No. 875,113. PATENTED DEC. 31, 1907.

E. E. SCHACHNER.

FIREPROOF STAIR STRUCTURE.

APPLICATION FILED AUG. 9, 1907.

Fig. 1.

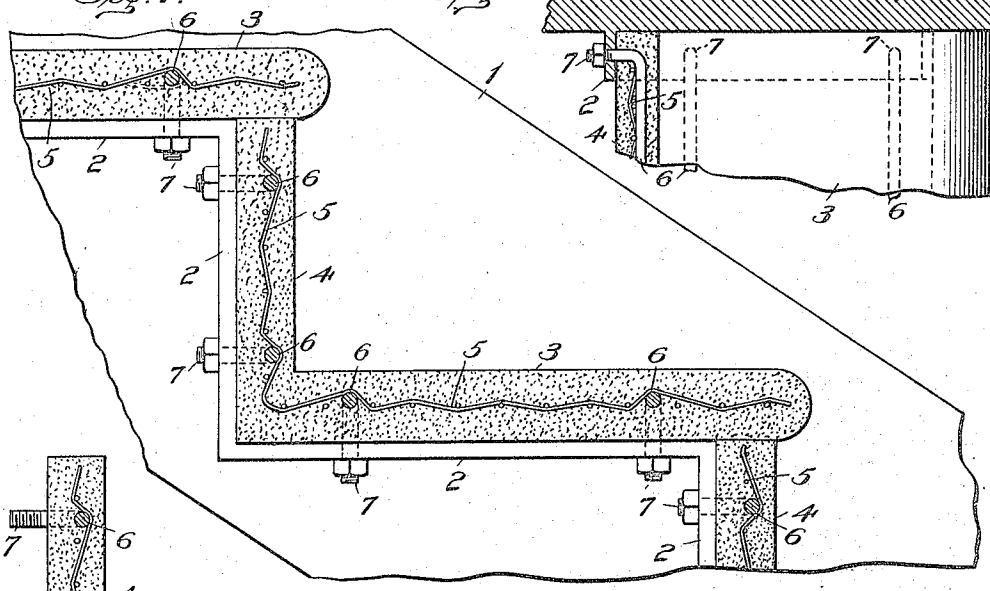


Fig. 4.

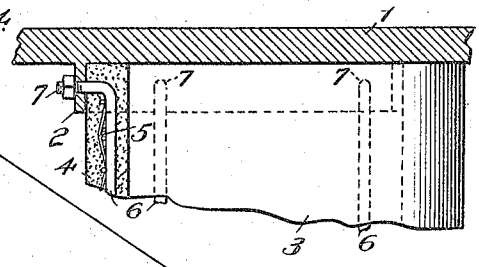


Fig. 2.

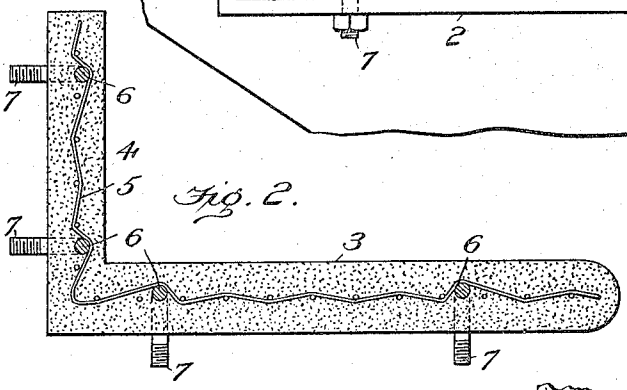


Fig. 5.

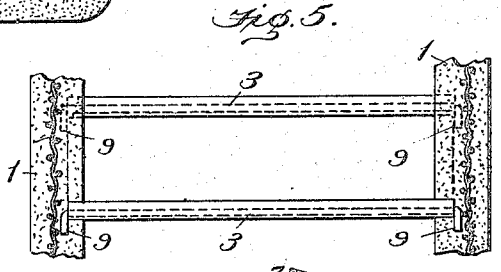


Fig. 3.

