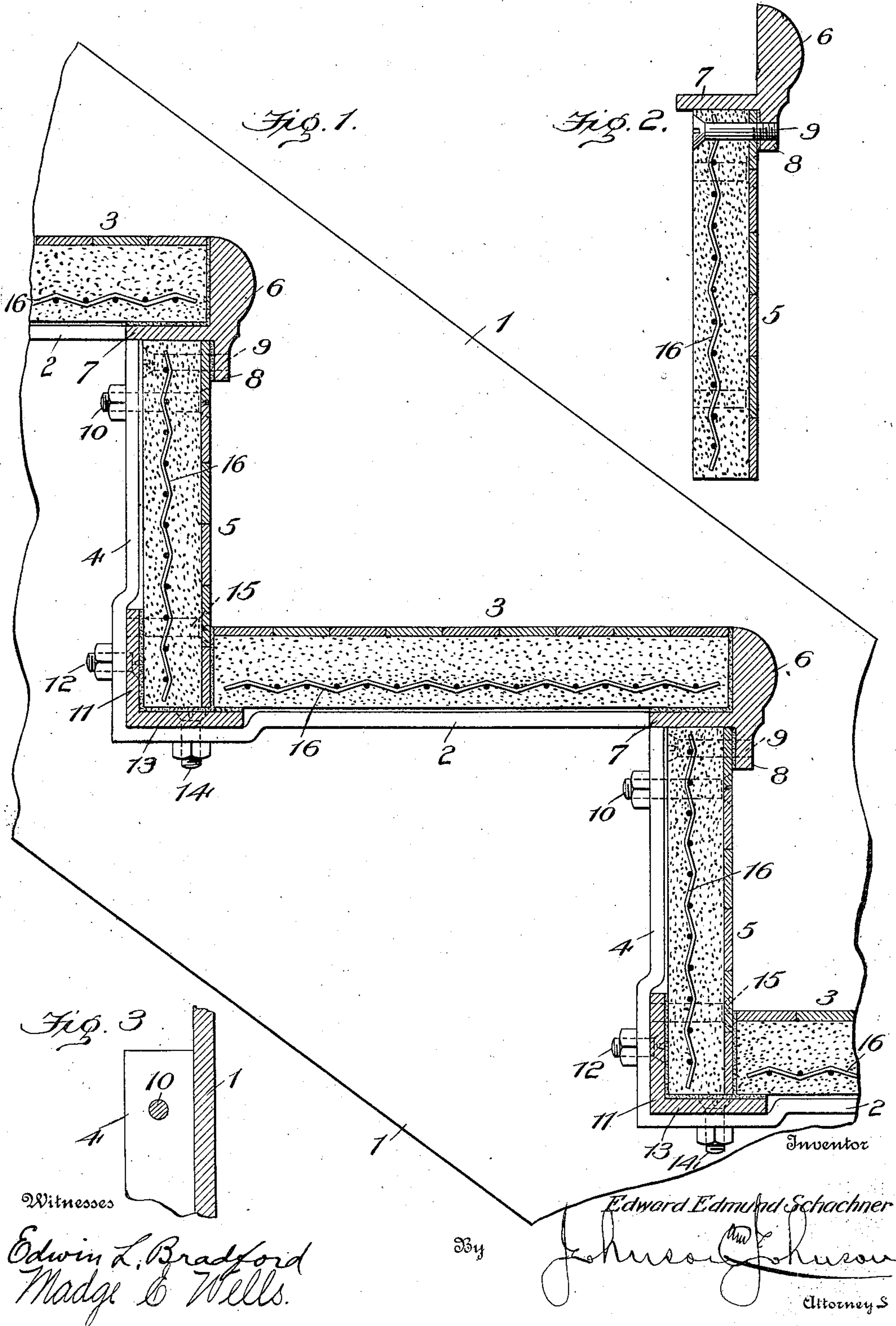


No. 844,408.

PATENTED FEB. 19, 1907.

E. E. SCHACHNER.  
FIREPROOF STAIR STRUCTURE.  
APPLICATION FILED NOV. 27, 1906.





# UNITED STATES PATENT OFFICE.

EDWARD EDMUND SCHACHNER, OF DENVER, COLORADO.

## FIREPROOF STAIR STRUCTURE.

No. 844,408.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed November 27, 1906. Serial No. 345,277.

