April 11, 1939. C. W. AKERS 2,154,390

CONCRETE SLAB CONSTRUCTION

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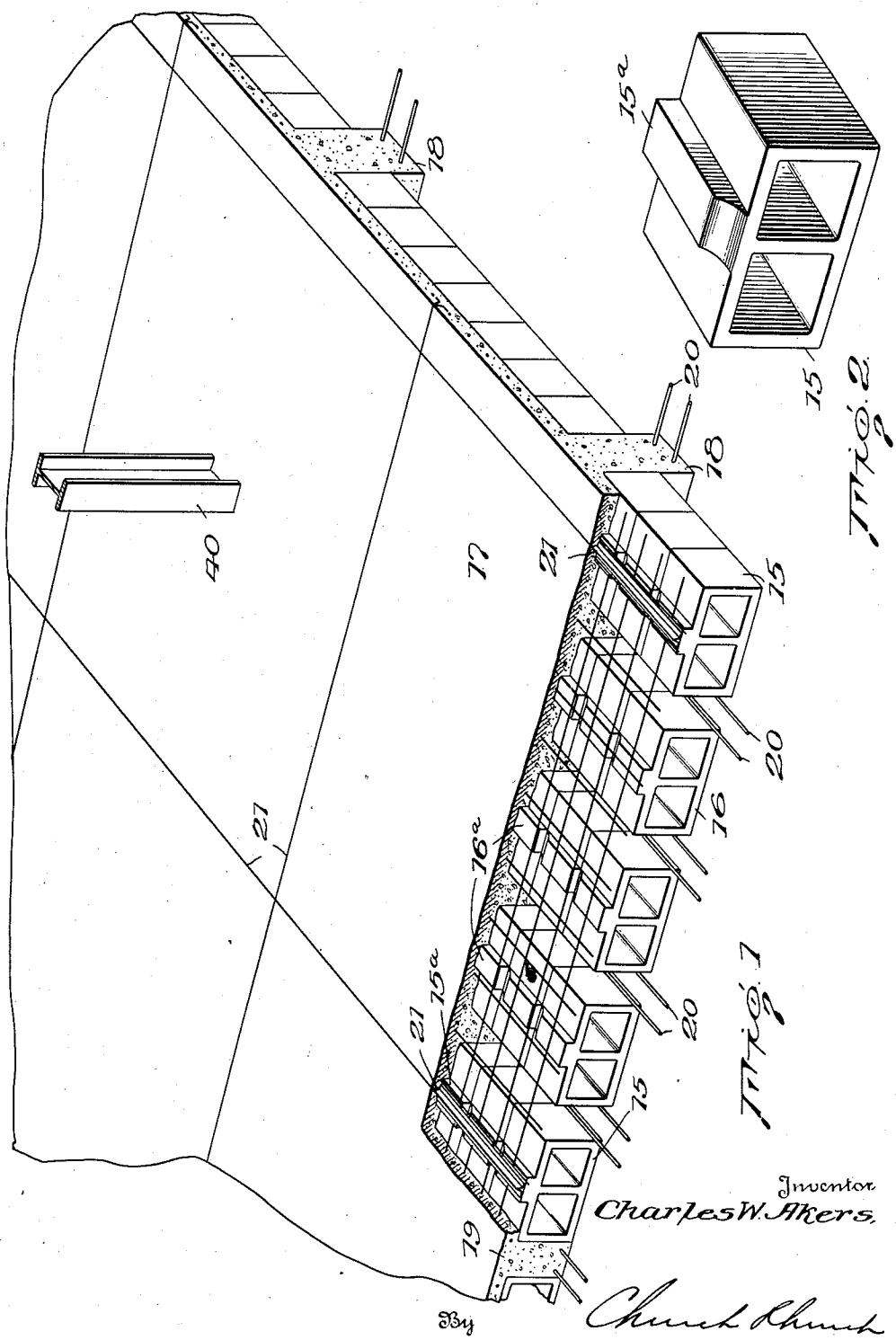


Fig. 2

Fig. 1

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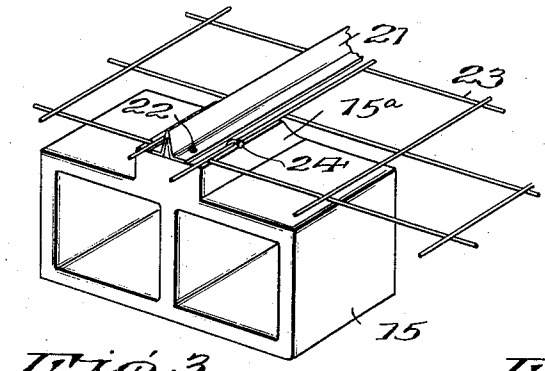


Fig. 3.

