

No. 625,544.

Patented May 23, 1899.

A. DE MAN.

FIREPROOF FLOOR AND CEILING CONSTRUCTION.

(Application filed Aug. 17, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

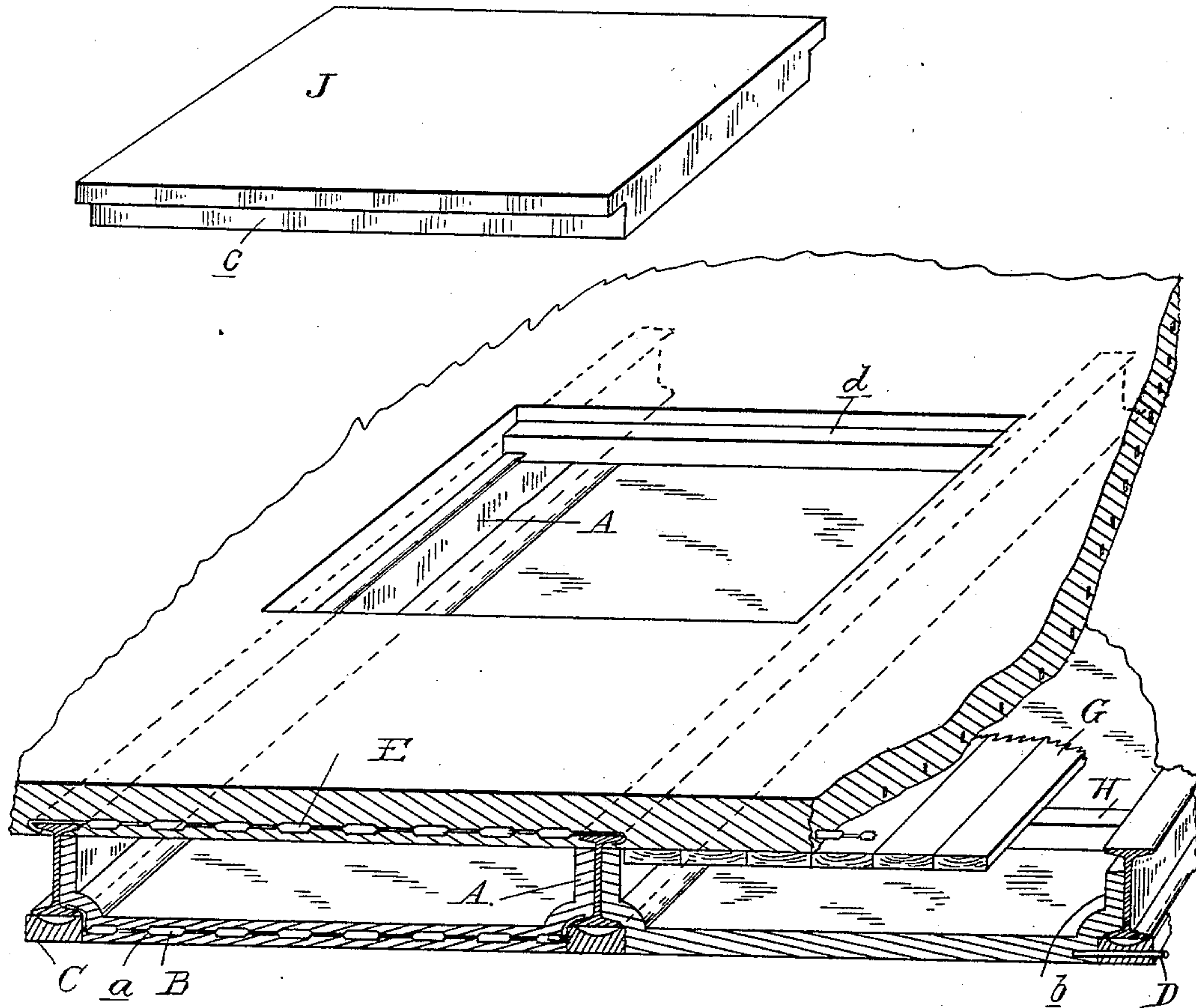
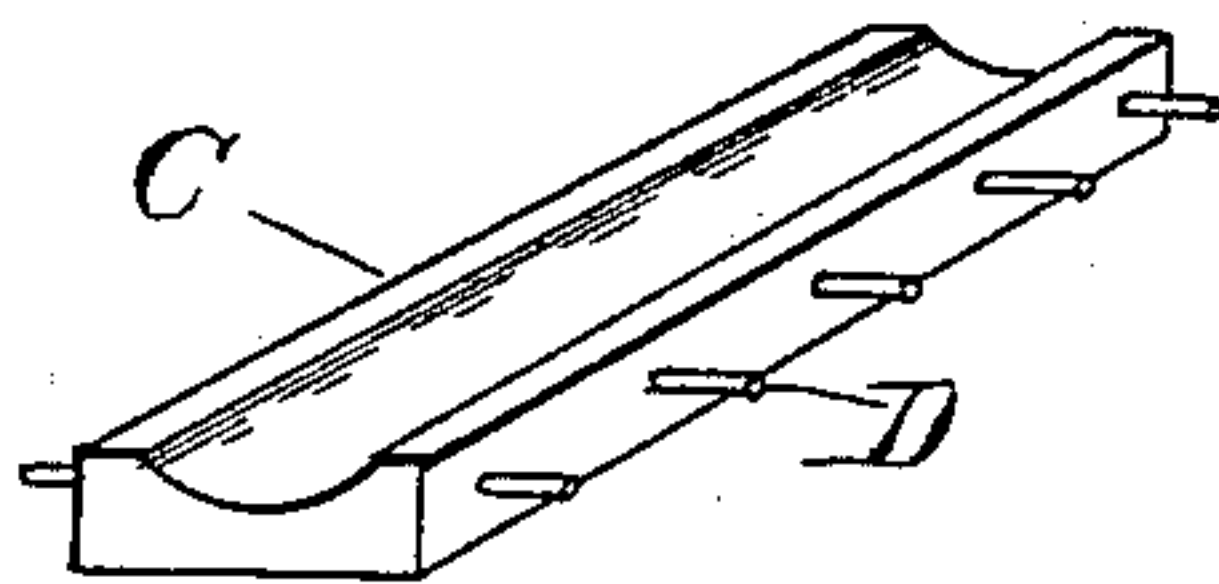


