C. B. ASHER.

CONCRETE FLOOR CONSTRUCTION.

APPLICATION FILED MAR. 28, 1911.

1,006,424.

Patented Oct. 17, 1911.

3 SHEETS—SHEET 1.

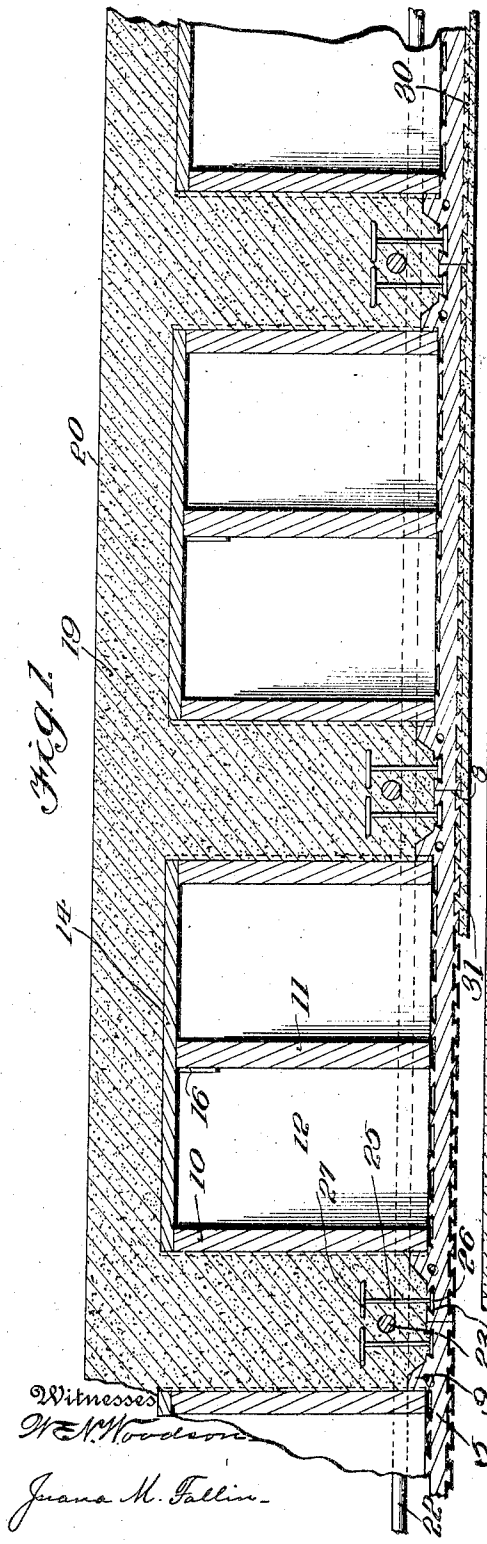

Fig. 1.

