G. B. WAITE.

HOLLOW METAL TILE FOR REINFORCED CONCRETE FLOORS.

APPLICATION FILED JULY 26, 1915.

1,250,254. Patented Dec. 18, 1917.

2 SHEETS—SHEET 1.

Fig. 1

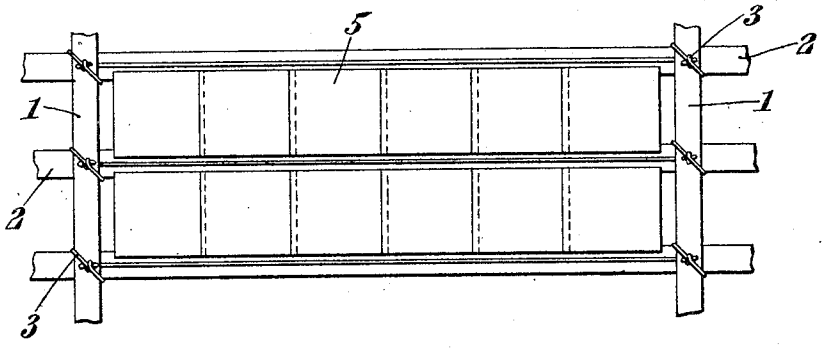


Fig. 2

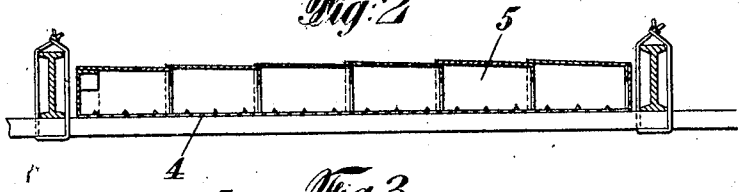


Fig. 3

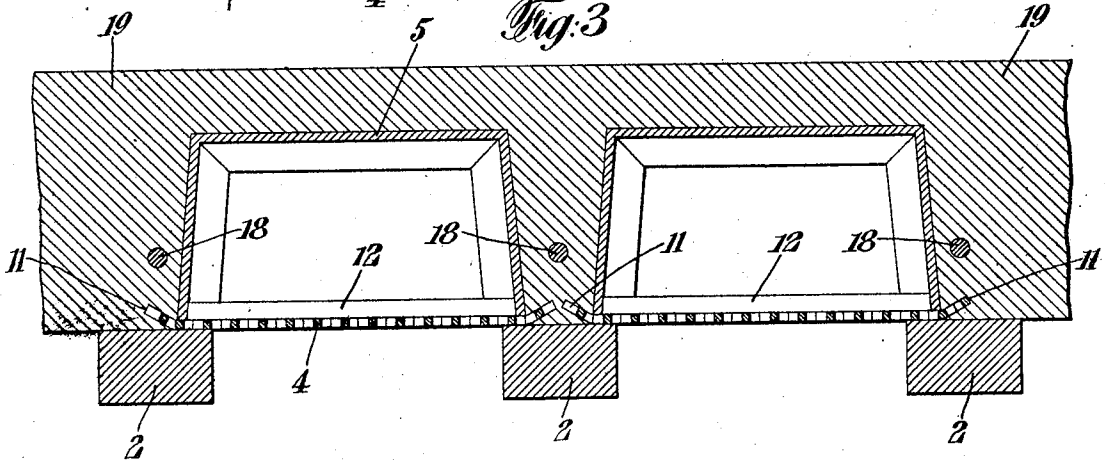
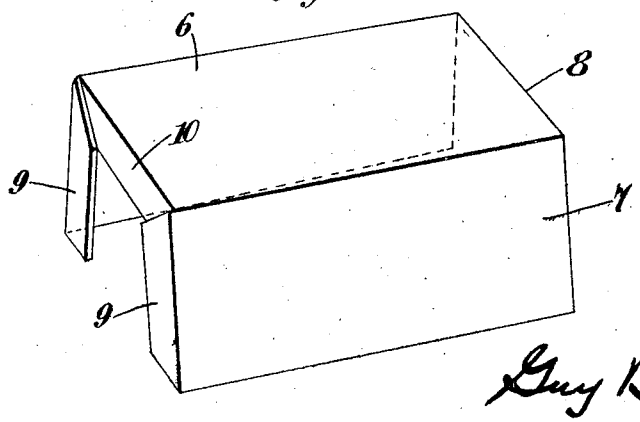