Fig. 4.



Witnesses

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2 Sheets—Sheet 2.

Fig. 2.

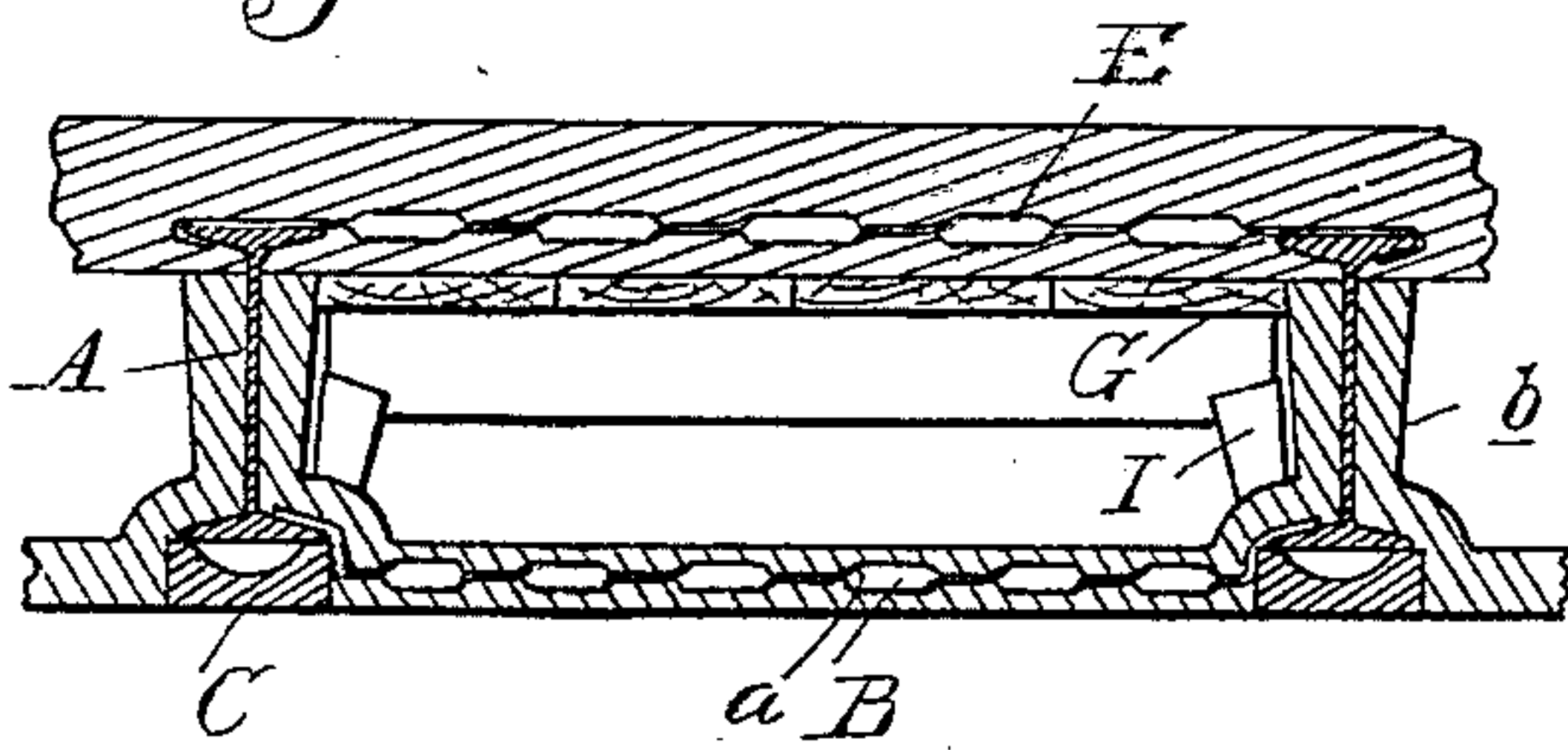


Fig. 3.