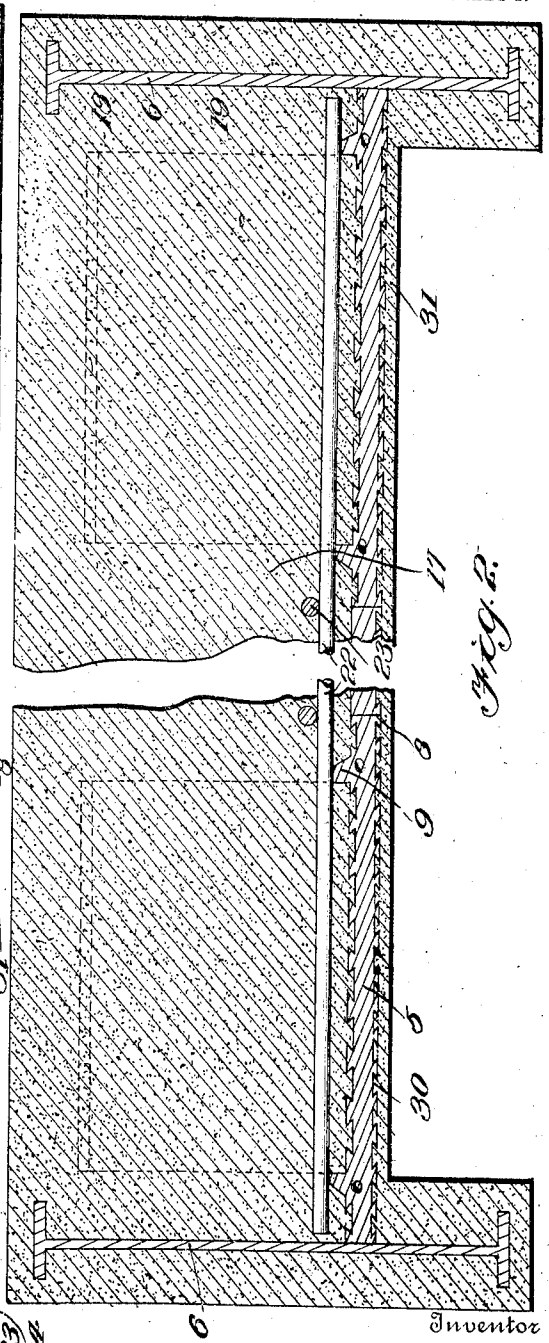

Fig. 2.

Witnesses

W. N. Woodward

Juana M. Fallin

Inventor

C. B. Asher.

By

Attorneys.

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3 SHEETS—SHEET 2.

