Nov. 27, 1923. 1,475,846

H. E. MARKS

ROOF OR FLOOR CONSTRUCTION

Filed Dec. 15, 1922

FIG. 1.

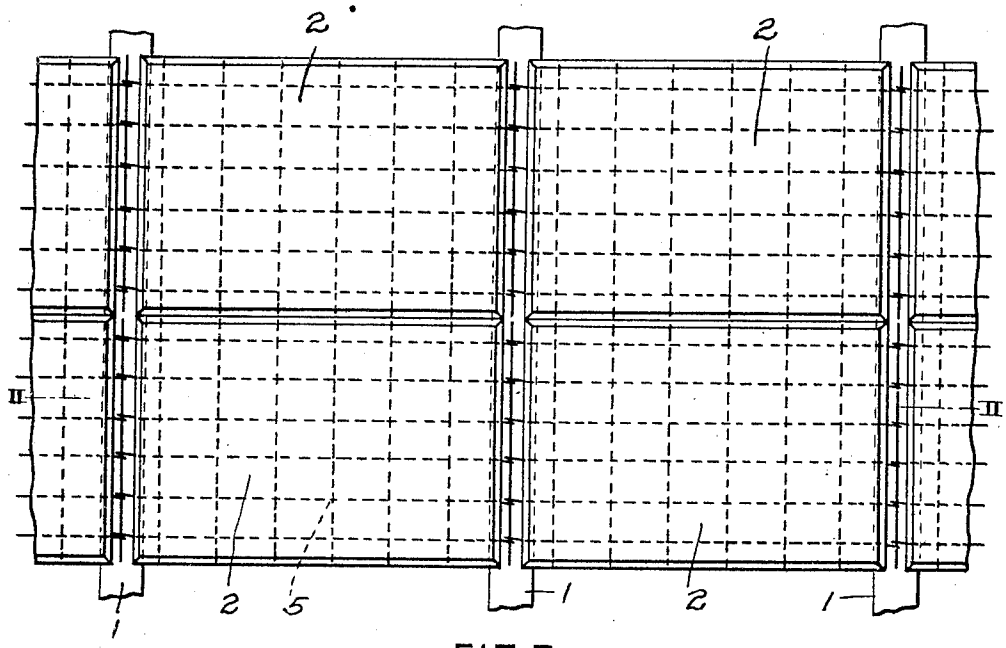


FIG. 2.

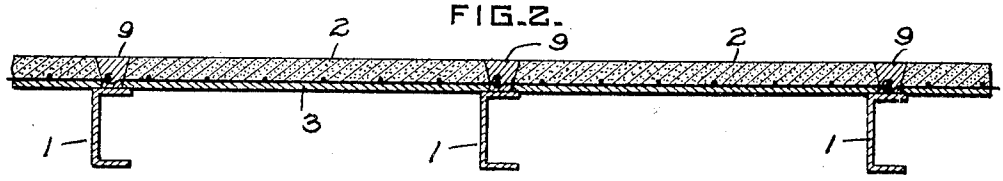


FIG. 3.

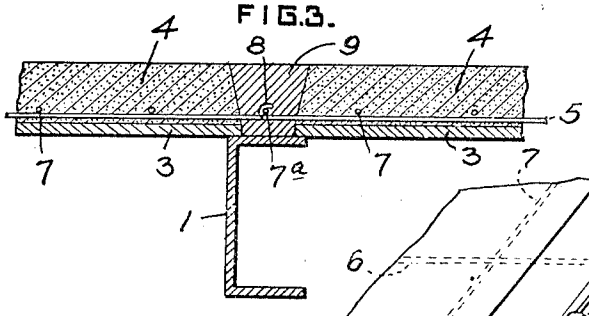
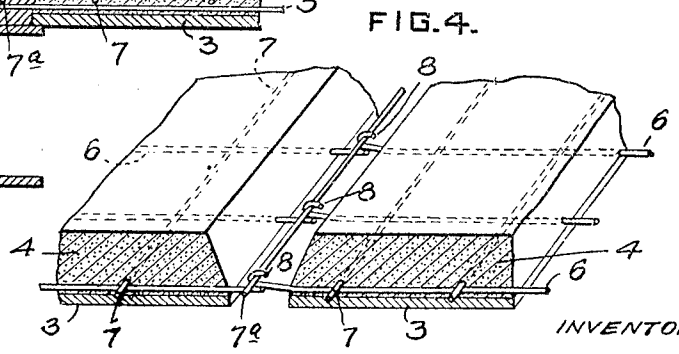


FIG. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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ROOF OR FLOOR CONSTRUCTION.