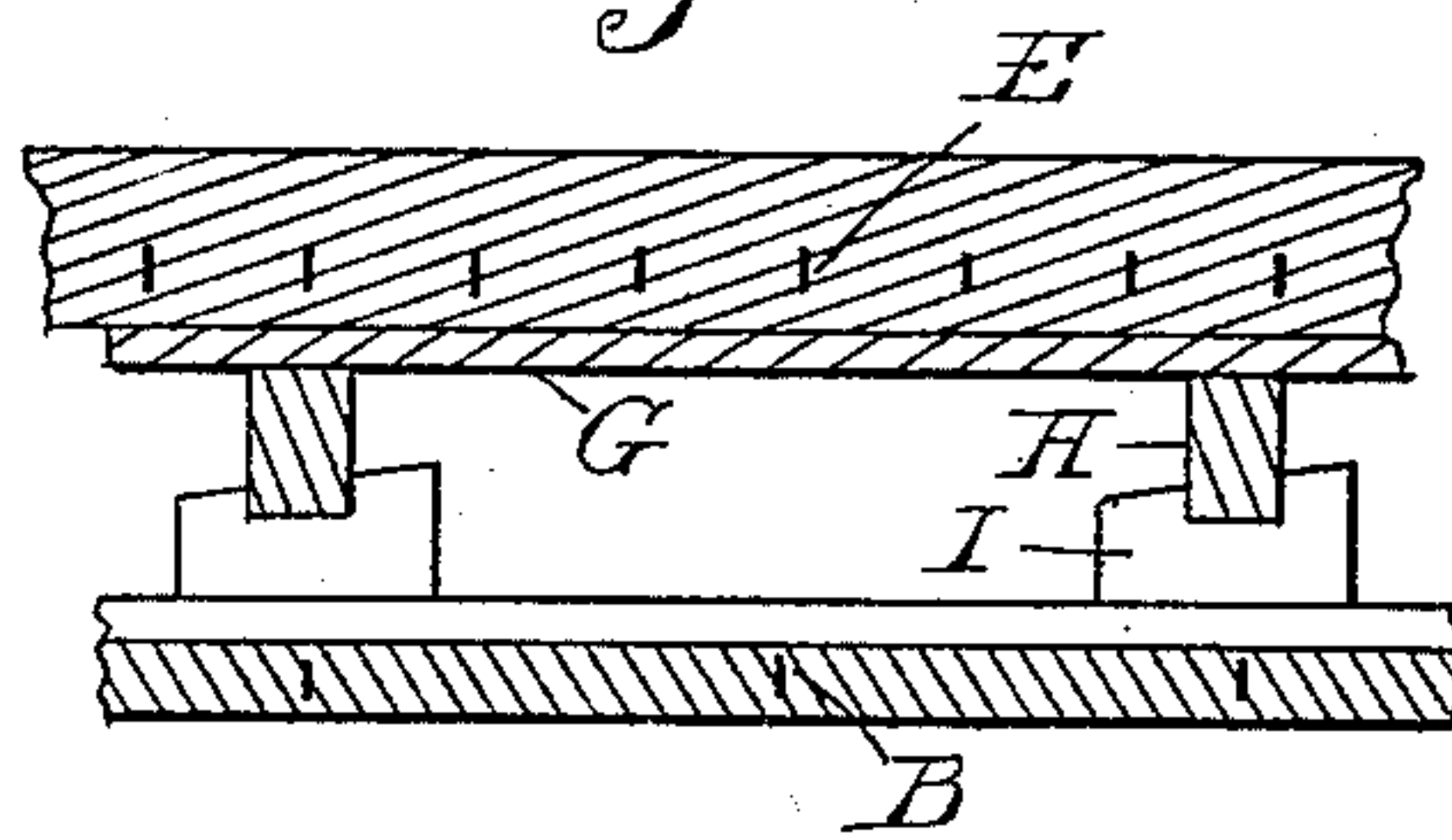


Fig. 5.

