(No Model.)

P. M. BRUNER.

FIRE PROOF FLOOR ARCH.

No. 478,914. Patented July 12, 1892.

Fig. I.

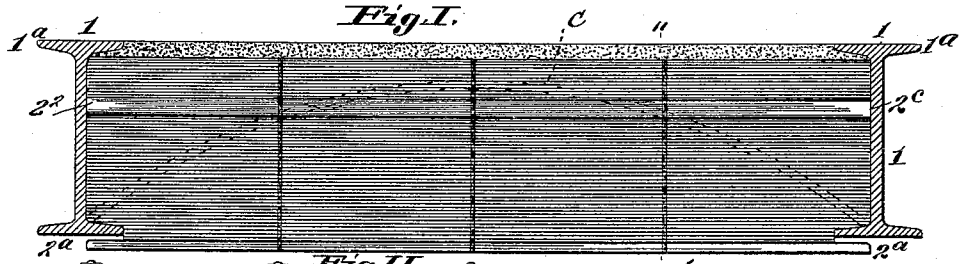


Fig. II.

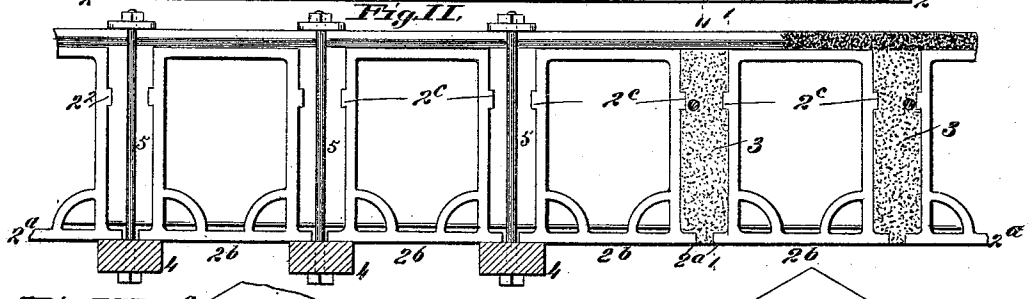


Fig. III.

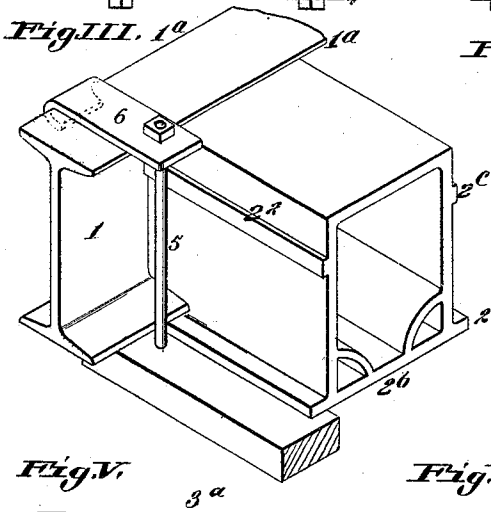


Fig. IV.

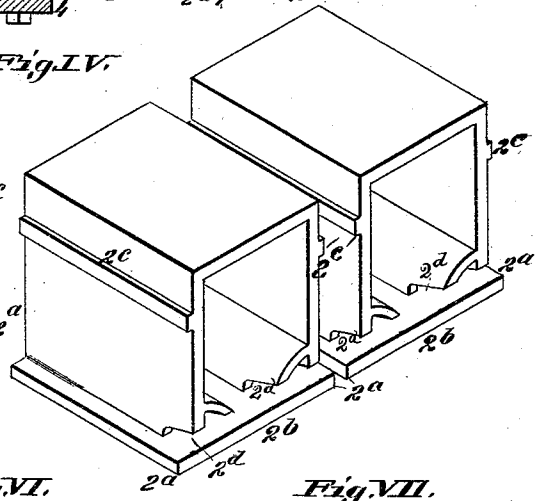


Fig. V.

