J. J. WHITACRE.

FLOOR CONSTRUCTION.

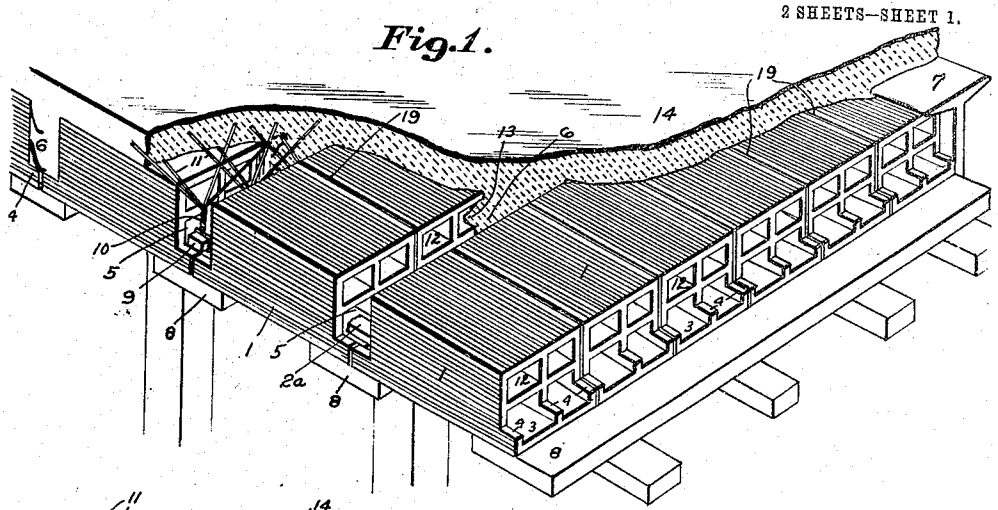
APPLICATION FILED DEC. 23, 1907

899,775.

Patented Sept. 29, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



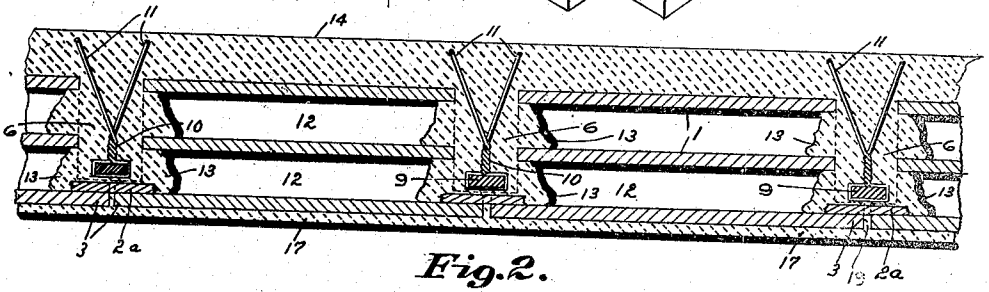


Fig. 2.

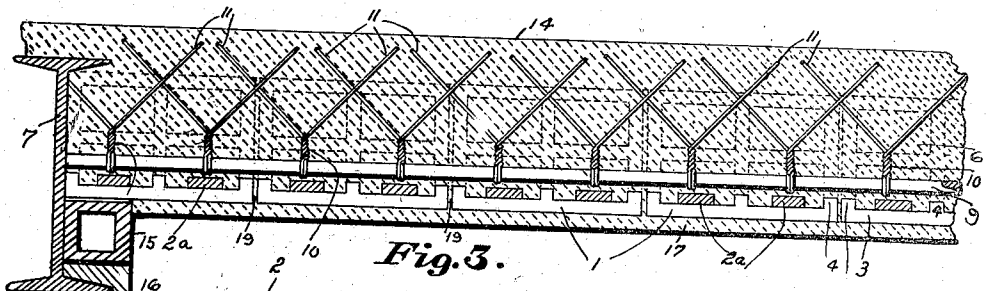


Fig. 3.

