Sept. 17, 1935. A. A. HEEREN ET AL 2,014,841

FLOOR AND ROOF CONSTRUCTION

Filed July 25, 1932

Fig. 1

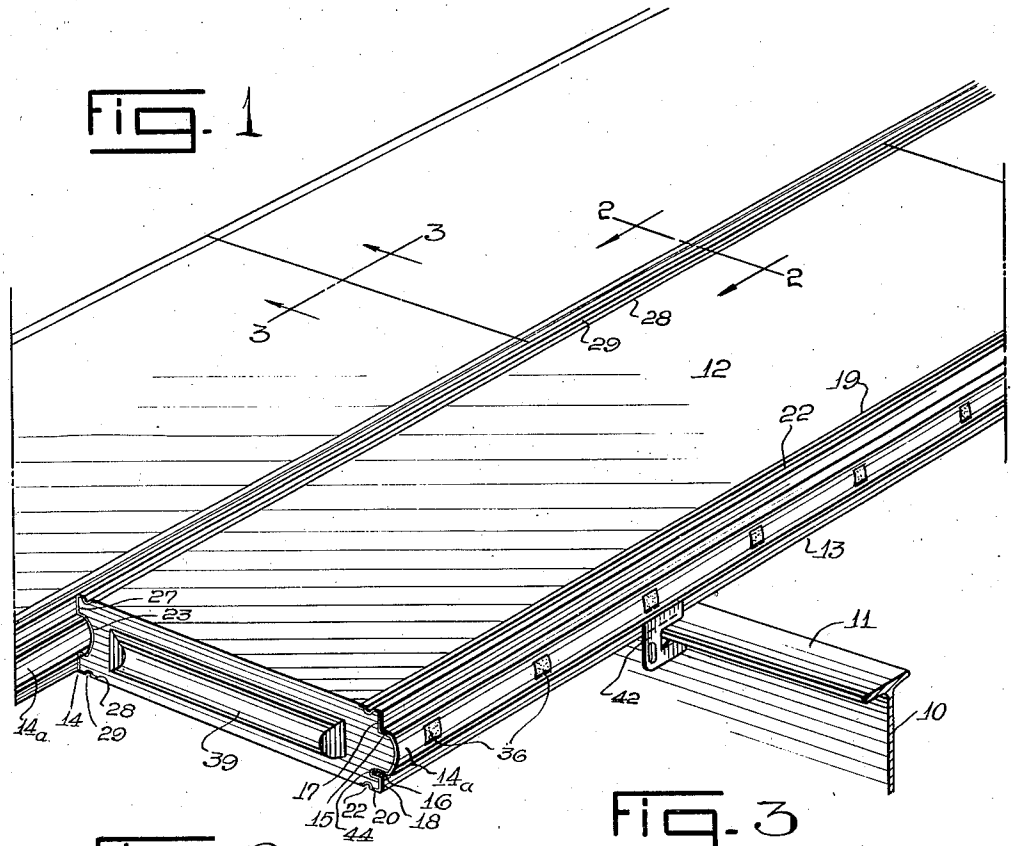



Fig. 2

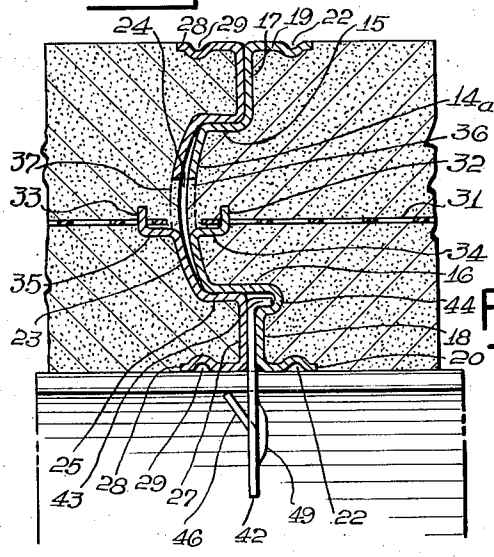



Fig. 3

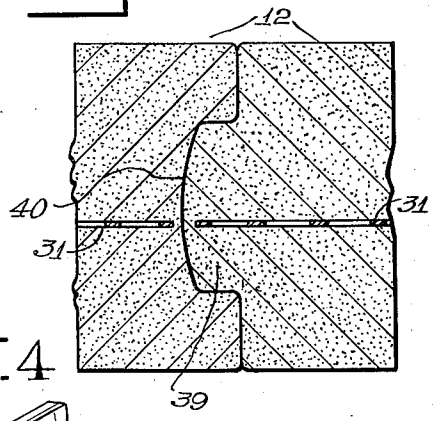
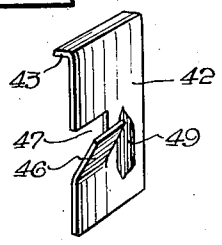



Fig. 4

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2,014,841

## FLOOR AND ROOF CONSTRUCTION

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9 Claims. (Cl. 72—68)

This invention relates to building constructions, and has reference more particularly to floor and roof constructions in which precast cementitious slabs of considerable length are supported upon steel beams.

