

J. F. GOLDING.

CONSTRUCTION OF FLOORS AND CEILINGS.

No. 529,724.

Patented Nov. 27, 1894.

Fig. 1

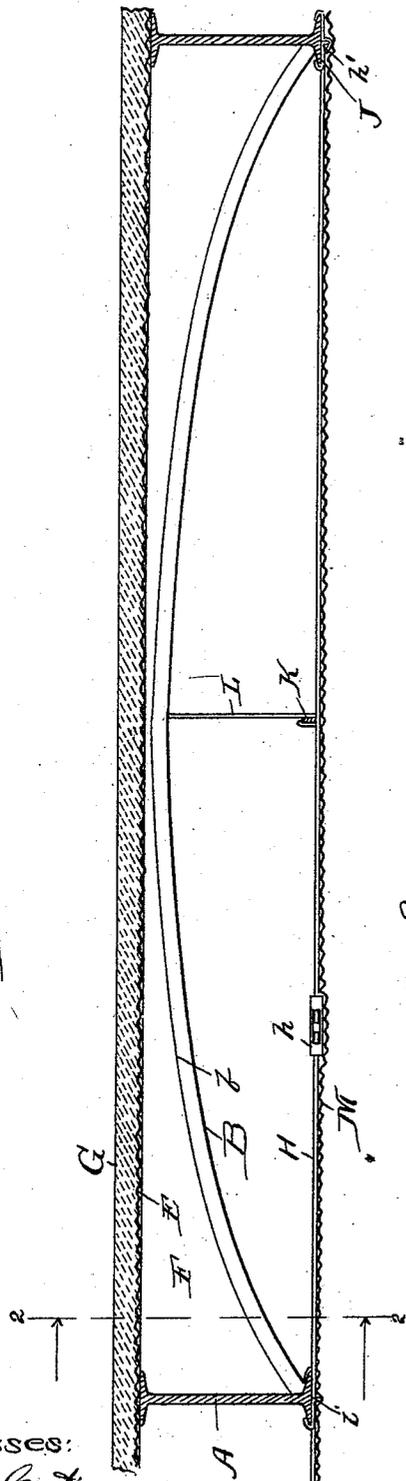


Fig. 2.

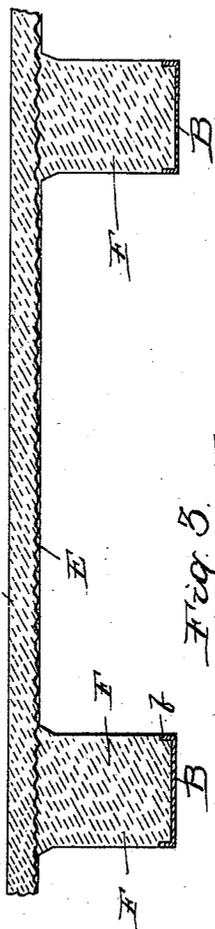
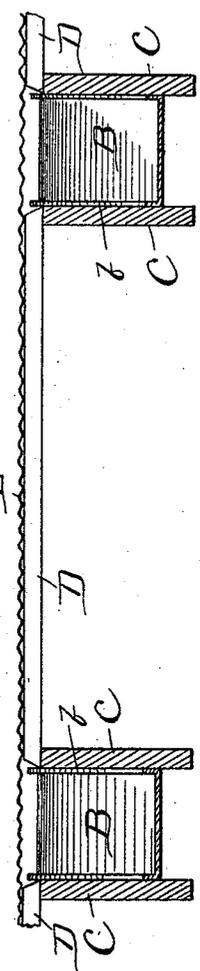


Fig. 3.



