

(No Model.)

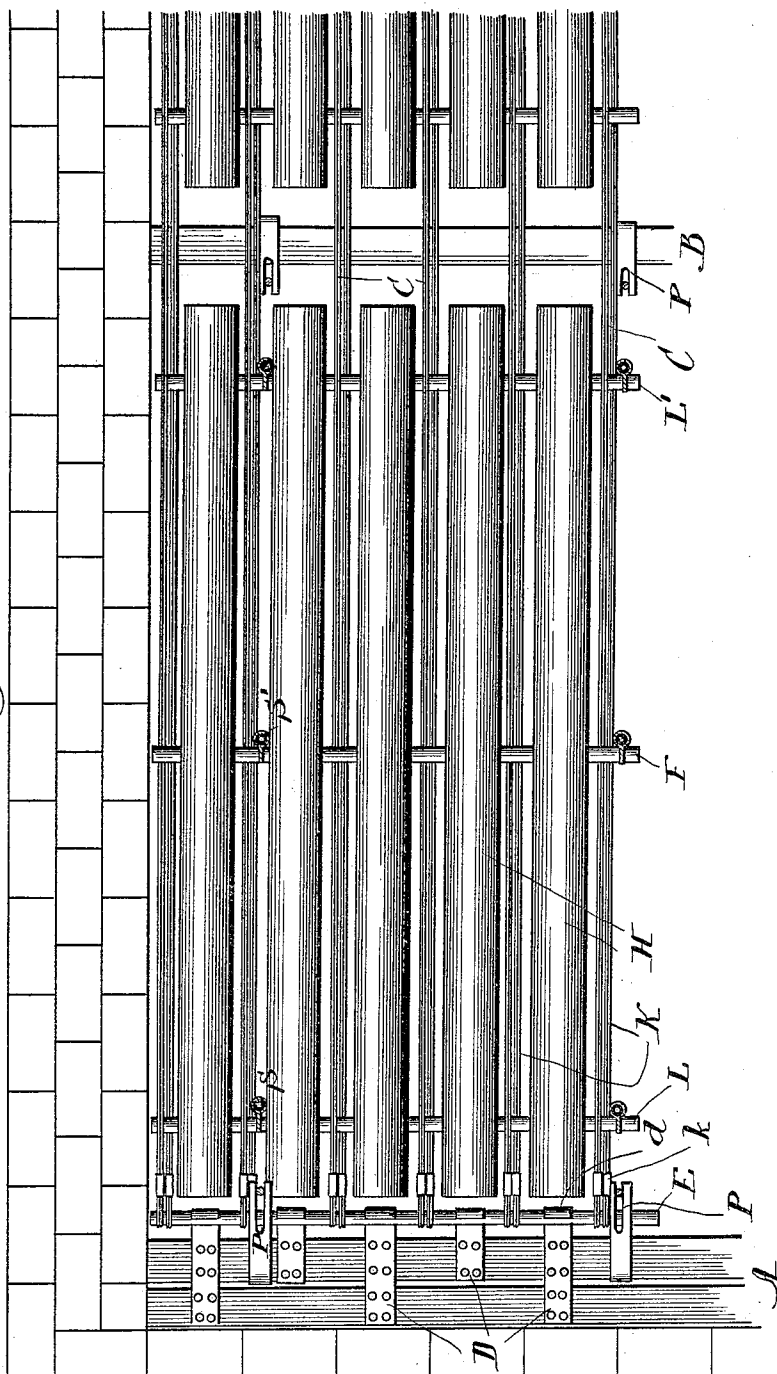
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M. F. McCARTHY.
FIREPROOF BUILDING.

No. 520,489.

Patented May 29, 1894.

Fig. 1.



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(No Model.)