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5

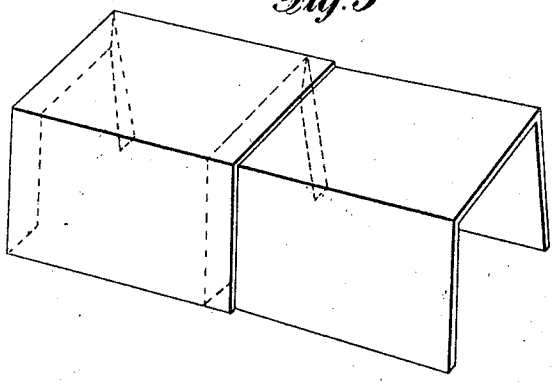


Fig. 6

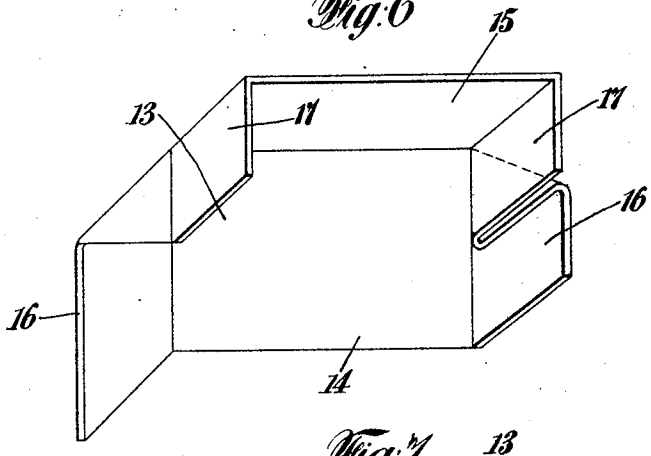


Fig. 7

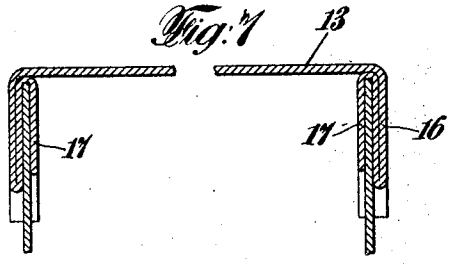
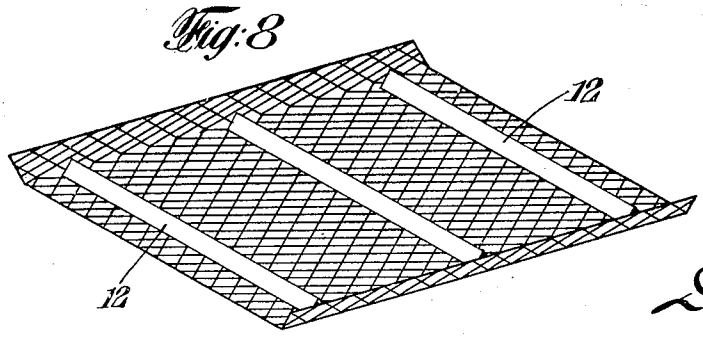


Fig. 8



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HOLLOW METAL TILE FOR REINFORCED-CONCRETE FLOORS.

1,250,254. Specification of Letters Patent. Patented Dec. 18, 1917.

Application filed July 26, 1915. Serial No. 41,894.

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.

This invention relates to certain improvements in the construction of hollow metal tiles used in concrete floors to form blank or hollow spaces therein. In the manufacture of hollow metal tiles heretofore used it was necessary to use a comparatively thick or heavy-gage metal in order that they might maintain their shape during the process of molding the concrete floor. It is necessary that these hollow metal tiles shall be of sufficient strength and stiffness to maintain their shape and resist the pressure of the wet concrete.

In the use of hollow metal tiles in floors it is necessary to provide some simple, convenient and cheap means for closing the lower side of the tiles if it be desired to have a smooth ceiling, and these closure devices must be of such character that they may be easily and securely anchored to the concrete and to the hollow metal tiles which they support.