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Inventor:
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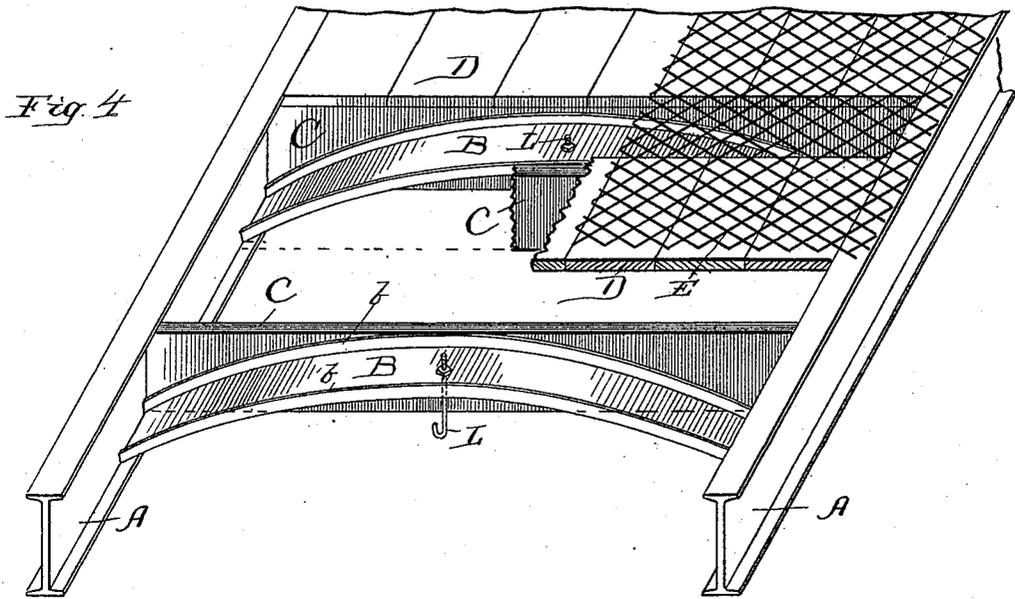


Fig. 4

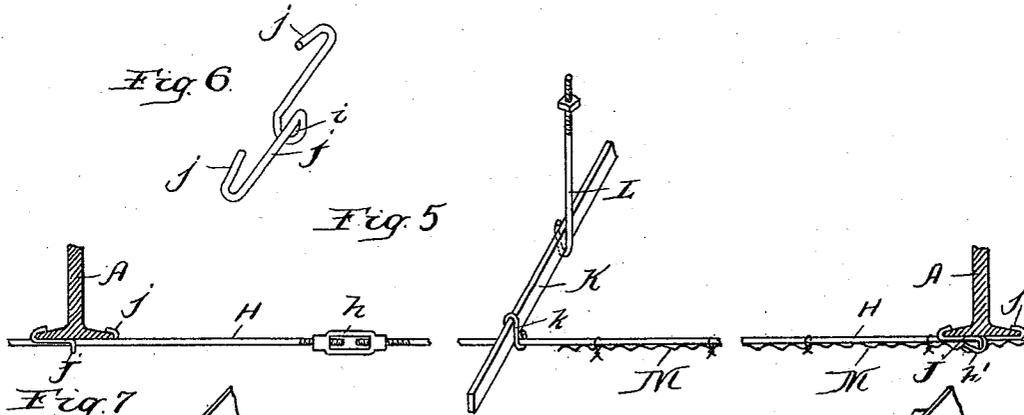


Fig. 6

Fig. 5

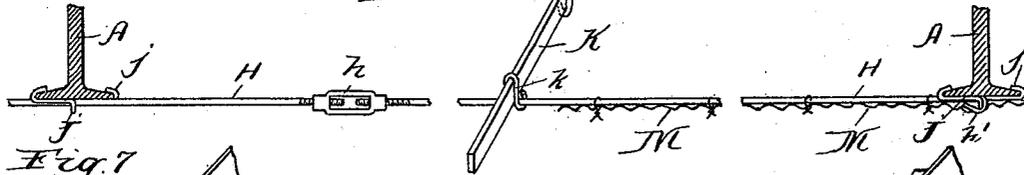
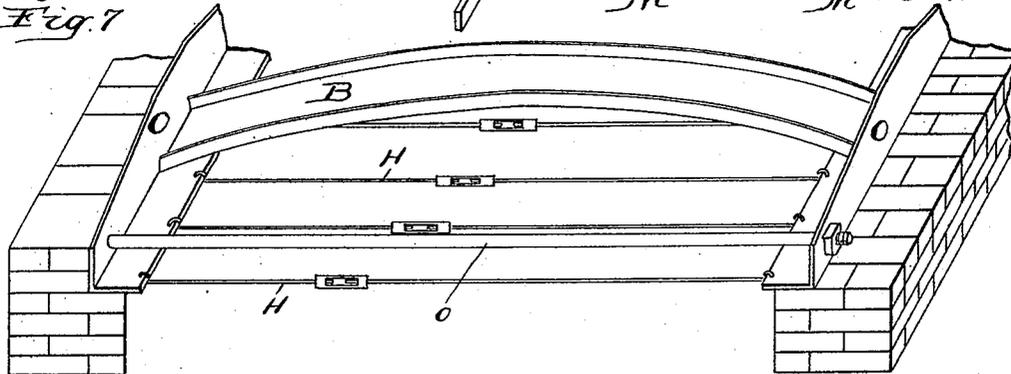


