

No. 706,347.

Patented Aug. 5, 1902.

J. T. SIMPSON & M. N. SHOEMAKER.

FIREPROOF FLOOR CONSTRUCTION.

(No Model.)

(Application filed Mar. 25, 1902.)

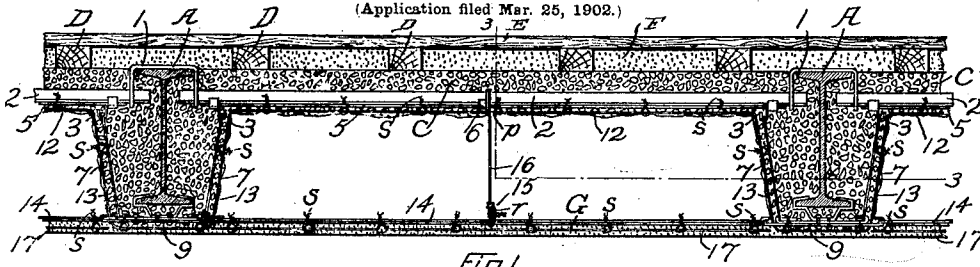


Fig. 1.

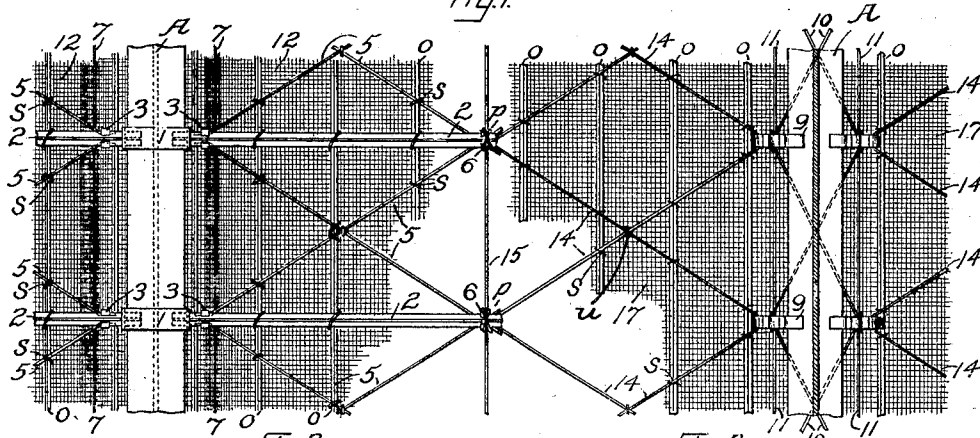


Fig. 2.

Fig. 3.

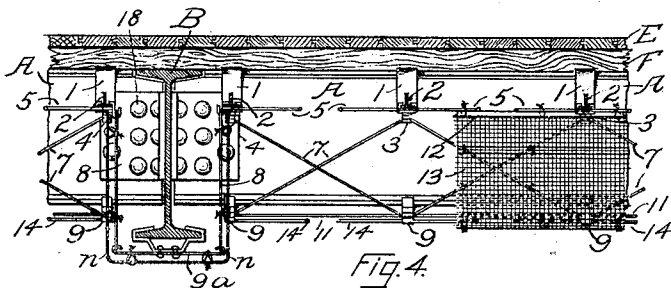


Fig. 4.

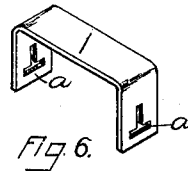


Fig. 6.

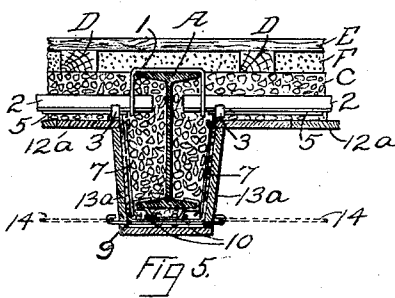


Fig. 5.

