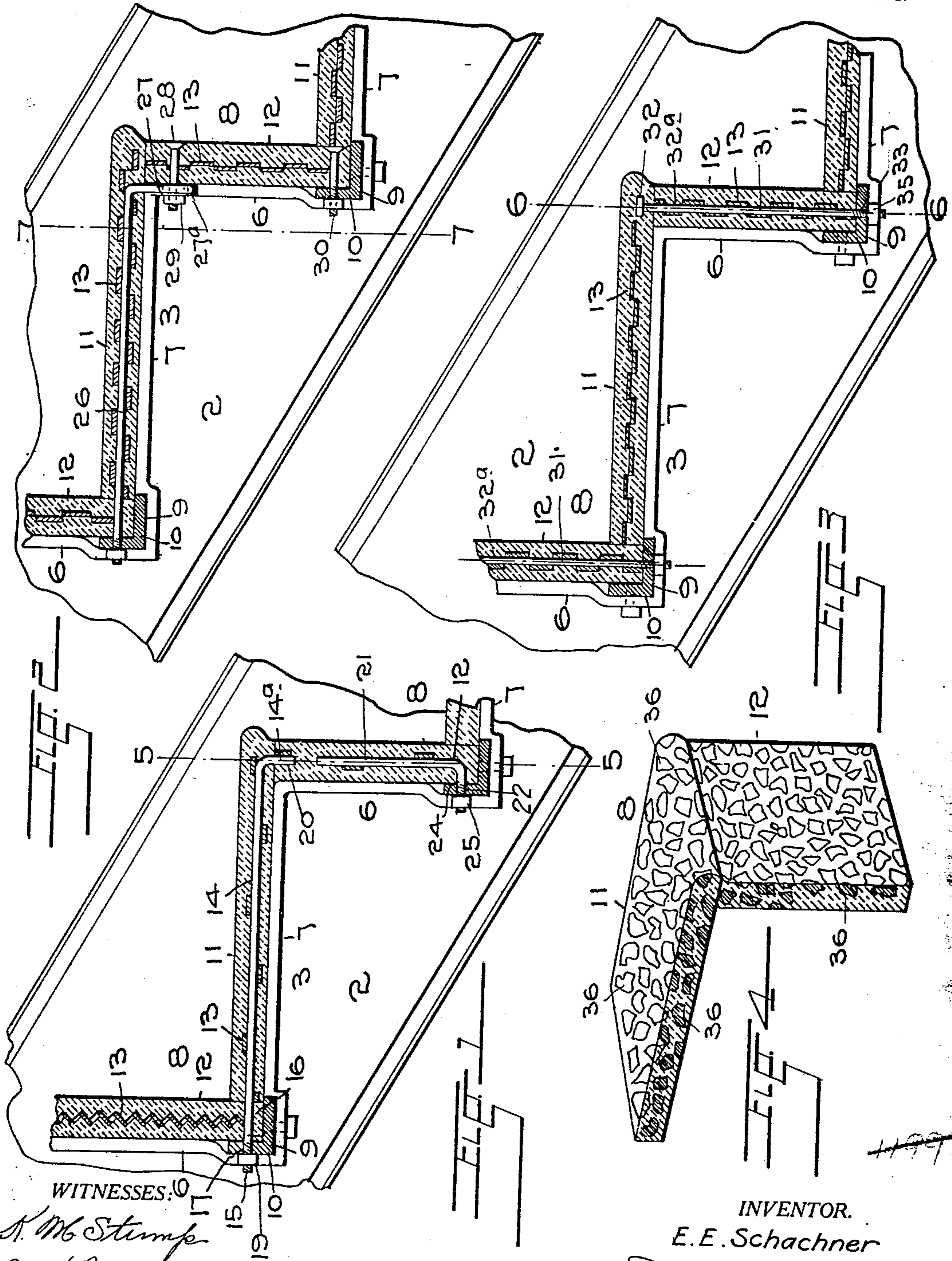


No. 870,905.

PATENTED NOV. 12, 1907.

E. E. SCHACHNER.  
STAIR CONSTRUCTION.  
APPLICATION FILED MAY 14, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

*A. M. Stimp*  
*E. K. Burrows*

INVENTOR.

*E. E. Schachner*

ATTORNEY.