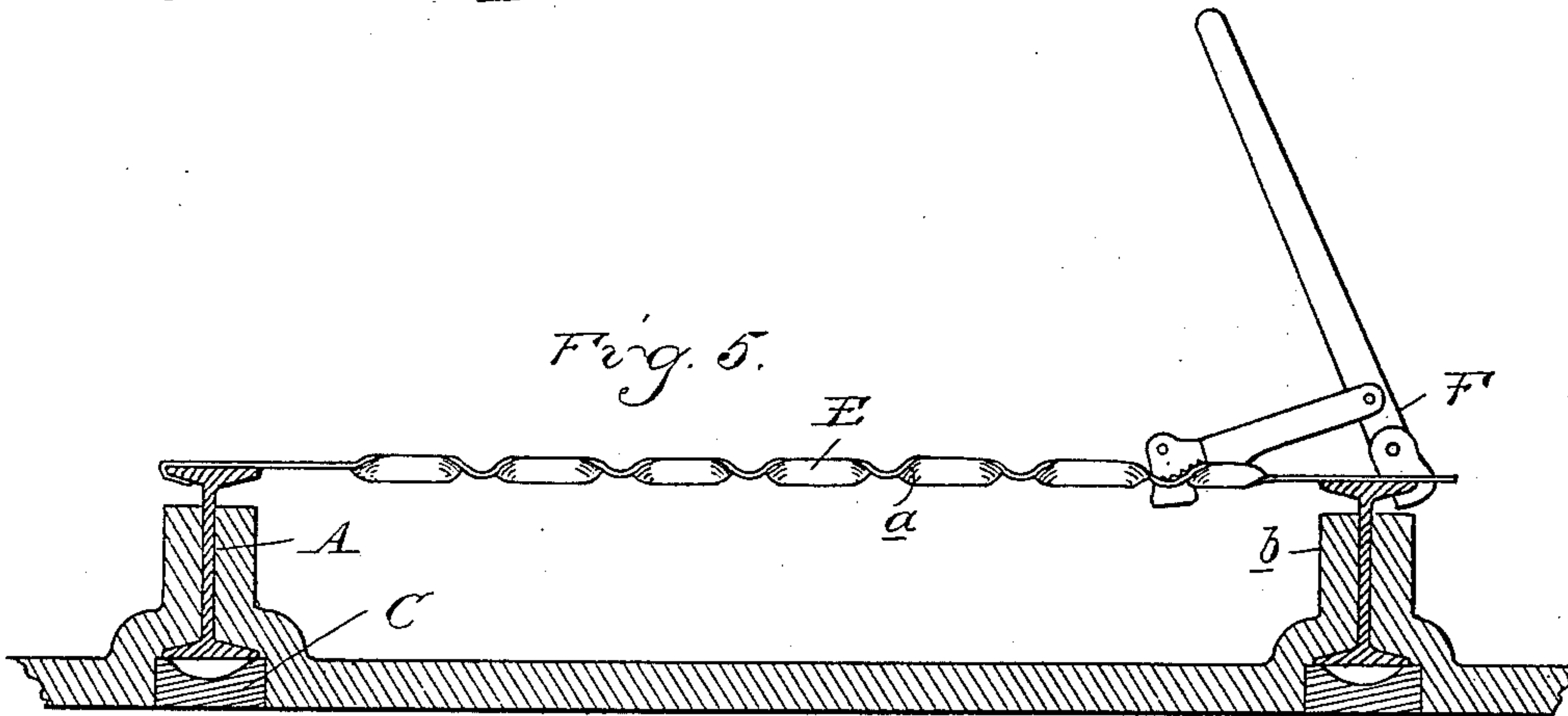
