

No. 738,950.

PATENTED SEPT. 15, 1903.

J. T. SIMPSON & M. N. SHOEMAKER.  
FIREPROOF FLOOR AND CEILING CONSTRUCTION.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

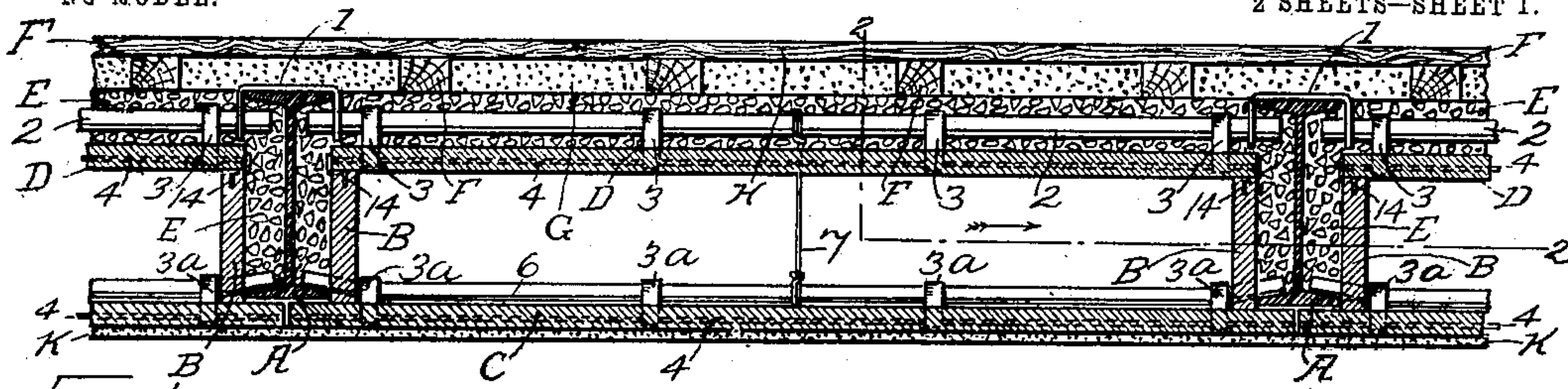


Fig. 1.

