatic view of the re-

enforcement d'' inserted within the concrete body thereof.

Throughout the several figures of the drawings I have employed the same character of reference to indicate similar parts.

Referring first to Fig. 2, it will be seen that the flight of steps therein illustrated appear from the front to have been molded as a single unit, due to the fact that the joints are all protected or concealed, as best shown in the fragmentary view, Fig. 3. However, the steps, or others of any desired width and height may be constructed from two types of units, merely; one for the bottom step and the other type for the other steps thereof.

Type a of stair section is provided with a tread a' and two integral risers a'' , a^2 , respectively above and below the tread which reinforce it throughout its entire width. The reinforcement rods therefor are shown in Fig. 4, comprising the transverse series of rods b and the cross rods c (including those portions or extensions shown in dotted lines). These rods are molded into the concrete unit in the well known manner to afford the usual internal reinforcement of that material.

Type c of stair section is identical with type a , except that it is provided with a riser only along its rear edge; comprising the tread c' and integral riser c'' . The reinforcement rods therefor are shown in full lines, Fig. 4, but it will be understood that such reinforcement is shown merely by way of illustration and may be varied in accordance with the requirements of different classes of steps or stairs.

These units may be readily handled in normal widths of steps by two workmen, who can easily carry and position them in building the steps, unit by unit. The side supports therefor comprise lateral jacks d of masonry or cellular concrete construction, suitably bedded upon stone-work d' preferably carried down below the frost line. These jacks afford risers of the same height as the proposed flight of steps.

Upon these jacks and along the upper edges of the risers a'' and c'' layers of mortar e are spread for bonding the units and uniting them with the jacks. It will be observed that the units a and c are provided with downwardly extending edges e' and e'' which serve to conceal the joints and protect the mortar thereof. Moreover, these

members e' and e'' materially strengthen and unite the completed steps or stair structure, as will best be appreciated by referring to the sectional views, Figs. 1 and 3.

5 It will also be noted from Fig. 1 that the treads a' and c' are gradually thickened rearwardly and are built up at the angle of the riser, in order to drain off the water and strengthen the step in this critical position.
10 Moreover, the reinforcement for the treads and risers preferably is positioned closely adjacent to the bottom and rear faces thereof, respectively, so that the continuous members are most efficiently disposed to withstand the strains particularly noticeable at
15 the angles of the concrete members.

The precast reinforced concrete units, except for the bottom step, are substantially L-shaped in cross section and identical in
20 form. All of these units are relatively light, yet by reason of the fact that they are built one upon another, with the riser of the next lower step supporting and reinforcing the forward edge of the tread throughout its
25 width, while its integral riser reinforces the rear edge of said tread, maximum strength is insured in the completed structure, with a given section of reinforced concrete.

It is apparent that the steps of my invention are essentially adapted for erection
30 out-of-doors, since the joints are all protected and no metal is employed for connecting or supporting the units, whereby the structure would be liable to certain and relatively
35 rapid deterioration.

Having now described the preferred embodiment of my invention in a form typical of various practical applications thereof, I claim as new, together with such modifications as may be made by the exercise of
40 ordinary skill in the art, and desire to secure by Letters Patent, the following:

1. A unit for constructing reinforced concrete steps, as a new article of manufacture,
45 comprising an integral tread and rearwardly positioned riser; said tread having a recessed plane under face with downturned edges continuous along three of its sides adapted to cover and conceal the mortar joints; all being integrally cast from
50 concrete mixture and containing reinforcing metallic members extended adjacent to the downturned edges, substantially as set forth.

2. A unit for constructing reinforced concrete steps, as a new article of manufacture, comprising an integral tread and forwardly and rearwardly positioned riser
55 members below and above said tread for the lower or bottom step; all being integrally

cast from concrete mixture and containing continuous reinforcing metallic members positioned adjacent to the bottom and rear faces respectively extending through all of the sections of the unit, substantially as set
65 forth.

3. A unit for constructing reinforced concrete steps, as a new article of manufacture, comprising an integral tread and forwardly and rearwardly positioned riser
70 members below and above said tread constituting the lower or bottom step; said tread having downturned edges adapted to cover and conceal the mortar joints, and also having reinforcement members extending into the riser members, in the form
75 of metallic rods bent to shape, substantially as set forth.

4. Reinforced concrete steps adapted for out-of-doors installations, comprising a
80 plurality of precast concrete units, each comprising an integral tread and rearwardly positioned riser built one upon another; the treads having down-turned edges adapted to cover and conceal the mortar joints,
85 and respectively resting upon and supported by the riser of the next lower step, and laterally positioned jacks affording corresponding risers; all united by concealed mortar bonds, substantially as set forth.
90

5. Reinforced concrete steps adapted for out-of-doors installations, comprising a plurality of precast embedded metal and concrete units each comprising an integral
95 tread and rearwardly positioned riser built one upon another; the treads having downturned edges adapted to cover and conceal the mortar joints, laterally positioned jacks constructed from analogous weather-resisting material, and a footing for each jack
100 extending below the frost line; said jacks and concrete units being united by concealed mortar bonds, substantially as set forth.

6. In weather-resisting steps of the class described, the combination with lateral
105 jacks built to form risers of the desired height and number, of a plurality of precast reinforced concrete units; each comprising an integral tread and upturned riser with downturned edges along the tread,
110 built successively upon the jacks and upon each other to the desired height, and mortar joints protectively positioned beneath the edges of the treads and serving to bond the structure as a whole, substantially as set
115 forth.

In testimony whereof I do now affix my signature.

ROBERT H. BARRIBALL.