June 21, 1932. F. M. VENZIE 1,863,734

BUILDING STRUCTURE

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Fig. 1.

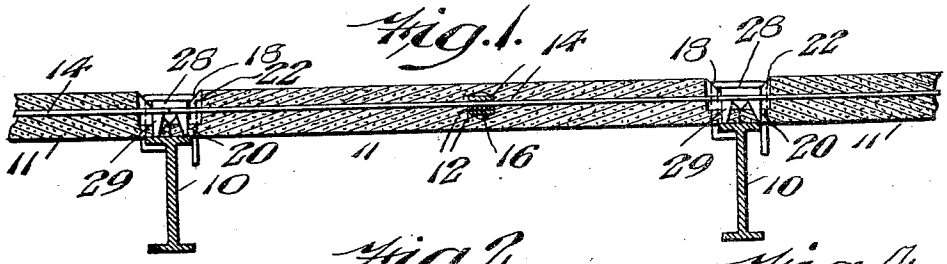


Fig. 2.

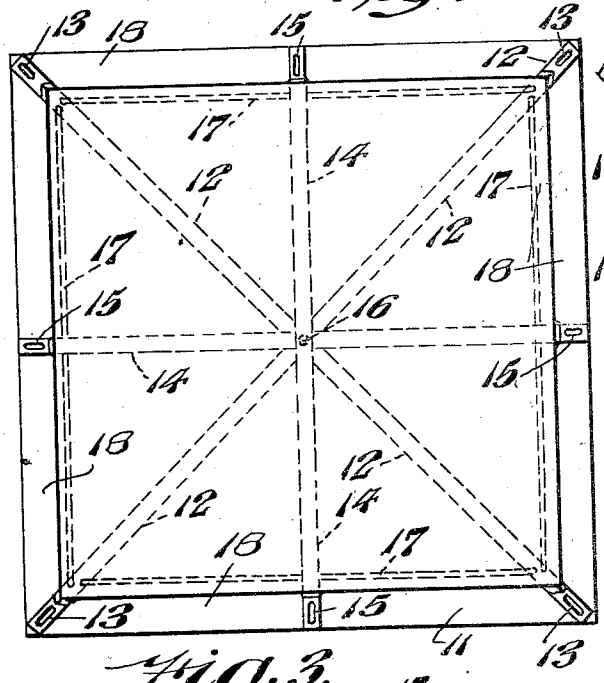


Fig. 4.

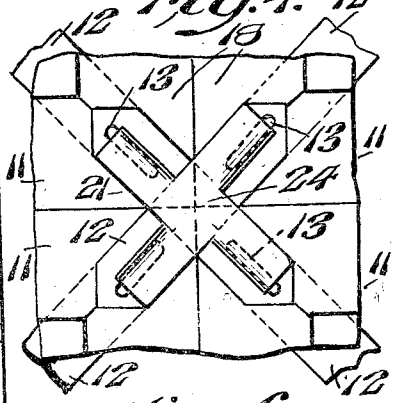


Fig. 6.

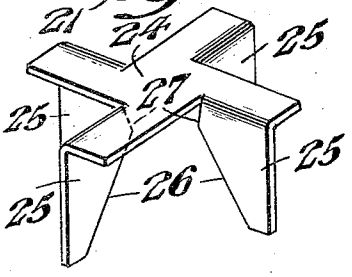


Fig. 3.

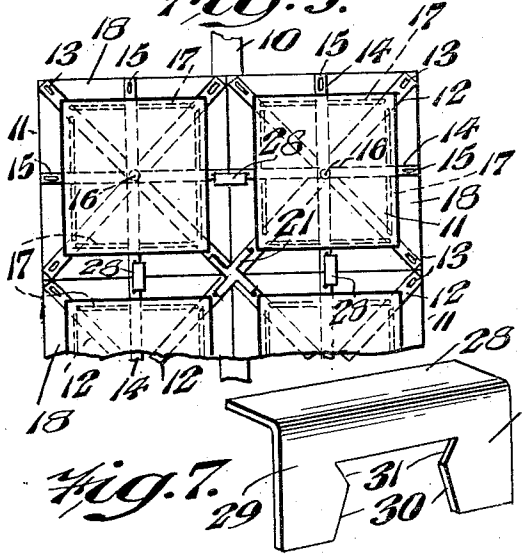


Fig. 5.

