

Oct. 26, 1943.

R. FELLOM
BUILDING CONSTRUCTION
Filed April 14, 1941

2,332,706

2 Sheets-Sheet 1

FIG. 1-

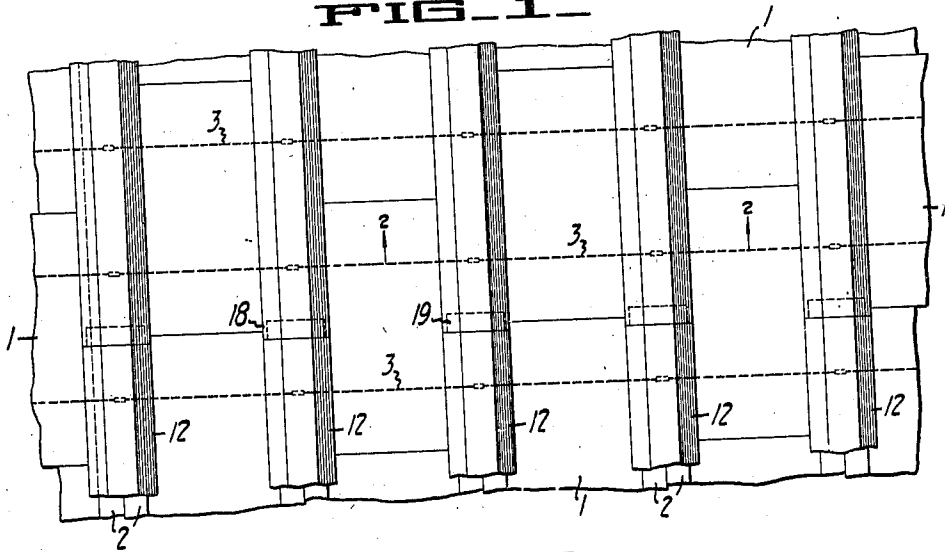


FIG. 2-

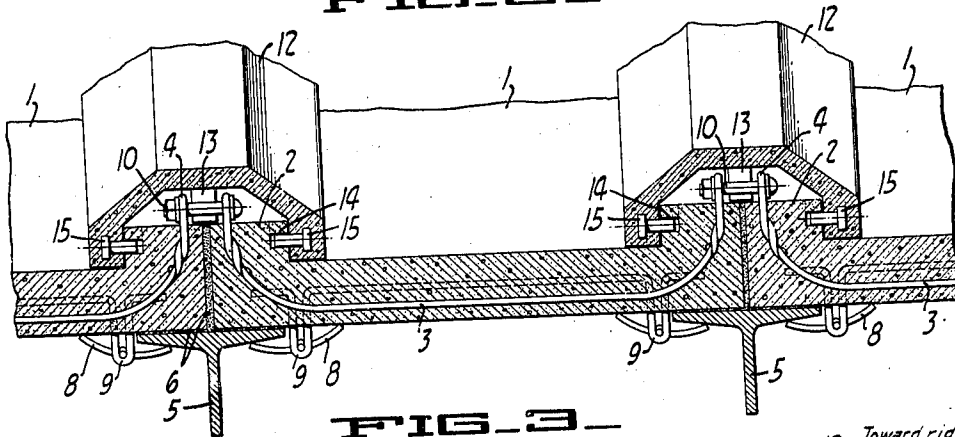
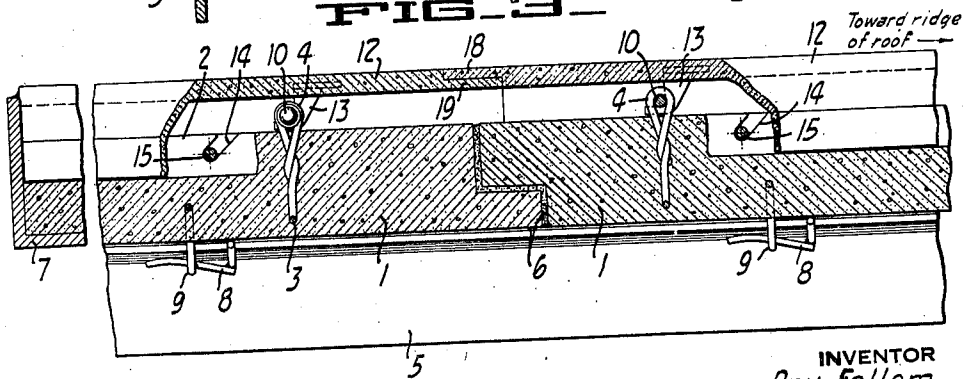