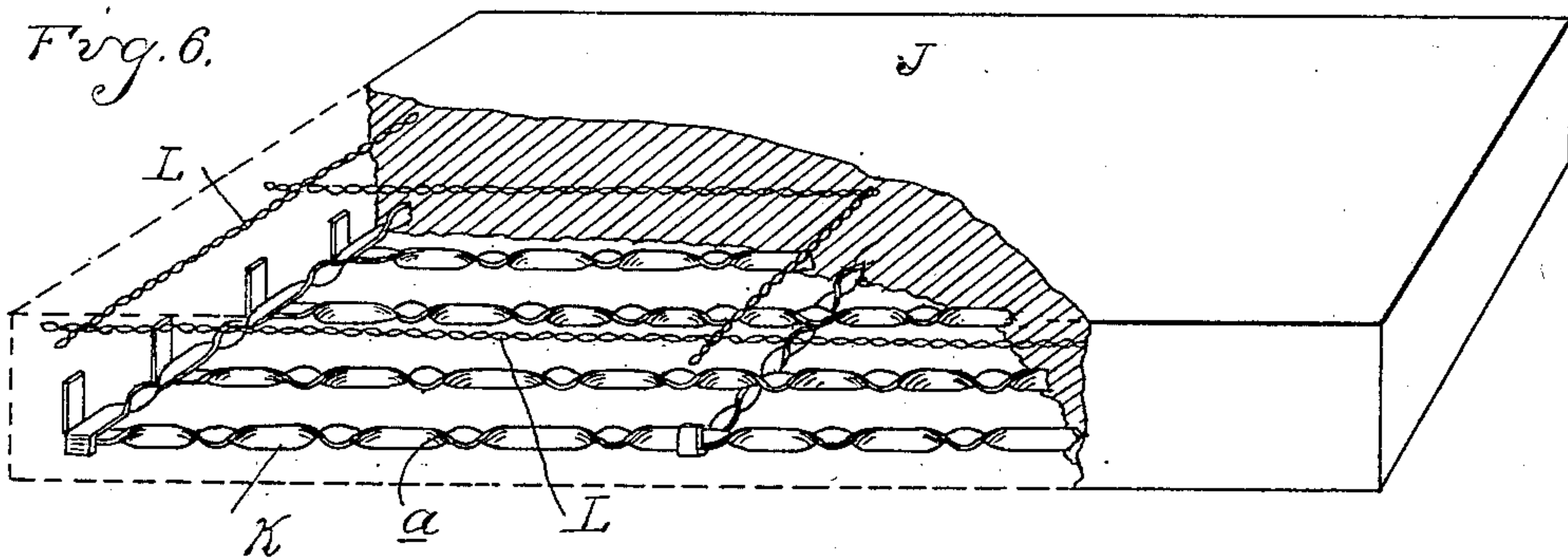


