

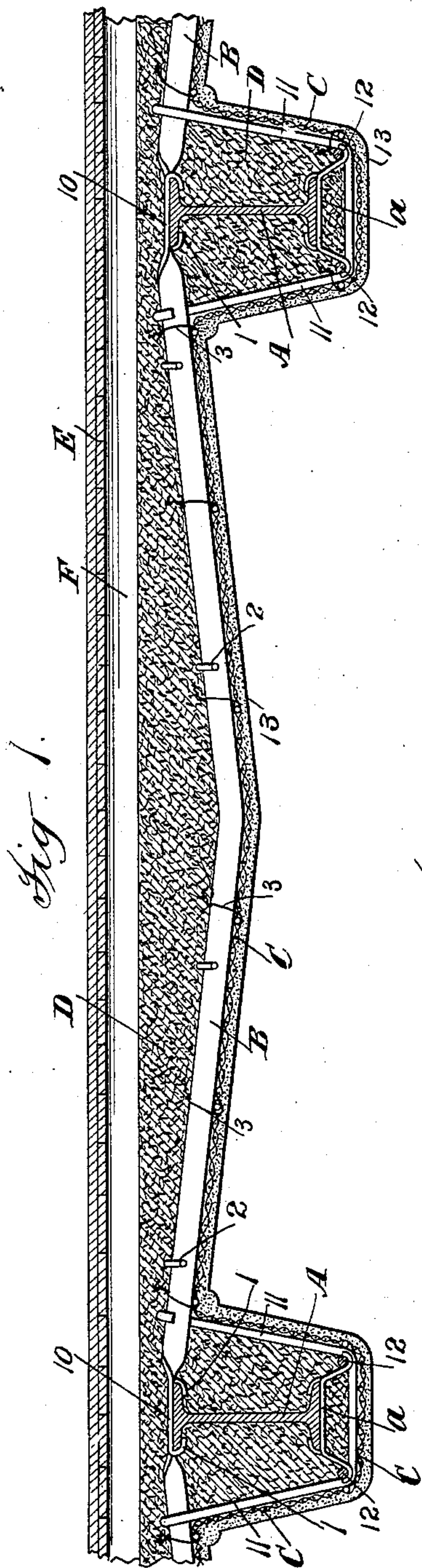
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