W. GABRIEL.

REINFORCED CONCRETE FLOOR CONSTRUCTION.

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908,658. Patented Jan. 5, 1909.

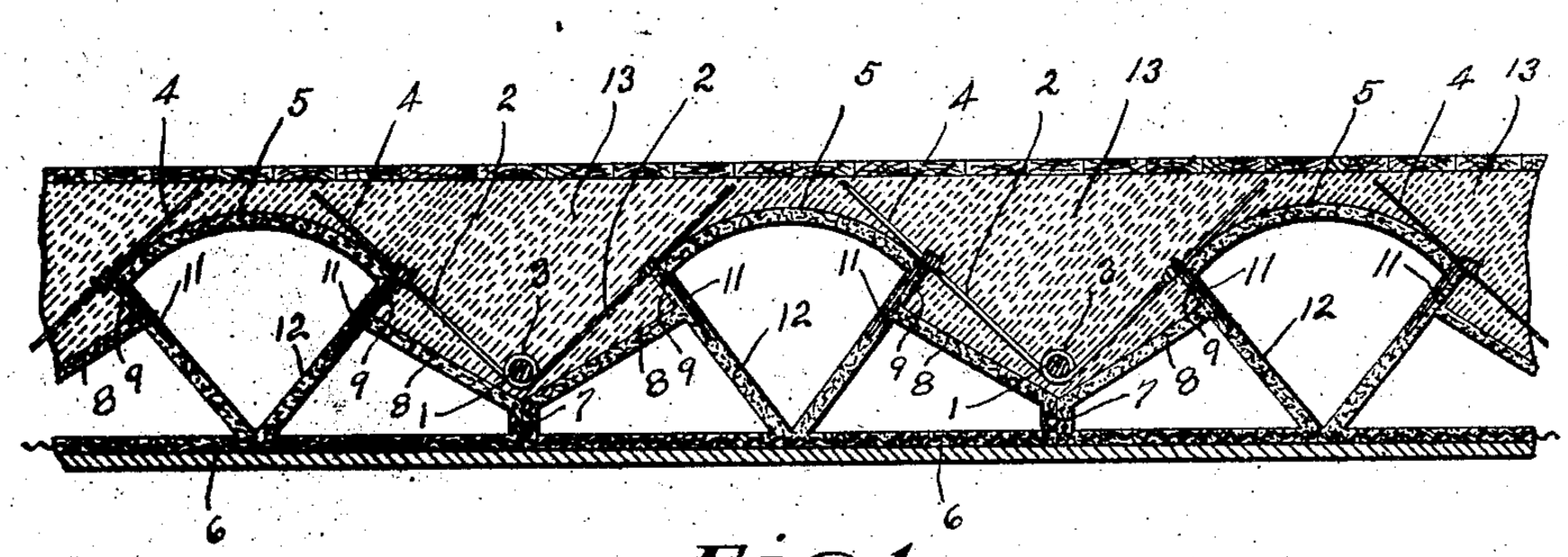

Fig. 1.

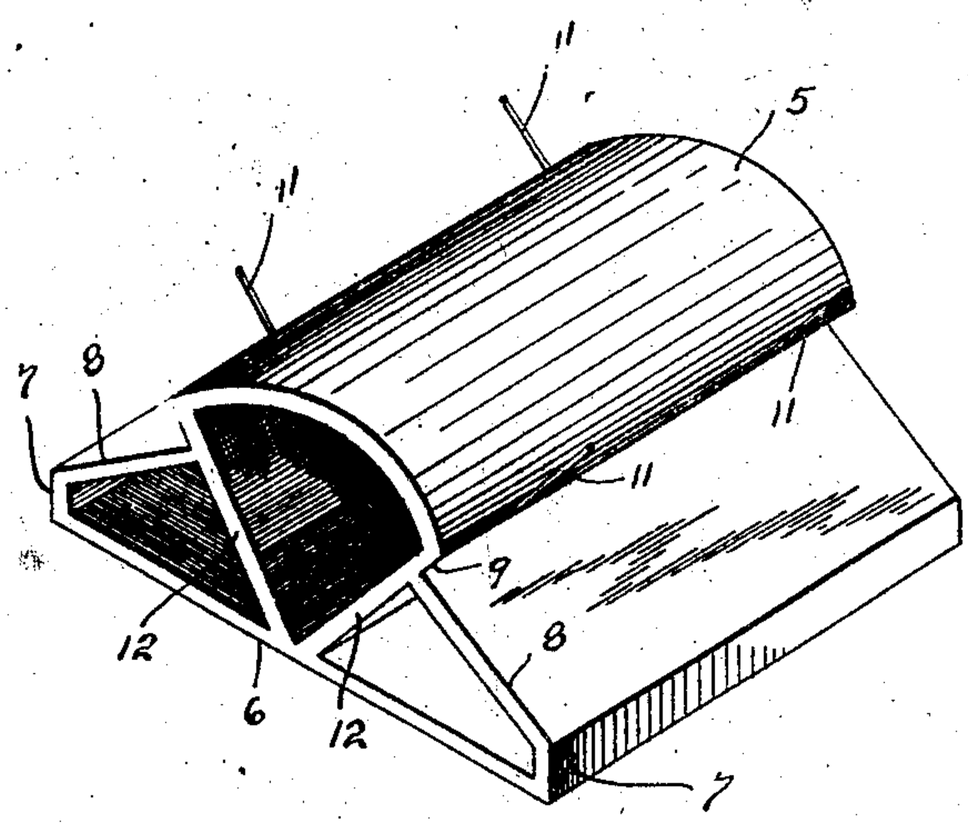

Fig. 2.