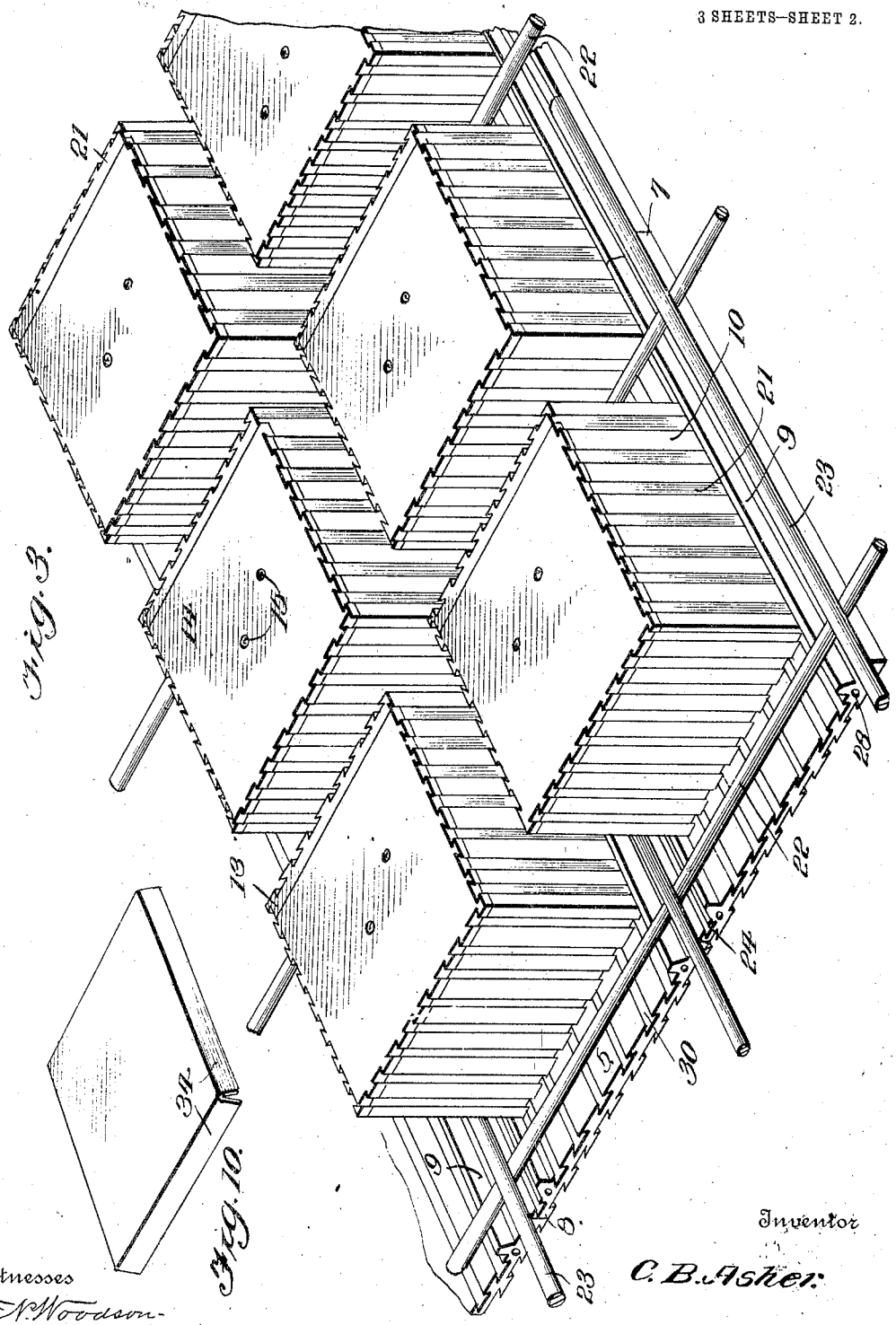

Fig. 3.

Fig. 10.

Witnesses

W. N. Woodson.

Juana M. Fallin.

Inventor

C. B. Asher.

By R. H. Stacy Attorneys.

C. B. ASHER.

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3 SHEETS—SHEET 3.

Fig. 4.

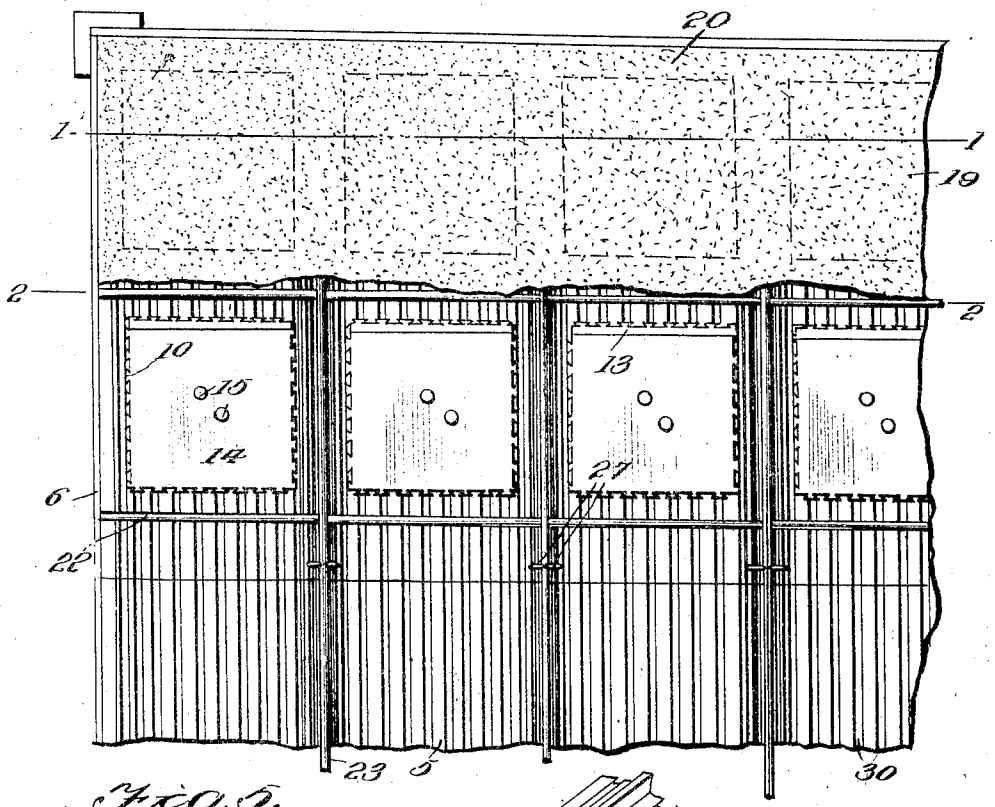
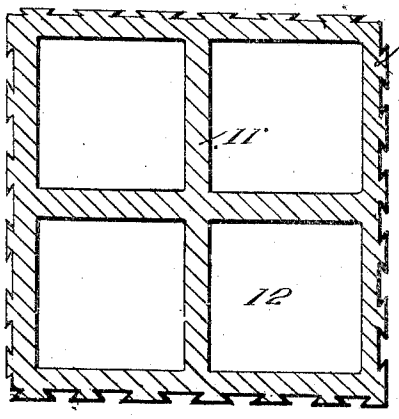