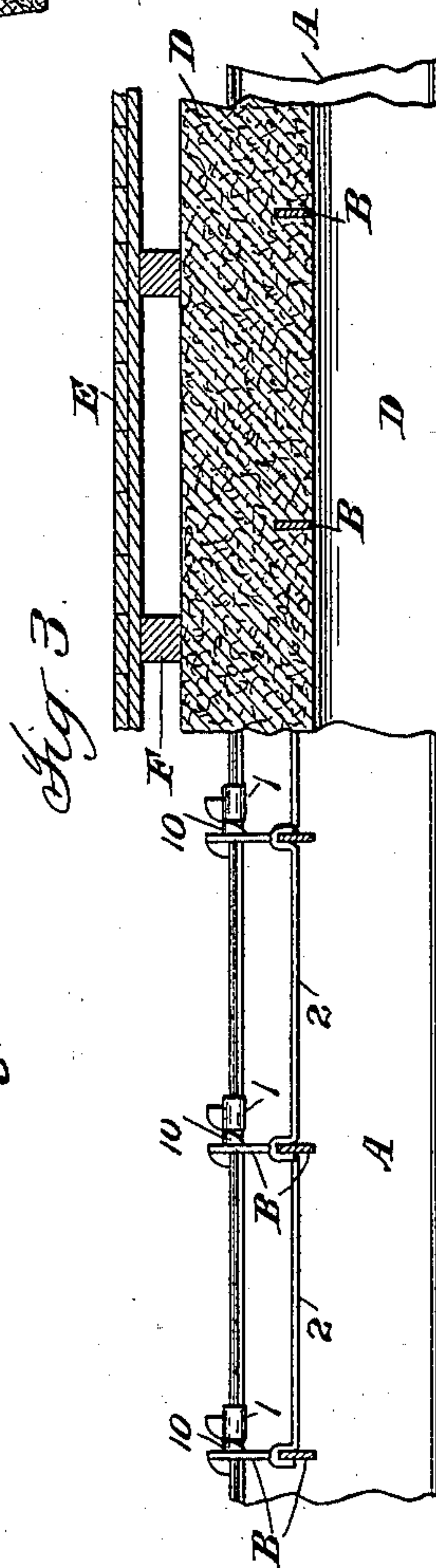
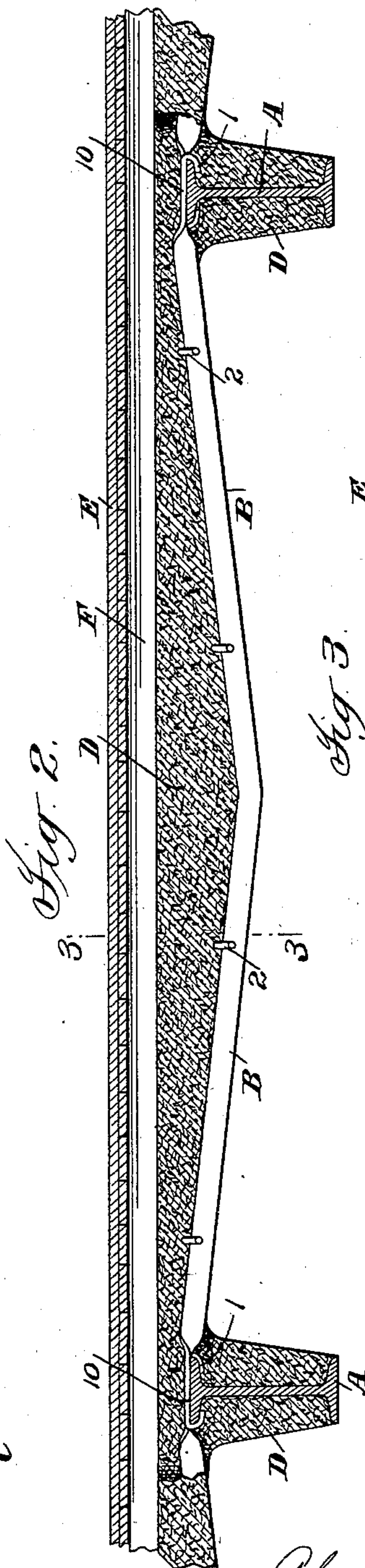
A. L. A. HIMMELWRIGHT.
FIREPROOF CONSTRUCTION.