FIG. 3-



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FIG. 4-

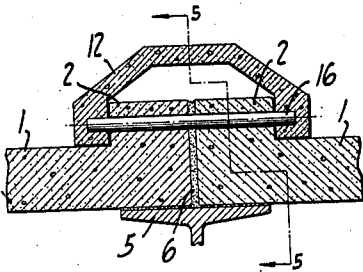


FIG. 5-

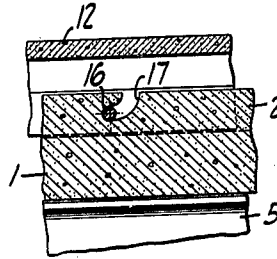


FIG. 6-

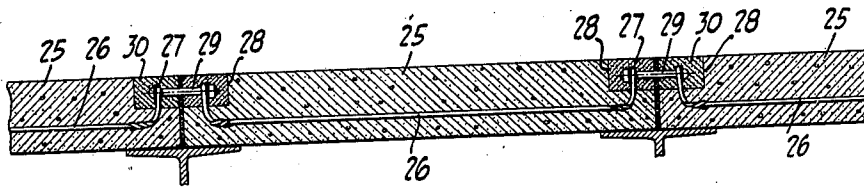


FIG. 7-

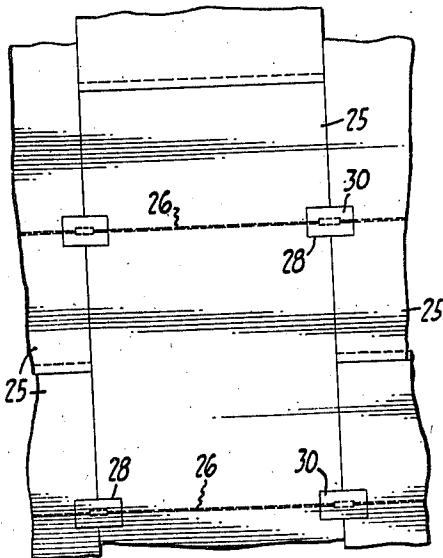


FIG. 8-

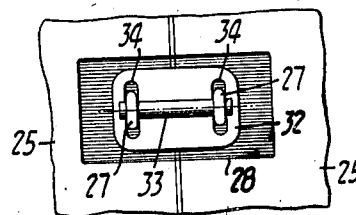
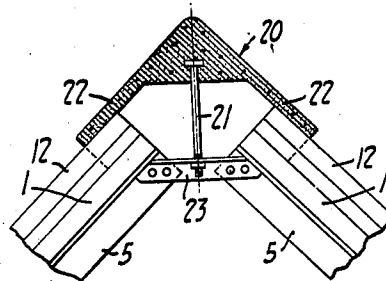


FIG. 9-



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2,332,706

BUILDING CONSTRUCTION

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Application April 14, 1941, Serial No. 383,421

9 Claims. (Cl. 108—1)

This invention relates to building construction generally, and more specifically to roof, floor and wall construction.

One of the objects of the invention is an improved roof construction providing a roof structure that is made up of slabs of preformed material, such as concrete, cement, tile, or composition material, in which the roof is easily and quickly laid, and is waterproof, strong, and relatively economical, and which structure in general, is also adapted for forming the floors and side walls of a building.

Another object is a roof, wall or floor construction providing a roof, wall or floor made up of slabs and waterproofing strips that are firmly, but removably united together to form a substantially unitary roof, floor, or wall, covering independently of the rafters, beams, joists or studding which supports such covering, but which construction includes means for removably clamping such slabs to rafters, beams, joists or studding of standard structural steel such as T-iron strips or the like.

Other objects and advantages will appear in the following specification and in the drawings annexed hereto.

In the drawings, Fig. 1 is a fragmentary plan view of a portion of a roof or wall showing my invention.

Fig. 2 is an enlarged perspective view, partly in section, showing the invention.

Fig. 3 is an enlarged part sectional, part elevational view of a joint between sealing strips and between slabs.

Fig. 4 is a modified form of the invention.

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4.

Fig. 6 is another form of the invention, being a sectional view through a floor.

Fig. 7 is a fragmentary plan view of a floor that uses the structure shown in Fig. 6.

Fig. 8 is a modified form of locking means adapted to connect the reinforcing elements of adjacent slabs.

Fig. 9 is a fragmentary sectional view through a roof at the ridge showing the ridge cap in place.

In detail, the slabs 1, are each substantially rectangular in shape, and may be formed of concrete or other material suitable for molding or casting to shape, such as tile, etc. Each slab is formed with a flange 2 along two opposite edges, which flanges terminate at the other two opposite edges of the slab.