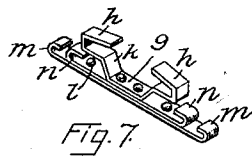


Fig. 7.

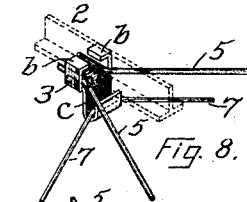


Fig. 8.

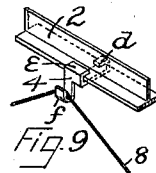


Fig. 9.

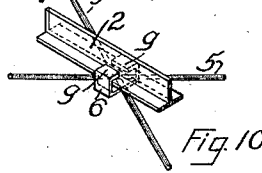


Fig. 10.

WITNESSES:

L. U. Stewart
H. F. Keller

INVENTORS
John T. Simpson
Marshall N. Shoemaker
 BY
Edgar Sale
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN T. SIMPSON AND MARSHALL N. SHOEMAKER, OF JERSEY CITY, NEW JERSEY, ASSIGNORS TO AMERICAN CONCRETE-STEEL COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FIREPROOF FLOOR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 706,847, dated August 5, 1902.

Application filed March 25, 1902. Serial No. 99,849. (No model.)

To all whom it may concern:

Be it known that we, JOHN T. SIMPSON and MARSHALL N. SHOEMAKER, citizens of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Fireproof Floor Construction, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide an improved fireproof floor and ceiling construction for buildings composed of concrete or similar plastic material reinforced with steel, with or without a wire or metal lath, and expanded metal or similar centering for receiving the concrete or similar plastic materials, the essential features of the invention being to provide a floor construction in which the floor shall employ the minimum amount of both concrete and steel to produce the desired strength and fireproof quality, the beams, girders, bars, rods, clips, and wires composing the floor construction being thoroughly protected by the concrete, a further object being to provide means for securing the concrete beam-casing securely to the beams or girders by means of diagonal wires and clips, so as to prevent it being washed away under heavy water-pressure during fire, and also to provide improved clips for securing a suspended ceiling.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvements are designated by the same reference characters in each of the views, and in which—

Figure 1 is a section of the floor construction which we employ taken at right angles to the floor-beams. Fig. 2 is a plan view of the said construction, showing the supporting members and the centering of the floor construction; Fig. 3, a sectional plan view on the line 3-3 of Fig. 1 and showing the suspended ceiling and support for the beam-casing; Fig. 4, a longitudinal section of the floor construction, showing the beam, and

girder casings, also the supports of the floor construction, a portion of the wires and all of the concrete being removed to show the construction, the parts in this view being shown at right angles to Fig. 1; Fig. 5, a cross-section of the floor construction taken at right angles to the floor-beams, similar to Fig. 1, but employing a wood centering of the ordinary type in place of the wire metal lath, expanded metal, or similar centering shown in Fig. 1; Fig. 6, a perspective view of the preferred form of stirrup used by us for supporting the floor-bars; Fig. 7, a similar view showing the preferred form of a clip used by us as a beam or girder holder and extended to receive the suspended ceiling; Fig. 8, a perspective view of the preferred form of clip used as a support for the diagonal rods of the floor construction and wires of the beam-casing; Fig. 9, a similar view of another form of the clip shown in Fig. 8 and used for supporting the diagonal wires in the girder-casing, and Fig. 10 a perspective view of the preferred form of the clip for supporting and securing the diagonal rods where they cross each other and pass under the bars of the floor construction.

