(No Model.)

C. A. BALPH & E. P. S. WRIGHT.

FIREPROOF FLOOR AND CEILING.

No. 557,100. Patented Mar. 31, 1896.

Fig. 1.

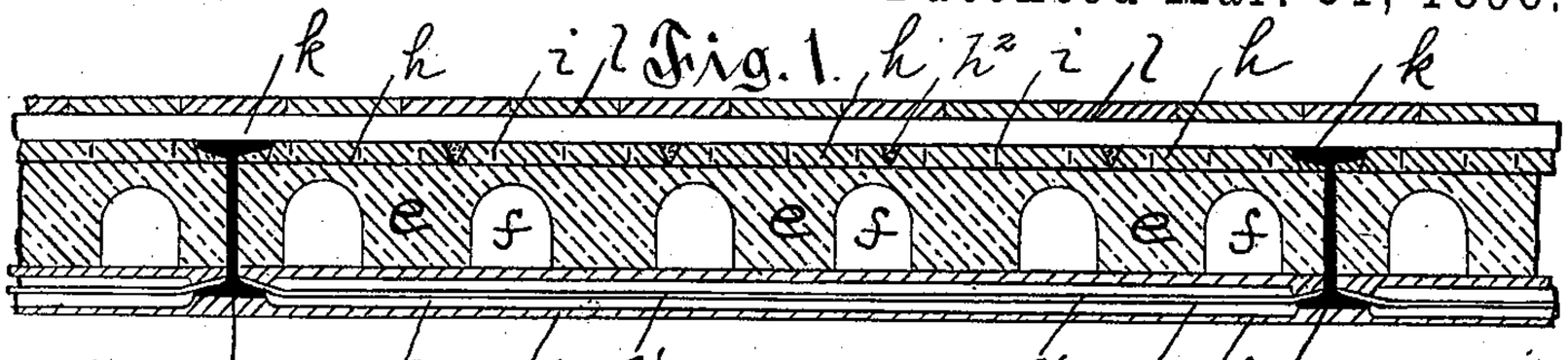


Fig 3.

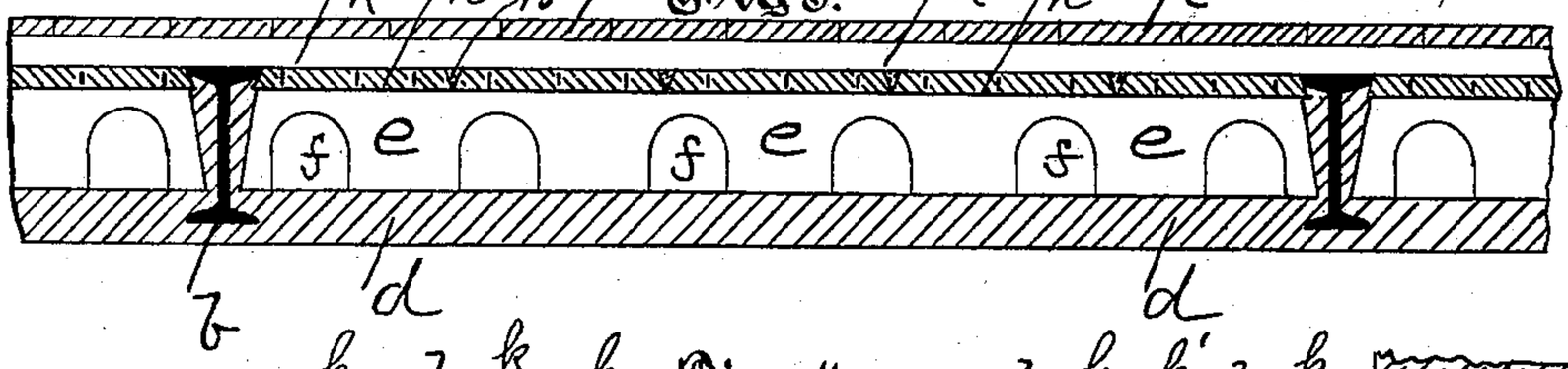
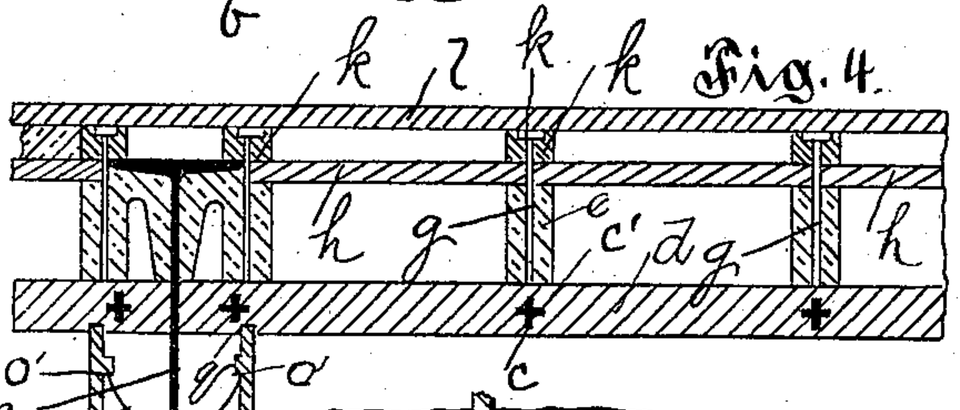