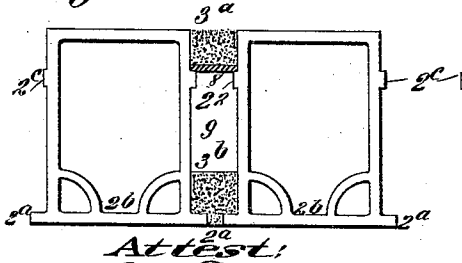


Fig. VI.

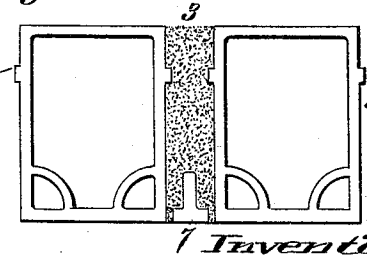
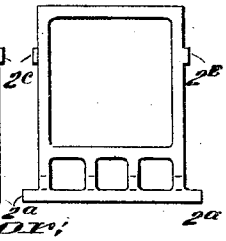


Fig. VII.



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UNITED STATES PATENT OFFICE.

PRESTON M. BRUNER, OF ST. LOUIS, MISSOURI.

FIRE-PROOF FLOOR-ARCH.

SPECIFICATION forming part of Letters Patent No. 478,914, dated July 12, 1892.

Application filed March 2, 1892. Serial No. 423,543. (No model.)

To all whom it may concern:

Be it known that I, PRESTON M. BRUNER, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Fire-Proof Construction of Floors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In this improved construction lines of rectangular blocks extend from beam to beam. These lines are set a distance asunder, so as to make room for a line of concrete between them, and the blocks are set a small distance asunder in the line, so that the concrete will enter between their edges and make the joint tight.

The invention also consists in forming the sides of the blocks with horizontal ribs and bottom flanges that are embedded in the concrete. The lower corners of the blocks are strengthened by curved braces. The novel features are fully described hereinafter, and set forth in the claims.

Figure I is a vertical section of a combined floor and ceiling having the novel construction, the section being taken at I I, Fig. II. Fig. II is a vertical section at II II, Fig. I; Fig. III, a perspective view showing one of the blocks in position upon the beam with part of the temporary wooden stringer or strip that serves to support the blocks and concrete until the latter is hardened. Fig. IV is a perspective view of two of the blocks, showing their relative position. Fig. V shows a modification of the concrete filling. Fig. VI is a vertical section taken on line II II, but showing a modification. Fig. VII is an end view of one of the blocks, showing a modified form of construction.

I-beams 1 are shown, as this is the preferred form of beam. The upper flanges 1^a are, however, not essential in the present invention. These beams may be any suitable distance asunder, even to several feet. The hollow blocks 2 are preferably open at the ends, as shown, and of rectangular form. 2^a are horizontal flanges extending from each side in the plane of the bottom plate 2^b. 2^c are ribs upon the side of the block, the flanges 2^a and ribs 2^c becoming embedded in the concrete 3 when the latter is put in the spaces between the lines of blocks extending transversely from beam to beam.

In constructing the floor and ceiling, the beams or joists 1 being in place, I suspend from the beams in the first place wooden stringers 4 parallel to each other and at right angles to the beams. These stringers are drawn up tight against the bottom of the beams 1 or are left a short distance below, as the lower level of the floor is to be even with the bottom of the beams or a short distance below the beams. These stringers may suitably be of two inches thick and four inches wide with length to reach from beam to beam or to extend across two or more of the spaces between the beams. They may be placed twelve inches (more or less) apart and in parallel rows.

I do not confine myself to any special dimensions in any of the parts going into my construction.

The stringers may be supported in any way. As a suitable means for their support, I show bolts 5, which pass through the stringers and through clips 6, engaging over the tops of the beams 1. On the stringers are placed the blocks 2, resting upon the edges of two adjoining stringers. The blocks next the beams are notched out at 2^d (see Figs. III and IV) to fit around the lower flanges of the beams. The blocks are made almost or quite as high as the beams are deep, so that while the lower face of the block forms the ceiling for the story below the upper part may form the foundation of the floor above. The space between the blocks is filled in with concrete made plastic enough to run in and fill all interstices between the blocks.