Fig. 7



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UNITED STATES PATENT OFFICE.

JOHN F. GOLDING, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE STANDARD
FIRE PROOFING COMPANY, OF SAME PLACE.

CONSTRUCTION OF FLOORS AND CEILINGS.

SPECIFICATION forming part of Letters Patent No. 529,724, dated November 27, 1894.

Application filed July 3, 1893. Renewed April 27, 1894. Serial No. 509,204. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. GOLDING, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in the Construction of Floors and Ceilings, of which the following is a specification.

This invention relates to a new and improved construction of fire proof floors and ceilings which may be used as substitutes for the hollow tile and solid concrete filled structures supported between iron girders now generally used, and it also relates to the art of building the same.

The structure produced by my invention is lighter and stronger than the old construction.

My improved concrete floor or ceiling consists of a series of arches, formed of concrete and strengthened by metal, supports for the ends of said arches, and concrete spans connecting the arches, the series of arches and spans being also bound together by continuous sheets of open work metal laid across them.

In laying the floor I first take bars of metal, preferably of the kind known as channel iron, and bend them to the curvature required for the undersurface of the arches, and then place such bars in position with their flanges standing upward and their ends resting upon I beams or girders, or upon the walls of the building. I then secure at each side of these arched bars wood planking set edgewise and inclosing the space above the bars and extending upward nearly to a plane corresponding to the plane desired for the under surface of the spans covering the interspaces. The ends of this side planking may be supported upon the same girders or walls which support the arch beams. A trough-like space is thus inclosed by the arch bar and the side planking, adapted to hold the concrete. The area of the interspaces is next floored over with a temporary floor of centering boards at the proper level for the under surface of the connecting spans. This temporary floor may be supported in any suitable way, but I prefer to support it upon the upper edges of the side planking used to confine the concrete in the arches. When this temporary floor is in place I preferably place over the whole area of the

floor or ceiling continuous sheets of expanded or equivalent open work metal having meshes large enough to permit the passage through them of the soft concrete. I next cover the entire structure with concrete, taking pains to fill the troughs formed by the arch bars and the side planking, solidly full therewith and to place over the temporary floors of the interspaces a sufficient thickness to give the interspace spans the requisite strength. The concrete thus forms an integral and homogeneous mass, uniting the arches and conferring their strength upon the lighter portions between them. The web of open work metal is laid with its sheets extending across the several arches and spans, and enough of them are employed to cover over the entire area of both arches and interspaces, so that it may not only possess great tensile strength but also be firmly anchored in the material of the arches, and thus be enabled to impart great resistance and supporting power to the connecting spans, wherein a comparatively limited amount of concrete is used. The false floor and side planking of the arches support the concrete until it is sufficiently hardened, when they are removed.

The nature of the structure as well as the method of constructing it are more fully set forth below and illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section of a portion of a floor embodying my invention, and showing one of the supporting arches in longitudinal elevation. Fig. 2 is a section thereof at right angles to that given in Fig. 1. Fig. 3 is a vertical section showing the temporary floor for the spans and the temporary sides for the arches used in constructing the floor or ceiling. Fig. 4 is a perspective of a section of the floor in process of construction, showing the metal parts and the temporary planking for supporting the concrete. Fig. 5 shows the metallic connections for supporting the under surface or ceiling employed where it is desirable to give the ceiling a uniform flat surface. Fig. 6 is a detail of one of the parts shown in Fig. 5, and Fig. 7 is a perspective of a modified construction.