Fig. 4.



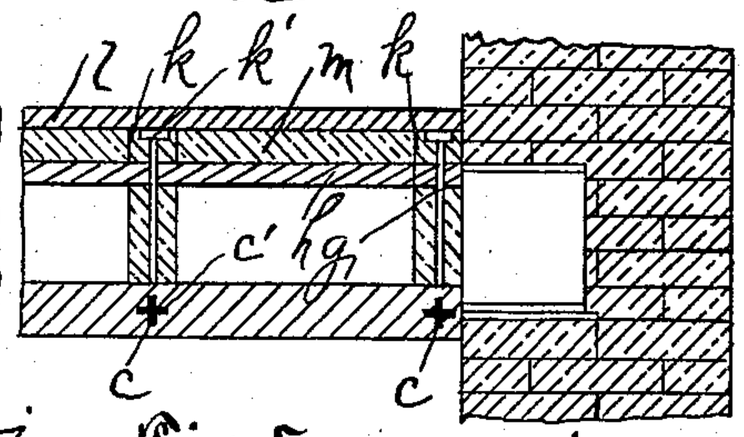


Fig. 6

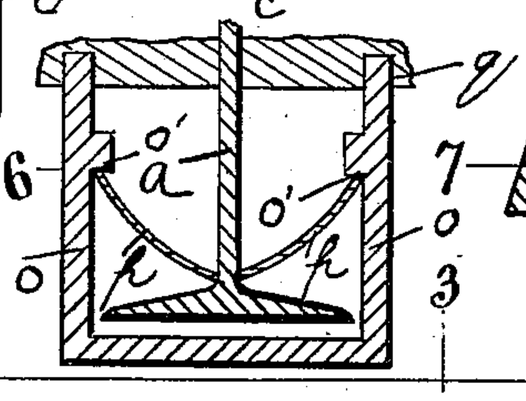


Fig. 5.

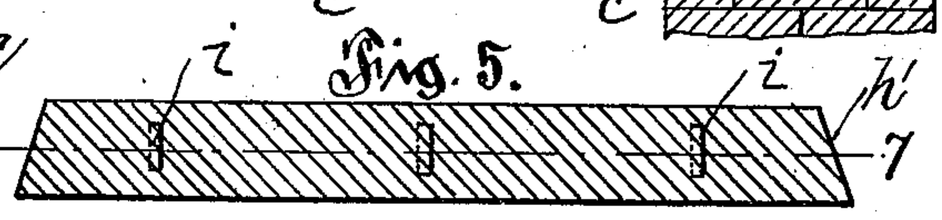


Fig. 2.