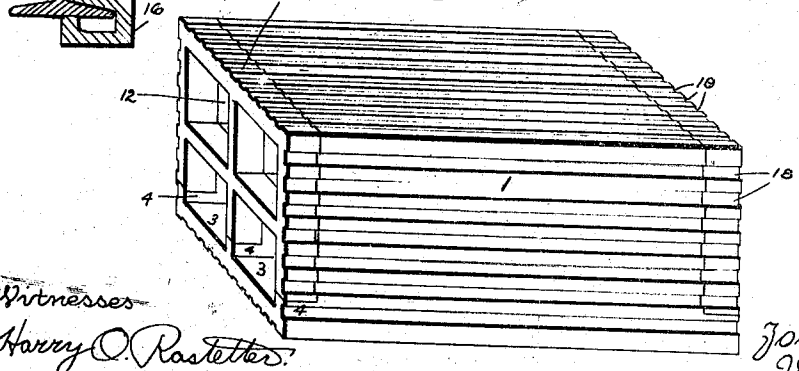


Fig. 4.

Witnesses

Harry O. Rastetter.

Mary A. Cavanaugh

Inventor

John J. Whitacre

By Harry Grease.

Attorney

J. J. WHITACRE.

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2 SHEETS—SHEET 2.

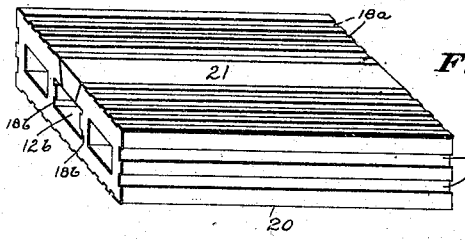


Fig. 10.

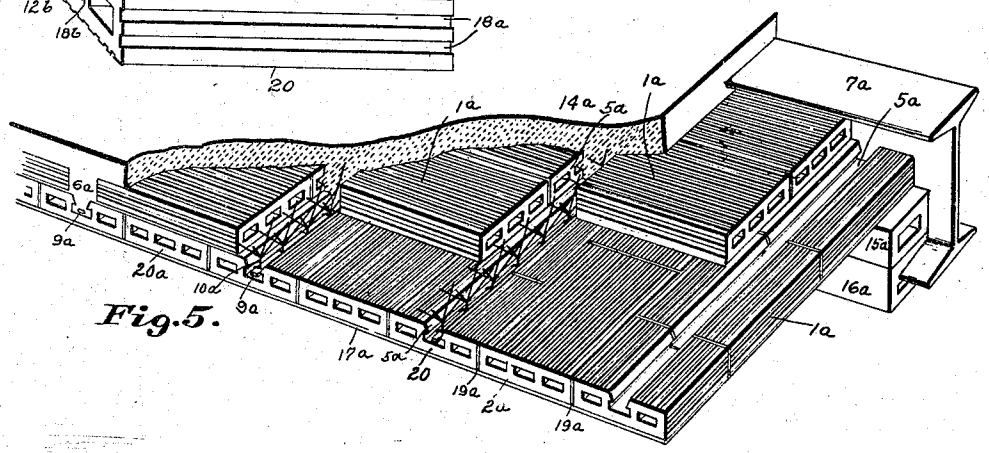


Fig. 5.

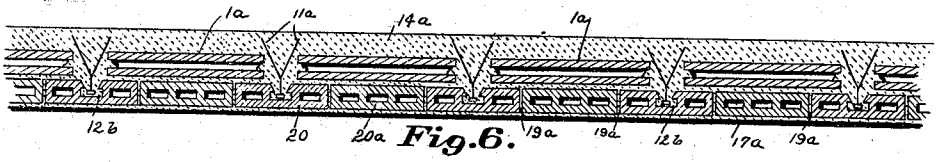


Fig. 6.

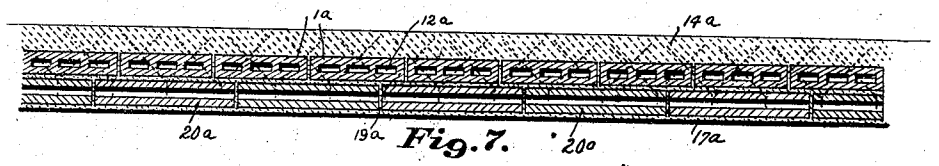


Fig. 7.

Fig. 8.