Referring to the drawings, A represents the floor-beams, which are shown as the ordinary I type, these beams being shown as supported by the girders B, with which they are connected by ordinary standard connections 18. On the top flanges of the beams A rest the stirrups 1, which are spaced at certain distances along the beams and into which are placed the bars 2 of the floor construction. These stirrups 1 are formed of metal with the center horizontal portion resting on the beams and the two ends bent at right angles to the same passing down the sides of the beams, having openings *a* of the same form as the bar 2. The bars 2, both ends of which rest on the stirrups 1, extend from beam to beam and are shown in the preferred form of the ordinary T shape, but may be round, square, L-shaped, flat, channel-shaped, or of some other desirable form. To these bars 2 are attached the clips 3, 4, and 6, as shown, and these clips 3, 4, and 6 in the preferred form

are made of wrought-iron and of one piece cut from a flat plate and bent into the form shown. Clips 3 (shown in Fig. 8 in the preferred form) are placed on the bars 2 near the end, being adjusted to suit the thickness of the bar-casing, the parts *b* passing up and over the bar 2, leaving a space of sufficient size to insert the diagonal rods 5, the parts *c* being bent down, forming a hook through which the diagonal wires 7 of the beam-casing pass. Clips 4 (shown in Fig. 9 in the preferred form) are placed on the bars 2 at certain distances as required for the support of the diagonal wires 8 of the girder-casing, and this clip is formed of wrought-iron cut from a flat plate, as previously described, being split from one end for a certain distance and the one leg *d* of which passes under and over the bar 2, the other leg *f* passing down, forming a hook into which the diagonal wire 8 of the girder-casing passes, the other end *e* passing up and over the bar 2.

Clip 6 (shown in Fig. 10 in the preferred form) is formed similar to clip 3, with the hook *c* of clip 3 omitted, the ends *g* passing up and over the bars 2, as shown, leaving sufficient space between the clip and bar 2, through which the diagonal rods 5 pass.

The diagonal rods 5 in the preferred form are made of a round or square bar of ordinary rolled shaped or other form (they may, however, be made of heavy wire) and pass through the opening between the clips 3 and the bar 2. In the preferred form these diagonal rods 5 will be placed under and supported by the bars 2, as shown. In case wire is substituted for the rod 5 it will be similarly placed; but the extreme ends after passing through the opening between the clip 3 and the bar 2 will be bent back over the upright legs of the clip 3 and twisted around itself or firmly secured in a suitable manner.

The rods 5 extend diagonally across the space between the beams A, being supported by the clips 6 at the center where they pass under the bar 2, and the ends of these diagonal rods 5 will be supported by the clips 3 on the two adjacent bars 2 or extend to the other adjacent bars, as the spans between the beams A may require, it being the purpose to keep the angle between the bars 2 and the diagonal rods 5 about constant.

Clips 9 (shown in Fig. 7) in the preferred form will be made of small flat wrought iron or steel bars bent into the forms shown and secured to each other by means of rivets or bolts *l*, passing through the several members of the same, the ends *h* being bent up and over the bottom flange of the beams A, the bend *k* being made of such size as may be required to suit the thickness of the concrete forming the beam or girder casing on the under side of the bottom flanges and the hooks *n* being formed to receive the diagonal wires 7 and 8 of the beam and girder casing, the hooks *m* extending out for a sufficient distance beyond the hooks *n* to permit of the

diagonal wires 14 forming the supports of the suspended ceiling, being secured to them after the concrete is in place.

Clip 9^a is a modified form of the clip 9 and is the same with the exception of the end hooks *m*, which are omitted. The wires 8 engage with the hooks *n*, the same as wires 7 in Fig. 4, and the wires 8 are arranged parallel with the girder B and in the same manner as the wires 7 are arranged with reference to the beam A.

The supports for the beam and girder casing are formed of diagonal wires 7 and 8, passing through the hooks *c* and *f* of the clips 3 and 4, passing down and over to the next hook *n* of the clips 9 or 9^a, (shown in Fig. 4,) then over and up to the hooks *c* or *f* of the next clip 3 or 4, and so on to the end, the end being secured by being twisted around in a suitable manner.

The diagonal wires 10, which form the support of the concrete-casing under the bottom flanges of the beams A or the girders B, pass from the hooks *n* of the clips 9 or 9^a diagonally across to the next clip 9 or 9^a, and so on to the end, as shown in Fig. 3; but they may, however, be placed as shown in Fig. 5, coming directly against the bend *k* of the clip 9 or 9^a and passing across diagonally, as before described, the ends being secured in a suitable manner.