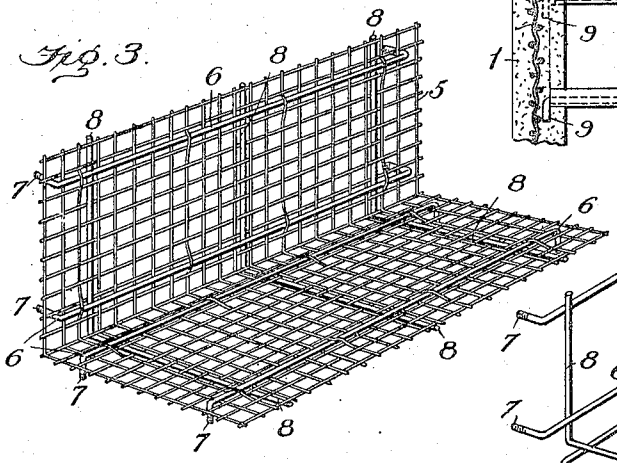
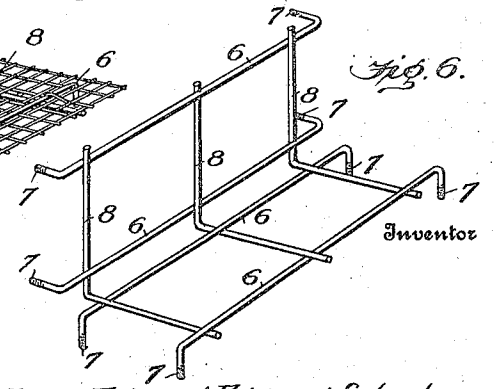


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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FIREPROOF STAIR STRUCTURE.

No. 875,113. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed August 9, 1907. Serial No. 387,880.

To all whom it may concern:

Be it known that I, EDWARD EDMUND SCHACHNER, a citizen of the United States, residing at Denver, county of Denver, and State of Colorado, have invented certain new and useful Improvements in Fireproof Stair Structures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In fireproof stair construction in which stringers have been connected together by angle tie-bars, the step construction proper has been laid and supported upon the angle tie-bars corresponding to the step-treads and risers, and while the angle tie-bars makes a durable and rigid stair construction their use is attended with considerable expense and undue weight to the stairs, and it is the object of my present improvement to dispense with the angle tie-bars for the stringers. For this purpose I have designed a construction whereby the treads and risers are made the means of tying, anchoring and bracing the stringers together and giving the desired rigidity and durability in a stair structure of comparatively light construction and avoiding thereby the objection of over weighting. I have also produced an integral and novel construction of reinforced concrete tread and riser whereby it is rendered more thoroughly braced and durable at the angle, and in the claim appended hereto I will point out the features of the structure which constitute my improvement in connection with the accompanying drawings in which,—

Figure 1 shows in vertical section so much of a stair structure as illustrates my invention. Fig. 2 shows in vertical section a molded reinforced stair tread and riser as an entirety and adapted by my improvement as the means of tying or anchoring the stringers together. Fig. 3 shows in perspective a trellis frame of woven wire and anchoring rods running parallel to the tread and the riser in which the frame is embedded and by which it is, as an entirety, made the means of tying, anchoring and bracing the stair stringers together. It also shows reinforcing rods crossing the angle or bend of the frame. Fig. 4 is a horizontal section of a portion of a stair stringer looking down upon the tread and showing the riser trellis-frame bolted or anchored to the stringer. Fig. 5 shows in sectional view a portion of the pair of stair stringers constructed of reinforced concrete and tied or anchored together by reinforced stair treads and risers. Fig. 6 shows the trellis frame formed of the reinforcing rods upon which the tread and riser are molded and by which it is adapted to tie or anchor the stringers together.

A molded reinforced tread and riser as an entirety is supported by and secured to the stringers, and it will be understood that it is the reinforcing-rods of this tread and riser which are secured or anchored at each end of the stringers and thus while the tread and riser as an entirety forms a tie for the stringers, each rod of the tread and of the riser is caused to serve as a tie-bar or anchor for the stringers whereby the steps are caused to effect a brace for the stringers and render the stair structure firm with a minimum of weight.

Stringers 1, when of metal have flanges or ribs 2, on their inner walls conforming to the angles of the step-treads and risers which are supported thereon.