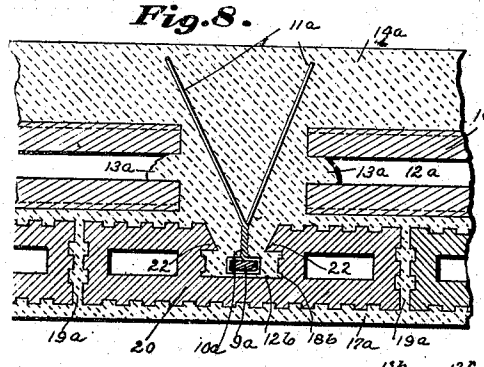
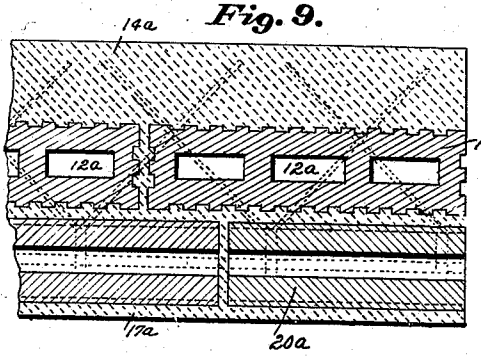


Fig. 9.



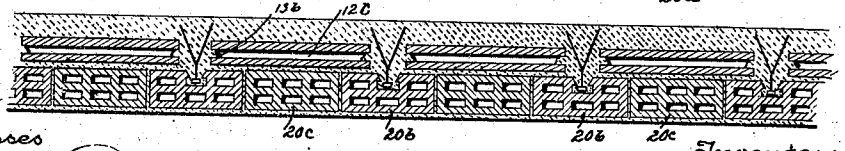


Fig. 11.

Witnesses

Harvey Rastetter

Mary A. Cavanaugh

Inventor

John J. Whitacre

By Harry Grease.

Attorney

UNITED STATES PATENT OFFICE.

JOHN J. WHITACRE, OF CANTON, OHIO.

FLOOR CONSTRUCTION.

No. 899,775. Specification of Letters Patent. Patented Sept. 29, 1908.

Application filed December 23, 1907. Serial No. 407,733.

To all whom it may concern:

Be it known that I, JOHN J. WHITACRE, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Floor Construction, of which the following is a specification.

The invention relates to the construction of fireproof floors out of terra cotta blocks and reinforced concrete.

The general object of the improvement is to construct a floor with a series of rows of terra cotta blocks located side by side and parallel with the main floor girders, and a series of transverse reinforced concrete beams extending from one girder to another and formed between the adjacent ends of the blocks, the beams being formed with projections extending into the ends of the longitudinal cavities of the blocks.

A further object is to combine this general form of construction with an underlying layer of blocks located parallel with the concrete beams, and having channels formed in corresponding rows of the underlying blocks, in which channels the lower portion of the beams are formed.

The invention also relates to the particular form of metallic reinforcement which is shown for the concrete beams whereby the reinforcement can be conveniently and readily made in the respective channels provided for the formation of the concrete beams, as the construction of the floor progresses.

These various objects and other accompanying advantages are attained by the construction and arrangement illustrated in the annexed drawings, in which—

Figure 1 is a fragmentary perspective view showing the general form of the improved construction with one layer of blocks located parallel with the floor girder; Fig. 2, a detail section of the same parallel with the floor girders and across the concrete beams. Fig. 3, a detail section of the same in the middle line of one concrete beam. Fig. 4, a parallel perspective view of one of the terra cotta blocks employed in the same form of construction; Fig. 5, a fragmentary perspective view showing another form of construction in which two layers of blocks are used; Fig. 6, an outline section of the same parallel with the floor girders and across the concrete beams; Fig. 7, an outline section of the same parallel with and intermediate the concrete beams; Fig. 8, a detail section of the same across one concrete beam; Fig. 9, a detail section of the same parallel with and intermediate the concrete beams; Fig. 10, a parallel perspective view of one of the special blocks employed in the lower layer; Fig. 11, an outline section parallel with the floor girders and across the concrete beams showing an alternate form of construction with double thickness blocks in the lower layer.

Similar numerals refer to similar parts throughout the drawings.