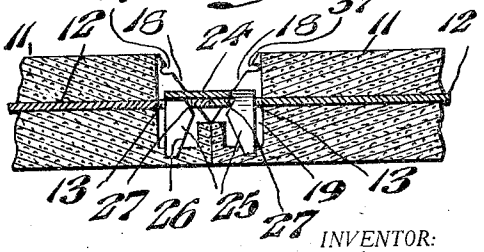


Fig. 7.

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Fig. 8.

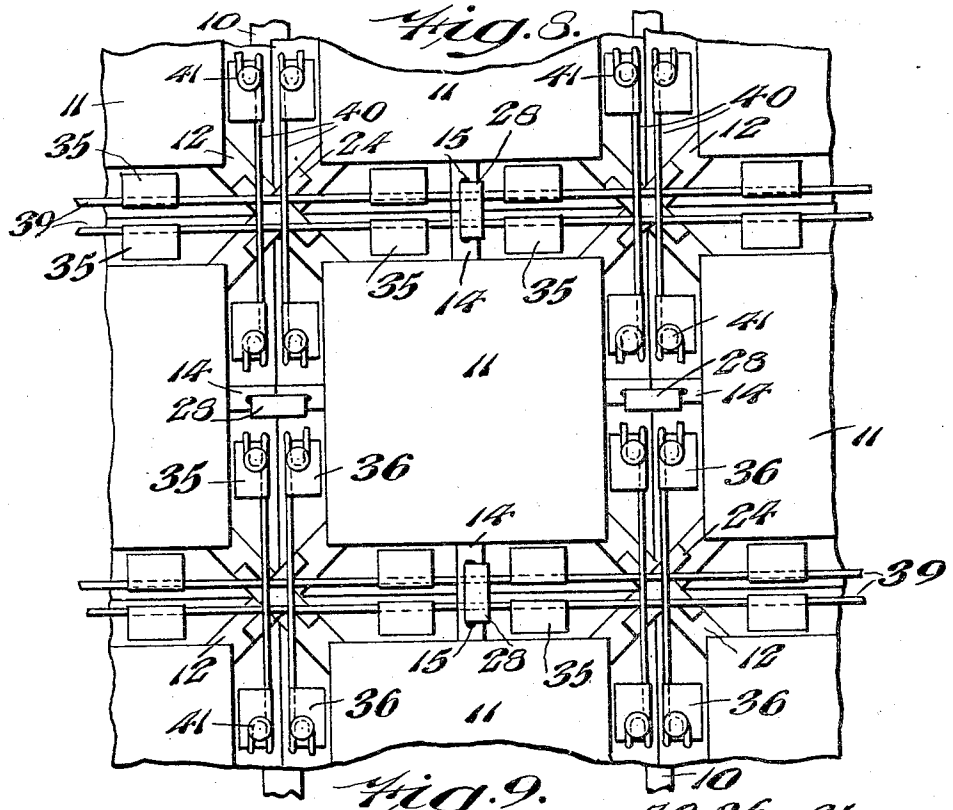


Fig. 9.

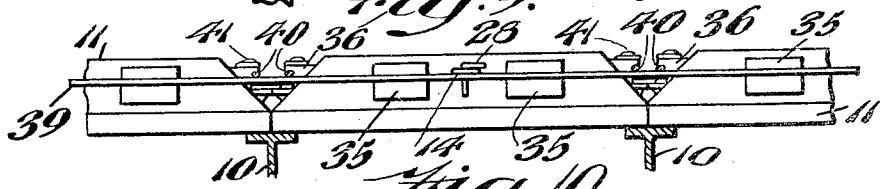


Fig. 10.

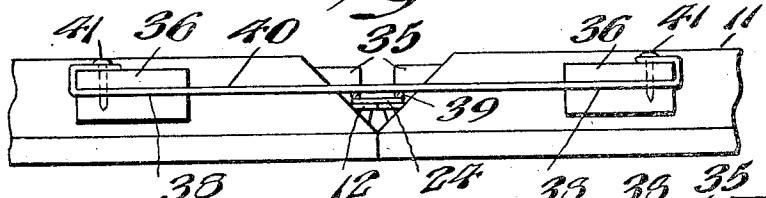


Fig. 12.