Fig. 5.



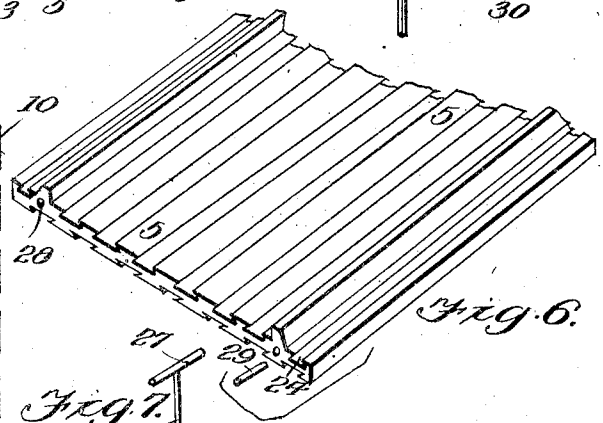


Fig. 6.

Fig. 7.

Fig. 8.

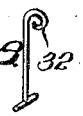


Fig. 9.

Witnesses

W. N. Woodson

Juana M. Fallin

Inventor

C. B. Asher.

By

Attorneys.

UNITED STATES PATENT OFFICE.

CLYDE B. ASHER, OF WASHINGTON, DISTRICT OF COLUMBIA.

CONCRETE-FLOOR CONSTRUCTION.

1,006,424. Specification of Letters Patent. Patented Oct. 17, 1911.

Application filed March 28, 1911. Serial No. 617,387.

To all whom it may concern:

Be it known that I, CLYDE B. ASHER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Concrete-Floor Construction, of which the following is a specification.

This invention relates to fire proof buildings and more particularly to the construction of the floors and ceilings thereof.

The object of the invention is to provide a reinforced concrete floor of durable and compact construction capable of sustaining an enormous weight without liability of cracking, breaking or otherwise disintegrating.

A further object of the invention is to provide a concrete floor having a plurality of hollow tiles embedded therein so as to reduce the dead weight of the floor, said tiles being supported on ceiling slabs, the lower faces of which are scored or grooved to form a bond for holding the plaster in place.

A further object is to provide the ceiling slabs with longitudinal reinforcing ribs which serve the dual function of holding the tiles in proper spaced relation and as supports for the reinforcing rods of the floor structure.

A further object is to provide a series of anchoring members, the lower ends of which are fastened to the ceiling slabs at the abutting ends thereof, while the upper ends of said anchoring members project upwardly between adjacent tiles and are embedded in the concrete or other material constituting the main body of the floor, thus to assist in preventing accidental displacement of said slabs.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a vertical sectional view of a reinforced concrete floor embodying the present invention, taken on the line 1—1 of Fig. 4; Fig. 2 is a similar view taken on the line 2—2 of Fig. 4; Fig. 3 is a perspective view of a portion of a floor with the filling removed, showing the arrangement of the hollow tiles or blocks and reinforcing rods; Fig. 4 is a top plan view partly in section of a portion of a floor; Fig. 5 is a horizontal sectional view of one of the auxiliary tiles or blocks; Fig. 6 is a perspective view of a portion of one of the ceiling slabs detached; Fig. 7 is a perspective view of one of the anchoring members detached; Fig. 8 is a perspective view, illustrating a modified form of anchoring member; Fig. 9 is a similar view, illustrating another form of anchoring member; Fig. 10 is a perspective view, showing a metallic closure for the tiles.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In constructing a reinforced concrete floor in accordance with the present invention, I provide a plurality of flat horizontally disposed ceiling slabs 5, preferably rectangular in shape and formed of terra-cotta, cement or other material, said slabs being supported between spaced girders or beams 6 and arranged in parallel rows, with the ends of the slab in each row abutting at 7 and with the longitudinal edges of the slabs in adjacent rows disposed in contact with each other, as indicated at 8.