In the drawings A represents I beams forming part of the framing of a floor or ceiling,

and serving in this instance as girders to support the arches hereinafter described.

B B represent metal bars, preferably of channel iron, having their ends supported upon the flanges of the beams A, as plainly illustrated. The bars are bent to the curvature desired in the arch, of which they form a part, and they are preferably positioned with their flanges *b* standing upward. After these arch bars have been positioned on the girders, planks C are placed along each side of each bar so as to inclose it, the planks standing on edge and also resting preferably at their ends upon the flanges of the I beams. False or temporary floors of centering boards D are now positioned between each arch and its neighbor arch or arches, these centering boards resting at each end upon the temporary sides C. I next lay preferably over both the arches and the covering interspace spans, a web of open work metal E, consisting of continuous sheets and having meshes sufficiently open to permit the ready passage through it of the concrete. The sheets are laid across the several arches and intervening spans so as to tie them together. This structure being in readiness, the concrete is next applied and forced through the meshes of the open metal until the spaces above the arch beams and between the side boards are entirely filled therewith, and also until the entire area of both arches and interspaces is built up to a sufficient thickness to give the interspans the necessary strength. The concrete portion of the arches thus formed, is indicated at F in the drawings, and the concrete covering of the spans between the arches is indicated at G. When the concrete has been applied in this manner and has set, the side planks and centering boards may be removed by first tipping the boards C over onto their sides.

The arches B F may be employed in such number as is requisite to give the floor very great solidity and strength, and the connecting spans may be as light as the burdens likely to be placed upon them will permit.

Where it is desired that the ceiling should present a flat surface, a false covering or ceiling may be applied below the structure already described by extending across the structure and under the girders a series of rods H adapted to sustain said false ceiling. These rods are each made in two or more parts connected by the turn buckle *h*, and they are secured to the girders by wire clips J, one of which is shown at Fig. 6, each having eyes *i* to receive the rods H, and being bent over at the ends *j* so as to clamp the flanges of the I beams. At their ends the rods H are hooked around the eyes *i*, as shown at *h'*, Fig. 5. The sagging of the rods H is overcome by attaching them to a bar K running across the series of rods and sustained by hangers L, which are provided with nuts at their upper ends,

and have such ends passed through the center of the arched bars, as plainly indicated in the drawings. The rods are clipped to the bar K by wire fastenings *k*. The metal lathing M being attached to the rods H, a coating of plaster is applied in the usual manner.

Where the framing of the floor is of metal, the I beams will ordinarily be properly braced, so that any tendency by the floor to spread and thus crowd the beams out of position will be effectually resisted. It may be essential however at times to tie the supports of the arches together in order to overcome the spreading strain, and one such construction is shown in the modification at Fig. 7, the arches being supported in this instance upon brick walls, and angle iron abutments O being employed upon which rest the ends of the arches. The abutments are suitably bolted together by bolts *o*, so that a chord is formed adapted to prevent any spreading. The under surfacing ceiling may also be employed with this structure, and the rods H thereof are indicated in the figures.

I claim—

1. The floor or ceiling composed of the supporting beams A, a series of narrow arches each consisting of a curved metal beam resting at its ends upon the flanges of beams A, and a superimposed body of concrete, concrete spans connecting the arches and covering the spaces between them, and a binding web of open work metal consisting of continuous sheets extending across the series of arches and embedded in the concrete of the arches and spans, substantially as specified.

2. The floor or ceiling composed of the supporting beams A, a series of narrow arches each consisting of a curved channel iron resting at its ends upon the flanges of beams A, and a superimposed body of concrete, concrete spans connecting the arches and covering the spaces between them, and a binding web of open work metal consisting of continuous sheets extending across the series of arches and embedded in the concrete of the arches and spans substantially as specified.

3. The improvement in the method of building the concrete floors and ceilings herein described, consisting in first positioning bent metal bars adapted to form the under portions of the arches in the completed structure, then temporarily inclosing the arches by means of side planking set edgewise, then temporarily flooring the intervening spaces by centering boards supported upon the top edges of said arch inclosing planking, and then completing the structure by laying the binding sheets of open work metal across the arches and spans and filling in the concrete, substantially as specified.

JOHN F. GOLDING.

Witnesses:

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