In the erection of the floors and roofs of buildings, it is desirable to have spaced, parallel steel beams which are arranged to support long, precast slabs of cementitious material, such as gypsum, concrete, etc. With materials such as gypsum which are rather fragile, it is desirable to have the edges of the precast slab protected by metal so that the slabs can be shipped without chipping or damaging the material composing the slab. Longitudinal runners embedded in the edges of the slab also serve materially to increase the longitudinal strength of the slab. With slab constructions heretofore opposed, some difficulty has been experienced in properly anchoring the longitudinal metal runners to the slab so as to prevent the runners from breaking loose from the slab. It is desirable that the slabs be interlocking and be provided with tongues and grooves along the edges thereof so as to interlock and form a rigid floor or roof surface. Some difficulty has been experienced in designing a slab which can be anchored to the supporting beams rapidly and with a low expenditure for labor and erection.

An object of this invention therefore is to provide an elongated precast cementitious slab having metal protected edges to protect the edges of the tile from fracture during handling.

Another object of the invention is to provide a slab of the class described in which the metal runners forming the edges are securely anchored to the body of the slab to prevent the runners from being broken away from the slab during handling.

A further object of the invention is to provide a cementitious slab with metal runners protecting the edges, said runners being so constructed as to add materially to the longitudinal strength of the slab.

A further object of the invention is to provide a slab in which the various reinforcing elements of the slab are tied together in such a way as to produce a slab which is practically shatter proof.

A further object of the invention is to provide a tongue and groove metal edge slab in which the tongue and groove is so arranged as to avoid the formation of thin sections.

A still further object of the invention is to provide a floor and roof construction of the class described in which anchoring means is provided to connect the slabs to the supporting beams by clips which lend themselves readily to fast erection with low cost of labor in erection; also to improve building constructions in other respects hereinafter specified and claimed.

Reference is to be had to the accompanying drawing forming a part of this specification, in which

Fig. 1 is a perspective view of my improved floor or roof construction,

Fig. 2 is a sectional elevation through the construction taken on line 2—2 of Fig. 1,

Fig. 3 is a sectional elevatibn through the construction taken through the transverse edges of the slab on line 3—3 of Fig. 1, and

Fig. 4 is a perspective view of one of the attaching clips used for connecting the slabs to the supporting beams.

In constructing our improved floor or roof, the beams 10 are positioned in spaced, parallel relation with the ends thereof, supported upon the framework of the building. These beams may be in the form of I-beams, channels, or other steel structural members having upper flanges 11. An elongated flat slab 12 is molded of gypsum, concrete, or other desired cementitious material by the use of a mold of suitable shape. In the molding operation, a male tongued edge runner 13 is placed in one side of the mold, and a female grooved edge runner 14 is placed along the other longitudinal edge of the mold. The runner 13 is provided with a tongue section 14a which is arcuate in shape and said runner also has parallel shoulders 15 and 16 which extend parallel to the faces of the slab 12. Integral shoulders 17 and 18 are formed on the shoulders 15 and 16 respectively, the shoulders 17 and 18 extending at right angles to the faces of the slabs. The shoulder 17 terminates in a longitudinally extending flange 19, and the shoulder 18 terminates in a longitudinally extending flange 20. Longitudinal beads 22 are formed in the flanges 19 and 20 for the purpose of stiffening the same and also for the purpose of anchoring said flanges and the runner 13 to the molded slab 12.

The runner 14 is provided with an arcuate-shaped groove 23 which has a slightly smaller radius than the tongue 14a, so that a space 24 is provided for a purpose to be hereinafter described. The runner 14 is provided with parallel shoulders 25 which telescope over the shoulders 15 and 16, and integral shoulders 27 are formed on the shoulders 25, the shoulders 27 terminating in flanges 28 which extend parallel to and in the plane of the surfaces of the slab 12. The flanges

28 are also provided with stiffening and anchoring beads 29 similar to the beads 22.

The two runners 13 and 14 are placed in the correspondingly shaped edges of the mold for forming the slab. The two runners are connected in the mold by engaging the edges of a reinforcing mat 31 of expanded metal or other desired material, over the upstanding ends 32 and 33 of struck-out integral hooks 34 and 35 respectively, which are formed out of the metal of the tongue and groove sections 14a and 23. The hooks 34 and 35 are spaced at frequent intervals along the runners 13 and 14 so that they are embedded in the cementitious material forming the slab 12 during the molding operation and serve to cooperate with the expanded metal mats 31 in securely anchoring the runners to the slab, and also in securely anchoring the runners one to the other. The mold is so shaped as to lie flush against the tongue and groove sections 14a and 23, so that the openings 36 and 37 left in the tongue and groove sections 14a and 23 respectively are filled with the cementitious material. If any of the cementitious material extends out beyond the tongue and groove sections 14a and 23, the clearance space 24 is provided for the reception of said cementitious material, thus insuring that the runner shoulders 17 and 27 will lie in closely abutting relation and give a perfectly tight joint on the upper surface of the slab. Cooperating tongues 38 and grooves 40 are formed on opposite ends of each tile from the cementitious material so as to hold the tile in alignment at their ends when supported upon the beams 10. If desired, the ends of the tile or slabs may also be armored with runners similar to the runners 13 and 14.