To enable the blocks to be fitted in readily between the beams placed at varying distances or spans, they are made of varying lengths—say seven and nine inches or eleven and thirteen inches. The rows of blocks between the beams may be lengthened or shortened by placing the blocks farther apart or nearer together in rows, it being preferred that the spaces between the blocks shall allow the entrance of the concrete to form a tight joint, but not to enter to any great degree the interior space of the blocks. By making the blocks of various lengths and placing them nearer together or farther apart

in the s there is no difficulty in adapting this system to any system of iron framing. The concrete when hardened forms the support of the floor, while the blocks are not required to bear any essential part. The blocks may or may not have the flanges or projections 2^a. In case these flanges are left off, or in case the concrete filling 3 is of considerable width, plates or bars 7 may be placed between the rows of blocks, as seen in Fig. VI. The concrete will hold these in place and they will serve to protect the concrete. The ribs 2^c may be used for support of a plate or strip 8, that in turn supports an upper filling 3^a of concrete, a hollow space 9 being left between the plate or strip 8 and the lower concrete filling 3^b. (See Fig. V.) Thus concrete material may be saved where the floor does not require the strength of the solid concrete filling shown in Figs. II and VI.

I am aware that tubular blocks have been used in a manner approximating to that herein described; but they have been made in one piece reaching from one beam to another. It is impracticable to make them longer than about three feet for technical reasons, and therefore the beams cannot be placed more than about three feet asunder. It is found in practice that the beams generally digress from parallelism, so that if the blocks are all made of equal length some are too long and others too short. Thus while the blocks are of suitable length for one part of the space between a pair of beams they may be unsuitable for other parts of the same space. Any cutting of the blocks is expensive, both from the care required causing expenditure of time and from the breaking of blocks in the operation. Rectangular blocks have also been laid in a manner similar to mine, with this difference, however: They were made and laid in mortar, as ordinary bricks are laid, while by my method the blocks are roughly and quickly placed in rows on the supports, while owing to the wider joints and the whole arrangement, as specified, the filling material is dumped from above with barrows and shovels. A mortar joint over a large block and laid by hand piece by piece will never be uniform, while a joint made as above will become uniformly solid and strong enough to carry the loads almost independent of the supporting power of the blocks.

My blocks have the advantage of not requiring the use of any complicated scaffolding when putting them in position, as they are supported on the stringers that also serve to close the bottoms of the spaces for reception of the concrete 3 or 3^b.

Where the blocks are cylindrical in whole or in part, much more concrete is required for filling the spaces between them and without imparting additional strength.

When extra strength is required for the concrete, an iron rod or bar C may be inserted, arching from one beam to the other and embedded in the concrete, as shown and claimed in my Letters Patent No. 356,703, dated January 25, 1887, where the bar is marked C. The position of this rod is indicated by dotted lines in Fig. I.

2^e are corner braces or connections to strengthen the lower part of the block. These connections may extend diagonally or on a curve from the sides to the bottom of the block, as seen in Figs. I and VI, or may extend in lines parallel with the sides and bottom, as seen in Fig. VII. The object is to strengthen the bottom 2^b and prevent its cracking or becoming fractured in any manner, especially where it joins with the beams 1.

I claim as my invention—

1. The combination, in a floor, of the beams 1, the bars or rods C, the blocks arranged in rows, extending from beam to beam, and the filling 3, said rows of blocks having spaces between them and said bars or rods and said filling fitting in said spaces, substantially as set forth.

2. The combination, in a floor, of the beams 1, and the rows of blocks 2, extending from beam to beam, the said blocks having ribs 2^c upon their sides, with the concrete filling 3 between the blocks, substantially as set forth.

3. The combination, in a floor, of the beams 1, the rows of blocks 2, extending from beam to beam, and the concrete filling between the same, said filling composed of an upper layer 3^a and a lower layer 3^b, with hollow space between them, substantially as set forth.

4. The combination, in a floor, of the beams 1, the rows of hollow blocks 2, extending from beam to beam, the concrete filling 3 between the blocks, and the plates 7 at the lower part of the filling, substantially as set forth.

PRESTON M. BRUNER.

Witnesses:
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BENJN. A. KNIGHT.