The wires 11 (shown in Figs. 3 and 4) pass directly from the hook *n* to the next hook *n* parallel to the beams A, and so on to the end, being secured at the ends, as described for the wires 10, these wires 11 forming a part of the support for the beams or girder casing.

In the preferred form the centering 12, composed of wire or metal lath, expanded metal, or similar material, is placed directly under and supported by the bars 2 and diagonal rods 5 and fastened securely thereto by means of small wires *s*, as shown, and this wire-centering is extended down and around the wires 7 and 8, 10 and 11, which form the supports for the beam and girder casing, and is secured to the same by means of the small wires *s*, and in the preferred form this centering 12 will have some reinforcing or stiffening bar *o*.

In Fig. 5 is shown a wood-centering 12^a, of suitable or ordinary form, which may take the place of the centering 12 of the preferred form. In the latter case the clips 3 and 9 form a support or gage to regulate the thickness of the concrete forming the beam or girder casing and upon the centering is placed from above the concrete or similar plastic materials forming the body of the floor construction beam or girder casing. After the concrete or similar plastic material C has set, or become hardened, and in the case of Fig. 5, the wood-centering 12^a has been removed, the suspended ceiling is supported to the clip 9. In the preferred form this suspended ceiling consists of wires 14, passing diagonally across the space between the beams A and attached

to the hook *m* of the clip 9. (Shown in Figs. 1, 3, 4, and 5.) The ends of these wires are secured by twisting the same around the hooks *m* of the clips 9 in a suitable manner and where they cross each other are secured together by means of the small wires *u*, passing around the same and having their ends twisted together. To prevent sagging of the ceiling while the plastic material *G* is still green, one or more bars or rods 15, of some suitable shape, are placed directly on top of the wires 14, running parallel to the beams *A*. To these bars or rods 15 are secured the diagonal wires 14 by means of a small wire *r*, passing around both and having the ends twisted together. From the bars 2 of the floor construction is suspended a heavy wire 16, with the top end *p* twisted around the bar 2 and firmly secured in a suitable manner, and the lower end of which passes around the bars or rods 15 and is secured thereto by having the end twisted in a suitable manner, and these rods or bars 15 and suspending-wires 16 will be placed as often as the span between the beams *A* may require. To the supporting-wires 14 is secured a wire or metal lathing, expanded metal, or similar material 17 by means of small wires *s*, and upon this material 17 is placed a plaster ceiling *G* of some suitable material.

In Fig. 1 we have shown at *D* the wood sleepers of the ordinary form placed directly on the concrete *C* of the floor construction, and *F* represents the cinder filling between the sleepers and protecting the top flange of the beams *A* and girders *B*, while *E* represents the finished wood floor, of the ordinary type, fastened to the wood sleepers *D* in the usual manner.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with floor beams and girders of main supporting metal bars, extending from beam to beam and attached thereto by means of stirrups, resting on the top flanges of the beams, diagonal rods, passing underneath and supported by said bars, and supporting-clips for said rods, the diagonal rods and clips forming a frame for the beam and girder casings, adapted to receive and hold the concrete or other plastic material, substantially as shown and described.

2. The combination with floor beams and girders, of main supporting metal bars extending from beam to beam, and attached thereto by stirrups resting on the top flanges of the beams, diagonal rods and supporting-clips, and diagonal wires and clips, passing down and about the beams and girders and located in such position as to allow a sufficient amount of concrete or other plastic material being placed against and under the bottom flanges of the beams and girders, and a body of concrete, or other plastic material placed around and about the same, all as substantially shown and described.