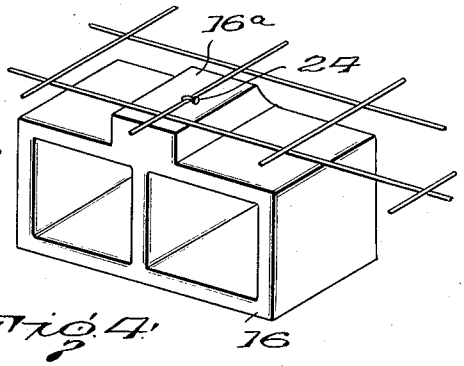


Fig. 4.

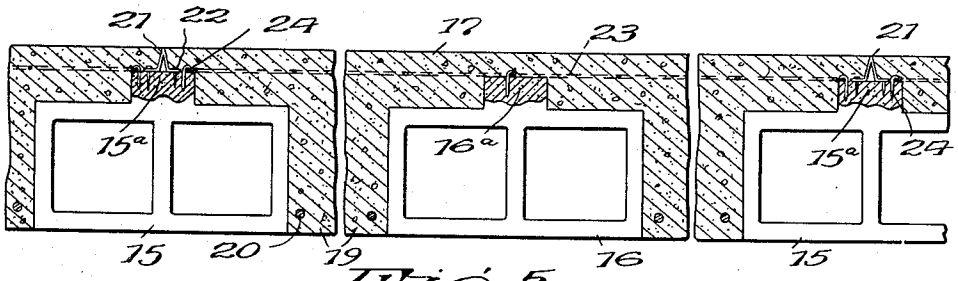


Fig. 5.

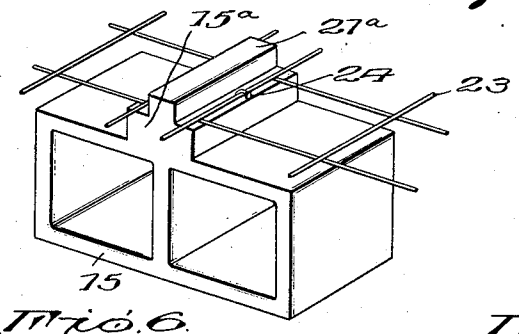


Fig. 6.

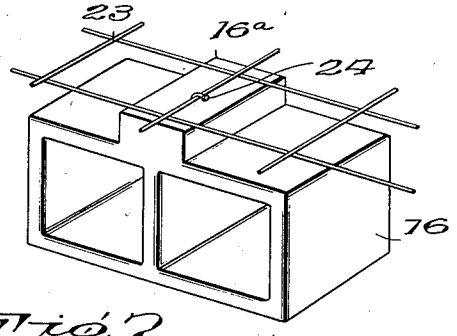


Fig. 7.

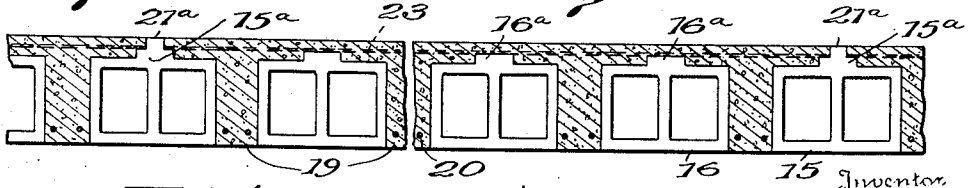


Fig. 8.

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CONCRETE SLAB CONSTRUCTION

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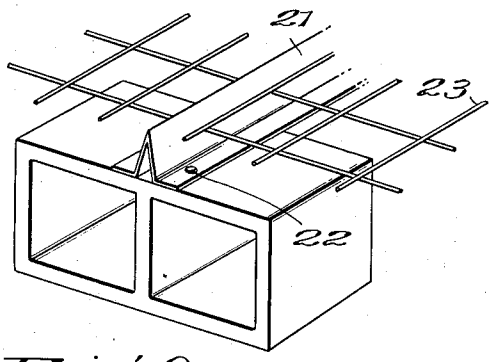


FIG. 9.