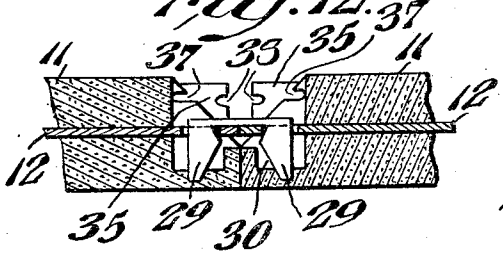
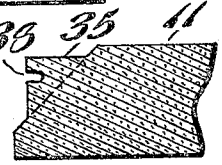


Fig. 11.



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Patented June 21, 1932

1,863,734

UNITED STATES PATENT OFFICE

FREDERICK M. VENZIE, OF PHILADELPHIA, PENNSYLVANIA

BUILDING STRUCTURE

Application filed April 14, 1931. Serial No. 529,916.

This invention, generally stated, relates to a building structure and has more especial relation to a floor construction.

One object of the present invention is to provide a floor construction in which pre-cast slabs of cementitious material may be manufactured at a central plant and shipped to point of erection, whereby unskilled labor may assemble the slabs expeditiously to thus lessen the erection costs of a building structure.

Another object of the present invention is to provide a novel form of floor slab in which it is necessary in erection or placing of floor slabs to have the floor members accurately spaced.

A further object of the present invention is to provide a floor construction in which substantially square floor slabs are reinforced both laterally and longitudinally considered throughout the length and breadth of a building structure.

A still further object of the present invention is to provide a pre-cast slab which has embedded therein a reinforcement symbolic of the spoke of a wheel.

A still further object of the present invention is to provide a floor construction made up of pre-cast square slabs which may be so arranged as to accept novel forms of metal clips for tying or coupling together adjacent corners of said slabs.

A still further object of the present invention is to provide a novel form of metal clip stamped from a single blank and having lugs or fingers extended therefrom to engage recessed portions of floor slabs including their reinforcements to interlock the slabs.

Other and further objects of the present invention reside in the provision of general details of construction and in the arrangement, combination, and connection of parts for attaining the results sought by the foregoing objects.

The invention consists of the novel construction hereinafter described and finally claimed.

The nature, characteristic features, and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, and in which:

Fig. 1 is a view principally in section of an arrangement of floor slabs embodying the invention;

Fig. 2 is a view in plan of one of the floor slabs detached;

Fig. 3 is a view in plan illustrating the manner of tying or coupling together a group or series of floor slabs embodying the invention;

Fig. 4 is a fragmentary view in plan illustrating floor slabs as coupled together at their meeting corners by means of my novel metal clip;

Fig. 5 is an edge view of a portion of slab showing in detail the clip accommodating recess;

Fig. 6 is a view in perspective of the corner clip shown in Fig. 4;

Fig. 7 is a similar view of a novel form of clip for coupling together adjacent sides of floor slabs;

Fig. 8 is a view in plan illustrating a modified form of the invention shown in Fig. 3, omitting, however, the dotted lines showing the spoke-like arrangement of reinforcement;

Fig. 9 is an edge view of Fig. 8;

Fig. 10 is a similar view, viewed from the left hand side of Fig. 8;

Fig. 11 is a fragmentary view in section illustrating a detail of construction; and

Fig. 12 is a similar view illustrating still further details of construction.

For the purpose of illustrating my invention I have shown in the accompanying drawings forms thereof which are at present preferred by me, since the same have been found in practice to give satisfactory and reliable