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALPHONSE DE MAN, OF DETROIT, MICHIGAN.

FIREPROOF FLOOR AND CEILING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 625,544, dated May 23, 1899.

Application filed August 17, 1898. Serial No. 688,768. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSE DE MAN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Fireproof Floor and Ceiling Construction, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to monolith floor and ceiling constructions comprising an artificial-stone body and metallic strengthening members embedded therein.

More particularly, my invention relates to constructions in which the floor and ceiling spans are separated by an intervening air-space and the beams are completely incased by a protecting-covering.

The invention consists in the peculiar construction of the composite spans; further, in the floor construction, whereby the spans between the ceiling and floor are accessible for the purpose of laying conduit-pipes, electric conductors, &c., therein; further, in the construction of the removable floor-slab; further, in the means employed for protecting the floor-beams on their under side, and, further, in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described.

In the drawings, Figure 1 is a perspective view of a section of my floor and ceiling construction. Figs. 2 and 3 are cross and longitudinal sections thereof, showing the manner of forming the floor-spans. Fig. 4 is a perspective view of the protecting-slab for the beams. Fig. 5 is a diagram elevation showing the manner of tensioning the metallic strengthening members. Fig. 6 is a sectional perspective view of one of the removable floor-slabs.

A are the floor-beams, which in the drawings I have shown as the usual metallic I-beams.

In building my structure I first form the ceiling in the following manner: Metallic strengthening members B are laid across the spaces between the beams, their opposite ends resting on the lower flanges of said beams and preferably dropping down therefrom sufficiently to bring the spanning portions below the level of the beams. These strengthening-

bars are provided at intervals with anchoring-shoulders *a*, preferably formed by bending or twisting the bars. Directly beneath the beams are arranged strips or slabs C of artificial stone, which slabs are preferably channeled on their upper surfaces to leave an air-space beneath the bottom of the beam. These channeled slabs are preferably previously prepared and have projecting from their sides metallic arms or anchors D. A suitable staging or platform is next erected, extending beneath the beam and the metallic members B, after which the artificial stone, preferably concrete, is filled in, embedding the metallic members B and the anchors D and forming the ceiling-span. The artificial stone is preferably also carried up to form a side protecting-covering *b* for the beam. After the completion of the ceiling the floor is formed, which also comprises a series of metallic members E, similar to the members B, extending across between the beams, and an artificial-stone body in which said members are embedded. In order to give greater rigidity to the floor-spans and to prevent any subsequent sagging even where the spans are of considerable extent, I place the members E under tension before the body is filled in. This may be accomplished by first hooking one end of the bar over the upper flange of one of the beams and then by means of a suitable tool, such as shown at F, Fig. 5, gripping the bar and engaging with the opposite beam. The bar may be placed under tension and the other end clenched around the flange of the beam. The tension-bars being thus placed in position, a platform or centering must be erected between said bars and the ceiling to support the artificial-stone body while in a soft state and to leave a space between the ceiling and floor when the latter is completed. This I preferably form by placing a number of boards G edge to edge, extending parallel with the beams beneath the tension-bars. The boards are supported by cross-bars H, resting at their ends on wedges I, which in turn are supported on the lower flanges of the beams or the artificial-stone ledge covering said flanges. The artificial stone is then filled in on this platform, and after it has sufficiently hardened the wedges I are knocked out, allowing the cross-bars and

boards to be drawn along into a position to form another section of the floor.