Secured to or formed integral with the inner faces of the ceiling slabs 5, are longitudinally disposed reinforcing ribs 9, preferably extending the entire lengths of the slabs and which form abutments for hollow tiles 10 and serve to maintain the latter in proper spaced relation. The tiles 10, which may be formed of clay, terra-cotta, concrete or other suitable material, are preferably rectangular in shape and provided with intersecting partitions 11 defining independent compartments 12, the lower end of each tile being open and adapted to rest on the upper surface of the adjacent ceiling slab 5.

The upper edges of three of the side walls of each tile, together with the upper edges of the intersecting partitions 11, are cut-away to form a lip 13 on the fourth wall of the tile for engagement with a top slab or cover 14, said cover being provided with spaced openings 15 adapted to receive nails

or similar fastening devices 16, which latter bear against the partitions 11 at the intersection thereof and serve to prevent accidental displacement of the cover.

It will here be noted that by cutting away the upper portions of the tiles, seats are provided for the covers 14, so that when said covers are placed in position on the tiles, the upper faces of the covers will be disposed in alinement with the upper ends of the lips 13, thus to produce a smooth, straight surface at the top of each tile. If desired, however, only one of the upper edges of the walls of the tiles may be cut away to accommodate the top slabs or closures and in some cases, the openings or holes 15 may be dispensed with.

The tiles 10 are spaced apart to form intermediate chambers or passages 17 and 18 adapted to receive a concrete filling, indicated at 19, said concrete also extending over the upper portions of the tiles to form a covering, indicated at 20. The side and end walls of the tiles 10 are preferably molded or otherwise formed with dove-tail grooves 21 adapted to receive the concrete or cement 19 and thus form in effect a bond between the tiles and plastic material constituting the body of the floor.

Supported on the ribs 9, are reinforcing bars or rods 22, preferably extending the entire width of the floor and embedded in the concrete 19, there being auxiliary reinforcing bars or rods 23 seated in the passages 17 and resting upon and intersecting the rods 22 at the abutting edges 8 of adjacent ceiling slabs, as best shown in Fig. 1 of the drawings.

It will here be noted that the ribs 9 not only serve to reinforce the ceiling slabs 5 and hold the tiles in proper spaced relation, preparatory to introducing the cement filling 19, but also serve to support the reinforcing rods or bars 22 and elevate the latter above the upper faces of the ceiling slabs, the auxiliary bars 23 in turn being supported by the rods 22, as before stated.

Formed in the opposite ends of the ceiling slabs 5 near the abutting edges 8 thereof, are dove-tail recesses 24, in which are seated suitable anchoring members 25. The anchoring members 25 are each preferably formed of a single length of wire or flat metal having its lower end bent to produce a substantially T-shaped head 26 adapted to enter the adjacent dove-tail recess 24, and its upper end extended upwardly within the adjacent passage 17 and provided with a similar head 27, which head is embedded in the concrete 19, thereby assist in sustaining the weight of the ceiling slabs.

It will be noted that the reinforcing rods 22 and 23 intersect at a point directly above the abutting edges 8 of the ceiling slabs, while the anchoring members 25 are disposed on opposite sides of the joint 8 and extend over the rods 23 so as to materially strengthen and reinforce the floor at the junction of the ceiling slabs. The slabs 5 are preferably of greater length than the hollow tiles 10, the opposite ends 7 of the slabs being provided with sockets 28 adapted to receive dowel pins 29 for the purpose of properly alining the slabs.