It is the main object of this invention to provide a hollow metal tile of extremely simple construction and which will be so strongly braced to resist the pressure of the concrete that it may be made of extremely light and thin metal.

Another object of this invention is to provide hollow metal tiles which are adapted to be overlapped in a series, the inclosed end of one tile being thoroughly braced and forming a substantial supporting means for the overlapping end of the adjoining tile.

A further object of the invention is to provide a perforated or expanded metal lath, in sections, adapted to be used as a means for closing the lower ends of the hollow tiles, said lath sections being provided with means for anchoring them to the inclosing concrete, and also being provided with means to interiorly brace the hollow metal tiles.

There are other objects and advantages of this invention which will appear more fully hereinafter.

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

Fig. 2 a longitudinal sectional view through a series of tiles;

Fig. 3 a transverse sectional view of a series of tiles on a large scale;

Fig. 4 a detail perspective view of one of the metal tiles;

Fig. 5 a similar view of two overlapped tiles;

Fig. 6 a detail perspective view of the end cap for closing the end of the series of tiles, said end cap being partially formed;

Fig. 7 a detail horizontal view of a portion of a tile showing the end cap in place thereon; and

Fig. 8 a detail perspective view of one of the metal tiles used to close the lower end of the hollow metal tile.

Referring to the various parts by numerals, 1 designates the ordinary floor supports or beams of a reinforced concrete floor. Secured to these beams are temporary supports 2 hung from the beams, preferably by wire loops 3. On these temporary supports 2 are placed perforated metal laths 4. These laths bridge the space between the supports, as shown clearly in Fig. 3, and on these laths rest the hollow metal tiles 5. These tiles are arranged in a series extending from one floor beam to the next adjoining beam, as shown in Fig. 1.

Each tile is preferably formed from a single sheet of metal and consists of a top 6 and two side walls 7. One end 8 of the tile is open; the other end is braced by folding inwardly a portion of the sides 7 to form the end flanges 9, and a portion of the top is folded down to form the end flange 10. The bottom of the box, like the end 8 thereof, is open. The flanges 9 and 10, where they join each other at the corners of the tile, may be folded in or crimped or disposed of in any suitable manner, said folded-in or crimped material serving to strongly reinforce the tile at the corners thereof. The tiles are placed on the perforated metal laths in such manner that the open end 8 of one tile will overlap and receive the flanged and braced end of an adjoining tile. In this manner the flanged end of one tile serves as an efficient support and brace for the unflanged end of an overlapping tile.

The perforated metal laths are arranged on the supports 2 end to end across the

spaces between the supporting beams 1. The side edges of these laths are bent upwardly to form the flanges 11 which project beyond the lower edges of the hollow metal tiles and are adapted to be interlocked with the concrete. Each lath is formed with a series of transverse metal ribs 12, said ribs being adapted to fit within the hollow tile supported by the lath and to brace the sides thereof against inward strain due to the pressure of the wet concrete.

To close the open end of the first tile of a series of tiles to prevent concrete entering the said tiles, an end cap 13 is provided. This end cap consists of the vertical end wall 14, the horizontal top 15 and the folded interlocking sides 16. The top 15 is adapted to slide in under the top of the tile as shown in Fig. 2, and the upper portions 17 of the side walls are adapted to slide within the tile and to engage the inner side thereof as shown clearly in Fig. 7, while the lower portions of said walls engage the outer surfaces of the sides of the tile. By this means the open end of the first tile of the series is thoroughly braced and supported by the end cap, the top of the cap preventing the depression of the top of the tile; and the end walls of the cap interlocking with the side walls of the tile hold said walls against an inward pressure and also against a pressure tending to spread them at their lower edges. The flanged or reinforced end of the tile, at the other end of the overlapped series may be closed by any suitable means. In closing this end of the series of tiles it is not necessary to provide the reinforcing and bracing cap 13, it being only necessary to use the end cap on the unbraced and unflanged end of the tile. I prefer to close this end of the series of tiles by means of a flat metal plate placed against the braced end of the last tile, as shown in Fig. 2. This plate is held in place by the concrete, or by any suitable fastening devices.

