

Jan. 18, 1938.

W. E. S. STRONG

2,106,140

ROOF CONSTRUCTION

Filed Nov. 16, 1933

2 Sheets-Sheet 1

Fig. 1.

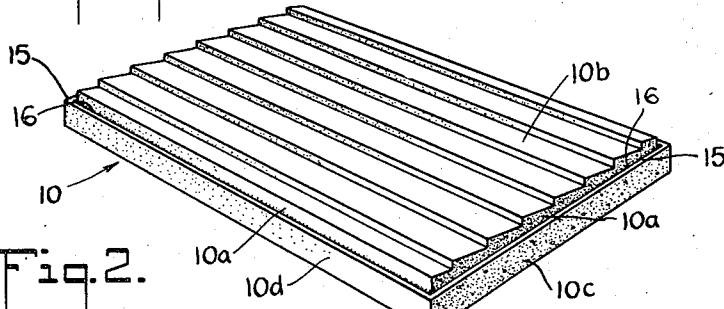


Fig. 2.

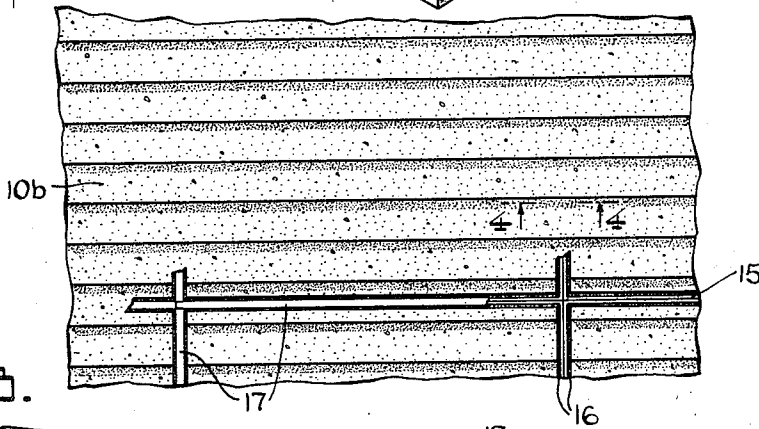


Fig. 3.

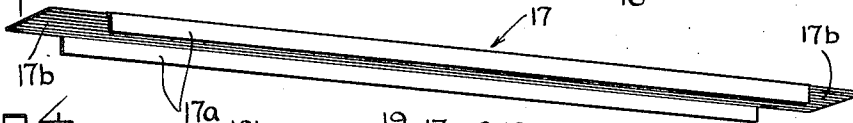
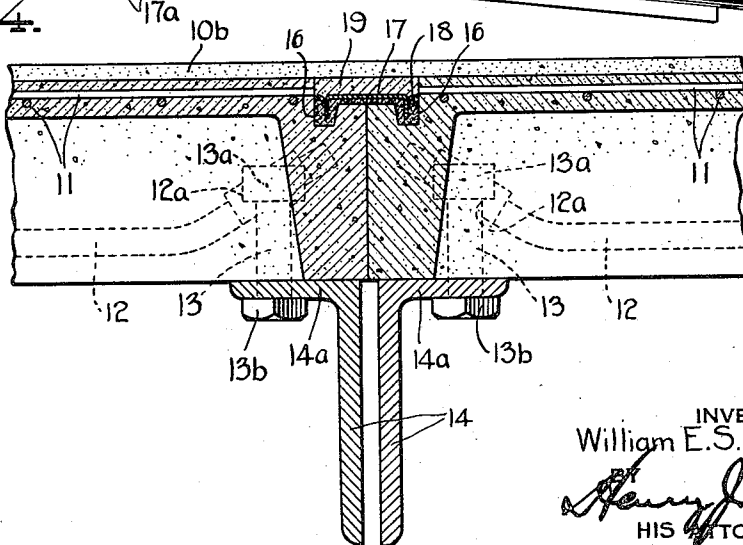


Fig. 4.



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2 Sheets-Sheet 2

Fig. 5.

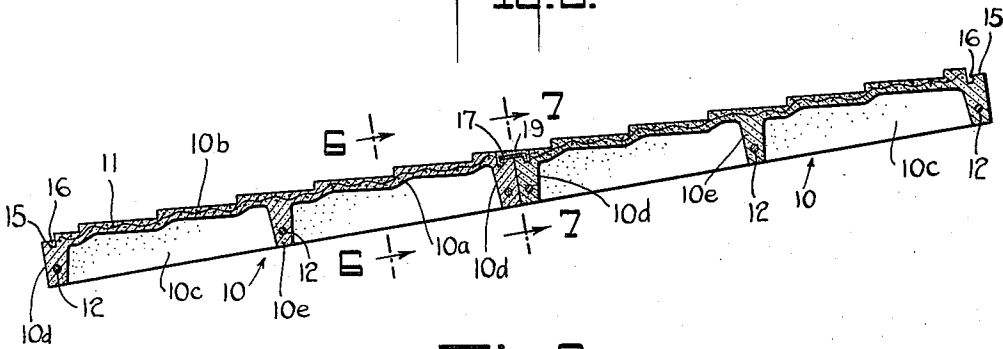


Fig. 6.