*To all whom it may concern:*

Be it known that I, EDWARD EDMUND SCHACHNER, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Fireproof Stair Structure; 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.

My invention is directed to fireproof stair structure with reinforced concrete treads and risers and in which the various parts in completed form may be transported to the place of use and assembled in such relation to each other as to render the structure firm, of great strength, and with reduced labor and cost of erection, and in the claims appended hereto I will set out the parts and combinations of parts which constitute my invention.

Referring to the accompanying drawings, Figure 1 represents in vertical section so much of a stair structure as illustrates my invention in mounting and securing the reinforced concrete treads and risers upon the stair-stringers. Fig. 2 shows in vertical section a concrete riser and its attached nose-casting for the tread. Fig. 3 shows a detail view of the stringer and the flange on its inner wall.

The stair structure is of the skeleton construction in which the pair of side stringers 1 are preferably of steel, are provided on their inner walls with horizontal flanges or ledges 2, on which the reinforced concrete stair-treads 3 are seated and supported, and vertical flanges 4, to which the concrete risers 5 are secured.

The tread-supporting flanges, it will be noted, terminate at the inner side of the upper end of the riser-supporting flange, while the upper end of the latter terminates on a plane with the under side of the tread-supporting flange, and this construction provides for the proper seating and support of a separate nose-casting 6 upon the upper ends of the vertical flanges and upon the upper edge of the concrete riser. For this purpose the nose-casting has a horizontal extension-bar 7, by which the nose is seated and supported upon the upper ends of the vertical flanges and upon the upper edge of the concrete riser in the plane of the tread-supporting flange to support the front part of the concrete tread, while the upper edge of the con-

crete riser is secured to the nose-casting by an extension 8, depending therefrom and fastened to the front of the riser by a machine-screw 9 passing through the concrete and engaging a screw-threaded opening in said depending extension. By this construction the nose-casting is made a fixed element of the concrete riser and is applied with it as a single element of the stair structure and is fastened to the vertical flanges at the upper part of the riser by a machine-screw 10 passing through the concrete and its reinforcing-trellis and through an opening in said flange and nutted on the inner side thereof, thus firmly bolting the riser and its nose-casting as an entirety to the flanges of each of the stringers.

At its lower edge each concrete riser is seated and supported upon a steel right-angle bar, one side 11 of which is secured to the vertical riser-supporting flange by a machine-screw 12 passing through said angle-bar and through an opening in the vertical flange and nutted on the outer side thereof. The other lower side 13 of the angle-bar is fastened to the horizontal tread-supporting flange by a wood-screw 14 passing through said angle-bar and through an opening in said flange and nutted on the under side thereof, so that this angle-bar serves the two purposes of connecting and bracing the pair of steel stringers and connecting and supporting the lower end of the riser and in which the angle-bars give great firmness to the structure. This angle-bar also serves as the means by which the lower portion of each riser is secured to the side stringers, a machine-screw 15 for this purpose passing through the concrete, and its reinforcing-trellis engages a threaded opening in the upper side of the angle-bar. By this construction each riser is secured against the vertical flange and against the inner wall of the angle-bar, while the inner edge of the tread abuts against the outer side of the riser and rests upon the lower side of the angle-bar, and the lower ends of the angle-bar abut against the inner walls of the pair of side stringers at the angle of the vertical and horizontal flanges. To allow of this compact arrangement of the angle-bar in its relation to the riser and the tread, the flanges at their angular junction are offset so as to form a sort of recess for each angle side of the bar, so that the inner faces of the angle-bar will be on a plane with that side of the



flange against which riser and the tread is secured.

The treads and risers are each molded as articles of trade with an embedded metal trellis or stay 16 and finished with a tiled surface of any desired ornamentation, and it will be understood that they are furnished as finished articles in which the treads are adapted to be fitted between the pair of side stringers and against the nose-casting upon the flange 2 of each stringer, while the riser, with its attached nose-casting, is fitted against the flange 4 of each stringer and within the angle-bar. A convenient way of assembling these tread and riser parts is to mount and secure the risers between the stringers upon the angle-bars against the flanges 4, so that the nose-casting part 7 will form an extension of the tread-supporting flanges 2 and a cross-bar on which the front end of the concrete tread is seated and supported, while the rear edge of the tread is seated and supported upon the lower part 13 of the stringer-connected angle-bar. The tread may be seated upon a cement binder laid on the flanges and upon the nose extension and upon the angle-bar, and the edges surrounding the tread are filled in with cement.