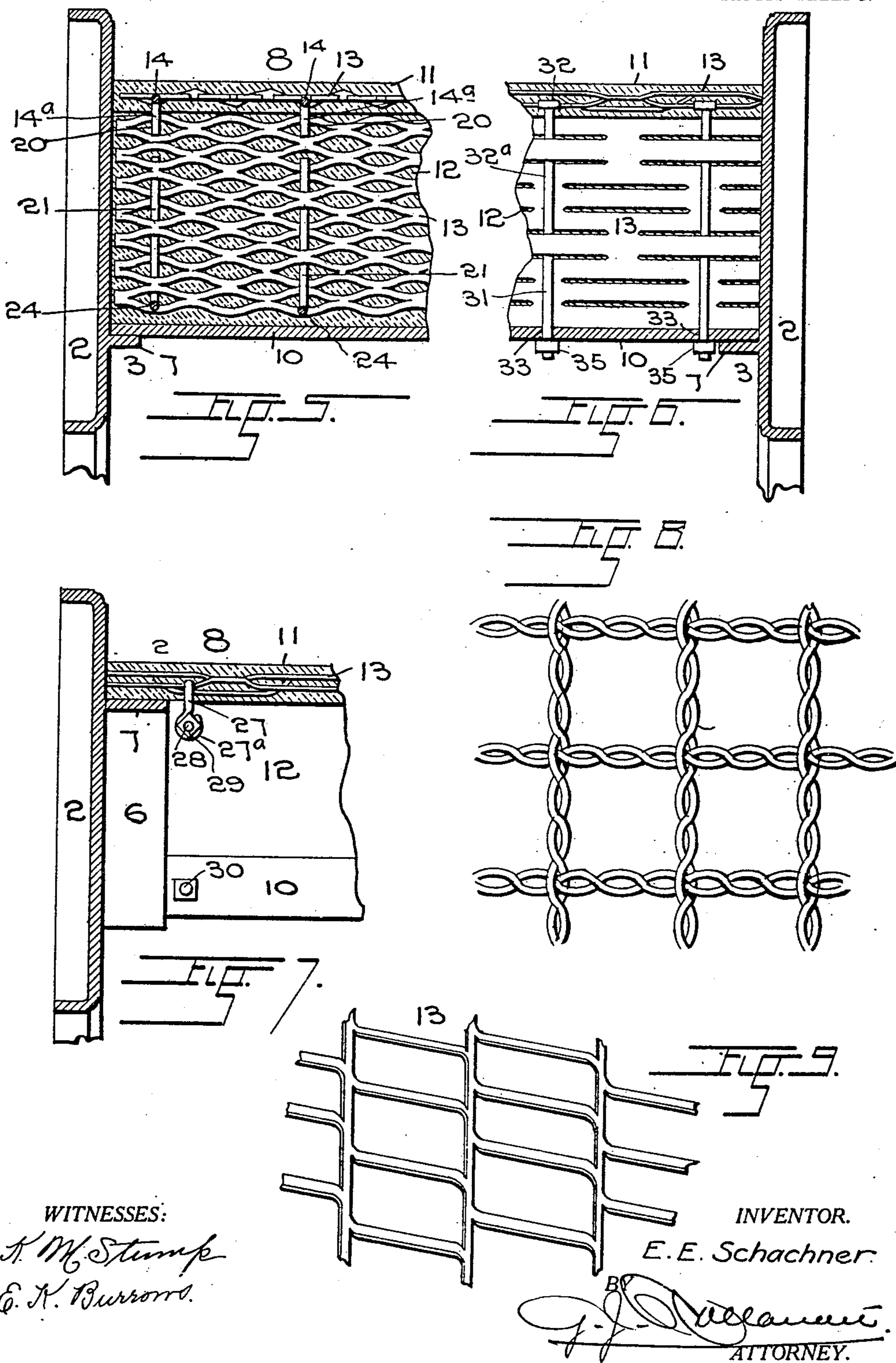
No. 870,905.

PATENTED NOV. 12, 1907.

E. E. SCHACHNER.  
STAIR CONSTRUCTION.

APPLICATION FILED MAY 14, 1907.

2 SHEETS—SHEET 2.



WITNESSES:

*H. M. Stump*  
*E. K. Burrows*

INVENTOR.

*E. E. Schachner*

BY *J. J. Williams*  
ATTORNEY.

# UNITED STATES PATENT OFFICE.

EDWARD EDMUND SCHACHNER, OF DENVER, COLORADO.