The tread 3 and riser 4 is molded as an entirety and embedded therein in the molding process, is a metallic trellis-frame preferably formed of a sheet of woven-wire 5, and rods 6, preferably interwoven with the wire parallel with the length of the step and reinforcing and bracing the molded body. But the rods have another and important function, that of forming the step proper as a tie or anchor for the stringers and for this purpose each rod terminates in right angled screw threaded ends 7, which project through the molded body and through corresponding holes in the stringer-flanges and are nutted thereto causing each rod thereby to form a tie-bar for the stringers. For this purpose the nutted ends of the rods of the riser project horizontally back through the vertical portion of the stringer flange and the nutted rods of the tread project vertically downward through the horizontal portion of the stringer-flange and the tread and riser having this construction is produced in molded form as an article of manufacture to be sold to the trade. In erecting the stair structure the holes in the stringer-flanges are made to register with the screw-ends of the rods and bound upon the flanges by the nuts. Any desired number of rods may be used for each reinforcing device—a pair for the tread and a pair for the riser and they may be notched or twisted or otherwise formed so long as their nutted ends project for engagement with the

stringer-flanges when the latter are of metal. The nose end of the tread rests upon and slightly overhangs the upper end of the riser; and obviously the tread of the riser as an entirety is anchored or secured to the stringers, the design being that the embedded reinforcing rods without regard to their number shall each act as a tie-bar or anchor for the step to the stringer. Nor do I confine myself to a trellis of woven wire as expanded or perforated metal may be used; or I may use the embedded tie-rods as a trellis-frame.

Obviously the tread and riser may be molded as an entirety of any suitable plastic composition and with any desired surface finish.

I may provide the trellis-frame with angle-rods 8, Figs. 3 and 6, which may or may not be interlaced with the trellis wire and with the tie-rods, whereby the trellis-frame will prevent the breaking of the molded tread and riser at its angle, and render it safe in being handled and keeping it in true form until it is thoroughly dried. Particularly are these angle-rods 8, important in stair-steps molded of unusual length upon a reinforcing trellis-frame and which obviously may be used without the backing of woven wire as in Fig. 6. The stringers may be made of cast or of wrought iron; or of reinforced concrete and when of the latter material they may be tied or anchored together by embedding the bent ends 9, of the reinforcing rods of the trellis frame in the walls of the stringers as seen in Fig. 5, so that the bent ends form anchoring hooks in the walls, while the ends of the treads and of the risers are themselves embedded in the walls. This construction gives the advantage of erecting the stair structure of materials provided at the building and greatly reduces the cost.

The trellis-frame may be of expanded or of perforated metal and the rods twisted or notched and of whatever form the reinforcement it is embedded near the outer wall of the tread and riser to effect the proper bracing and strength. Nor do I confine myself to any particular plastic, as it may be composed of sand and cement; broken rock and cement, or sand, gravel and cement; and the finish of the surface of the treads and risers may be in colors, mosaic, encaustic tile or terrazzo.

I claim:

1. As a new article of manufacture, a tread and its riser for stair-steps molded as an entirety of plastic material and having an embedded reinforcing metallic trellis-frame, a plurality of rods extending lengthwise of the tread and of the riser and terminating at each end in screw threaded nutted bends at the back of the molded body and at right angles thereto.

2. As a new article of manufacture, a tread and its riser for stair-steps molded as an entirety of plastic material and having embedded therein a plurality of rods extending lengthwise of the step and terminating at each end in screw threaded nutted bends standing at right angles to the back of the body.

3. As a new article of manufacture, a stair-step composed of a tread and its riser molded as an entirety of plastic material and having embedded therein a plurality of rods extending lengthwise of the step and terminating at each end in screw-threaded nutted bends standing at the back of the body, and angle rods embedded therein at right angles to the nutted rods, and crossing the angle of the step.

4. A reinforcing frame for the integral tread and riser of a stair-step composed of a plurality of rods extending lengthwise of the tread and of the riser and a plurality of angle-rods at right angles to the nutted rods and crossing the angle of the step.

5. In a fireproof stair structure and in combination a pair of stringers, a tread and its riser molded as an entirety of plastic material and a plurality of rods embedded in the body and terminating at each end in screw-threaded bends standing at right angles to the back of the body and adapted to engage said stringers.

6. In a fireproof stair structure and in combination a pair of stringers, a tread and its riser molded as an entirety of plastic material, a reinforcing frame comprising a plurality of rods embedded in the body and terminating at each end in bends at the ends of said body, the said bent ends of the rods and the ends of tread and its riser being engaged with the stringers, whereby the members of the step are engaged with the stringers and the stringers thereby tied together in the operation of erecting the stair structure.

7. In a fireproof stair structure, a pair of stringers, a tread and its riser molded as an entirety of plastic material, a reinforcing trellis frame embedded therein, and means whereby it is secured at each end direct to the inner walls of the stringers and without the intervention of separate transverse angle tie-bars.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD EDMUND SCHACHNER.

Witnesses:

J. E. KENNEDY,

HARRY FIELD.