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REINFORCED CONCRETE FLOOR CONSTRUCTION.

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To all whom it may concern:

Be it known that I, WILLIAM GABRIEL, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Reinforced Concrete Floor Construction, of which the following is a specification, reference being had therein to the accompanying drawings.

In composite or reinforced concrete floor construction, parallel floor beams of the usual constructional form spaced at regular intervals, are used, between which a body of concrete is molded in place, with transverse metal tension members embedded therein, whose ends are supported by the beams. In as much as the concrete is only capable of standing compression, and cannot resist the tension strains which develop in uniformly loaded beams supported at either end, the mass of concrete lying directly between and below the tension members is a dead weight which does not in any way increase the strength of the floor, but merely serves to embed or cover the tension members and to present a smooth under surface for a ceiling.

This invention relates to a reinforced concrete floor construction wherein the dead weight mass of concrete above referred to is replaced by hollow tiles interlocking with the concrete and the tension members, thereby greatly decreasing the weight of the floor.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a view in cross-section between the supporting beams, of a reinforced concrete floor construction which embodies the features of the invention. Fig. 2 is a view in perspective of one form of tile which may be used.

In the drawings, 1 represents a plurality of spaced metal tension members arranged in parallel relation and supported at each end by the regular floor beams. These tension members are provided at regular intervals with metal shear members 2, which may consist of pieces of metal wire or rod provided with central rings or stirrups 3 adapted to encircle or closely grip the tension members at regular intervals, the intermediate portions presenting obliquely disposed upwardly extending arms 4, which end just below the surface of the floor.

Tiles 5 are set between each pair of tension members, each comprising a hollow body of general triangular cross-section, whose lower face 6 presents a horizontal surface to which the ceiling coat may be applied. The contiguous apices of the triangle are truncated to present vertical surfaces 7 which abut below the tension members. The oblique faces 8 of each tile are provided with shoulders 9 and the upper surface of the tile between the shoulders is preferably crowned or arched. At regular intervals on each length of tile, wires 11 are embedded with projecting ends which may be bent up or around or otherwise secured to the upper divergent arms of the tension members. To further stiffen the tile, cross walls 12 of any preferred design may be used.

In the form of tile hereinbefore illustrated, the walls are practically continuations of the outer shoulders in the side faces of the tiles, and extend to the median line of the lower face so that a triangular cellular design is obtained of great rigidity and lightness. The space between and above the tiling to the line of the floor is filled with a concrete mass 13, which completely envelops the tension and shear members. In constructing the floor, false supports are placed in position between the floor beams, against their underside, the tiles are then laid in courses between the beams in regular order with their vertical faces in abutment; the tension members are then secured in place above the abutting joints of the tile with the shear members distributed in place.

If desired, the shear members may be anchored against displacement by twisting the projecting ends of the wires 11 embedded in the tile, around them or they may be left free. The concrete is then tamped in place, between the tiles and around the metal members, closely filling the space between the sides and covering the tile crowns, the surface being finished in the usual manner for a floor. By this method of construction, a floor is obtained which is in effect a series of reinforced beams of triangular cross-section whose compression strains are taken up by the concrete at its greatest cross-sectional area; whose tension strains are provided for by longitudinal metal members designed especially for floor load, and which are provided with shear members which extend transversely across the line of shear and are consequently more efficient. The space between the triangular beams is filled by the hollow tile whose projecting shoulders inter-

lock with the sides of the triangular mass of concrete so that they remain in position as in an arch while the dead weight of the mass of concrete between the tension members, customary in the usual reinforced floor construction, is replaced by air spaces, the tiling being of sufficient strength to carry any ceiling which may be applied to its under surface.

It is obvious that the metal tension and shear members may be readily distributed so as to be adapted for any local concentration of loads and the tiles may be designed so that they will accommodate themselves to any desired spacing of these members.

The design and construction of the members may be varied without departing from the spirit of the invention and I do not care to limit myself to any particular form and arrangement of parts.

I claim as my invention:—

1. A composite concrete floor comprising regularly disposed cylindrical tension rods adapted to be supported at each end, shear members consisting of wire bent into loops encircling the rods and divergent arms between the loops extending obliquely upward, hollow tiles between and below the tension members presenting a continuous ceiling surface, concrete surrounding the rods and wires and interlocking with the tiles, and metal fasteners embedded in the tiles, and secured to said shear members.

2. A concrete, composite floor comprising an upper body of cement, parallel tension rods embedded therein near the under side, shear members consisting of wire formed into loops engaging the rods at regular intervals and extended upwardly in divergent arms between the loops, and courses of triangular cellular tiles, the edges of said tiles abutting below the tension rods, the sloping sides of said tiles extending up between the tension bars and provided with undercut shoulders interlocking with the underface of the concrete, and the bases of said tiles forming a continuous ceiling surface, and wire fasteners embedded in the sides of the tiles and secured to the shear members.

3. A concrete, composite floor comprising parallel, spaced metal tension rods, metal shear members of wire bent into loops engaging the rods at regular intervals, extended upwardly with divergent arms between the loops, a concrete body enveloping the tension and shear members, presenting a continuous floor surface, and tiles, each comprising a triangular, cellular section with arched top, having shoulders along its oblique sides perpendicular thereto, the lateral margins of said tiles abutting beneath the rods, and the tops of said tiles extending into the concrete between the rods and interlocking therewith along said shoulders, and flexible wires embedded in the sides of the tiling, projecting therefrom and secured to said shear members.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM GABRIEL.

Witnesses:

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OTTO F. BARTHEL.