The most simple form of the improved construction is illustrated in Sheet 1 of the drawings, wherein the blocks 1 are shown with portions 2 of each end cut off to leave the projecting portions 3 of the lower wall and the lower portions 4 of the vertical walls, which projecting portions are butted endwise against the similar projecting portions of adjoining blocks to form the channels 5 between the cut off ends of the respective blocks, in which channels the concrete beam 6 is adapted to be formed. In the manufacture of the blocks the end portions are preferably only partially cut when the block is molded and burned, and the pieces remain attached until the blocks are shipped to the place of construction, when the partially cut ends are knocked off by a slight blow of a hammer. The cut off portion can then be broken into pieces 2^a and the same are adapted to be laid across the joint formed by the juncture of the ends of the lower blocks thereby bridging the same and giving added protection to the metallic reinforcement.

A series of rows of the blocks 1, located side by side and parallel with the floor girders 7, are laid on suitable scaffolding, and each row extends from one girder to another. It is evident that with this form of construction the deck of the scaffolding need only be made with the separated planks 8 located under the ends of the blocks of the several rows, as shown in Fig. 1, instead of with a continuous deck of planks as is required in other forms of construction. The metallic reinforcements for the concrete beams are then placed in the channels 5 formed between the ends of the blocks, and, as shown, these reinforcements are composed of the main members 9, located longitudinally and preferably near the lower part of the beam-channel, and the subordinate members 10 connected at intervals on the main members. The subordinate members are each composed of a number of

wires, preferably four, which are wrapped around the main member from below upward and brought together in the middle of the upper side, whence they are twisted upward a short distance, whence the respective wires 11 are separated and individually inclined upward in various directions as may be desired. A preferred manner of disposing the free ends of the wire is to incline them in slightly diverging directions toward the ends of the beam, and to locate the several subordinate members so that the two diverging ends of one member will overlap the diverging ends of the adjacent member, by means of which the beam is thoroughly bound together in various directions throughout its body.

The reinforcements having been placed in position, the concrete beams are formed in the channels between the ends of the blocks, and in so doing the concrete is run into the ends of the longitudinal cavities 12 in the blocks 1, thus forming the lugs 13 which constitute substantial and positive supports for the blocks. The floor surface 14 is made of a layer of concrete in conjunction with the beams and consequently forms a monolith therewith, and it will be understood that the floor is suitably sustained either directly on the girder flanges or, as shown, on supplemental terra cotta blocks, as 15 and 16, resting on the girder flanges, and that after the concrete beams and floor surface have been set and hardened the scaffolding is entirely removed, whereupon the ceiling surface is preferably finished, as with the layer of plaster 17. The outer surfaces of the respective blocks are preferably provided with the longitudinal grooves 18 to increase the adhering surface of the cement which is laid in the joints 19 and of the concrete and the plaster.

It is evident that the concrete beams will span the distance between the floor girders and constitute a positive support for each individual block in the floor, and the metallic reinforcements, having the longitudinal main member in the lower part and the subordinate members reaching in various directions upward through the beams and into the concrete layer of the floor surface, will rigidly stiffen and sustain the beams. By this construction the abutting projecting portions of the lower wall of the blocks completely cover and protect the lower sides of the concrete beams so that they can not be chipped off by the action of fire to expose the metallic reinforcements therein.

Another form of construction wherein two layers of terra cotta blocks are employed, is shown in Sheet 2 of the drawings. The blocks 1^a, located parallel with the floor girders 7^a, are formed square at the ends without any projection of the lower wall, and an underlying layer of blocks 20 and 20^a is located transverse the floor girders. The ends of the longitudinal blocks are spaced apart and form the channels 5^a for the formation of the concrete beams, and the middle line of one row of the transverse blocks is located to register with this channel. The portions 21 of the upper wall of these transverse blocks are cut out so that the beam channel extends downward into the middle longitudinal cavities 12^b of these blocks. The shoulders 22 are formed at the sides of the openings in the upper wall of these transverse blocks, and the longitudinal grooves 18^a are formed on the outer sides of all the blocks and the similar grooves 18^b may be provided in the walls of the middle cavity of the blocks which are cut open. The blocks having been assembled in this manner on suitable scaffolding, the metallic reinforcement 10^a is placed in the channel, with the main member 9^a preferably located in the middle cavity of the transverse blocks, after which the concrete beam is formed in the channel. In making the beam the entire middle cavities of the transverse blocks 20 are filled with the concrete so that these blocks are securely sustained by the shoulders 22 and by the grooves in the sides of the cavities; and the concrete is also run into the ends of the longitudinal blocks, and the lugs 13^a thus formed serve to securely support these blocks. There is thus provided a substantial support for each layer of blocks independent of the other.