## STAIR CONSTRUCTION.

No. 870,905.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed May 14, 1907. Serial No. 373,588.

*To all whom it may concern:*

Be it known that I, EDWARD E. SCHACHNER, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Stair Construction, of which the following is a specification.

This invention relates to certain improvements in stair structures and more especially in the class of structures in which the treads and risers are composed of a molded plastic substance and secured upon suitable metallic supports.

The main object of this invention is to provide novel means for reinforcing the treads and risers which form the steps of the structure and for securing the same in operative relation to each other and to the above named supporting means.

Another object of the invention is to render the treads and risers of the steps comprised in a stair structure, durable and attractive in appearance by the embedment of diversely colored fragments of stony substances, such as granite, marble, etc., which as they appear on the surface of the stairs, produce a variegated mosaic effect.

I attain these objects by the construction illustrated in the accompanying drawings in the various views of which like parts are similarly designated and in which

Figures 1, 2 and 3—represent fragmentary, sectional elevations of a stair case, showing different manners of applying the reinforcing and fastening means, Fig. 4—a perspective view of a tread and riser provided with embedded stony fragments, Fig. 5,—a section taken along a line 5—5, Fig. 1, Fig. 6—a section taken along a line 6—6, Fig. 3, Fig. 7—a section taken along a line 7—7, Fig. 2, Fig. 8—a detail view showing the construction of the trellis which may be employed in reinforcing the steps, and Fig. 9—a fragmentary view of a sheet of expanded metal of a construction differing from those shown in preceding views.

Referring to the drawings let the reference character 2 designate the parallel stringers between which the stairs are supported and which are provided upon their inner surfaces with inwardly ranging, stepped flanges 3, the alternate, vertical and horizontal parts 6 and 7 of which are arranged in conformity with the stairs 8. The members 6 and 7 of the flanges 3 are at the junction of the lower portion of the vertical parts with the adjacent horizontal parts, offset to form angular seats 9 adapted to receive the extremities of the angle supports 10, which being arranged horizontally between the two stringers, provide a firm support for the stairs 8, the ends of which abut the vertical surfaces of the latter.

The stairs or steps 8 are produced by molding a plastic substance or a composition of plastic and fire proof, tenacious or other advantageous materials in a suitably constructed matrix. The treads 11 and risers 12 of each step are made separate and although I do not

wish to limit myself to the use of any specific material, I preferably employ in molding them, a mixture of cement and sand in suitable proportions, in which are embedded certain metallic reinforcing and fastening appliances, the nature and application of which will now be described.

The reinforcements 13 employed to render the molded parts tenacious and durable, consist of sheets of so-called expanded metal, which having upon its surface a multitude of laterally ranging projections, is well adapted to the purpose of promoting the cohesion of the substances and parts of which the treads and risers are composed. The expanded metal is produced in various forms, three of which are illustrated respectively in Figs. 5, 6 and 9 of the drawings, while Fig. 8 represents a trellis composed of interwoven ropes of twisted wire which may be employed as a substitute for the expanded metal. The metallic sheets 13 are embedded in the treads and risers during the process of molding, in approximate parallel relation to their surfaces, the areal dimensions of the said sheets being approximately equal to those of the parts to which they are applied. The treads and risers are furthermore provided with a plurality of embedded rods whose twofold function is to strengthen the molded parts and to provide fastening means by which the members of each step may be secured to each other and to the supporting angle bars upon which they are assembled. The rods which preferably are intertwined with the metallic plates 13, may be applied in various ways, their functions remaining the same in each instance.

In the construction illustrated in Figs. 1 and 5 of the drawings, the treads are provided with transversely applied rods 14, one extremity 15 of which extends beyond the rear edge of the member and projects, when the parts are assembled intermediate the stringers 2, through registering apertures 16, and 17, respectively in the lower portion of the adjacent riser against which the tread abuts and the angle bar 10 upon which the said riser is supported. The extreme ends of the rods 14 are provided with a screw thread, and nuts 19 are screwed thereupon to secure the parts in their relative positions. The opposite extremities 14<sup>a</sup> of the rods 14 being bent at right angles to the main portions, project beyond the lower surface of the tread in proximity to its front edge which forms the nose of the step, and are arranged to enter corresponding bores 20 in the upper edge of the subjacent riser 12, for the purpose of securing the two members against independent displacement. The risers 12 are furthermore provided with a plurality of embedded, transversely disposed rods 21, the upper extremities of which terminate below the above mentioned bores 20, while their lower ends 24 are bent at right angles to their main portion and extending beyond the rear surface of the riser, are arranged to project through apertures 22 in the adjacent

angle bar 10. The extreme end of the bent portion 24 of each rod is threaded for the application of nuts 25.