By extending the reinforcing ribs 9 for the entire length of the slabs 5, when said slabs are arranged between the girders 6, the ribs on adjacent slabs will abut, so as to form in effect a plurality of continuous ribs extending the entire length of the floor. The upper and lower faces of the ceiling slabs 5, are preferably formed with dove-tail grooves or recesses 30, similar in construction to the grooves 21, the upper set of grooves or recesses in the slabs at the opposite longitudinal edges thereof, serving to receive a portion of the cement 19, and the grooves 30 on the lower faces of the slabs, serving to receive the plastic facing of the ceiling and thus form a firm bond for the latter.

Attention is here called to the fact that by making the slabs 5 longer than the tiles 10, some of said tiles will rest on the central portions of the ceiling slabs, while others will span said slabs at the junction of the adjacent ends thereof so as to break joint and thus produce a strong rigid structure.

In constructing a floor, the bottom or ceiling slabs 5 are supported between the beams or girders 6 either on loose forms or suspended from overhead blocks, after which the tiles are placed on the slabs with the outer faces of the side walls thereof bearing against the inner faces of the ribs 9 so as to space the tiles a uniform distance apart in one direction, the tiles being manually spaced apart in the other direction. After the ceiling slabs, with the anchoring members 25 secured thereto, have been placed in position, the reinforcing rods 22 are lowered within the passages 18 until they rest on or extend above the upper edges of the ribs 9, the auxiliary rods 23 being subsequently lowered within the passages 17 and allowed to rest on the reinforcing rods 22. With the several parts thus assembled, concrete or other plastic material is introduced within the passages 17 and 18 and spread over the top of the tiles, to any desired depth, the concrete being tamped in the usual manner and then allowed to harden or solidify, thus producing a strong, rigid structure, which is light in weight and capable of sustaining an enormous strain without danger of cracking or otherwise disintegrating.

The plastic facing 31 may be applied to the lower surface of the slabs 5 either during the construction of the floor or after the concrete has thoroughly set, the dove-

tail grooves or scoring providing a perfect bond for holding the plaster in place.

In Fig. 8 of the drawings, there is illustrated a modified form of anchoring member, in which the upper ends thereof, instead of being T-shaped, are bent inwardly and downwardly to form hooked terminals 32 adapted to be embedded in the concrete above the reinforcing rods 23. A different form of anchoring member is shown in Fig. 9 of the drawings, in which the lower ends thereof are bent to produce lateral lips 33 adapted to enter the adjacent dove-tail recesses in the ceiling slabs, while the intermediate portions of said anchoring members intersect and are extended upwardly to form terminal hooks.

If desired, the tops or closures of the tiles may be constructed of metal, as best shown in Fig. 10, in which case the closures are preferably formed with a depending marginal flange 34 for engagement with either the interior or exterior walls of the tile. While it is preferred to provide the hollow tiles with independent compartments and removable covers, either reinforced or otherwise, it will of course be understood that the tops of the tiles may be made integral with the side walls thereof and said tiles provided with a single interior chamber or compartment, if desired, without departing from the spirit of the invention. It will also be understood that the floor, instead of being supported between iron beams or girders, may be supported between concrete girders or anchored directly to the side walls or partitions of a building, and that the concrete filling need not necessarily cover the tops of the tiles. By providing the floor with intersecting reinforcing bars or rods embedded in the cement in the passages formed by the hollow tiles, not only is the floor materially reinforced and strengthened, but a much thinner floor may be constructed than if the rods ran in one direction only.

Having thus described the invention, what is claimed as new is:

1. In concrete floor construction, a plurality of ceiling slabs having their lower faces formed with plaster receiving grooves and their opposite ends provided with openings, dowel pins seated in said openings and serving to connect adjacent slabs, ribs formed on the upper faces of the slabs and extending the entire length thereof, hollow tiles of less length than the slabs resting on the latter and bearing against the inner faces of the ribs, said tiles being spaced apart to form intersecting passages, concrete seated in said passages and covering the tiles, reinforcing rods supported on the ribs and embedded in the concrete in some of the passages, auxiliary reinforcing rods resting on the first mentioned rods and embedded in the concrete in other of said passages, and anchoring members projecting upwardly from the opposite ends of each slab and embedded in the concrete on opposite sides of the adjacent reinforcing rods.