When the longitudinal blocks are sufficiently long to require one or more rows of transverse blocks 20^a between the beam-supported rows, such blocks do not have their upper walls cut out, and they are supported by the adjoining beam-supported blocks by means of the cement in the joints 19^a which enters into the grooves 18^a on the sides of the blocks. The floor surface is finished as before by making the layer 14^a of concrete as a monolith with the transverse beams, which beams and floor layer of concrete are bound together by the reinforcing wires 11^a diverging upwards in different directions, and the ceiling surface is preferably finished with the layer of plaster 17^a. The ends of the rows of transverse blocks are supported either directly on the floor girders or on the supplemental blocks 15^a and 16^a, and it is evident that the lower wall of the transverse blocks completely incase the lower sides of the concrete beams and protect them from being chipped off by the action of fire to expose the metallic reinforcements.

In the manufacture of the blocks 20 the portion 21 of the upper wall is only partially cut away during the molding and burning, and the same are preferably permitted to remain in position to stay the blocks until they are shipped to the place of use, when the cut away portions are knocked out by the blow of a hammer.

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In Fig. 11 is shown another form of construction in which the lower layer is made of blocks 20^b and 20^c of double thickness, that is to say having two rows of longitudinal cavities, which form of construction is manifestly made in the same manner as described when the lower layer is made of blocks of single thickness.

The floor structure including a series of rows of blocks with longitudinal cavities therein and having the ends of the lower walls extending longitudinally beyond the ends of the upper portions of the blocks, the blocks of each row being located side by side and the extended ends of the lower walls of the blocks of adjacent rows being butted together to form a channel between the ends of the upper portions thereof, with or without terra cotta plates spanning the joints between the ends of the lower walls, and concrete beams in the channels and having lugs projecting into the ends of the block cavities, with or without metallic reinforcements in the beams, which is described and illustrated but not claimed herein is made the subject-matter of a supplemental application for Letters Patent, filed February 20, 1908, Serial No. 416,839: and, the metallic reinforcement for a concrete beam comprising a main member, and a series of separate subordinate members located at intervals apart and composed of a plurality of wires wrapped around the main member and twisted together on the upper side thereof, and thence separated and extended singly as tension members upward in diagonally different directions, with or without the diverging wires overlapping the similar wires of adjacent subordinate members, which is described and illustrated, but not claimed herein, is made the subject-matter of a divisional application for Letters Patent, filed February 21, 1908, Serial No. 416,958.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A floor structure including a series of rows of blocks having longitudinal cavities therein, the blocks of each row being located side by side with channels between the ends of the blocks of adjacent rows, an underlying layer of blocks transversely located and having open cavities in their upper sides registering with the channels, and concrete beams in the channels and in the open cavities of the lower blocks and having lugs extending into the cavities of the upper blocks.

2. A floor structure including a series of rows of blocks having longitudinal cavities therein, the blocks of each row being located side by side with channels between the ends of the blocks of adjacent rows, an underlying layer of blocks transversely located and having open cavities in their upper sides registering with the channels, concrete beams in the channels and in the open cavities of the lower blocks and having lugs extending into the cavities of the upper blocks, and metallic reinforcements in the beams.

3. A floor structure including a series of rows of blocks having longitudinal cavities therein, the blocks of each row being located side by side with channels between the ends of the blocks of adjacent rows, an underlying layer of blocks transversely located and having open cavities in their upper sides registering with the channels, concrete beams in the channels and in the open cavities of the lower blocks and having lugs extending into the cavities of the upper blocks, and a monolithic concrete layer on the upper blocks.

4. A floor structure including a series of rows of blocks having longitudinal cavities therein, the blocks of each row being located side by side with channels between the ends of the blocks of adjacent rows, an underlying layer of blocks transversely located and having open cavities in their upper sides registering with the channels, concrete beams in the channels and in the open cavities of the lower blocks and having lugs extending into the cavities of the upper blocks, a monolithic concrete layer on the upper blocks and metallic reinforcements binding the beams and concrete layer together.

JOHN J. WHITACRE.

Witnesses:
JOSEPH FREASE,
MARY A. CAVANAUGH.