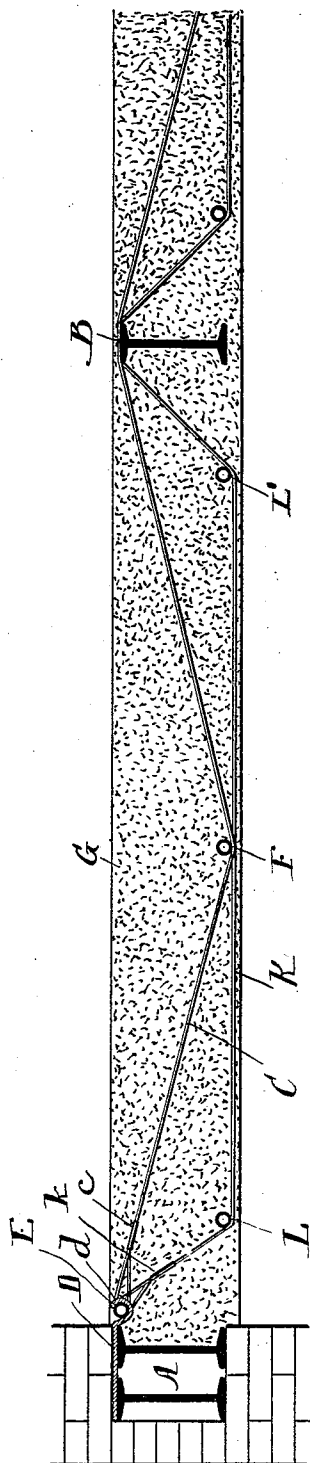
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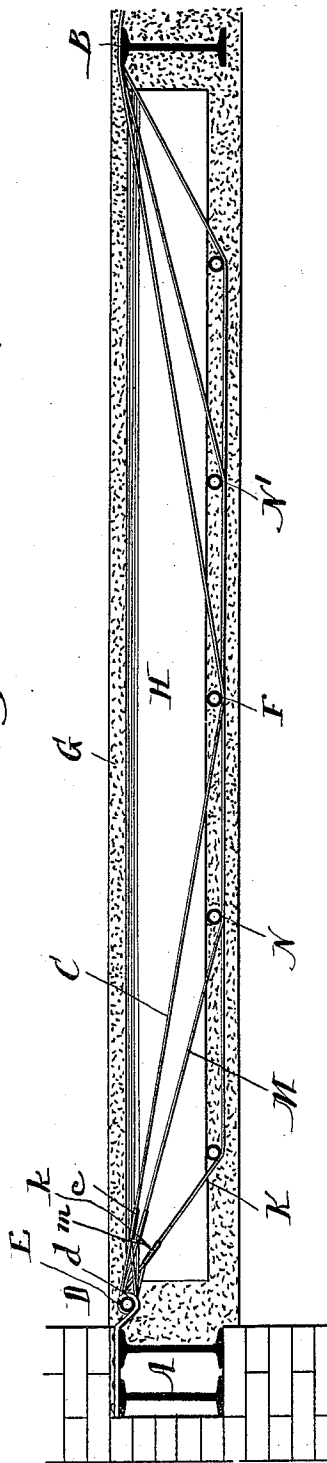
Patented May 29, 1894.

Fig. 2.



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Fig. 3.



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(No Model.)

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Fig. 4.