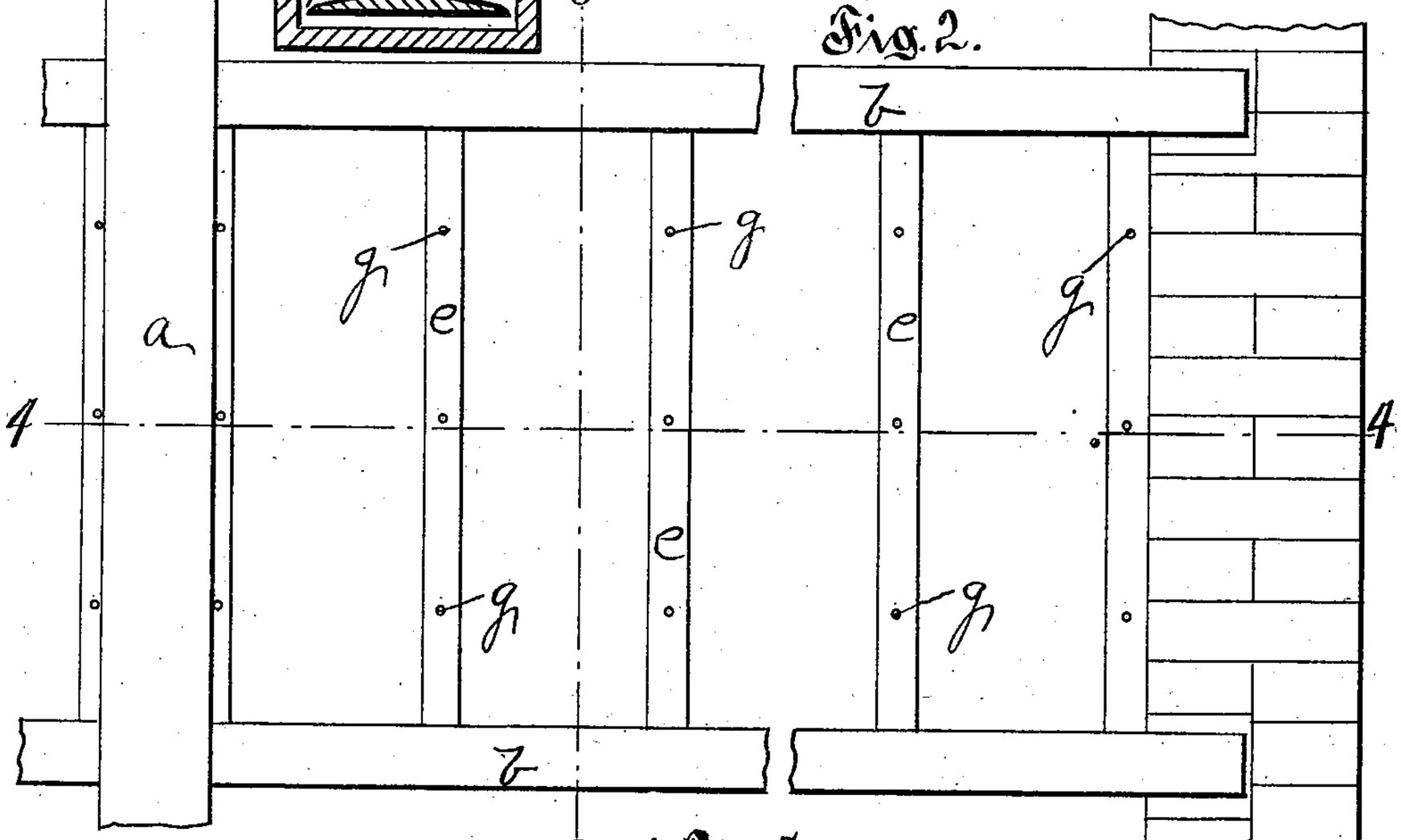
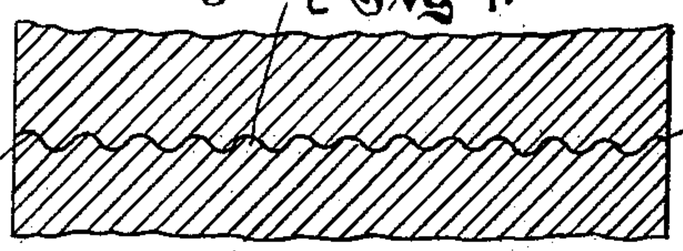


Fig 7.



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UNITED STATES PATENT OFFICE.

CHARLES A. BALPH, OF PITTSBURG, AND ELISHA P. S. WRIGHT, OF AVALON, PENNSYLVANIA.

FIREPROOF FLOOR AND CEILING.

SPECIFICATION forming part of Letters Patent No. 557,100, dated March 31, 1896.

Application filed April 29, 1895. Serial No. 547,555. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. BALPH, a resident of Pittsburg, and ELISHA P. S. WRIGHT, of Avalon, Allegheny county, State of Pennsylvania, have invented a new and useful Improvement in Fireproof Floors and Ceilings; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to fireproof floor and ceiling construction.

The several objects of our invention and what it comprises will fully appear in the following description and claims.

To enable others skilled in the art to make and use our invention, we will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a cross-section of a portion of a floor and ceiling embodying our invention. Fig. 2 is a plan view before the slabs have been laid in position. Fig. 3 is a section on the line 3 3, Fig. 2, with the rest of the floor added. Fig. 4 is a section on the line 4 4, Fig. 2, with the rest of the floor added. Fig. 5 is an enlarged cross-section of one of the slabs. Fig. 6 is an enlarged detail view of the manner of protecting the girders. Fig. 7 is a section on the line 7 7, Fig. 5, of a portion of one of the slabs.

Like letters indicate like parts in each of the figures.