In the construction of modern buildings provision must be made for the various conduit-pipes, electric conductors, &c., with which said buildings are supplied, and inasmuch as frequent changes and repairs are necessary it is desirable that these conduits should be so placed as to be easy of access. With my floor and ceiling construction the space between the ceiling and floor spans is ample for the laying of all such conduits; but if the monolith construction which I employ were carried out uninterruptedly there would be no means of access to the conduits excepting by breaking up a portion of the floor. To avoid this difficulty, in forming the floor-span I leave open a section, preferably in the central portion of the floor and extending completely across between two beams. This opening is removably covered by a composite slab J, formed by embedding metallic strengthening members K in an artificial-stone body. These members K are similar in construction to the members E and are arranged side by side in a suitable form, into which the artificial stone is filled while in a plastic state. The ends of the members K are preferably turned up to form anchors extending to near the ends of the slab, but completely covered by the artificial stone. One or more cross members are also laid in the form and embedded in the body, the members serving to strengthen the slab laterally, so that it may be handled without danger of breaking when placed or removed from its position in the floor.

Where the distance between the beams is considerable, I preferably place the members K under tension before embedding them in the body. This may be done by allowing the ends of the members to project beyond the ends of the slab and engaging them with a suitable straining or tensioning device, in which they are held while the body is soft. With these large slabs I also preferably employ additional strengthening members L, which are embedded in the body, near the upper surface thereof. These members may be similar in construction to the main members, but of lighter material, or may be formed of small wire cables. They give an additional element of strength to the slab, which protects it from breaking in case it should be reversed in position during handling.

The slab J is supported in the opening in the floor by its ends, which rest upon the floor-beams, and, if desired, the edges of the slab

may be formed with a rabbet *c*, which overlaps a complementary rabbet *d*, formed at the edges of the opening in the floor.

I desire to particularly emphasize the advantage derived from placing the metallic members under tension when they are embedded in the plastic body material. These members are placed in a portion of the slab or span which will be subjected to tensile strains and, together with the body, form, in effect, a truss, the body acting as the compression member. By placing the metallic member under an initial tension there will be less elongation when subsequently loaded, and consequently a more limited lateral deflection or sagging of the slab. The anchors *a* serve to prevent any slipping of the metallic member in the body after the latter has hardened.

What I claim as my invention is—

1. In a floor and ceiling construction, the combination with the floor-beam, of a strip or slab of artificial stone extending longitudinally beneath said beam and having laterally-extending anchors, and a ceiling-span adjoining said slab formed of metallic strengthening members, and a body of artificial stone having said lateral anchors embedded therein.

2. In a floor construction, a removable slab forming a section of the floor comprising a body of artificial stone, a series of longitudinal metallic strengthening members embedded therein, each comprising a flat bar twisted at intervals to form anchoring-shoulders, and one or more independent cross strengthening members.

3. In a floor construction a removable slab forming a section of the floor, comprising a body of artificial stone, and metallic strengthening members embedded therein, a series of said members being arranged side by side near the bottom of the slab and a second series of lighter weight being arranged near the upper surface of the slab.

4. A floor construction comprising the floor-beams, monolith artificial stone ceiling and floor spans arranged respectively below and above said beams, the floor-span having an opening left therein, and a slab removably closing said opening consisting of a body of artificial stone and metallic strengthening members embedded therein the ends of said slab being supported upon the floor-beams.

In testimony whereof I affix my signature in presence of two witnesses.

ALPHONSE DE MAN.

Witnesses:

M. B. O'DOHERTY,
OTTO F. BARTHEL.