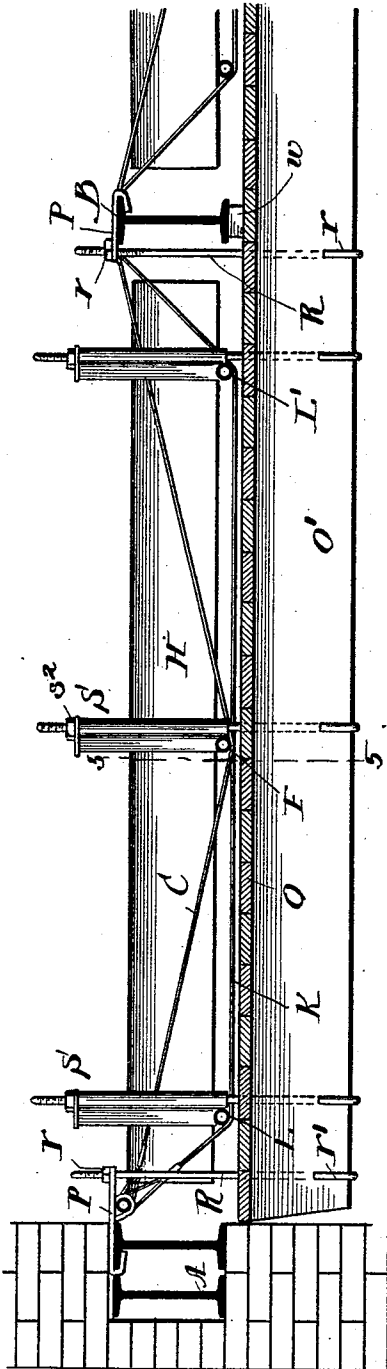
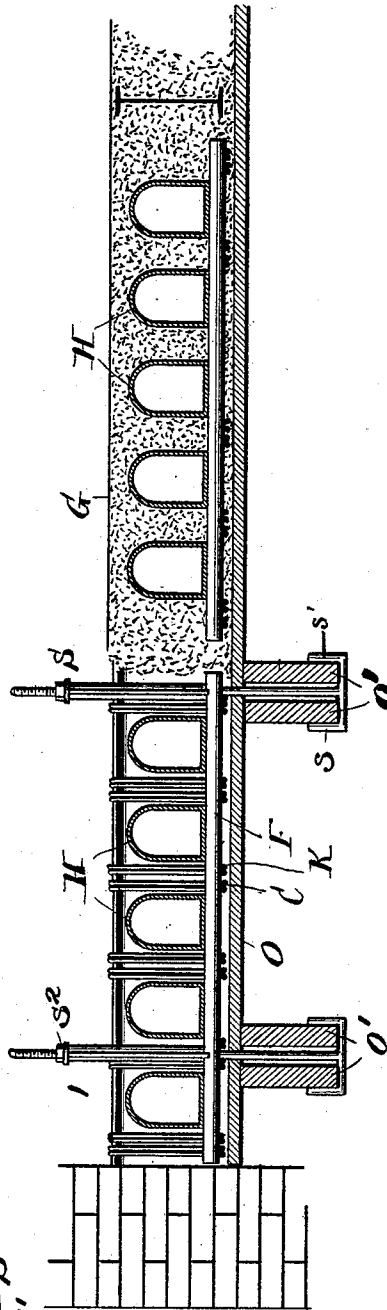
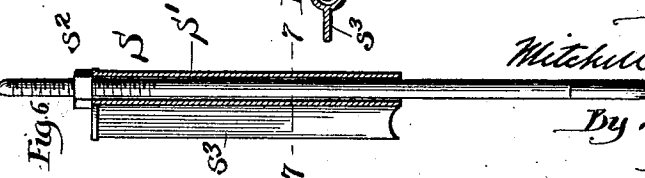


Fig. 5.



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UNITED STATES PATENT OFFICE.

MITCHELL F. MCCARTHY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SUSPENSION ARCH FIRE PROOFING COMPANY, OF ILLINOIS.

FIREPROOF BUILDING.

SPECIFICATION forming part of Letters Patent No. 520,489, dated May 29, 1894.

Application filed May 23, 1893. Serial No. 475,271. (No model.)

To all whom it may concern:

Be it known that I, MITCHELL F. MCCARTHY, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Fireproof Buildings, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention has relation to improvements in the construction of fire proof floors, ceilings, roofs and the like of that class wherein a plastic mass usually of concrete and (preferably) interspersed hollow tiles are sustained between metallic beams by the aid of strands of wire or like wire fabric; and more particularly does my invention relate to the improvement of a fire proof structure set forth in Letters Patent No. 455,687, granted to the United States Fire Proofing Company, as my assignee, July 7, 1891.

The invention consists in the novel features hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the several claims at the end of this specification.

Figure 1 is a plan view of a fire proof floor, embodying my invention, parts of the sustaining walls being also illustrated. Fig. 2 is a view in vertical longitudinal section taken through Fig. 1 at points between the rows of hollow tiles. Fig. 3 is a view in vertical longitudinal section through a floor similar to that shown in Fig. 1, but having additional wire strands for aiding in the support of the concrete and tile filling, parts of the concrete being omitted so as to illustrate the arrangement of the wires and of the tile. Fig. 4 is a view in vertical section showing the temporary staging and the tension mechanism in position for the laying of the concrete and tile work. Fig. 5 is a view in vertical transverse section on line 5—5 of Fig. 4, parts of this view, however showing the concrete as filled around the tiles. Fig. 6 is an enlarged detail view of the tension mechanism a part being shown in vertical section and a part in elevation. Fig. 7 is a view in transverse section on line 7—7 of Fig. 6.