3. The combination with floor beams and girders, of main supporting metal bars extending from beam to beam, and attached thereto by means of stirrups resting on the top flanges of the beams, diagonal rods and their supporting-clips diagonal wires and clips passing down and about the beams and girders, and located in such position as to allow of a sufficient amount of concrete or other plastic material being placed against the web and under the bottom flanges of the beams and girders, a centering attached thereto, and passing around the space between and down and up the sides of and under the flanges of the beams and girders and forming a supporting-center on which the concrete or other plastic material is placed from above, said centering being used only for the support of concrete or other plastic material while the concrete or other plastic material is being placed around and about the supporting beams and girders, bars, rods, clips, &c., to form the body of the floor, and the beam and girder casing, substantially as shown and described.

4. The combination with floor beams and girders of main supporting metal bars extending from beam to beam, and attached thereto by means of stirrups resting on the top flanges of the beams, diagonal rods and their supporting-clips diagonal wires and clips, passing down and about the beams and girders, and located in such position as to allow of a sufficient amount of concrete or other plastic material being placed against the web and under the bottom flanges of the beams and girders, a wooden centering of the ordinary form, placed under and about the supporting beams, girders, bars, rods, clips, &c., forming a supporting-center on which the concrete or other plastic material is placed from above, said centering above mentioned being used only for the support of the concrete or other plastic material, while the concrete or other plastic material is being placed around and about the supporting beams, girders, bars, rods, clips, &c., to form the body of the floor and the beam, and girder-casing, said centering being removed after the concrete or other plastic material has become set or hardened, substantially as shown and described.

5. The combination with floor beams and girders, of main supporting-bars, extending from beam to beam, and attached thereto by means of stirrups resting on the top flanges of the beams, diagonal rods and their supporting-clips, diagonal wires and clips, passing down and about the beams and girders and located in such a position as to allow of a sufficient amount of concrete or other plastic material being placed against the web and under the bottom flanges of the beams and girders, a wire or metal lath, expanded metal, or similar centering attached thereto and passing across the space between and down and up the sides, and under the flanges of the beams and girders, and forming a supporting-center upon which the concrete or

other plastic material is placed from above, substantially as shown and described.

6. The combination with beams A girders B, and main supporting-bars 2 extending between the supporting-beams A and attached thereto by means of suitable connections, diagonal rods 5 extending diagonally between beams A and passing under the bars 2 and attached thereto by means of clips 3 and 6, diagonal wires 7 and 8 placed alongside of and parallel with the webs of beams A and girders B, and clips 9 and 9^a secured to the bottom flanges of the beams A and girders B, diagonal wires 10 passing between clips 9 and 9^a across and under the bottom flanges of beams A and girders B, parallel wires 11 attached to clips 9 and running parallel with and below the bottom flanges of beams A and girders B, and clips 4 attached to bars 2 and supporting-wires 8 of the girder-casing, all substantially as shown and described.

7. The combination with beams A, girders B and main supporting-bars 2 extending between the beams A and attached thereto by means of stirrups 1, rods 5 extending diagonally between beams A passing under the bars 2 and attached thereto by means of clips 3 and 6, diagonal wires 7 and 8 placed alongside of and parallel with the webs of beams A and girders B, clips 9 and 9^a secured to

the bottom flanges of the beams A and girders B, diagonal wires 10 passing between clips 9 and 9^a across and under the bottom flanges of beams A and girders B, parallel wires 11 attached to clips 9 and running parallel with and below the bottom flanges of beams A and girders B, clips 4 attached to bars 2 and supporting-wires 8 of the girder-casing, wires 14 passing diagonally between beams A and attached to clips 9 and secured at their intersection by wires *u* supported by bars or rods 15 running parallel with beams A, said bars 15 being supported from the main bars 2 by means of suspension-wires 16, substantially as shown and described.

8. In a fireproof floor and ceiling structure, a clip composed of two or more pieces secured together by means of rivets or bolts and provided with a plurality of pairs of upwardly-directed hooks, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 24th day of March, 1902.

JNO. T. SIMPSON.

MARSHALL N. SHOEMAKER.

Witnesses:

F. A. STEWART,
F. F. TELLER.