In the form illustrated in Fig. 2, the tread has embedded rods 26 applied in a manner similar to that of the rods 14 in the construction hereinbefore described, with the exception that the bent portions 27 are spaced from the front edge or nose of the tread a distance sufficient to permit them to engage the rear surface of the subjacent riser 12 and are formed at their lower extremities with eyes 27<sup>a</sup>, adapted to admit the threaded ends of stove bolts 28 which project through apertures in the upper portions of the riser and are secured by means of nuts 29. The risers are furthermore connected with the angle bars which engage their lower ends, by the use of similar bolts 30.

The tread 11 illustrated in Fig. 3 is provided with downwardly extending rods 31, the heads 32 of which are embedded below the upper surface of the member in proximity to its foremost edge. The rods 31 extend, through corresponding, vertical bores 32<sup>a</sup> in the subjacent riser and protruding beyond the latter's lowermost edge, project through apertures 33 in the subjacent angle bar 10 to be secured by nuts 35 screwed upon their correspondingly threaded extremities.

Stairs subjected to much wear by frequent and rough usage, such as those employed in public buildings, may be further reinforced and rendered indurate by the promiscuous embedment of fragments 36 of marble, granite, slate and other hard substances. The fragments being placed in the plastic composition while the parts of the steps are being molded, are firmly held therein when the substance has hardened and after the surfaces of the members have been finished by abrasion, the diversity of colors presented by the said fragments produce a mosaic effect as illustrated in Fig. 4 of the drawings.

As the manner of assembling the parts has been referred to at intervals in the course of the foregoing description, further explanation is omitted.

What I claim and desire to secure by Letters Patent is:—

1. In a stair structure the combination with suitable supporting means of steps formed of treads and risers composed of molded plastic substance and fastening means fixed therein by embedment and arranged to detachably secure them to each other.

2. In a stair structure the combination with suitable supporting means of steps formed of treads and risers composed of molded plastic substance and fastening means fixed therein by embedment and arranged to detachably secure them to each other and to the said supporting means.

3. In a stair structure the combination with suitable supporting means of steps formed of treads and risers each composed of molded plastic substance, reinforced by em-

bedded metallic sheets and rods interwoven with the latter, adapted to secure the said treads and risers to each other and to the said supporting means.

4. In a stair structure the combination with suitable supporting means, of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods fixed therein by embedment whose protruding extremities are adapted to detachably secure each tread to the adjoining risers and the steps to the supporting means.

5. In a stair structure, the combination with suitable supporting means of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods fixed therein by embedment one of whose extremities are arranged to project through registering apertures in the adjoining riser and the supporting means, while their opposite ends being bent in angular relation to the main body, protrude below the lower surface of the tread and project into corresponding bores in the subjacent risers.

6. In a stair structure, the combination with suitable supporting means, of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods fixed therein by embedment one of whose extremities protrude beyond the lower surface of the treads and are arranged to cooperate with means on the subjacent riser to detachably secure the treads and risers to each other.

7. In a stair structure the combination with parallel stringers connected by transverse supports, of treads and risers composed of molded plastic substance, upon the said supports, the said treads having metallic rods fixed therein by embedment one extremity of which extends through apertures in the adjoining superposed riser and the adjacent support and are secured by nuts screwed thereon, while their opposite ends project beyond the lower surface of the said treads and are connected with the respective subjacent risers.

8. In a stair structure the combination with suitable supporting means, of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods fixed therein by embedment and protruding beyond their lower surface and the said risers having means to connectedly engage the said protruding parts.

9. In a stair structure, the combination with suitable supporting means of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods, fixed therein by embedment and protruding beyond the lower surface and the said risers having bores arranged to admit the protruding parts.

10. In a stair structure, the combination with suitable supporting means, of steps formed of treads and risers each composed of molded plastic substance, the said treads having rods fixed therein by embedment and protruding beyond their lower surface and the said risers having upon their upper ends means to connectedly engage the said protruding parts, and means securing their opposite ends to the supporting means.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDWARD EDMUND SCHACHNER.

Witnesses:

G. J. ROLLANDET,  
K. M. STUMP.