Embedded in each slab at the time of molding is a pair of reinforcing members 3, of any suitable material, such as relatively heavy wire. The members 3 are parallel and extend across the slab transversely of the flanges, and project at their ends from the outer surfaces of the flanges in the form of eyes, or loops 4. These

flanges on each slab project from the same side of the slab. The openings of loops 4 are directed transversely of the flanges from which they project, and the portion of each member 3 connecting between the loops at its ends, may curve longitudinally thereof in the plane of the loop openings and in direction generally away from said loops, so as to form truss-like braces in each slab.

The two opposite edges of each slab that extend between the corresponding ends of flanges 2, may be rabbeted, as best indicated in Fig. 3 so as to form an overlap with the complementarily rabbeted edge of an adjacent slab. The grooves forming the rabbet joint are formed in the slabs when the latter are molded, and the opposite rabbeted edges of each slab are formed so that side along the rabbet at the lower edge of each succeeding slab on an inclined roof in direction toward the ridge overlies the corresponding side of the rabbet formed in the elevated edge of the slab below it, thus insuring proper drainage from the roof free from leakage past the joint (Fig. 2).

The rafters 5 in Fig. 2 are preferably T-iron members or strips, with the flanges facing toward the outer side of the building. These rafters are so spaced that the margins of the slabs along the sides thereof opposite the flanges will lie flat on the rafter flanges, and if desired, any suitable plastic, cement, or so called "mastic" 6, may be disposed between the said margins and flanges, as well as between the adjacent edges of adjacent slabs.

In laying a roof, any suitable means, such as a metal strap 7 (Fig. 3) may be welded to the lower ends of the rafters in longitudinal extension thereof, and the lower ends of such straps may be turned up as indicated, to engage the lower edges of adjacent pairs of slabs that form the lower row of slabs. The turned up ends of said straps are of a width to each engage two adjacent slabs at opposite sides of their adjacent edges.

In the lower row of slabs, alternate slabs are preferably half the length of the normal sized slabs in direction longitudinally of flanges 2, and the eyes or loops 4 in the normal sized slabs are positioned at points spaced from opposite ends of the flanges a distance about one quarter of the total length of each flange, while in the half-sized slabs of the lower row (and uppermost row at the ridge of the roof) the loops 4 are midway between the ends of flanges 2.

By the above arrangement it will be seen that the loops of each slab, in each vertical or inclined row, between the upper and lower slab of each row, will each register with a loop in different slabs in the row adjacent thereto. The lower pair of loops in each of the normal-sized lower slabs of each vertical or inclined row that

extends longitudinally of the rafters, will register with the loops in the half-length slabs adjacent thereto, and the upper pair of loops in the normal-sized slabs at the top of each row will likewise register with the loops in the half-length slabs adjacent thereto.

When the roof is laid, as above described, it will be seen that the registering loops projecting from adjacent flanges 2 are spaced apart and their openings are in horizontal alignment. In this position, the slabs may be tightly drawn against the flanges of the T-iron rafters by clips 8, such as are illustrated in my co-pending application Ser. No. 377,308 filed February 7, 1941. These clips are generally wedge-like, resilient members of T-shape, the arms of which engage the flange of the T-iron rafter and the side of the slab, while the leg of the clip extends through an eye 9 secured to slab. The outer end of said leg also engages the side of the slab engaged by one of the arms of said device, and said leg is supported in inclined position by said arms, so that upon movement of the device 8 longitudinally of said leg and the flange engaged by one of said arms, the slab will be drawn tightly against the flange of the rafter, but as the leg of the device is slightly resilient, the slabs will not be loosened upon expansion and contraction of the slab or by excessive vibration.

Before or after the clips 8 are in position, the adjacent loops of adjacent flanges are connected by any suitable means, such as bolts 10 that project through the openings of said adjacent loops. By tightening the nuts on said bolts, the slabs will be drawn toward each other and after all bolts are in position, it will be seen that the roof is substantially a unitary covering irrespective of the supporting rafters, since there is an indirect connection between all slabs on the roof at one side of the ridge thereof, both in the direction of incline of the roof and transversely thereof. The slabs of each vertical or inclined row are offset relative to the row adjacent thereto, but the adjacent flanges 2 of the adjacent inclined rows are in alignment and relatively close together.