results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

Referring to the drawings in detail, and with particular reference to Figs. 1 to 7, the reference numeral 10 designates spaced floor members, as I-beams, which according to the present invention are accurately spaced. The reference numeral 11 designates pre-cast floor slabs of cementitious material of rectangular configuration and in practice are square, as illustrated. In molding or casting the floor slabs 11 I embed therein a reinforcement which is of the general configuration of spokes of a wheel. Extending from opposite corners of a slab and crossing one another diagonally at the slab center are flat strips 12 of thin metal. At each corner of a slab these strips 12 are slotted as at 13 and in secured position the strips 12 form a substantially X-shaped arrangement of parts. Embedded in each slab are other metal strips designated 14 which are diametrically arranged with respect to a slab to form a cross-shaped arrangement of parts. In practice the strips 14 are arranged in a plane above the diagonal strips 12, and extend from side to side of a slab. These strips 12 also are slotted at their extremities as at 15. The strips 12 and 14 intersect each other at the slab center and are secured together by means of a rivet 16, thus forming a structure of the general configuration of spokes of a wheel to reinforce a slab in all directions. Embedded in a slab and connecting the outer ends of strips 12 are wires 17, which wires pass beneath the outer ends of strips 14, thus making for an interconnected or interlaced arrangement of parts best seen in Fig. 2. The slabs are bevelled as at 16, see Fig. 5, and the bevelled surface at each corner of a slab is provided with a cut-away vertical portion 19 into which project the slotted ends of the diagonal strips 12. Each cut-away portion 19 has at its bottom a somewhat tapered recess 20 to accept the tapered prong of a corner clip 21, best seen in Fig. 6, and to be presently described in detail. Intermediate the corner cut-away portions 19 are other cut-away portions 22 into which project the slotted ends of the strips 14, whereby adjacent slabs may be coupled or tied together by means of clips 23, best seen in Fig. 7, and which will be presently described in detail. In assembling the floor slabs the same are positioned upon the floor beams 10 with their bevelled edges uppermost, as best seen in Fig. 1. In this position the meeting corners of the slabs are so arranged that the cut-away portions 19 of the respective slabs form a substantially X-shaped configuration, as best seen in Fig. 4. I then tie or couple together the diagonal strips 12 by means of corner clips stamped from a single blank of metal, and comprised of a flat, horizontal plate 24, depending from which are prongs or fingers 25, four in number, arranged diametrically opposite one another and each having a bevelled edge 26 and an undercut edge 27. In practice the prongs or fingers 25 engage the recesses 20 of the openings 18 of a slab and the bevelled and undercut edges of a finger serve to provide a wedge-like portion for efficient engagement with a recessed corner part of a slab, it being understood that the fingers of the clip pass through the slots of the strips 12. In order to tie or couple together the sides of adjacent slabs I make use of the clip shown in Fig. 7, which comprises an integral, stamped metal member having a right-angle upper portion 28 having pendant fingers 29, the inner edges of each finger being bevelled at 30 and undercut at 31. The fingers 29 are introduced through the slotted portions 15 of the bars 14 of the slabs and co-act with said bars in wedge-like fashion to form an efficient interlock.

From the above description it is apparent that efficiently reinforced square floor slabs may be tied or coupled together both longitudinally and laterally of a building structure to interlock the slabs in such manner that even though the floor beams are equally spaced to permit adjacent edges of companion floor slabs to rest upon the floor beams. the efficient interlock of slabs overcomes this defect.

After the slabs are positioned upon the floor beams 10 the space between adjacent slabs is filled in with cementitious material and in the connection it is to be noted that the side walls of the slabs are grooved upon all sides so that when the cementitious material is filled in a key is provided between adjacent slabs so that the cementitious material cannot be dislodged.

Referring now to the modified form of construction seen in Figs. 8 to 12 inclusive, the principle is the same as that previously described, and in the main the construction of parts is similar in most respects. In Fig. 8 I have omitted showing in dotted lines the embedded metal strips 12 and 14, but the construction is similar in all respects to that disclosed in Fig. 2. In Fig. 8 the floor slabs 11 are provided with spaced projections 35 and 36, which are formed integrally with the slabs, as best seen in Fig. 11. The projections 35 and 36 are notched as at 37 in opposed relation so that when cementitious material is poured between adjacent slabs the cementitious material enters the notches to form a bond between adjacent slabs. These notches are arranged in the bevelled faces of the slabs. The projections 35 upon their perpendicular faces are also notched at 38, see Figs. 11 and 12, for the accommodation of wires 39 which

are arranged at right angles with respect to the beams 10, see Figs. 8 and 9. These wires 39 in practice are secured to one side wall of a building and stretched taut to engage the opposite side of a building. These wires 39 tie together adjacent slabs. The perpendicular faces of the projections 36 of slabs 11 are also notched to accommodate parallel wires 40, which wires parallel the beams 10. These wires 40 instead of extending entirely across a building structure are relatively short and are secured to the projections 36 by means of nails 41 or equivalent fastening mediums, see Fig. 10. These wires 40 pass over the wires 39, as clearly shown in Fig. 8, and serve to effectively tie together adjacent slabs 11 considered transversely of a building in contradistinction to longitudinally of a building.