In order to anchor the slabs 12 to the beams 10, clips 42 are provided, each of said clips having an outstanding angular flange 43 at its upper end for engaging in a groove 44 which is formed in the metal of runner 13 between shoulders 16 and 18. The body of the clip 42 is provided with a struck-out, angularly positioned lug 46 which forms a slot 47 for receiving one of the beam flanges 11. The lug 46 has a wedging action against the bottom of the flange 11 so as to hold the clip 42 in position with the flange 43 engaging the groove 44 during the time from the placing of one slab until the next adjoining slab is moved into interlocking position with the clip 42 firmly held between shoulders 18 and 27. A stiffening bead 49 may be formed in the body of the clip 42 adjacent the slot 47 for the purpose of stiffening said clip and prevent it from bending adjacent the lug 46 during erection. It will be noted that the widths of shoulders 15 and 16 are slightly different to the extent of the thickness of the metal forming the clip 42 so that the shoulders 17 and 27 on the top surface of the slab are in closely abutting relation, while the shoulders 18 and 27 at the bottom of the slab are spaced apart a distance equal to the thickness of the clip 42.

It will be noted that the width of the tongue members between shoulders 15 and 16 is comparatively large relative to the total thickness of the slab, so that great strength is provided by the interlocking runners owing to the large amount of cementitious material filling the tongue section. It will also be noted that owing to the comparatively narrow width of the flanges 19, 20 and 28, no extremely thin sections are produced in the slab which might be ruptured during handling or erection.

We would state in conclusion that while the illustrated example constitutes a practical embodiment of our invention, we do not wish to limit ourselves precisely to these details, since manifestly, the same may be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:—

1. In a building unit, an elongated, cementitious slab, tongue and groove metal runners extending along opposite longitudinal edges of said slab, a plurality of hooks formed on the inside of each runner, and a reinforcing metal mat connecting the hooks of the two runners so that the material of said slab embeds said hooks and mat.

2. In a building unit, an elongated cementitious slab, metal tongue and groove edge runners encasing opposite edges of said slab, flanges formed on said runners in the planes of the surfaces of said slab, and reinforcing beads formed in said flanges for anchoring said runners to said slab.

3. In a building unit, an elongated cementitious slab, tongue and groove metal edge runners provided on opposite edges of said slab, one of said edge runners being provided with a rolled groove, said groove being adapted to receive an outstanding flange formed on a metallic, beam attaching clip.

4. In a building construction, a plurality of beams in spaced, parallel relation, elongated slabs of cementitious material supported by said beams, metallic edge runners formed on opposite edges of said slabs, one of said edge runners being provided with a groove, a clip having an outstanding flange engaging in said groove between adjacent slabs, and attaching means formed on said clip for attaching said clip to a beam.

5. In a building construction, a plurality of beams in spaced, parallel relation, a plurality of elongated flat slabs supported by said beams, metallic edge runners encasing opposite edges of each slab, struck-out hooks formed on said runners and embedded in the body of said slab, a reinforcing mat extending in the body of each slab and connecting said hooks, one of said edge runners having a longitudinally extending groove, a clip extending between edge runners of adjacent slabs, and a flange formed on said clip and engaging in said groove so as to connect said slab to said beam.

6. In a building slab, an elongated, flattened slab of cementitious material, edge runners encasing opposite edges of said slab, the runners being tongued and grooved, forming parallel telescoping shoulders thereon extending parallel to the bases of said slab, and flanges formed on said runners in the plane of the surfaces of said slab.

7. In a building construction, a plurality of beams in spaced, parallel relation, said beams having oppositely extending, upper flanges, elongated slabs of cementitious material supported by said beams, metallic edge runners encasing opposite edges of said slabs and having interlocking tongues and grooves, a longitudinally extending anchoring groove formed in one of said runners, a clip having a flange extending into said anchoring groove, said clip being provided with a slot for the reception of a flange of said beam, and a struck-out, angularly positioned lug formed on said clip, for engaging the lower face of said beam flange.

8. In a building unit, an elongated, cementitious slab, tongue and groove metal edge runners

provided on opposite edges of said slab, integral hooks struck-out from said runners and embedded in the slab, and reinforcing members connecting the hooks of the two runners to securely anchor said runners to the slab.

9. In a building unit, an elongated, cementitious slab, tongue and groove metal runners extending along opposite, longitudinal edges of said slab, a plurality of integral attaching members formed on the inside web of each runner, and reinforcing ties connecting the attaching members of the two runners.

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