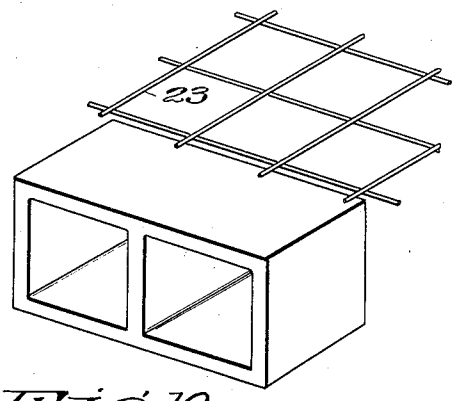


FIG. 10.

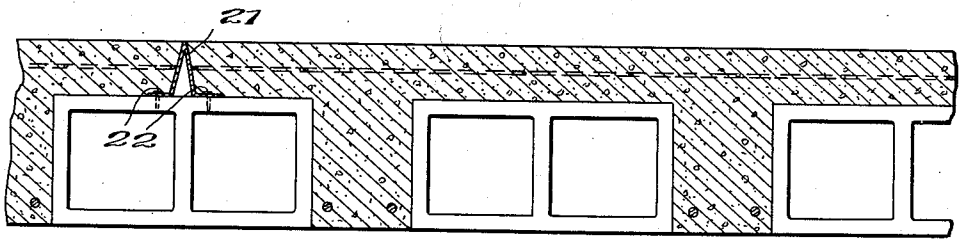


FIG. 11.

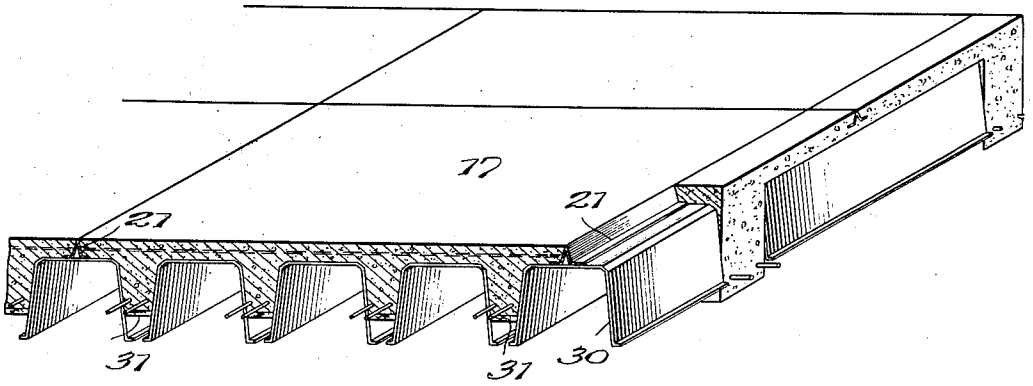


FIG. 12.

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2,154,390

UNITED STATES PATENT OFFICE

2,154,390

CONCRETE SLAB CONSTRUCTION

Charles William Akers, Nashville, Tenn.

Application September 30, 1937, Serial No. 166,668

4 Claims. (Cl. 72—66)

This invention relates to improvements in concrete slab construction.

It is a well known fact that, in the fabrication of concrete structures, for instance, concrete floors, the contraction of the concrete mass, while setting or hardening, results in the formation of cracks in the finished floor or slab, and the primary object of the present invention is to provide means for regulating the formation, or rather the location, of the cracks in such concrete slabs or floors.

A further object is to provide means for controlling the formation of the cracks which means can be used in leveling the plastic mass of concrete in the pouring of the slab or floor.

More specifically, the invention contemplates a concrete floor or slab having therein separator strips dividing the floor or slab into a plurality of subdivisions or sections with separate, individual temperature bar or reinforcing units embedded in each section, whereby the mass of concrete of each section contracts independently of the other. The area of the individual sections is such that no cracking will occur in the surface of the section, but the concrete will simply recede, so to speak, from the separator strips, being free to do so by reason of the fact that each section has an individual or independent temperature bar unit. As a result, all cracks due to contraction of the concrete mass extend along the separator strips and, being rather minute, are soon filled with foreign matter and become substantially invisible.

Another object of the invention is the use of filler tile or other structural units formed with portions of nailable material in combination with the separator strips, whereby the latter may be rigidly positioned preliminary to the pouring of the concrete.