It is to be understood that the cancellation or amendment of any claim to change the phraseology more clearly to define the construction or to meet the views of the Examiner is not to be construed as a waiver of any rights which applicant may hereafter desire to assert in case of any future litigation on the patent eventuating out of this application.

What is claimed is:

1. In a floor structure of the character stated, floor members, substantially square, pre-cast floor slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said floor slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said grooves, and metal clips for coupling said floor slabs together, each clip comprising a flat plate having extended therefrom at right angles pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, and means for securing said radially arranged strips at their central intersections.

2. In a floor structure of the character stated, floor members, substantially square pre-cast floor slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said floor slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, metal strips embedded in each slab, said strips having slotted ends projected into said grooves, and metal clips for coupling said floor slabs together, each clip comprising a flat plate having extended therefrom at right angles pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, and tie wires embedded in said slab connecting the slotted ends of said strips together.

3. In a floor construction of the character stated, floor members, substantially square pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said floor slabs being bevelled and having vertical grooves therein at each corner and also intermediate said corner grooves, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said vertical grooves, metal clips connecting adjacent slabs at each corner through said slotted strips, and other metal clips connecting the slotted ends of said strips through said intermediate grooves.

4. In a floor construction of the character stated, floor members, substantially square pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said floor slabs being bevelled and having vertical grooves therein at each corner and also intermediate said corner grooves, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said vertical grooves, metal clips connecting adjacent slabs at each corner through said slotted strips, other metal clips connecting the slotted ends of said strips through said intermediate grooves, and a rivet connecting said radially arranged strips at their central intersection.

5. In a floor construction of the character stated, floor members, substantially square pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said floor slabs being bevelled and having vertical grooves therein at each corner and also intermediate said corner grooves, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said vertical grooves, metal clips connecting adjacent slabs at each corner through said slotted strips, other metal clips connecting the slotted ends of said strips through said intermediate grooves, a rivet connecting said radially arranged strips at their central intersection, and tie wires connecting the slotted ends of said strips.

6. In a floor structure of the character stated, floor members, substantially square, pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, metal strips embedded in each slab, metal clips for coupling said slabs together through the medium of said strips, projections upon the sides of said slabs, and wires extending both laterally and longitudinally of said slabs connecting with said projections for tying said slabs together.

7. In a floor structure of the character stated, floor members, substantially square, pre-cast slabs of cementitious material ar-

ranged upon said floor members side to side in abutting relation, the sides of said slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, metal strips embedded in each slab, said strips having slotted ends projected into said grooves, metal clips for coupling said slabs together, each clip comprising a flat plate having extended therefrom at right angles pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, and wires extended both laterally and longitudinally of said slabs for tying same together.

8. In a structure of the character stated, floor members, substantially square, pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said grooves, metal clips for coupling said slabs together, each clip comprising a flat plate having extended therefrom at right angles pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, and wires arranged both laterally and longitudinally of said slabs for tying the same together, said wires being arranged in different planes with one set crossing over another set.

9. In a structure of the character stated, floor members, substantially square, pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, radially arranged metal strips embedded in each slab, said strips having slotted ends projected into said grooves, metal clips for coupling said slabs together, each clip comprising a flat plate having extended therefrom at right angles pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, grooved projections upon the slab sides, and wires arranged at right angles to one another for tying said slabs together, said wires being accommodated in the grooves of said projections.

10. In a structure of the character stated, floor members, substantially square pre-cast slabs of cementitious material arranged upon said floor members side to side in abutting relation, the sides of said slabs having vertical grooves therein at each corner thereof and upon their sides intermediate said corners, metal strips embedded in each slab, said strips having slotted ends projected into said grooves, metal clips for coupling said slabs together, each clip comprising a flat plate having extended therefrom at right angles thereto pendant fingers for engaging the slotted ends of said strips as projected into the grooves of said slabs, projections upon the sides of said slabs, wires connecting with said projections to tie said slabs together both laterally and longitudinally considered, and means for attaching the ends of certain of said wires to certain of said projections.

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