In the drawings, *a* represents the girders which support the beams *b*, preferably I-beams. Supported on the lower flanges of beams *b* are the bars *c*. The bars *c* are formed of metal, the ends thereof being bent to present a flat face to rest upon the lower flanges of the beams *b*, while the intervening portions of said bars have their edges lying in a horizontal plane in the manner set forth in Letters Patent No. 527,042, granted to us October 9, 1894. The ends of the bars *c* may be supported in any suitable manner, provided that the bars have their edges lying in a horizontal plane. The bars *c* are also preferably provided with the ribs *c'*, which aid to support the concrete. When the bars *c* have been placed in position at suitable intervals, the concrete *d* is packed into place, a temporary support or "centering," as it is commonly termed, having first been erected. In this manner the bars *c* are completely embedded by the concrete *d*.

The concrete *d* forms the ceiling, and the floor is built upon the concrete *d* in the following manner: We erect on the concrete *d* the cross-walls *e*, said walls being formed preferably of plaster-of-paris and directly over the bars *c*. These cross-walls *e* are arched, being formed with the arches *f* at suitable intervals. These arched cross-walls *e* transmit the floor-load to the floor proper and act as insulating material. In the formation of the cross-walls *e* bolts *g* are embedded therein, which project a suitable distance above said walls.

Supported on the cross-walls *e* are the slabs *h*. These slabs *h* may be of any suitable fireproof material, but we prefer to construct them as shown in the drawings. The slabs are composed of a series of corrugated or ribbed strips *i* supported on their edges and completely embedded in concrete—that is, the height of the strips is not as great as that of the concrete, so that the upper and lower edges of said strips are completely embedded in the concrete. These slabs may be formed in suitable molds and may be of any desired length or breadth. They are furthermore formed with the beveled edges *h'*, which form the V-shaped grooves h^2 when said slabs are laid side by side. These grooves h^2 are filled with suitable concrete.

A slab constructed as described will be capable of sustaining heavy loads, as the strips *i*, embedded in the concrete, hold the concrete firmly together and add greatly to the strength of the slab. When the slabs *h* have been placed in position, the floor-strips *k* are then secured in place. These floor-strips are usually formed of wood, although we do not confine ourselves to any particular material. Openings are formed in floor-strips *k* adapted to coincide with the upwardly-projecting ends of the bolts *g*, so that said bolts will pass up through said openings. The upper ends of the bolts *g* are threaded, and nuts *k'* are screwed thereon to fasten said floor-strips securely in position. The floor can thus be completely finished at one time and is ready for flooring. The flooring *l* is then laid on the

floor-strips *k*. The space between the slabs *h* and the flooring *l* may be filled with concrete *m*, or the space may be left vacant to permit of the carrying of electric tubes, &c., through the same.

By the above construction the floor and ceiling may be formed at the same time. The arched cross-walls form a continuous ventilating-passage between the ceiling and floor, and this passage may be employed for carrying heavy pipes, &c. A perfectly level and firm bearing for the floor-strips is provided, and by having said floor-strips bolted down in the manner described the usual filling of concrete for holding said strips in place is done away with.

The beams *b* are embedded in concrete in the ordinary manner. The girders *a* being higher than the combined floor and ceiling, only a portion of same are embedded in the concrete. To protect the exposed portion we employ the box *o*, constructed of tile or other suitable non-combustible material, and preferably formed in one piece. The interior walls of said box *o* have the shoulders *o'* formed thereon. In order to support said box in position, we employ the springs *p*, which are interposed between the lower flanges of said girder *a* and the shoulders *o'* on said box *o*. Slight grooves *q* are formed in the ceiling to receive the upper edges of said box. When the springs *p* are sprung into position, they will hold the box rigidly in place. By having the box formed in one piece it may be quickly fixed in position or quickly removed, if desired.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In floor and ceiling construction, the combination with a suitable body of concrete, of bolts embedded therein and projecting upwardly therefrom, and floor-strips secured in place by said bolts, substantially as set forth.

2. In floor and ceiling construction, the combination with suitable beams, of a body of concrete supported thereby, cross-walls of concrete on said body of concrete, bolts embedded in said cross-walls and projecting upwardly therefrom, and floor-strips secured in place by said bolts, substantially as set forth.

3. In floor and ceiling construction, the combination of a girder, a removable non-combustible box inclosing a portion of said girder from below, an abutment on said box, and a spring interposed between said abutment and a flange on said girder, substantially as set forth.

In testimony whereof we, the said CHARLES A. BALPH and ELISHA P. S. WRIGHT, have hereunto set our hands.

CHARLES A. BALPH.
ELISHA P. S. WRIGHT.

Witnesses:
ROBT. D. TOTTEN,
ROBERT C. TOTTEN.