G. B. WAITE.

HOLLOW METAL TILE FOR REINFORCED CONCRETE FLOORS.

APPLICATION FILED MAY 14, 1914.

1,241,793. Patented Oct. 2, 1917.

Fig. 1.

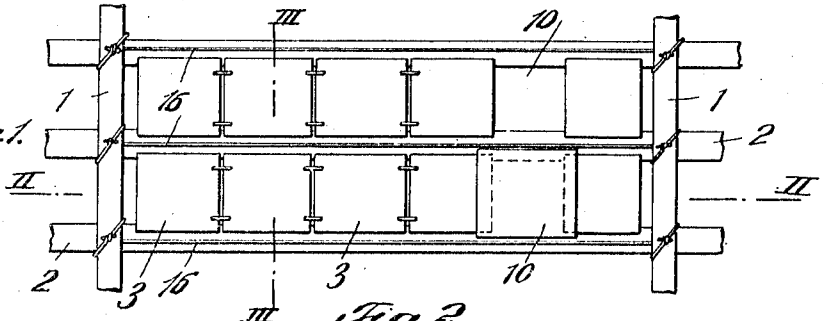


Fig. 2.

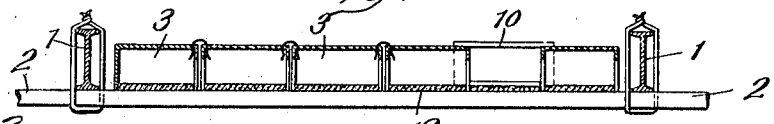


Fig. 3.

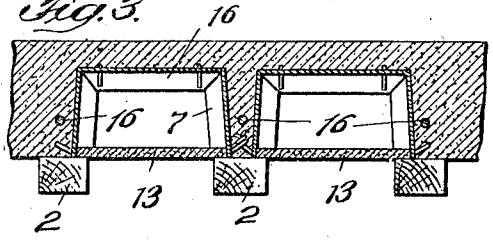


Fig. 4.

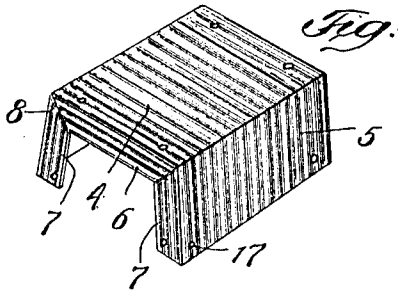


Fig. 5.

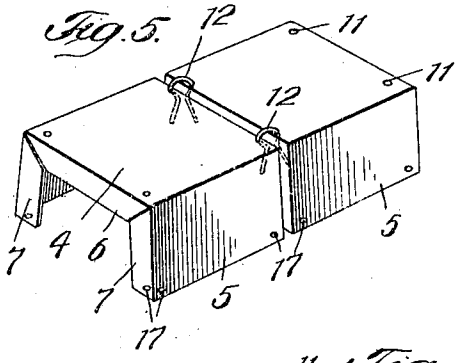


Fig. 6.

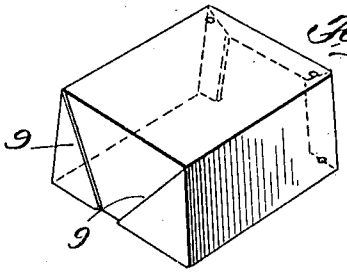


Fig. 7.

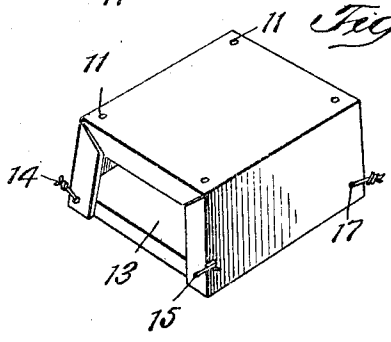
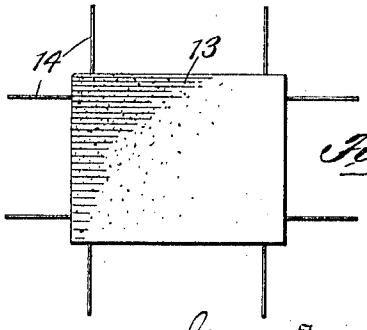


Fig. 8.



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HOLLOW METAL TILE FOR REINFORCED-CONCRETE FLOORS.