Application filed December 15, 1922. Serial No. 607,019.

To all whom it may concern:

Be it known that I, HERBERT E. MARKS, a citizen of the United States, and a resident of Glen Osborne, Sewickley, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Roof or Floor Constructions, of which the following is a specification.

This invention relates to roof or floor constructions of the type in which pre-cast slabs of cementitious material are supported on the roof or floor beams, and in which a metal mesh reinforcement, or its equivalent, is embedded in the cementitious material.

One object of the invention is to provide a slab for the purpose stated which will cheapen the construction of roofs and floors. A further object is to provide a cheap and easily applied way of uniting the reinforcement of adjacent slabs to form an efficient continuous reinforcement. A still further object is to provide a construction of slab for the purpose stated which insures that the metal reinforcement will be located in the tension zone of the slab, but which nevertheless affords complete protection for the metal reinforcement and at the same time has marked heat insulating properties and thus prevents the ceiling from sweating.

In the accompanying drawings Fig. 1 is a plan view, partly broken away, showing the invention applied to a roof construction; Fig. 2 is a vertical sectional view taken on the line 2—2, Fig. 1; Fig. 3 is a vertical sectional view showing the ends of two of the slabs and one of the joints on an enlarged scale; and Fig. 4 is a perspective view illustrating the manner of connecting the reinforcement at the joint.

The drawings illustrate the invention applied to a roof construction, but it can be applied in an exactly similar way to a floor construction. In the drawings 1 represents the main beams of the structure, which in the case of a roof will be the purlins. These may be of any suitable type, either wood or metal, and are illustrated as metal channel beams.

2 indicates the cementitious slabs, which are shown of a length equal to the distance between adjacent purlins and are supported at their ends upon the purlins. These slabs are formed of three parts, to-wit, a lower portion 3 comprising the well known plaster or gypsum board, an upper or body portion 4 formed of a suitable cementitious material, and an embedded metal reinforcement 5. The body portion may be formed of any suitable cementitious material. Where great strength is required it may be formed of concrete of the usual mixture, but where less strength is permissible and lightness is desired, it will be formed of a gypsum mixture.

These slabs will be formed in suitable molds, in well known ways, with the metal reinforcement located in the lower part of the body portion and therefore in the tension zone of the slab, and the plaster or gypsum board bonded directly to the cementitious body. Because the cementitious mixture is applied in the wet state, it bonds firmly with the plaster or gypsum board and consequently the slab becomes substantially monolithic. It is desirable to have the metal reinforcement as far down in the cementitious body as possible, and by applying the plaster board to the lower face of the body, there is no danger of any part of the metal reinforcement being exposed on the lower face of the slab.

The metal reinforcement may be of any suitable kind, but for efficiency or cheapness of construction it is preferred to use an electrically welded mesh composed of longitudinal strand wires or rods 6 and transverse wires or rods 7, welded at their crossing points. This fabric will be placed in the slab in such position that one of the transverse wires or rods 7, such as that indicated as 7^a, will be located a predetermined short distance, say an inch, beyond one end of the slab. At the other end of the slab the reinforcement will be allowed to project a suitable distance, say two or three inches, but without taking into account the location of the transverse wires or rods at this projecting end. The slabs will be molded of a length corresponding to the distance between the centers of adjacent purlins. As this distance varies in different roofs and floors, the above method of placing the reinforcement is entirely independent of the length of the slabs. The result is that no matter what are the lengths of slabs, said slabs at one end will have the projecting reinforcement provided with a transverse wire or rod properly spaced from the end of said slab, and at the other end will have the longitudinal wires or rods of the reinforcement projecting a suitable distance. These slabs are placed with their ends resting on