With these and other objects in view, the invention consists in certain details of construction and combinations and arrangements of parts, all as will hereinafter be more fully described, and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawings—

Figure 1 is a perspective view of a portion of a concrete floor embodying the present invention;

Fig. 2 is a perspective view of the preferred form of filler tile;

Fig. 3 is a similar view of a tile with the filler strip and the units of temperature bar for two floor sections secured to a rib on the tile;

Fig. 4 is a like view illustrating the tiles for supporting the temperature bar units at points intermediate the separator strips;

Fig. 5 is a vertical sectional view through the floor of Fig. 1, the section being taken transversely of the individual tile;

Fig. 6 is a perspective view illustrating a modified form of tile and separator strip;

Fig. 7 is a perspective view of the tile used in combination with the tile of Fig. 6 for supporting the temperature bar units intermediate the separator strips;

Fig. 8 is a view similar to Fig. 5 illustrating a floor fabricated with the tile of Figs. 6 and 7;

Figs. 9 and 10 are perspective views illustrating still further forms of tile which may be used in practising the present invention;

Fig. 11 is a view similar to Fig. 8 illustrating a floor containing tile such as shown in Figs. 9 and 10; and

Fig. 12 is a still further form of the invention, removable form members being used in this instance in lieu of tile.

In the form of the invention illustrated in Figs. 1 to 5, the floor is made up of a plurality of series of filler tiles, such as indicated at **15** and **16**, embedded in the mass of concrete **17**. It will be understood that, in pouring, the floor tiles **15**, **16** are properly supported on wooden forms which form closures at the bottom of the spaces between the juxtaposed rows or series of tiles **15**, **16**, so as to retain the plastic mass of concrete, when poured, on or between the tiles. At certain points lengthwise of the rows of tiles, spaces are left so that, in the finished floor, the concrete deposited in such spaces will be of greater depth and constitute beams **18**, while the concrete deposited in the spaces between each two rows of tiles will form joists **19**. Suitable temperature elements or reinforce bars **20** are preferably embedded in these joists or beams. In carrying out the present invention, the floor is subdivided into a plurality of sections by the use of separator strips **21**. In this preferred embodiment of the invention, the separator strips **21** are secured on ribs **15a** formed on the upper surfaces of the tiles **15**, these ribs, and preferably the entire tile, being formed of a nailable substance whereby the separator strips can be rigidly secured on the ribs by nails or other securing elements **22**. It is, of course, necessary in concrete structures of this type that the slab or floor be properly reinforced but, in carrying out the present invention, it is essential that these reinforce means be of such nature as to not permit the contraction of the plastic mass

of concrete in one subdivision or section of the floor influencing the action of the concrete in adjacent sections in setting or hardening. For this reason, these reinforce means in the present invention take the form of a multiplicity of temperature bars **23**, preferably fabricated in a mesh-like unit for each section or subdivision of the floor or slab. It is, of course, proper that this mesh-like unit of temperature bars be located in a plane spaced from the upper face of the filler tiles **15**, **16**, as well as from the upper surface of the finished floor and, to this end, it is convenient to secure said units by fastening elements **24** to the rim **15a** of tiles **15** and, if desired, to the ribs **16a**, of tiles **16**.

The combined heights of the ribs **15a** of tiles **15** and the separator strips **21**, should be such that the upper edges of said strips denote the upper surface of the finished floor because, in that event, the separator strips function as leveling strips or permanent leveling screeds in finishing off the top surface of the slab or floor. Thus, the ribs on the filler tiles serve as continuous chairs for supporting the separator strips at a predetermined level and said ribs are a further advantage in that the temperature mesh units **23** are secured thereto and are thus held in place during the pouring of the plastic concrete. In addition, the isolation, so to speak, from one another of the several units of temperature steel mesh **23** in the several sections of the floor permits the concrete of the individual sections to contract and set independently of all the other sections, with the result that by making the sections of a more limited area, as compared to the entire floor or slab, any space that is formed by the contraction of the concrete mass is definitely forced to occur along the several separator strips, thus the location of what would otherwise be cracks in the floor is definitely determined, and by having them so located along the sides of the separator strips, they are rather quickly filled with foreign matter and soon become substantially invisible.

In the form of invention illustrated in Figs. 5 to 8, the separator strip takes the form of a supplemental rib **21a** formed integral with the rib **15a** of the tiles **15**. In the preferred construction, the strips are of metal, but as shown in this modification, the supplemental rib **21a** will function to separate the mass of concrete into individual sections or subdivisions. At the same time, the temperature steel mesh units **23** can still be firmly secured to the ribs **15a** by the fastening elements **24**. In this modification, the tiles intermediate the rows of tiles **15** may take the same form as those illustrated in the preferred embodiment of the invention, the temperature steel mesh units being secured to the ribs **16a** of tiles **16**.