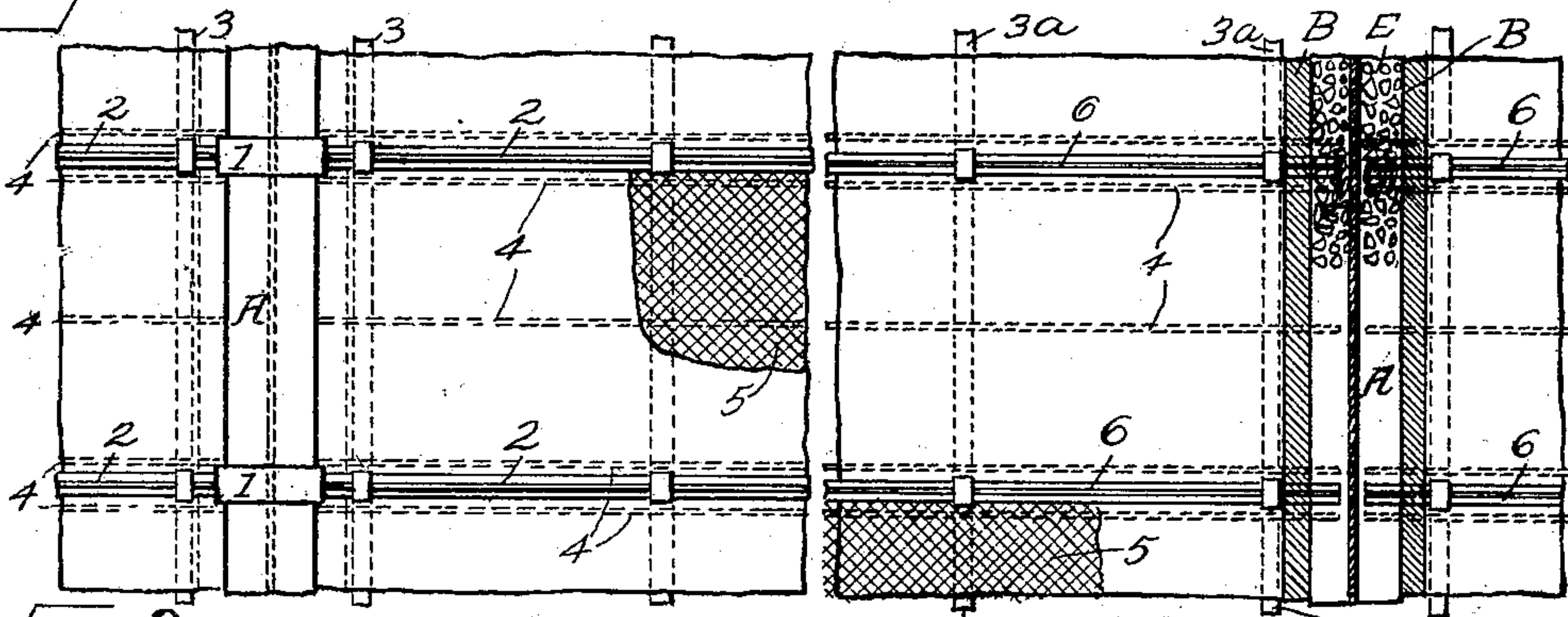


Fig. 2

Fig. 3

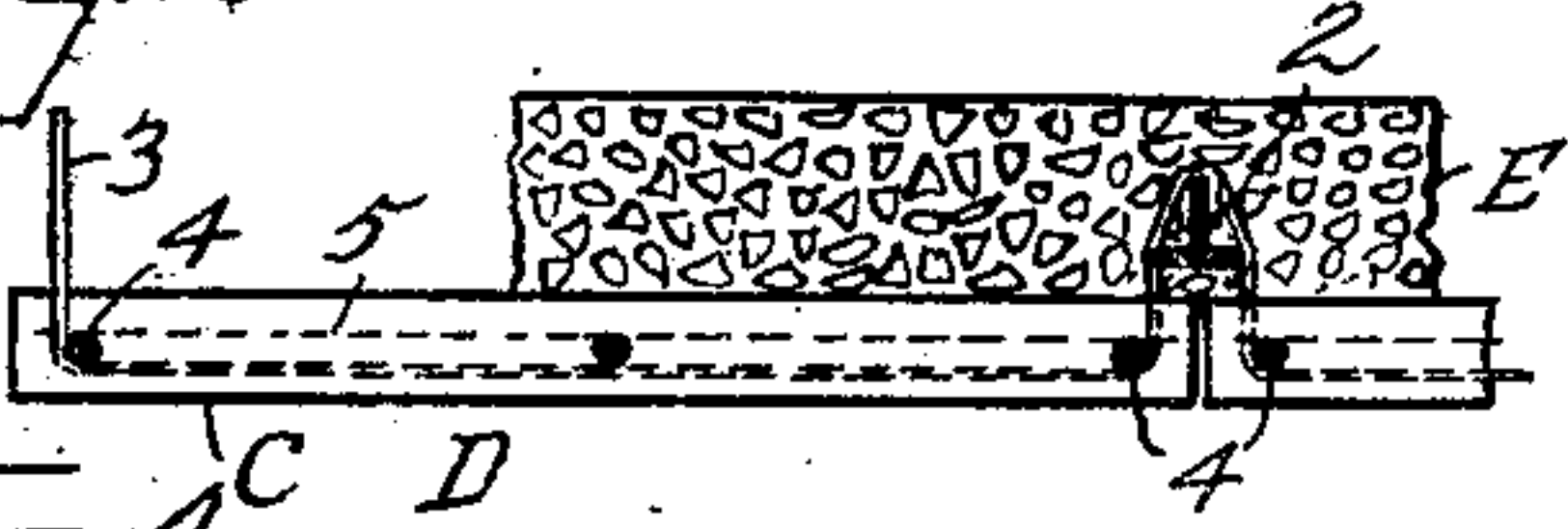


Fig. 4

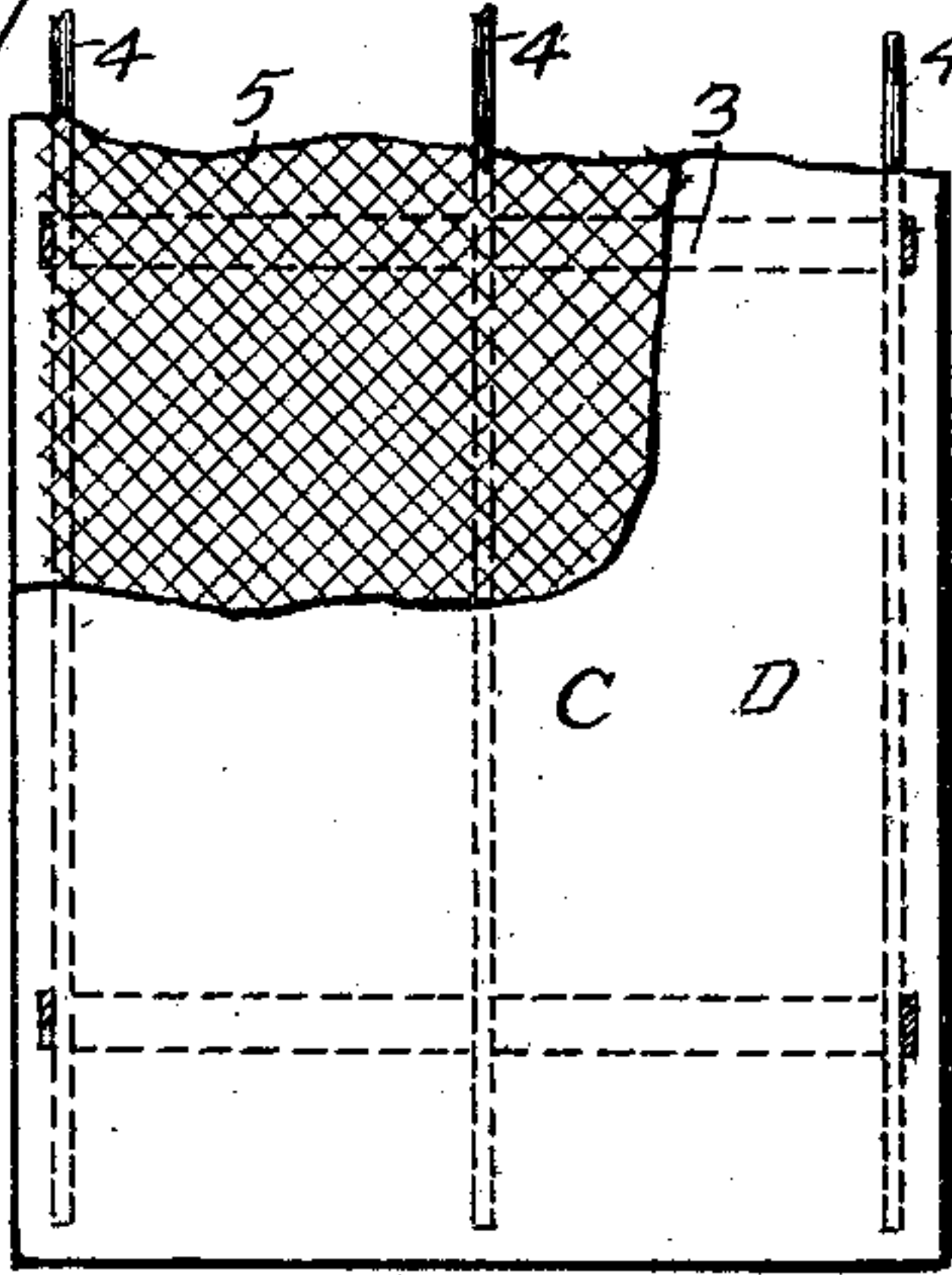


Fig. 5.