the purlins, as shown in the drawings, and the projecting ends of the longitudinal wires or rods of one slab will be bent to engage against or around the transverse rod or wire of the reinforcement at the end of the adjacent slab, as shown at 8. In this way the longitudinal wires or rods of the reinforcements of adjacent slabs are formed into substantially continuous reinforcing members,—and this is accomplished in a cheap and efficient manner, in exactly the same way no matter what the lengths of the slabs may be. After the slabs are put in place, the joint between adjacent ends is filled with grouting, in the usual way, as shown at 9, thus completely embedding the joint and holding the interlocking ends of the reinforcement in place. The top surface may, when desired, be provided with a waterproofing coating in the usual way.

The slabs, as stated, can be formed in this way of any desired length, and as they are not supported at their edges they may be formed of any desired width. Generally speaking, the slabs will be cast of a size and weight to permit of their ready handling, and consequently when the slabs are short they may be of considerable width, but when they are very long they will preferably be of narrower width. This form of slab is therefore flexible and readily adapts the construction to any spacing whatsoever between the purlins or supporting beams.

The plaster boards not only form a finish for the lower surface of the slabs, but also have high heat insulating properties and therefore prevent the ceilings formed by slabs faced with them, from sweating. Also by using such plaster boards the metal reinforcement can be embedded in the slab well down in the tension zone of the body, the plaster board firmly bonded to the body, insuring concealment of the metal reinforcement and its absolute protection from the atmosphere.

The construction described is cheap, does not require rafters or similar smaller roof or floor members, but can be supported directly upon the purlins or main floor beams; is flexible and thus adapted to any spacing of purlins or floor beams, gives a strong roof or floor with substantially continuous reinforcement from end to end; possesses good heat insulating qualities; absolutely protects the reinforcement from the atmosphere and at the same time insures that said reinforcement is located in the tension zone of the slab; and withal is cheap not only as to the materials used and method of forming the slabs themselves, but also as to the manner of erecting or placing them in position.

While I prefer to use plaster or gypsum board to form the lower face of the slabs, the same results can be secured by first pouring into the molds a thin layer of gypsum or similar composition, and then applying the metal reinforcement and cementitious body.

I claim:

1. A slab for roof or floor constructions comprising a lower layer of plaster or gypsum, a body of strong cementitious material molded directly to said gypsum layer, and metal reinforcement embedded in the tension zone of said body.

2. A slab for roof or floor constructions comprising a plaster or gypsum board forming its lower face, and a body of cementitious material molded thereto and integral therewith.

3. A slab for roof or floor constructions comprising a plaster or gypsum board forming its lower face, a body of cementitious material molded thereto and integral therewith, and metal reinforcement embedded in said body adjacent to the plaster board.

4. A slab for roof or floor constructions comprising a body of cementitious material, and a metal reinforcing fabric embedded therein and comprising a fabric having longitudinal members and transverse members rigidly united at their crossing points, and so located that at one end of the slab a transverse member is outside of and spaced from the end of the slab and at the other end the longitudinal members project beyond the end of the slab.

5. A slab for roof or floor constructions comprising a plaster or gypsum board forming its lower face, a body of cementitious material molded thereto and integral therewith, and a metal reinforcing fabric embedded therein and comprising a fabric having longitudinal members and transverse members rigidly united at their crossing points, and so located that at one end of the slab a transverse member is outside of and spaced from the end of the slab and at the other end the longitudinal members project beyond the end of the slab.

6. A roof or floor construction comprising supporting beams, cementitious slabs supported at their ends on said beams, a metal reinforcement embedded in said slabs and comprising a fabric having longitudinal members and transverse members rigidly united at their crossing points and so located that at one end of each slab a transverse member is outside of and spaced from the end of the slab and at the opposite end of each slab the longitudinal members project beyond the end of the slab, said projecting ends of the longitudinal members being bent to interlock with the transverse member at the end of the adjacent slab, and grouting filling the spaces between the ends of the slabs.

In testimony whereof, I sign my name.

HERBERT E. MARKS.

Witness:

EDWIN O. JOHNS.