2. In concrete floor construction, a plurality of ceiling slabs, hollow substantially rectangular tiles supported on the slabs and having some of their side walls cut-away to produce an upstanding lip, covers forming closures for the upper ends of the tiles and bearing against said lips, and concrete surrounding the tiles and extending over the covers thereof.

3. In concrete floor construction, a plurality of ceiling slabs, hollow tiles supported on the slabs and each comprising a body portion having intersecting partitions and an upstanding lip, covers forming closures for the tiles and bearing against the lips, said covers being provided with spaced openings, fastening devices extending through the openings in the covers and engaging the adjacent partitions, and concrete surrounding the tiles.

4. In concrete floor construction, a plurality of thin substantially rectangular ceiling slabs having continuous upstanding ribs spaced inwardly from and disposed parallel with the adjacent longitudinal edges of the slabs, tiles resting on the slabs and bearing against the inner faces of the ribs, concrete interposed between the tiles, reinforcing rods supported on the ribs and embedded in the concrete, and auxiliary reinforcing rods resting on the first mentioned rods and also embedded in the concrete.

5. In concrete floor construction, a plurality of thin substantially rectangular ceiling slabs having their opposite ends provided with interengaging parts and their upper faces formed with straight continuous upstanding ribs spaced inwardly from and disposed parallel with the adjacent longitudinal edges of the slabs, tiles resting on the slabs and bearing against the inner faces of the ribs, concrete interposed between the tiles and covering the latter, reinforcing rods supported on the ribs and embedded in the concrete, and auxiliary rods resting on the first mentioned rods and also embedded in the concrete.

6. In concrete floor construction, a plurality of thin substantially rectangular ceiling slabs having their upper faces provided with straight continuous upstanding ribs spaced from and disposed parallel with the adjacent longitudinal edges of the slabs throughout the entire length of the latter, hollow tiles of less length than the slabs resting on the upper faces thereof and bearing against the inner faces of the ribs, concrete interposed between the tiles and covering the latter, reinforcing rods resting directly on the ribs and embedded in the concrete, and auxiliary rods also embedded in

the concrete and resting on the first mentioned rods.

7. In concrete floor construction, a plurality of thin substantially rectangular ceiling slabs laid in rows and arranged to break joint, said ceiling slabs being provided with straight continuous upstanding ribs spaced inwardly from and disposed parallel with the opposite longitudinal edges of the slabs, tiles resting on the upper faces of the slabs and bearing against the inner edges of the ribs, said tiles being spaced apart both longitudinally and transversely to form intersecting passages, concrete filling said passages and covering the tiles, reinforcing rods supported on the ribs and embedded in the concrete in some of the passages, and auxiliary rods resting on the first mentioned rods and embedded in the concrete in other of said passages.

8. In concrete floor construction, a plurality of thin substantially rectangular ceiling slabs having their opposite ends provided with openings and their upper faces formed with straight continuous upstanding ribs spaced inwardly from and disposed parallel with the opposite longitudinal edges of the slabs for the entire length of the latter, dowel pins seated in said openings and serving to connect the ends of adjacent slabs, hollow tiles resting on the upper faces of the slabs and bearing against the inner faces of the ribs, said tiles being spaced apart both transversely and longitudinally to form intersecting passages, concrete filling said passages and covering the tiles, reinforcing rods supported on the ribs and embedded in the concrete in some of the passages, and auxiliary reinforcing rods resting on the first mentioned rods and embedded in the concrete in other of said passages, some of said tiles spanning the abutting ends of adjacent slabs.

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

CLYDE B. ASHER. [L. S.]

Witnesses:
F. CLYDE GIDEON,
A. M. BIGELOW.