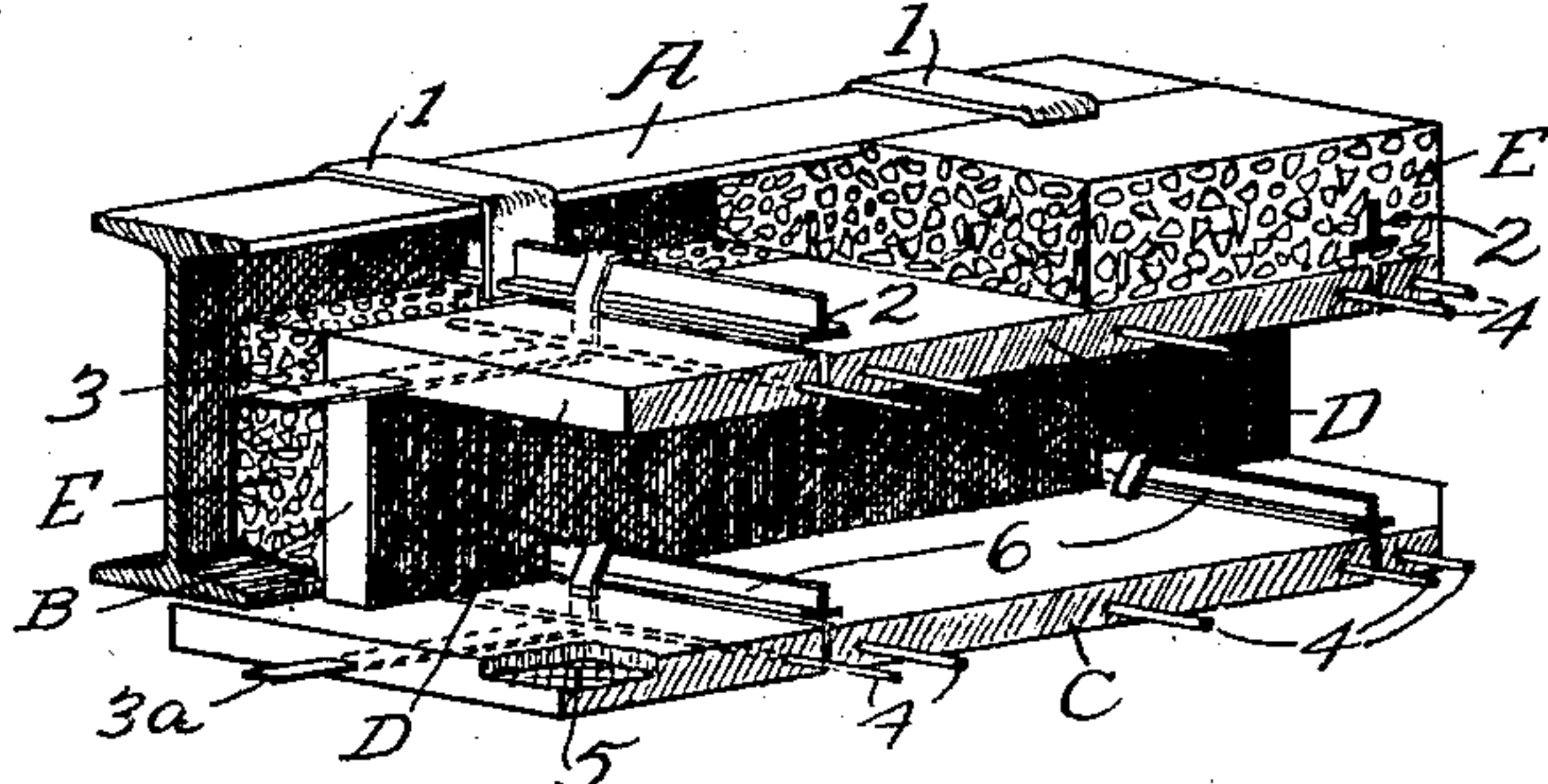


Fig. 6

WITNESSES

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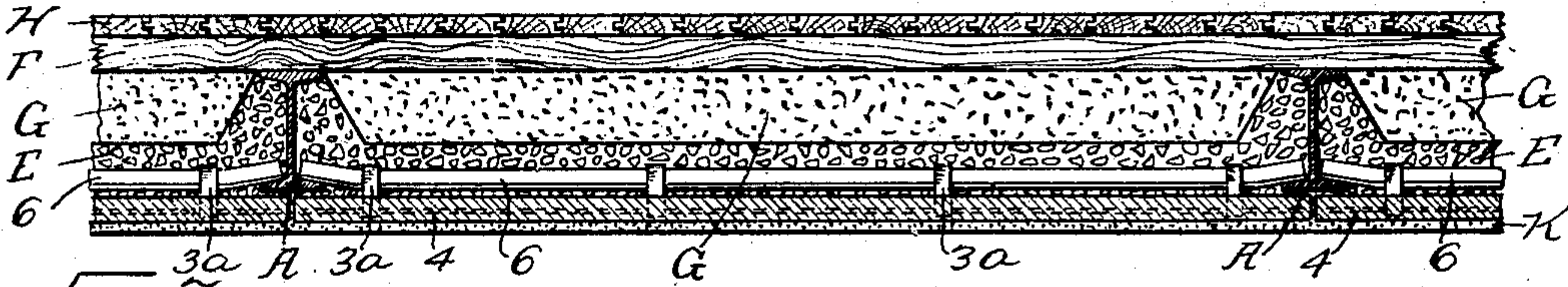