In arranging a series of tiles on the temporary supports and between the floor beams the said tiles may be overlapped at their ends as may be necessary to properly adjust the tiles to the space between the beams. This may be readily done whether or not the tiles are corrugated or smooth. It will, of course, be understood that the metal of the tiles may be corrugated if desired, or it may be otherwise grooved or deformed in order to stiffen the completed tile. By corrugating the tiles so that their overlapped portions will interlock they will be held against longitudinal slipping or sliding movement under the pressure of the wet concrete. This is desirable for the reason that the concrete is first applied at one end of the series of tiles and then tamped and worked toward the other end. This form of the tile is illustrated in Fig. 9 of the drawings. By arranging the braced end of one tile within the unbraced and unflanged end of the adjoining tile there is no tendency for the upper walls of the tiles to separate under the weight of the wet concrete. The uppermost cap is forced tightly down against the inclosed end of the adjoining cap and as the said inclosed cap is rigidly braced the result is that the concrete forces the overlapped part of the caps close together and prevents concrete passing between them. It has been found that when overlapping, unbraced metal tiles are used, the concrete depresses the inner tile, leaving a space between the tiles through which the wet concrete may pass.

The perforated metal lath forms a comparatively smooth ceiling and is especially well adapted for receiving the ceiling plaster.

When the tiles and laths are properly arranged, reinforcing rods 18 are placed between the rows of tiles, as shown clearly in Fig. 3, and then the concrete 19 is poured in place. When the concrete is hardened the upturned or flanged edges of the laths are embedded and thoroughly anchored in the concrete so that the supports 2 may be removed and the ceiling finished.

It will be readily understood that hollow metal tiles constructed in accordance with this invention may be nested into a compact package for transportation. It is also manifest that very thin metal may be used in the manufacture of the tiles, said tiles being thoroughly braced by overlapping them and providing the flange reinforcement at each overlapped end of the tile. It is obvious that other forms of stops or braces may be formed on the lath to hold the sides of the tile against inward pressure.

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 one open end, means for bracing the other end of each of said tiles, said tiles being arranged in series across the space between the supports the open end of one tile fitting over the reinforced or braced end of the adjoining tile, means for closing and bracing the open end of the first tile of the series, a perforated metal lath closing the bottoms of said tiles, means for anchoring said metal laths in the concrete between the hollow metal tiles, and means carried by the laths within the tile to brace the sides of the tiles against inward movement, and a mass of concrete.

2. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps each cap having a closed top and sides and one open end, means for bracing the other end of each of said tiles, said tiles being arranged in a series across

the space between the supports, the open end of one tile fitting over the braced end of the adjoining tile, and an end cap for closing and bracing the open end of the first tile of the series said end cap being formed with a top adapted to fit under the top of the tile, and with interlocking sides adapted to embrace the sides of the tile to brace them against both inward and outward strains.

3. A reinforced concrete floor comprising supports, a series of hollow metal tiles in the form of caps said tiles being arranged in a series across the space between the supports, the end of one tile fitting over the adjoining end of the next tile, and an end cap for closing and bracing the open end of the end tile of the series said end cap being formed with a top adapted to fit under the top of the tile and with interlocking sides adapted to embrace the sides of the tile and brace them against both inward and outward strains.

4. An end cap for closing and bracing the open end of hollow metal tiles, said cap being formed with a top adapted to fit under the top of the tile and with double side walls adapted to interlock with the sides of the tile to brace said sides against both inward and outward strains.

5. A reinforced concrete floor comprising spaced supports, rows of telescoped hollow metal tiles extending between the supports, said tiles comprising integral top and side plates formed with inwardly extending bracing flanges at one end and being entirely open at the opposite end and at the bottom, the open end of one tile slidably embracing the braced end of the adjoining tile whereby said tiles may be telescoped longitudinally one within the other to vary the length of the rows, and a mass of concrete embedding said tiles.

6. A reinforced concrete floor comprising spaced floor beams, rows of telescoped hollow metal tiles extending transversely between the beams, said tiles comprising integral top and side plates formed with inwardly extending bracing flanges at one end and being entirely open at the opposite end and at the bottom, the open end of one tile fitting over the braced end of the adjoining tile and adjustable longitudinally thereupon, metal lath closing the bottoms of said tiles, means carried by the lath to brace the side walls of the tiles against inward pressure, and a mass of concrete embedding said tiles.

In testimony whereof I hereunto affix my signature.

GUY BENNETT WAITE.