I provide a special covering strip extending longitudinally of the adjacent flanges of each inclined row of slabs in the form of an inverted channel 12, preferably formed of concrete or of a molded material, the bottom of which extends across the adjacent flanges 2 of the slabs in adjacent inclined rows, and the sides of which channel extends over the oppositely, outwardly facing sides of said adjacent flanges, thus enclosing the said flanges. Within each channel I may provide a hook-like member 13, that is adapted to hook under each of the bolts 10 between adjacent loops, thus holding the channels against the slabs, and I may also form each of the flanges with an inclined recess 14 into which inwardly projecting elements 15 on the inner sides of the channel may slide. These recesses open outwardly of the outer edges of the flanges 2 and extend slantingly in direction toward the eaves of the roof, thus supporting the channels against separation from the flanges by gravity. The same holds true of the hook-like members 13, since these extend from the channels in direction generally toward the eaves. In some instances the members 15 and recesses 14 may be omitted, but when used these coact with the members 13 to secure the channels 12 in position.

Figs. 4, 5 show a modification of the members 13 and recesses 14 of the previously described figures. In Figs. 4, 5 there is a bar 16 secured at

its ends in the sides of channel 12, which bar extends across the channel and is adapted to fit in slots 17 that extend across the adjacent flanges and which open outwardly of said flanges.

Each strip 2 is formed to overlap adjacent strips at its ends that are in longitudinal extension thereof so as to drain water from the upper of such strips over the one adjacent thereto and below it, as best indicated in Fig. 3 in which the lip 18 at the lower end of the upper strip of each row thereof fits over the lip 19 at the upper end of the strip extending downwardly from such upper strip.

In my invention, the ridge cap for the roof, comprises an angle strip 20 of concrete or cementitious material, or any other suitable material. As shown in Fig. 9, said cap carries a bolt 21 projecting from between the legs 22 of the angle strip. These legs 22 overlap the upper margins of the slabs 1 and strips 12 at opposite sides of the ridge, and the upper ends of each pair of rafters 5 are joined by a short angle strip 23 through the horizontally disposed flange of which one of bolts 21 extends. By tightening nut 24 on each bolt below said flange, the cap 20 is drawn against the slabs and strips at opposite sides of the ridge of the roof.

It is pertinent to note that the space between the bottom of each channel 12 and the flanges 2 enclosed by said flanges, may be substantially filled with a plastic which fills the spaces between the adjacent flanges, so that a roof, when laid, is absolutely waterproof and will last for an indefinite number of years.

In Figs. 6, 7 I show a structure suitable for floors or for flat roofs, on which rectangular slabs 25 are provided without flanges, but still have the reinforcing members 26 thereon with loops 27 at their opposite ends. These loops are disposed in recesses 28 at the adjacent edges of pairs of slabs forming the floor, and bolts 29 connect the loops in the same manner as described for the roof or side wall structure, disclosed in Fig. 2. After the bolts are in place, the recesses are filled with a waterproofing plastic 30, or the like, which also covers the loops and bolts disposed in said recesses.

When the floor is fully laid, the floor presents a planar upper surface free from any projections such as the flanges and strips used in Figs. 1 to 3. The edges of slabs 25 that extend at right angles to the ones along which the recesses 28 are formed are rabbeted the same as shown in slabs 1 in Fig. 3, and the slabs 25 are secured to the floor joists 31 of T-iron by the same means employed in Figs. 2, 3.

In some instances, each bolt 29 may be substituted by a plate 32 (Fig. 8) and a pin 33. The plate 32 is formed with a slot 34 for each of the loops 27. The plate is inserted in the adjacent recesses 28 with the loops projecting through slots 34, after which the pin 29 is passed through the loop openings above said plate. The plastic material, or the like that thereafter fills the recesses, covers the plate, loops and pin, the same as it covers the loops and bolts shown in Fig. 6.

Having described my invention, I claim:

1. An inclined roof comprising inclined rafters provided at their lower ends with generally upwardly extending stop members; rectangular slabs in rows extending longitudinally of said rafters, each of said rows being also supported against said stop members against sliding downwardly on said rafters; means clamping each slab against adjacent rafters of said row of raft-

ers independently of the other slabs of said rows; and means removable from the slabs securing the slabs of each row to those of adjacent rows and to each other in each row independently of the rafters.

2. In roof, floor or wall construction; a plurality of pairs of parallel rows of rectangular slabs in which the slabs are in co-planar relation; reinforcing wires embedded in each of the slabs of said rows and projecting at their ends from said slabs; means removable from the projecting ends of said wires securing the projecting ends of the wires in the slabs of adjacent rows of slabs together; preformed strips extending over the connected ends of the wires in the slabs of said adjacent rows and over the adjacent marginal portions of the adjacent slabs of each adjacent pair of rows; separate means on said adjacent slabs and on the said strips removably interengaging with each other securing the said strips to said adjacent slabs and securing said slabs together.