(Application filed Aug. 23, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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FIREPROOF CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 671,596, dated April 9, 1901.

Application filed August 23, 1900. Serial No. 27,750. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM L. A. HIMMELWRIGHT, a citizen of the United States, residing at New York city, county of New York, and State of New York, have invented certain new and useful Improvements in Fireproof Constructions, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved fireproof floor and ceiling construction of that class in which a filling of concrete or similar plastic material is applied in connection with light iron or steel work forming tension members between the floor-beams, the especial object of the invention being to provide a floor construction of this class which shall be of great strength, so as to be applicable for long spans, while at the same time employing light metal parts and a small body of concrete.

As a full understanding of the invention can best be given by an illustration and a detailed description of a construction embodying the same, such a description will now be given in connection with the accompanying drawings, forming a part of this specification and showing floor constructions embodying the invention in preferred forms, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a section of a construction employing reticulated metal in addition to metal tension-bars. Fig. 2 is a similar section of a construction in which the reticulated metal is not used. Fig. 3 is a cross-section on the line 3 of Fig. 2, partly broken away to show the construction.

Referring now particularly to Fig. 1, A represents the floor-beams, shown as of the common I form, from the upper flanges of which beams are supported metal joists B, which consist of flat metal bars of the required thickness arranged edgewise vertically and having their opposite ends formed with a quarter-twist, so that the ends 10 lie at right angles to the main portion of the joists, and these ends 10 extend over the tops of the beams, upon which they rest flatwise, and are provided with hooks 1, hooked over the flanges of the beams, so as

to be held thereby. With these joists B are preferably used spanners 2 to aid in holding the joists in proper position and enable them to be rapidly and accurately spaced in building the construction. It will be understood, however, that spanners of any other form than those shown may be used or the joists used without spanners.

By the joists B is supported the reticulated metal C, which is preferably used to form an anchorage for the concrete or similar plastic material of the floor construction. This reticulated metal is shown as common metallic lathing of woven wire, and this is the preferred construction; but the reticulated metal may be of any other suitable form and mesh, either of woven or netted wire, or metal rods or straps, or perforated or expanded metal, so that the concrete or plastic material applied from above will set into the openings and between the parts of the reticulated metal and secure the desired anchorage of the concrete. This lathing C or other reticulated metal may be secured on or supported by the joists B in any suitable manner, but is shown as secured thereto by wire ties 3 at suitable intervals.

As shown in the drawings, the webs and bottoms of the beams A are fireproofed, as is preferable, the construction shown for this purpose being as follows: Below the beams is supported, partly by rods 11, hooked over the joists B, and partly by hangers α on the lower flanges of the beams and rods 12, carried by said hangers, reticulated metal C, forming a continuation of the reticulated metal below the joists B, a space thus being inclosed by the reticulated metal about the webs and bottoms of the beams. After the metallic parts have been placed in position as above described and as shown in Fig. 1 a filling of concrete or similar plastic material D is applied from above, filling all the space above the reticulated metal C, embedding the joists B and preferably extending above the tops of the beams, as shown, this concrete seating through the openings of the metal C, so as to secure the desired anchorage thereon, and also being packed down through the spaces inclosed by the metal and

about the webs and bottoms of the beams, thus forming an integral body of concrete or similar plastic material, which extends in a web of the desired thickness from beam to beam and around the webs of the beams and forms a body of fireproofing below the flanges of the beams. Upon the concrete D the flooring E may be applied directly; but the flooring is preferably supported thereon by wooden or other joists F, as shown. Upon the under side of the concrete D the usual plaster finish 13 is shown, forming an integral floor and ceiling construction. This is not material, however, and it will be understood that it may be omitted or a suspended ceiling construction of any suitable form used in connection with the present invention.

The general features of the construction as above described are the same as shown and described in my Letters Patent No. 644,914, granted March 6, 1900, one of the essential objects of the invention being to provide a construction of this general type which shall be of greater strength and thus capable of efficient use in longer spans than the construction of the patent above referred to and enabling the production of constructions of equal strength with less concrete.

Referring now to the features in which the present invention consists, it will be seen from an examination of Fig. 1 that the joists B instead of being straight bars extending from beam to beam, as in the patent above referred to, are bent so as to extend downward on an incline or curve from each beam to a point centrally between the beams, the joists being preferably formed, as shown, on a straight incline downward from opposite ends to the central point. The drop on the joists between the beams is such that the joists extend from beam to beam in substantially catenary curves, these joists thus acting in the most efficient manner as tension members to support and transmit the strain of the body of concrete in which they are embedded. In the construction shown the span is about eight feet from beam-center to beam-center and the drop of the joists is about six inches at its greatest depth. This drop may be varied, however, and the construction used with spans of any length. With the reticulated metal C on the under side of the joists B and the joists B properly spaced the concrete may be filled in upon the reticulated metal to embed the joists without the use of centering, the green concrete being supported by the metal-work formed by the joists and reticulated metal. It will be understood, however, that centering may be used below the reticulated metal to aid in supporting the green concrete, if desired, and that the tension-joists B may be spaced as desired.