Any suitable mold may be provided for the manufacture of the concrete reinforced slabs, so that each slab is produced as a complete tiled element of the stair structure, the molding process being preferably effected upon the tile-sections laid on the bottom of the mold with their finished faces down.

It is important to provide a continuous supporting-seat for the concrete tread, and this is provided by the horizontal flanges 2, which are cast integral with the steel or cast-iron stringers, and on these flanges the tread at each side rests, while the front portion of the tread rests upon the cross-bar of the nose-casting, and the rear portion of the tread rests upon the angle-bar which connects the stringers, and it is upon these seats that the tread is set and cemented, giving a firm seating for the tread all round its edges, while the middle portion of the tread is strengthened and braced by the embedded metallic trellis, and it is this construction that enables me to use a molded concrete tread as an article of manufacture in a skeleton stair structure. It is also important to note that while the angle-bars serve to tie the stringers together they also serve as the means for supporting and securing separately-constructed risers. It will also be noted that the screws which fasten the riser pass through the reinforcing-trellis, and thereby assist in holding the concrete body firmly against the vertical flange and upon its seating with the angle-bar. It will also be noted that the fastening of the risers at their upper parts to the stringer-flanges and the

lower parts of the risers to the angle-bars gives a direct connection of each riser with the pair of stringers, and thus each riser co-operates with each angle-bar to connect and brace the stringers in every direction.

While I have shown and described a concrete riser, obviously a metal-nosed riser may be used having the flange 8 and fitted against the end of the tread the same as the separate nose-casting.

I claim—

1. In a fireproof stair structure and in combination a pair of stringers each having horizontal and vertical flanges on their inner walls, an angle-bar seated within the angular meeting of said flanges, for connecting the stringers together, a riser seated and supported against the vertical flange and upon and within the angle of said connecting-bar, means for securing the upper part of the riser to the vertical flange, means for securing the lower part of the riser to said angle-bar, and a concrete tread seated and supported upon the horizontal flanges.

2. In a fireproof stair structure and in combination a pair of stringers each having horizontal and vertical flanges on their inner walls, an angle-bar seated within the angular meeting of said flanges, nutted screws for connecting each angle of the bar to said flanges, a concrete riser having a reinforcing metallic trellis, and seated and supported against the vertical flange and upon and within the angle of said bar, a nutted screw for securing the upper part of the concrete riser to the vertical flanges, a screw for securing the lower part of the concrete riser to the vertical angle of said bar, and a concrete tread, seated and supported upon the horizontal flanges.

3. In a fireproof stair structure a pair of stringers each having horizontal and vertical flanges on their inner walls, each flange having a recess at their angular meeting, an angular bar seated upon said flanges within the recess in each, a nutted screw for securing each angle side of the bar to the flanges, a concrete riser having a reinforcing metallic trellis and seated and supported against the vertical flange, means for securing the lower part of the riser to the vertical part of the angle-bar, means for securing the upper part of the riser to the vertical flange, a nose-casting seated upon the upper end of the riser and having an extension in the plane of the horizontal flange, said nose-casting having also an extension depending in front of and in contact with the outer face of the riser, a screw securing said depending extension to the riser, and a concrete reinforced tread seated and supported upon the horizontal flanges, upon the horizontal extension of the nose, and upon the horizontal angle part of the angle-bar.

4. In a fireproof stair structure a pair of



stringers having horizontal flanges on their inner walls, a nose-casting having an extension-bar equal in length to the distance between the stringers, and in the plane of the flanges, an angle-bar connecting the stringers, and a concrete tread having a metallic trellis, the sides of the tread seated and supported upon said flanges, the front end of the tread seated and supported upon the nose extension and the rear end of the tread seated and supported upon the angle-bar and within the space between these continuous supports the tread is supported and braced.

5. In a fireproof stair structure a concrete riser having a metallic reinforcing-trellis, and

a nose-casting supplementing and secured to the upper end of the riser.

6. In a fireproof stair structure a pair of stringers, angle-bars connecting the stringers, a riser for each angle-bar, means connecting the lower part of each riser to the angle-bar, and means connecting the upper part of each riser to the stringers.

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

EDWARD EDMUND SCHACHNER.

Witnesses:

HARRY FIELD,

J. E. KENNEDY.