3. A reinforced concrete slab roof for buildings comprising a plurality of horizontally extending rows of generally rectangular slabs of concrete; rafters supporting adjacent pairs of slabs of each row at their adjacent edges; flanges formed on adjacent pairs of slabs of each row extending along their adjacent edges and projecting upwardly from said slabs; slab reinforcing wires imbedded in each of said slabs extending thereacross and through said flanges and projecting at their opposite ends from said flanges; means securing together the adjacent ends of the wires projecting from the adjacent flanges of each adjacent pair of slabs in each of said rows; an inverted channel strip enclosing said adjacent flanges of said adjacent pairs of slabs and also enclosing the said adjacent ends of the wires projecting from said adjacent flanges; means on each of said strips and on the adjacent pair of flanges enclosed thereby respectively interengaging one with the other removably securing each strip to the pair of flanges enclosed thereby.

4. A reinforced concrete slab roof for buildings comprising a plurality of horizontally extending rows of generally rectangular slabs of concrete; rafters supporting adjacent pairs of slabs of each row at their adjacent edges; flanges formed on the adjacent pairs of slabs of each row extending along their adjacent edges and projecting upwardly from said slabs; slab reinforcing members imbedded in each of said slabs projecting outwardly therefrom adjacent the adjacent edges of adjacent pairs of slabs in each row; means securing the members of adjacent pairs of slabs together; an inverted channel strip enclosing the adjacent flanges of adjacent pairs of slabs; said adjacent flanges being formed with outwardly opening slots and means carried by the strip enclosing each adjacent pair of flanges disposed in said slots securing said strips to said flanges and slabs, said last mentioned means being removable from said slots through the outwardly open ends of the latter upon sliding said slabs longitudinally of said flanges in one direction.

5. In roof, floor or wall construction, a pair of parallel rows of substantially rectangular slabs in co-planar relation; an elongated support for said rows extending longitudinally thereof and across the line of division between the same at one of the sides of said slabs and in engagement with said sides; a covering strip against the opposite sides of said slabs extending longitudinally of said support and across said line of division;

means securing said strip against the slabs of said rows including elements positioned along said line of division and relatively rigid with respect to said slabs, and members rigidly secured to said strip hook to said elements.

6. In roof, floor or wall construction, a pair of parallel rows of substantially rectangular slabs in co-planar relation; an elongated support for said rows extending longitudinally thereof and across the line of division between the same at one of the sides of said slabs and in engagement with said sides; a covering strip adapted to be secured to said slabs at their sides opposite said support in a position extending longitudinally of said rows and over said support and across said line of division; means securing said strip in said position comprising elements carried by said strip and projecting therefrom and members carried by said slabs projecting therefrom and in releasable interengaging relationship with said elements, and means on said slabs including said members connecting the slabs of one row with the slabs of the other row.

7. In a construction as defined in claim 6, guide means respectively carried by said slabs and said strip for guiding said strip toward said slabs upon movement of said strip generally longitudinally thereof in one direction upon movement of said projecting ends of said elements into said interengaging relationship with said members; said elements being generally of hook-like form with their free ends facing generally in said one direction, and each of said members having a portion thereof formed for hooking engagement therewith by each of said elements.

8. A roof, floor or wall of a building comprising; a plurality of pairs of spaced, parallel structural steel members arranged in side by side relationship; parallel rows of similar sized rectangular slabs arranged with two of the opposite marginal portions of the slabs in each row supported against one of the sides of the members of each adjacent pair thereof and in which the adjacent marginal portions of the slabs of each adjacent pair of rows are supported against the same member; individual elements separable from the slabs releasably securing the individual slabs in each row to the members supporting the same; loop members rigidly secured to each slab releasably securing said elements to said slabs, said elements slidably extending through said loop members and into releasable engagement with said structural steel members and said loop members; the slabs in the alternate rows thereof being arranged in staggered relation to the slabs in the rows therebetween whereby the marginal portions of each slab in such alternate rows will extend across the junctures between adjacent pairs of slabs in the rows at either side thereof; and spaced devices carried by each slab in said alternate rows releasably securing each such slab to said adjacent pairs of slabs in the said rows adjacent thereto.

9. A roof, floor, or wall comprising; a plurality of similar sized rectangular slabs arranged in a pair of rows alongside each other; loops of wire, or the like, secured to the slabs in said rows with the openings in the loops of the slabs in one row in axial alignment with the loops of the slabs in the other row; bolts extending through the loop openings of the aligned loops securing the loops together; said loops projecting from the slabs and being inseparably secured to the latter.