Fig. 7

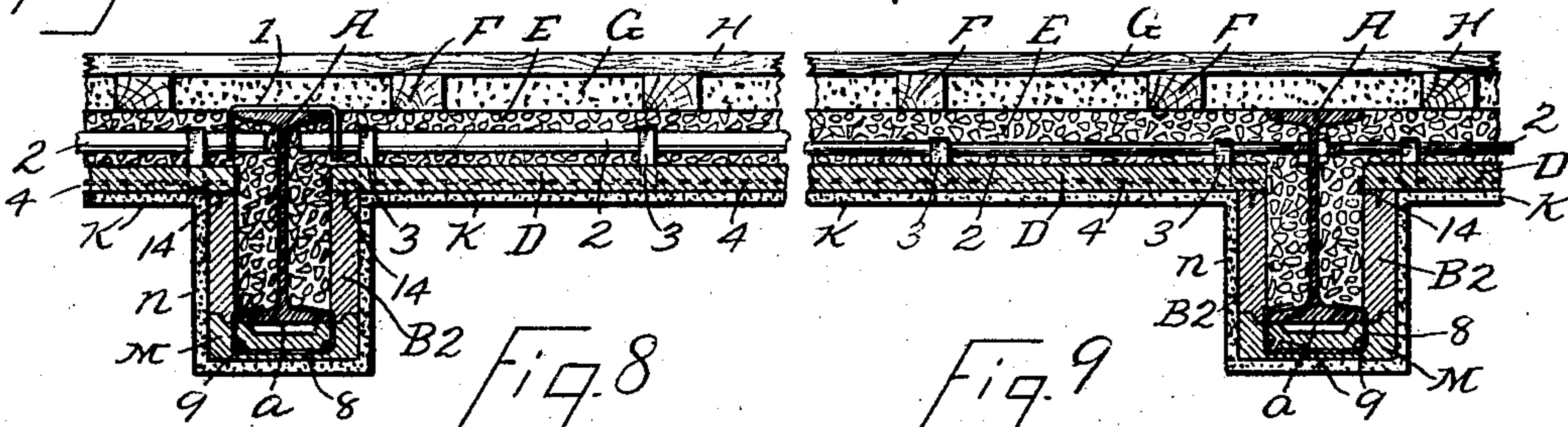


Fig. 8

Fig. 9

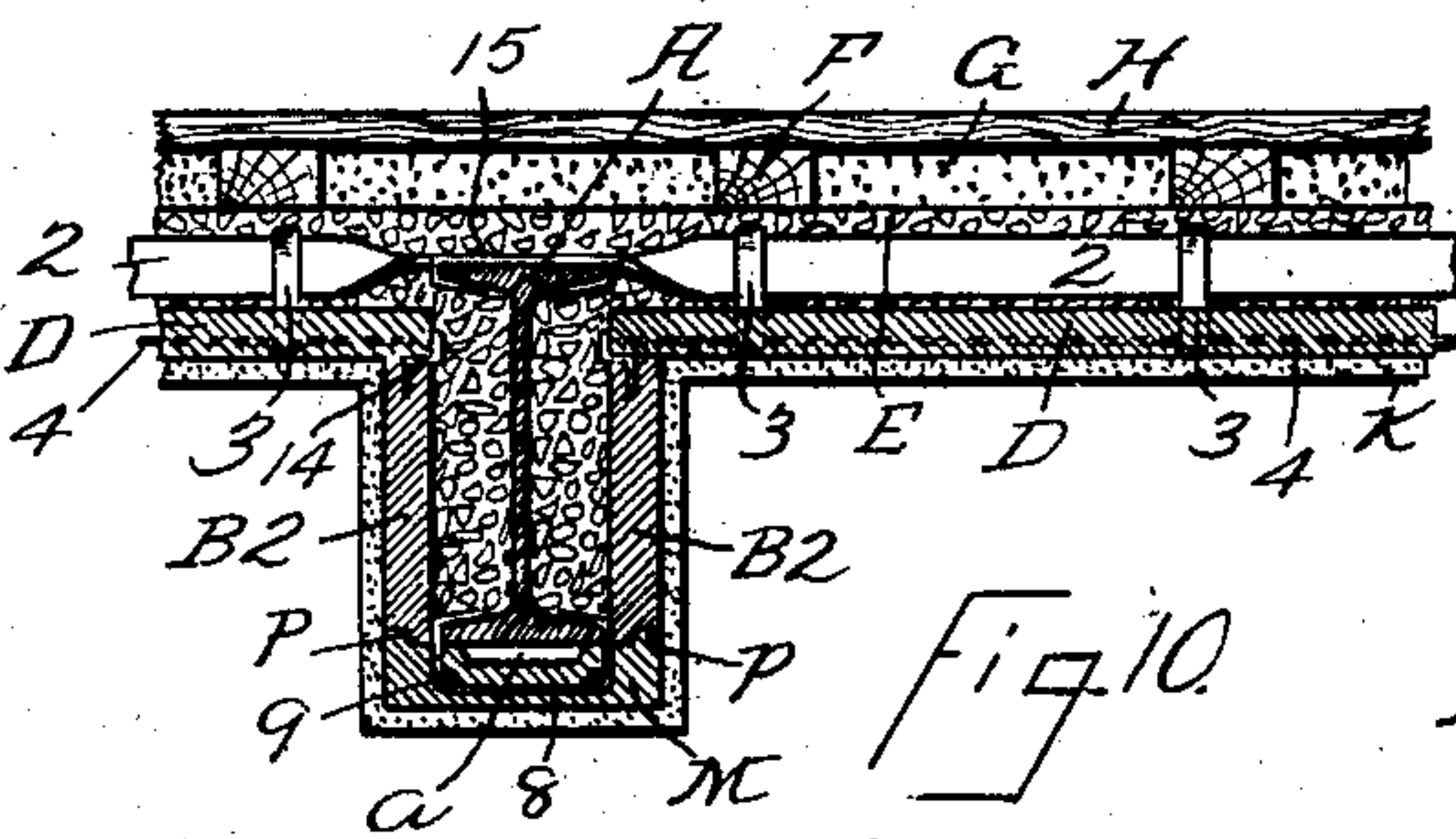


Fig. 10

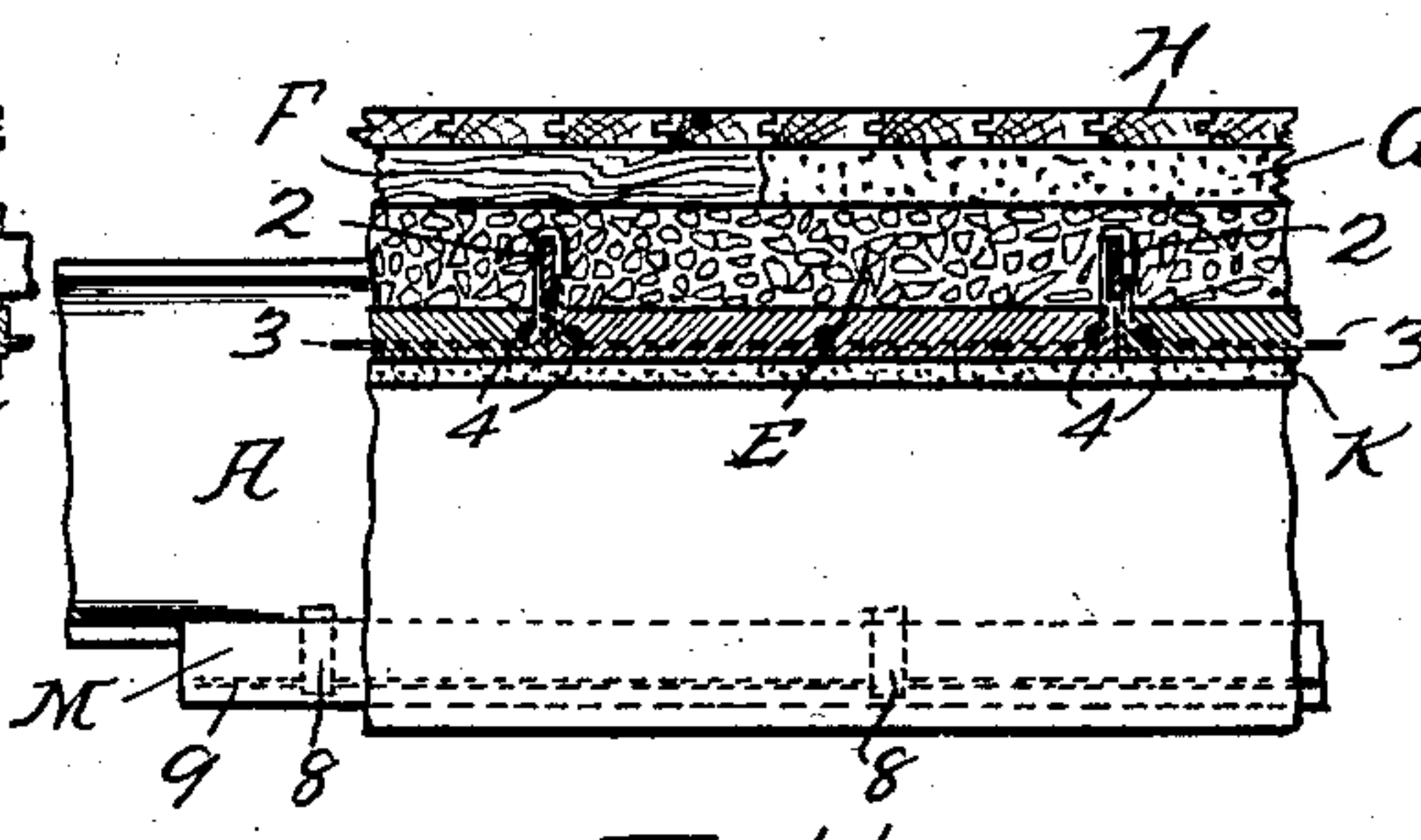


Fig. 11

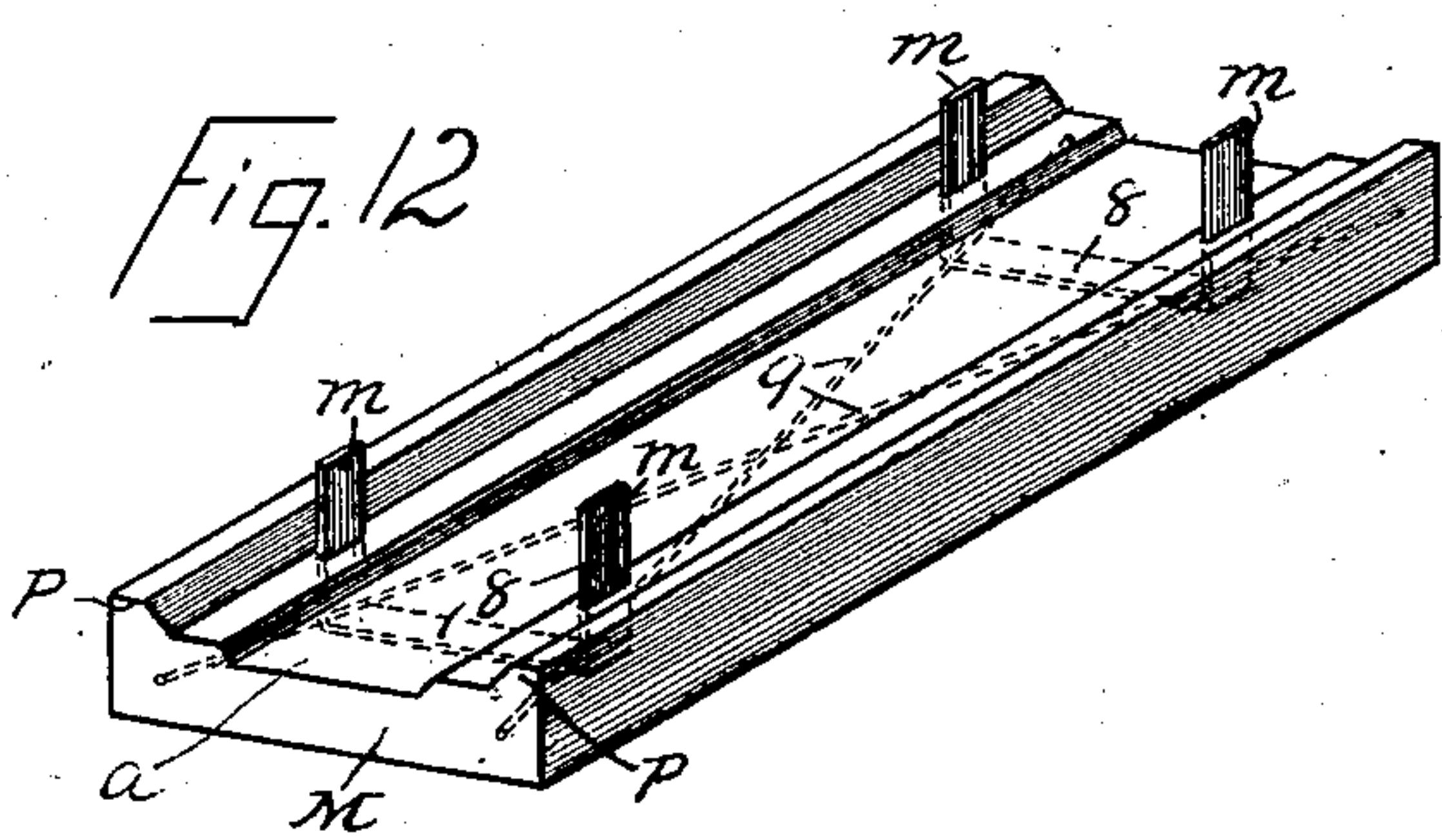


Fig. 12

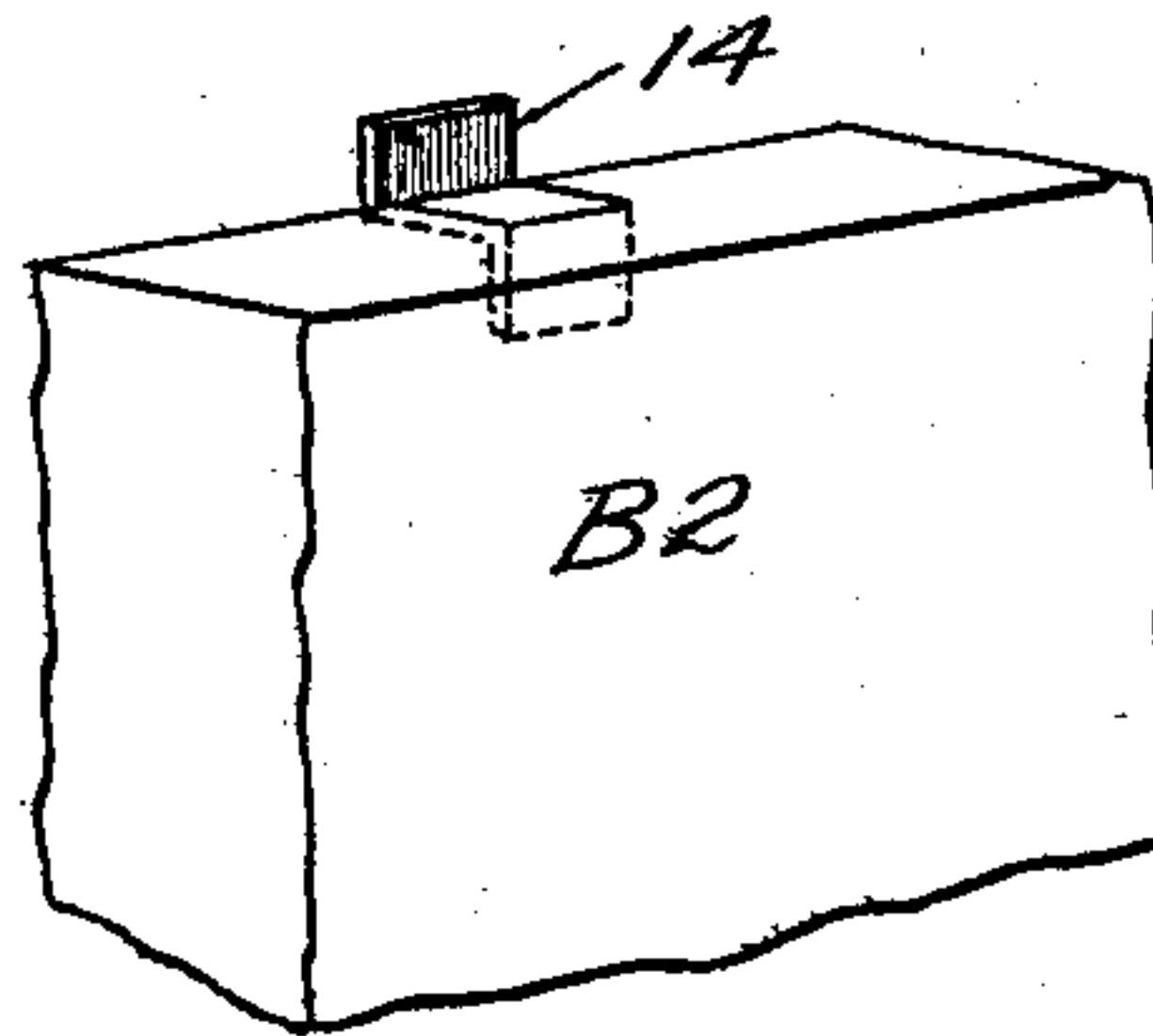


Fig. 13

WITNESSES

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## UNITED STATES PATENT OFFICE.

JOHN T. SIMPSON AND MARSHALL NEY SHOEMAKER, OF NEWARK, NEW JERSEY, ASSIGNORS TO THE CEMENTAL FIREPROOFING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## FIREPROOF FLOOR AND CEILING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 738,950, dated September 15, 1903.

Application filed September 22, 1902. Serial No. 124,412. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN T. SIMPSON and MARSHALL NEY SHOEMAKER, citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Fireproof Floor and Ceiling 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 materials reinforced with metal and having a center for receiving the concrete or other plastic materials forming the body of the floor construction, which center is composed also of concrete or similar plastic materials reinforced with metal.