In my hereinbefore mentioned Letters Pat-

ent No. 455,687, the wires which aided in sustaining the concrete mass between the metallic beams were drooped between the beams, the extreme depression of the wires occurring about the central point between the beams. The ends of the wires were carried around the beams and secured by twisting around the body of the wires. I have found that where the space between the beams is of considerable width, there is danger of the great strain incident to the weight of the concrete breaking the concrete mass at points between the depressed center of the wire strands and the beams. I have discovered that this danger can be effectively overcome by employing supplemental wires which shall extend between the beams at a lower level than the main strands and shall serve to effectively aid in sustaining the mass of filling beneath the main strands. In the preferred arrangement the supplemental strands are depressed abruptly from the beams and extend in substantially the lower part of the concrete throughout a large part of the distance between the beams. I have found also that the construction can be materially improved by providing anchor plates and preferably a supplemental rod to which the sustaining strands can be attached instead of connecting these strands directly to the beams, as in the construction set out in my above mentioned patent.

In the practice of my invention, the metallic beams employed, are preferably I-beams A and B, these beams being suitably supported from the walls of the building. Between the beams A and B are drooped the wires C, these wires being placed in convenient numbers and arrangement. In order to sustain the ends of the wires, I prefer to attach to the beams A, suitable anchor plates or brackets D, the up-turned ends *d* of which serve to receive a rod E, preferably of gas pipe, over which the ends of the wires C will be passed, the free ends being fastened to the body of the wires preferably by suitable clips *c*. Manifestly, the wire strands might be looped directly over the hooked ends of the anchor plates, although I regard the use of the supplemental rod E, as preferable. The bodies of the wires C will be extended over the tops of the beams B and across the cen-

tral portions of the several wires C will extend a rod or bar F preferably of gas pipe. By employing the anchor plates D for the attachment of the strands, the strands can be
 5 more readily placed in position than would be possible if the ends of the strands were passed around the beams A. While the strands or wires C serve to effectively sustain a great part of the weight of the concrete filling G and of the hollow tiles H, I
 10 found in practice that the weak point of the floor, particularly where the space between the beams A and B is considerable, is between the beams and the central depressed part of the wires C. To remedy the weakness of the floor at such point and as well
 15 also to give increased strength to the floor throughout its surface, I employ the supplemental strands or wires K, these wires being arranged in convenient number and manner. The ends of the wires K are passed around the supplemental rod E and are fastened to the body of the wires by suitable clips k.

In order to locate the wires K at such points
 25 as will enable them to most effectively sustain the weight of the concrete mass and hollow tiling, I prefer to abruptly depress the wires K at a slight distance from the beams A and B and pass them beneath suitable rods or bars L and L' (preferably of gas pipe) that
 30 extend transversely to the wires K. By this arrangement of the supplemental wires K that part of the mass of concrete and tile beneath the wires C is much more effectively guarded against danger of sagging or cracking. In some instances, particularly where
 35 the space between the beams A and B is of unusual length, I prefer to employ a second set of supplemental strands or wires M, as illustrated in Fig. 3 of the drawings. These
 40 wires M will have their ends looped around the supplemental sustaining rod E and fastened to the bodies of the wires by means of the clips m, or in other convenient manner. The wires M will have given thereto a
 45 depression less abrupt than the depression given to the wires K, but more apt than that given to the wires C, but the wires M will be depressed at the points at which the transverse rods N and N' are placed and between
 50 such rods will extend in the lower part of the concrete filling.

By reference more particularly to Figs. 1 and 5 of the drawings, it will be seen that the
 55 hollow tiles H rest upon the transverse rods L, L' and F and the several strands of wire are preferably located between these tiles, the space between the tiles and around the wires being filled by the mass G of concrete or like
 60 plastic material, as illustrated more particularly in Figs. 1, 3 and 5 of the drawings.

It will be understood, of course, that the several strands of wires C, K and M above described, should be brought to the position
 65 shown under tension and there retained under tension until the plastic mass has been filled in around the wires and has sufficiently

set or hardened to insure the retention of the wires in taut condition. In order to sustain the temporary staging O in proper position
 70 for receiving and temporarily supporting the plastic mass employed in the floor construction, I attach to the beams A and B suitable brackets P having slots or sockets to receive the suspension hooks R, the threaded ends of
 75 these hooks being provided with adjusting nuts r, while the lower ends of the hooks are preferably furnished with up-turned portions r' to engage the joists O' of the temporary
 80 flooring O. By thus employing the plates or brackets P and suspension hooks R, the temporary flooring O can be readily retained in position without the necessity of using beams
 85 extending across the beams A and B, and which would interfere with the filling in of the concrete and tile work between the metal beams.