In the form of the invention illustrated in Figs. 9 to 11, all the tiles are formed with plane upper surfaces and the separator strips **21** are simply made of greater height and fastened by fastening elements **22** to the upper surfaces of the tiles. Where the metal separator strip is used, and particularly in the present modification, it is in the form of an inverted V, so that the temperature steel units **23** will wedge, so to speak, on inclined side surfaces of the strips at a point spaced vertically above the top surfaces of the tiles.

In the form of the invention illustrated in Fig. 12, the filler tiles are not used but, in lieu thereof, the concrete is poured on a form composed essentially of spaced U-shaped metal form members **30**, the space between each two juxtaposed members being closed, usually, by a wooden member **31**. In this instance, the separator strips **21** are secured directly to the upper surface of certain of the form members **30**, said strips being of such height as to extend to a point corresponding to the desired floor level and being of the inverted V type in order to support the temperature steel units in spaced relation with respect to the upper surfaces of the form members **30**.

In each form of the invention, it is preferred that the size of the individual sections be such that there will be a column **40** in each section. This is indicated more or less diagrammatically in Fig. 1. Also, as indicated in Fig. 2, the ribs of the filler tiles may have recesses formed therein, in which can be laid electrical conduits or the like, if desired, preliminary to the pouring of the floor or slab.

In each instance, it will be observed that the so-called leveling strips are rigidly mounted so as to be used as leveling screeds and, at the same time, they separate the entire floor into individual increments of concrete and, by having the several units of temperature steel mesh free to contract and expand independently of the others, each increment of concrete is free to contract without influencing the action of the remaining increments or sections and, as pointed out, the location of spaces formed by the contraction of the plastic mass is definitely controlled so as to cause such spaces to occur along the separator strips.

It is also important that the so-called separator strips be located along lines spaced laterally from the beams and joists. In other words, the concrete is of considerable depth at the joists and beams, due to which fact it will not crack as readily at these points as it will at points of less depth. Consequently, the separator strips are placed in those portions of the concrete which is of less depth than the beams and joists. It will also be appreciated that individual temperature bars, instead of mesh material can be used and that such bars, though not actually connected to each other in any one section of the slab, may be said to form a unit of temperature bars in their respective sections.

What I claim is:

1. In a reinforced concrete slab construction, the combination of filler tile embedded in a layer of concrete, said layer of concrete forming the surface of said slab, separator strips disposed transversely of each other and subdividing said slab into a plurality of sections, and temperature elements embedded in and reinforcing the surface layer of concrete of each section, the elements of each section being entirely disconnected from those of the remaining sections.

2. In a reinforced concrete slab construction, the combination of filler tile embedded in a layer of concrete, said concrete forming the surface of said slab, ribs of nailable material formed on said tile, separator strips on said ribs, said separator strips being disposed transversely to each other and dividing said surface layer of concrete into a plurality of subdivisions, and temperature elements embedded in the concrete of each subdivision, said temperature elements being supported on said ribs in spaced relation to the upper surfaces of the tile members and the temperature elements of each subdivision being entirely disconnected from those of the remaining subdivisions.

3. In a reinforced concrete slab construction, the combination of filler tile embedded in a layer of concrete forming the surface of said slab, ribs of nailable material formed on the upper surfaces of said tile, the upper portion of said ribs being of reduced width to form ledges on the ribs, and said ribs being exposed and lying flush with the surface of said concrete, and temperature elements secured to the ribs on the ledges of the latter in spaced relation to the surfaces of the tile, said ribs being disposed transversely of each other to divide the slab into a plurality of subdivisions, the temperature elements in each subdivision being entirely disconnected from those of the remaining subdivisions.

4. In a reinforced concrete slab construction, the combination of filler tile embedded in a layer on concrete forming the surface of the slab, ribs of nailable material on said tile, separator members on said ribs, said ribs projecting laterally beyond said separator members to form ledges and said separator members being arranged transversely of each other to divide the slab into a plurality of subdivisions, and temperature elements in each subdivision secured to the ledges formed by said laterally projecting portions of said ribs, the temperature elements in each subdivision being entirely disconnected from those of the remaining subdivisions.

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