The essential features of the invention are to provide a floor construction that is simple of application to the various conditions of building construction, employing a minimum amount of both concrete and metal, doing away with the expensive wood or wire lath centering heretofore applied in similar constructions by using a center composed of concrete or similar plastic materials reinforced with metal and made in such a manner that the same can be suspended below the metal bars forming the stiffening members of the floor and ceiling construction, so as to allow the concrete or similar plastic materials forming the body of floor construction to completely embed these bars and bind with and gain strength from the center and placed under and around the supporting-beams, bars, clips, &c., in such a manner as to afford a complete protection against fire.

Figure 1 is a section of the floor and ceiling construction which we employ, taken at right angles to the floor-beams. Fig. 2 is a plan view of the construction, showing the supporting members and having the wood floor, cinder filling, and concrete body removed to

show the concrete center and construction of same. Fig. 3 is a sectional plan view on the line 2 2 of Fig. 1 and shows the supporting members and construction of the suspended ceiling-slab. Fig. 4 is an end view of concrete slab used for centers and ceilings, showing the concrete, reinforcing metal rods, and wire lath, together with hangers for attaching slabs to supporting-bars. Fig. 5 is a plan view of concrete slab, showing the wire-lath, expanded-metal, or similar metal fabric used to bind the concrete together and stiffen the slab, so as to permit of its being made at a factory and shipped to the building or place of erection. Fig. 6 is a perspective view of the floor and ceiling construction and having the wood floor, sleepers, and cinder filling removed, together with a portion of the main concrete body, to more plainly show the construction. Fig. 7 is a section similar to Fig. 1, showing the ceiling-slab being employed as a center where the depth of the floor-beams will permit of such construction. Fig. 8 is a section similar to Fig. 1, showing but one supporting-beam, but where the suspended ceiling is omitted and a flange-slab is employed to protect the bottom of the steel floor-beams. Fig. 9 is a section similar to Fig. 8, except showing the slab suspended from the ordinary tie-rods used in steel-frame constructions. Fig. 10 is also a section similar to Fig. 8, except showing the slab attached to a bar that is bent and hooked over the top flange of the floor-beams when the nature of the construction will permit the same to be used. Fig. 11 is a section of Fig. 10, taken on a line parallel to the floor-beam and showing the clips used to support the flange-slab and rods to stiffen the same. Fig. 12 is a perspective view of the flange-slab, showing clips for suspending same from beams, reinforcing metal rods, and ledge for securing the web-slabs. Fig. 13 is a perspective view of a web-slab, showing only that portion that engages the clip for securing said slab in place.



Referring to the drawings, A represents the floor-beams, which are shown of the ordinary I type. On top of the flange of beams A rest the metal stirrups 1, which are placed 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 openings to receive the bars 2 and bent into the form shown. The bars 2, both ends of which rest in the stirrups, Fig. 1, or pass through the web of the beams, as shown in Fig. 9, or hook over the top flange of said beams, as shown in Fig. 10, extend from beam to beam and are shown in the preferred forms of the ordinary T, round, and flat shape, but may be square, L-shaped, channel-shaped, or some other desirable form. To these bars 2 are attached the concrete slabs D, forming the center, this attachment being made by means of clips 3, which are embedded in the slabs when same are made and bent over the bars 2, as shown, and providing sufficient space between the bottom of the bars 2 and top of the center slabs D to permit of the concrete when being placed on the same to completely embed the bars 2. In these concrete slabs D are embedded the clips 3, rods 4, and wire lath 5 near the bottom surface thereof, and said slabs are made in lengths to extend from beam to beam, as shown, the clips 3 being placed at certain distances apart, as the strength of the slabs may require, and the rods 4 resting upon the clips 3 and adding tensional strength to the slabs. The wire lath 5, forming the binding element of the slabs, rests directly on the top of rods 4, as shown in Fig. 5, the slab being formed by means of successive layers of concrete molded in a form and allowed to harden or set before being placed in position to receive the concrete or other plastic materials forming the body of the floor. If desired, however, the wire lath or expanded-metal or metal fabric 5 may be omitted.

When the construction makes the employment of a level ceiling necessary, the same is formed by suspending concrete slabs C, formed the same as slabs D, just described, from bars 6, similar to bars 2, placed directly beneath bars 2 and resting on the bottom flanges of the beams A and being bent, as shown, and supported when necessary from the bars 2 by means of wires 7 to prevent sagging of the ceiling-slabs and to permit of bars 6 being as light as possible. These slabs C are when practicable made in one length from beam to beam and of a width to suit the spacing of bars 6; but they may, however, be in one or more pieces from beam to beam, as the case may require. No concrete is placed on these slabs C from above when forming a suspended ceiling; but when used to form a center, as shown in Fig. 7, the ceiling-slab becomes the center slab and concrete is placed thereon. Resting on the ceiling-slabs C and

extending to the under side of centering slabs D are placed concrete web-slabs B, formed of concrete, without any reinforcing metal, but made in a mold and taken to the place of erection ready to set up. These slabs B are made in lengths to suit the requirements, and when in place they form pockets between the same and the web of the beams A, into which the concrete or similar plastic material E, forming the body of the floor construction, is rammed, thus forming a complete protection of beams A against fire.

When the concrete centering slabs B are set in place, the concrete or similar plastic materials E of the floor construction are placed from above, embedding the bars 2 and clips 3 and forming the binding mass of the floor construction. Upon this concrete E when hardened are placed the wood sleepers F, of the ordinary form, and between which is placed the cinder filling G of the ordinary mixture. The floor H, of the ordinary wood type, is then nailed in place to the sleepers F, thus completing the floor.

The under side of the ceiling-slabs C is plastered in the ordinary manner with any desirable material K, completing the ceiling construction.