1,241,793. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed May 14, 1914. Serial No. 838,429.

To all whom it may concern:

Be it known that I, GUY B. WAITE, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Hollow Metal Tiles for Reinforced-Concrete Floors, of which the following is a specification.

Reinforced concrete for floors and ceilings has largely been made of flat concrete slabs reinforced on their under sides with metal. When the span of the slab is considerable, either the concrete must be made very thick or beams of reinforced concrete are projected below the slabs. In the former case the thick slab makes a very heavy construction; and in the latter case the beams projecting below the slabs make the construction expensive and prevent a smooth ceiling. Some times a ceiling is placed below the beams for the special purpose of concealing them.

Many efforts have been made to construct a concrete floor with the minimum amount of concrete and to give a flat or smooth ceiling. Hollow terra cotta tiles as well as hollow metal tiles have been used. The hollow tile has proven both expensive and comparatively heavy. The metal tile heretofore used was formed of metal of comparatively heavy gage or thickness and stamped out with deep corrugations or indentations, thus requiring heavy special machinery for turning out the tiles rapidly.

It is the main object of this invention to provide a metal tile of such construction that the commercial sheet iron may be used.

It is a further object of the invention to provide means within the tile to brace the side walls thereof against the weight of the wet concrete.

A further object of the invention is to make the tile of simple construction whereby it may be readily manufactured.

Another object of the invention is to provide a thin concrete board or block which may be securely fastened within the concrete tile to thoroughly brace the metal side thereof and to form a flat comparatively smooth ceiling, and thereby reduce the expense of plastering finished ceilings.

Another object of my invention is to save centering work.

Another object of the invention is to so construct the tiles that a considerable quantity of them may be nested for convenience of transportation and storage and also so that they may be readily handled.

In the drawings, Figure 1 is a plan view of a portion of a floor showing a series of metal tiles in place;

Fig. 2 a sectional view thereof on the line II—II of Fig. 1;

Fig. 3 a vertical sectional view taken on the line III—III of Fig. 1;

Fig. 4 a detail view of a single tile;

Fig. 5 a detail perspective view of two tiles connected together at their adjoining ends;

Fig. 6 a detail perspective view of an end tile designed to be placed at the end of a row or series of tiles;

Fig. 7 a detail perspective view of a tile showing a concrete block secured in the lower end thereof; and

Fig. 8 a detail plan view of a concrete block adapted to be secured in the lower end of one of the tiles.

Referring to the various parts by numerals, 1 designates the ordinary floor supports or beams of a reinforced concrete floor. Secured to these supports or beams are temporary supports 2 which are connected to said beams usually by means of wire loops. It is obvious, however, that they may be temporarily secured in position in any suitable manner. On these temporary supports 2 are placed the hollow metal tiles 3.

Each metal tile is preferably formed from a single piece of thin sheet metal bent in suitable dies to form the top 4 and the depending sides 5, said sides being the full height of the tile. The ends of the tiles are formed by narrow depending flanges 6 formed on the ends of the top part 4, and by the narrow inwardly extending flanges 7 formed on the ends of the sides 5, these flanges being bent in suitable dies which form a fold at the corners of the tile, as at 8. A considerable number of tiles formed in this manner may be placed one within the other or "nested" for convenience of transportation and storage. When placed in position for forming a reinforced concrete floor, the edges of the sides 5 rest on the temporary supports 2 as shown clearly in Figs. 1, 2 and 3. By reason of the partially open ends, the tiles may be readily grasped by the workmen and placed in position on

the temporary supports. These tiles are usually of considerable size and the partially open ends form hand-holds which permit of the ready handling and manipulation of the tiles, as well as allowing access to the inside of the tile for work to be done on and about the construction.