While I preferably use reticulated metal in connection with my improved form of tension members or joists and a construction including such reticulated metal forms a specific fea-

ture of my invention, the invention, broadly considered, includes also constructions in which reticulated metal is not used.

In Figs. 2 and 3 I have shown a construction embodying the broader features of my invention, which is substantially the same as the construction shown in Fig. 1 so far as the construction and use of the joists B are concerned; but these joists constitute the entire metal framework for the concrete D, the reticulated metal of Fig. 1 being omitted. In this construction (shown in Fig. 2) the fireproofing of the webs of the beams is varied from that shown in Fig. 1; but it will be understood that this is immaterial so far as the present invention is concerned.

I have found in practice that with the metal joists B extending from beam to beam and formed substantially as shown the strength of concrete constructions is greatly increased as compared with such constructions employing straight tension bars or joists, and I am thus enabled to provide very strong and light short-span constructions and to secure the required strength in longer spans than with constructions heretofore in use.

While the invention has been shown in connection with a construction in which the joists B are twisted at the ends and hooked on the beams, it will be understood that this is not essential to the invention, considered broadly, and that the joists may be connected to or supported by the beams in any other suitable manner. It is preferable, however, that they be secured to the beams in some manner so as to form tie-bars between the latter.

What I claim is—

1. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically, and formed with a downward bend between the beams having its greatest depth midway between the beams, and a body of concrete or similar plastic material forming a fireproof web between the beams and in which said joists are embedded, substantially as described.

2. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically and formed with a downward bend between the beams having its greatest depth midway between the beams, reticulated metal supported by said joists, and a body of concrete or similar plastic material on said reticulated metal forming a fireproof web between the beams and in which said joists are embedded, substantially as described.

3. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically, said joists being secured to the beams to form tie-bars for the beams and formed with a downward bend between the beams having its greatest depth midway between the beams, and a body of concrete or similar

plastic material forming a fireproof web between the beams and in which said joists are embedded, substantially as described.

4. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically, said joists being secured to the beams to form tie-bars for the beams and formed with a downward bend between the beams having its greatest depth midway between the beams, reticulated metal supported by said joists, and a body of concrete or similar plastic material forming a fireproof web between the beams and in which said joists are embedded, substantially as described.

5. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically and formed with a downward bend between the beams having its greatest depth midway between the beams, said joists being twisted at their ends to form portions lying flatwise over the beams and hooked over the tops of the beams, and a body of concrete or similar plastic material between the beams and in which said joists are embedded, substantially as described.

6. The combination with beams or the like, of joists formed of metal bars extending from beam to beam and arranged edgewise vertically and formed with a downward bend between the beams having its greatest depth midway between the beams, reticulated metal supported by said joists, said joists being twisted at their ends to form portions lying flatwise over the beams and hooked over the top flanges of the beams, and a body of con-

crete or similar plastic material between the beams and in which said joists are embedded, substantially as described.

7. A fireproof-floor construction having light metal bars arranged edgewise vertically and extending from floor-beam to floor-beam and secured to the beams, said bars being formed with a downward bend between the beams having its greatest depth midway between the beams, reticulated metal supported by and below said bars and parallel therewith, and a body of concrete extending from floor-beam to floor-beam applied from above on said reticulated metal and in which the bars are embedded, said metal bars and reticulated metal being constructed and arranged to support the concrete while green and to provide tension-bars for the construction, substantially as described.

8. The combination with the beams A, of the joists C consisting of metal bars arranged edgewise vertically and extending from beam to beam and secured to the beams, said joists being inclined downward from the beams to a point midway between the beams, and a body of concrete or similar plastic material forming a web between the beams and in which the joists are embedded, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ABRAHAM L. A. HIMMELWRIGHT.

Witnesses:

C. J. SAWYER,
A. A. V. BOURKE.