In Figs. 8, 9, and 10 when no level ceiling is desired the flange-slabs M (shown in Fig. 12) are made and allowed to become hardened before attaching to beams A. These slabs M are made similar to slabs C and D, but are formed in such a way as to allow an air-space *a* between the top of the same and flanges of beams A, the clips 8 being embedded near the bottom of said slabs and of sufficient width to permit of the upward-extending legs thereof to bend over the bottom flanges of beams A. The steel reinforcing diagonally-placed rods or wires 9 rest upon these clips 8 and bind the mass together, stiffening the same. A ledge *p* is also formed on each top edge of the slabs M to engage a similar one on the bottom of web-slab B<sup>2</sup> and to prevent slab B<sup>2</sup> from being thrust outward when the pocket is filled with concrete E. The slabs B<sup>2</sup> are similar to slabs B, but have a ledge *p* formed on the bottom edges and running the full length of the slabs to engage similar ledges on slab M, as shown in Figs. 8, 9, and 10, and clips 14 are placed at certain distances apart in the top edge to rest against the slab center D of the floor construction and to form a support for slabs B<sup>2</sup> against outward pressure during the ramming of concrete E in the pockets.

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

1. The combination with floor-beams 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 and a concrete or similar plastic-ma-



terial center reinforced with metal rods and a wire lath or fabric and suspended from said bars so as to permit the concrete or similar plastic materials forming the body of the floor to completely surround and embed the bars when said material is placed on the center from above, substantially as shown and described.

2. The combination with steel floor-beams of main supporting metal bars extending from beam to beam and attached thereto by means of stirrups resting on the top flanges of beams, a concrete center reinforced with metal and suspended below the bars in such a manner as to allow bars to be completely embedded in concrete or similar plastic materials when placed on same from above, metal bars extending from beam to beam resting on the bottom flanges thereof, a concrete slab reinforced with metal and suspended therefrom and extending from beam to beam and under bottom flanges thereof and a concrete or similar plastic-material slab resting upon the ceiling-slabs and supported thereby and extending to the underside of the center above and placed parallel with the floor-beams and against the flanges thereof and forming a pocket into which the concrete or similar plastic materials forming the body of the floor construction is placed from above, substantially as shown and described.

3. The combination with steel floor-beams of main supporting metal bars extending from beam to beam and attached thereto, a concrete center reinforced with metal and suspended from said bars so as to embed said bars in concrete or similar plastic materials when the same is placed thereon as a center from above, a concrete flange-slab reinforced with metal and having an air-space below and flanges and ledges to engage ledges of a web-slab and attached to the beams by means of metal clips bent over the top of the bottom flange of said beams, a concrete web-slab having ledges on bottom edge to engage the ledges of the flange-slab and having clips in the top edge to prevent it from being thrust outward while the pocket is being rammed, a main body of concrete or similar plastic material which is placed in and about said slab forming the body of the floor and uniting with center and slabs and being strengthened thereby and binding with the metal bars so as to develop the total tensile strength of same, substantially as shown and described.

4. The combination in a floor construction, of main floor-beams having metal bars extending between the same and attached thereto, and embedded in a main body of concrete or similar plastic material placed upon a concrete center having metal reinforcing-rods embedded in the same to strengthen it when being handled and when the main body of concrete is placed thereon, metal clips pass-

ing under the reinforcing-rods and having upwardly-directed ends which are bent and hooked over the main supporting-bars of the floor construction, and concrete slabs supported by said rods to permit of the concrete materials forming the bottom portion of the floor being rammed solidly while being put in place, said slabs being provided with a metal lath or fabric forming a binding element, substantially as shown and described.

5. The combination of supporting-beams A and bars 2 passing between the supporting-beams A and attached thereto by means of suitable connections, and having a concrete center D reinforced with metal rods 4 and wire lath 5 and having suitable clips 3 for attaching to bars 2, bar 6 passing between beams A and resting on the lower flange of same, and having a concrete ceiling-slab C reinforced with rods 4 and wire lath 5 and suitable clips 3 and for attaching bars 6, a concrete web-slab B resting on ceiling-slab C and extending to center D and a main body of concrete E resting on and about the same, substantially as shown and described.

6. The combination of supporting-beams A and bars 2 passing between the supporting-beams A and attached thereto by means of suitable connections, and having a concrete center D reinforced with metal rods 4 and wire lath 5 having suitable clips 3 for attaching to bars 2, a concrete flange-slab M reinforced with metal rods or wires 9 and suitable clips 8 having ends passing up and over the bottom flanges of the beams A and attached thereto, and having ledges P to engage the lower edges of a web-slab B<sup>2</sup>, a concrete web-slab B<sup>2</sup>, resting on the flanges of slab M and having ledges on the lower edge to fit the ledges of flange-slab M and having clips 14 on top edges to engage the edges of center, and a main body of concrete E placed on and about the same, substantially as shown and described.

7. The combination with a series of suspending-bars suitably supported, of center slabs between the same having embedded in them reinforcing-rods connected at their ends to the said suspending-bars and supporting and reinforcing the center slabs.

8. The combination with main supporting-beams of a series of suspending-bars supported thereby, and center slabs between said suspending-bars, having embedded in them reinforcing-rods connected at their ends to the said suspending-bars and supporting and reinforcing the center slabs.

9. The combination with a series of suspending-bars suitably supported, of center slabs between the same, having embedded in them reinforcing-rods connected at their ends to the said suspending-bars and supporting and reinforcing the center slabs, and a body of concrete or other plastic material



supported by said center slabs and suspending-bars.

10. The combination with a series of suspending-bars suitably supported of center  
5 supports or rods arranged transversely between the adjacent suspending-bars and connecting the same and supported thereby, and center slabs carried by said supports, the lower faces of said center slabs being below  
10 the lower edges of the suspending-bars.

In testimony that we claim the foregoing as our invention we have signed our names, in

presence of the subscribing witnesses, this 19th day of September, 1902.

JNO. T. SIMPSON.

MARSHALL NEY SHOEMAKER.

Witnesses as to John T. Simpson's signature:

F. A. STEWART,

J. C. LARSEN.

Witnesses as to Marshall Ney Shoemaker's signature:

G. DOWNING,

HENRY BROCK BROWN.