These tiles are usually arranged in a series extending from one support or beam to the next beam, as shown in Figs. 1 and 2. The tiles in the series are arranged close together, end to end, so that concrete will not flow, to any extent, in between them. The end tiles of the series are formed with one closed end, as shown in Fig. 6, to prevent the concrete entering the end tile. This closed end is preferably formed by folding over sufficient metal, as shown clearly in Fig. 6, the folds in the metal being as shown at 9 in said figure. Where the series of tiles does not accurately fit the space between the supporting beams 1, a thin bridge piece of metal, as shown at 10 in Fig. 1, may be used to cover or bridge the joint between two of the tiles. The purpose of this bridge piece is to prevent concrete flowing into the tiles. In order to tie adjoining ends of these tiles together and prevent them shifting during the pouring of the concrete, the tops of the tiles are perforated as at 11 and spring clips 12 employed to enter said perforations and bridge the joint between the connected tile ends. These spring clips draw the ends of the tiles together and hold them firmly in position until the concrete is set. These clips may be readily placed in position when the tiles are arranged on the temporary supports 2. The folded over ends and the folded over flanges 6 and 7 greatly strengthen the tile and enable it to resist the pressure of the concrete, which would be impossible for the light metal used if left plain without the reinforced corners.

In order to close the lower ends of the tiles for the purpose of producing a flat or level ceiling, thin concrete boards or blocks 13 are secured within the tiles at their lower open ends by means of wires 14. These wires are embedded in the concrete boards and are arranged to be passed through perforations 15 in the sides of the tile and in the flanges 7 thereof. These wires may then be twisted together around the corners of the tiles as shown in Fig. 7, or they may be brought through slots or holes and twisted together with the corresponding wires from the tiles of an adjoining series, as shown in Fig. 3. In both arrangements of these tie wires the twisted ends of the wires form means for effectually locking or tying the tile to the concrete. These blocks are flush with the lower edges of the sides of the tiles so that when the temporary supports 2 are removed a flat ceiling is produced which may be readily plastered or otherwise finished. I do not restrict myself to the form of ceiling herein shown nor to the specific manner of holding the blocks to the metal as any other suitable form may be used.

If the span between the beams 1 is of considerable length, reinforcing rods 16 may be placed in the channels formed between the rows of tiles, as shown clearly in Figs. 1 and 3.

The concrete blocks or boards may be conveniently wired within the hollow tiles at any time and the entire tile then conveniently handled by means of the partially open ends of the tiles.

While for certain classes of work the tiles formed from smooth uncorrugated metal may be of sufficient strength, when said tiles are of considerable size I prefer to crimp or corrugate the metal as shown in Fig. 4, in order to stiffen them and give them greater strength. By reason of the flanged ends, however, these tiles need not be deeply corrugated as said ends materially stiffen and strengthen the tile.

A reinforced concrete floor made up of metal tiles as described herein will be light and strong and of cheap construction. The parts may be readily and quickly assembled by unskilled labor; and the tiles are of sufficient strength to maintain their shape and proper position during the rough usage which they necessarily receive, and when in position are of sufficient strength to sustain the weight of workmen should that be necessary at any time before the concrete has been placed in position.

When it is desired to extend reinforcement 16 in two directions, as is often done when there are supports on all four sides, the tiles are not laid close together but are spaced apart with all four sides closed. The two open ends may be closed by placing pieces of metal up against them or by extending edge 7 all the way across, as shown in Fig. 6.

What I claim is:

1. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps having closed tops and sides and partially open ends, said tiles being arranged end to end across the space between the supports, means for closing the outer ends of the end tiles of the series, a longitudinally adjustable section in said series of tiles whereby the length of the series may be varied to fit the space between the support, and a mass of concrete covering said tiles and extending across the space between the supports.

2. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps having closed tops and sides and open ends, said tiles being arranged end to end across the space between the supports, means for loosely connecting together the adjoining edges of the said

tiles, means for closing the outer ends of the end tiles of the series, a longitudinally adjustable section in said series of tiles whereby the length of the series may be varied to fit the space between the supports, and a mass of concrete covering said tiles and extending across the space between the supports.

3. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps having closed tops and sides and open ends, said tiles being arranged end to end across the space between the supports, means for loosely connecting together the adjoining edges of the said tiles, means for closing the outer ends of the end tiles of the series, a thin block or slab in the lower end of each tile, means for individually securing each block within its tile, and a mass of concrete covering said tiles and extending across the space between the supports.

4. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps having closed tops and sides, the ends of said caps being folded inwardly from the sides and tops to stiffen and strengthen the ends of the caps, spring clips bridging the joints between adjoining caps and connecting them together along the edges of the tops, thin concrete blocks closing the bottoms of said caps and carrying wires embedded therein said wires extending through apertures in the caps to hold the blocks therein, and a mass of concrete covering said tiles and extending across the space between the supports.

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

GUY B. WAITE.

Witnesses:
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F. R. MILLER.