In order to produce the proper tension upon the wires C, K and M, I prefer to use the simple construction of tension mechanism shown in the drawings. Each of the ad-
 90 justing screw-rods S has its lower hooked ends s and s' in engagement with the joists O' of the temporary flooring, the upper portion of each of these rods being encircled by
 95 a sleeve S' against the upper end of which will bear a tension-screw nut s². The sleeve S' might bear directly against the wire to be stretched, but preferably it is provided with
 100 an extension s³, to engage one of the rods or pipes L, L' or F, in order to exert the proper pressure upon such pipe. From the foregoing description, it will be seen that when the
 105 wires C and K have been fastened to the supplemental rod E, and have been passed over the beams B and the transverse rods L, L' and F have been placed in position, the tension mechanism consisting of the screw-rods
 110 S and sleeves S' will be placed in such position that the hooks s and s' shall engage the joists O' while the arms s³ of the sleeves S' shall engage the adjacent transverse rods as
 115 seen in Figs. 4 and 5 of the drawings. By means of the nuts s², the required tension will then be given to the wires C and K (and to the wires M, if such supplemental wires are
 120 also used). The tiles H will then be placed intermediate the wires C and K, these tiles resting upon the transverse rods F, L and L'. The plastic mass G will be filled in around
 125 the wires, the rods, the tiles and the beams B, as shown, and as well also around the tension mechanism and the hooks R. The temporary flooring L' will serve to support the mass of plastic material until it is sufficiently set,
 130 and the tension mechanism will be allowed to remain in position until the plastic material has so far set or hardened as to prevent any relaxing of the wires C and K. When the plastic material G has sufficiently set, the
 135 nuts s² will be removed and the screw-rods S will be drawn downward while the sleeves S' will be raised from out the plastic mass. When the temporary flooring O is to be re-

moved, the nuts *r* will be withdrawn, thereby permitting the rods *R* to be drawn downward through the plastic filling.

In order to guard against any lifting of the temporary flooring *O* when the tension is being placed upon the wires, suitable blocks *w* will be placed at convenient points beneath the beams *A* and *B*. By providing the brackets *P* with the long slots, these brackets can be used with beams of different widths and the rods *R* can be set within the slots so close to the beams that the strain of the rods will fall almost directly upon the beams and all bending of the brackets *P* will thus be guarded against.

I do not wish the invention to be understood as restricted to the strands of wires shown, nor to the shape of these strands or wires, since obviously they may be either round, flat and of such size as may be best suited for the character of work for which they are employed.

I do not claim in this application the brackets and hooks whereby the temporary staging is suspended, nor the adjustable rod and sleeve whereby tension is given to the strands, as the features are included in another application filed by me of even date herewith.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In fire proof structures, the combination with the beams, of a series of strands sustained by said beams, said strands being depressed between the beams, and a supplemental series of strands sustained by the beams, said supplemental strands being abruptly depressed between and near the beams and a plastic filling sustained by said strands, substantially as described.

2. In fire proof structures, the combination with the beams, of a series of strands sustained by said beams, said strands being de-

pressed at substantially central points between said beams, a supplemental set of strands sustained by said beams, said supplemental strands being depressed abruptly between and near said beams and a second set of supplemental strands sustained by said beams, said second set of strands being depressed at points intermediate the beams and at each side of the center of the space between the beams, substantially as described.

3. In fire proof structures, the combination with the beams, and with a series of strands sustained by said beams of anchor plates attached to said beams and with which plates the strands are connected, substantially as described.

4. In fire proof structures, the combination with the beams, of a series of strands sustained by said beams and an end support for said strands comprising a rod around which said strands pass, said rod being suitably connected to the flanges of the end beams, substantially as described.

5. In fire proof structures, the combination with the beams, and with the wire strands of the supplemental rod *E* and anchor plates *D* connected to the beams, and to the rod *E*, substantially as described.

6. In fire proof structures, the combination with the beams of the flexible strands sustained by said beams, said strands being abruptly depressed under tension between said beams, the lower parts of said strands being removed from the base of said beams, a series of rods extending cross-wise of said strands and resting thereon and a series of tile resting upon and extending transversely to said cross-rod, substantially as described.

MITCHELL F. MCCARTHY.

Witnesses:

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