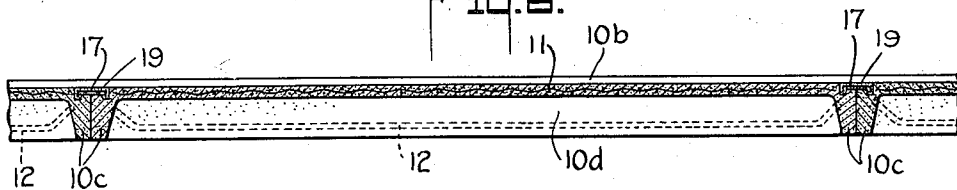


Fig. 7.

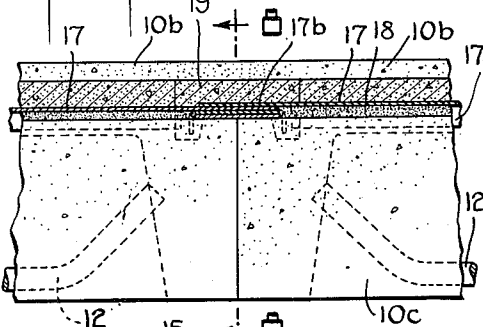


Fig. 8.

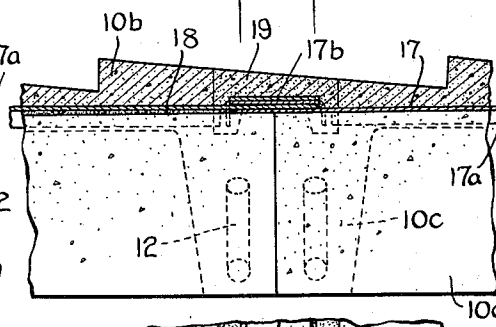


Fig. 9.

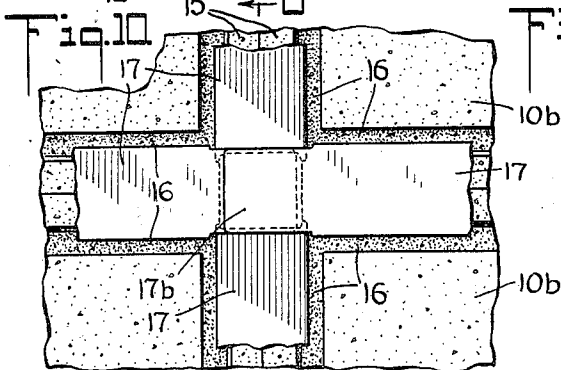
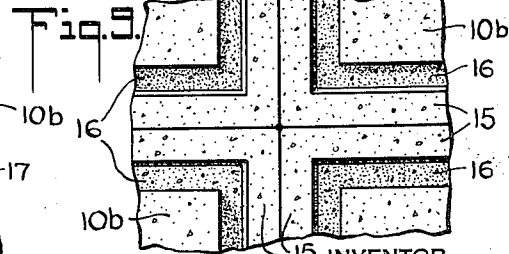


Fig. 10.



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ROOF CONSTRUCTION

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Application November 16, 1935, Serial No. 50,066

3 Claims. (Cl. 108—10)

My present invention relates to improved roof construction for buildings and the like.

An object of the invention is to provide a construction for a roof of a house or like structure, including units capable of being pre-fabricated, each unit comprising material, the body of which serves combinedly as the roof per se and the roof support, and may bear a finish on its exposed face, capable of shedding and withstanding rain, snow, sleet, moisture and the like, and/or wind and other weather conditions.

Preferably, such material of each unit comprises or is constituted substantially of cementitious composition, resulting from vibrating and compressing a suitable concrete mixture, and is desirably molded to shape and suitably configured for weather resistant attributes.

Commercial embodiments of such units usually are molded to provide relatively depressed areas adjacent the margins of the edges of the units, suitable jointing means being coordinated at such depressed areas, for sealingly jointing contiguous units to one another. Advantageously, such means includes jointing elements of sheet metal, each having a body of channel configuration and a flat extension at each end, the flat extensions of adjacent jointing elements overlapping one another. Suitable plastically applied sealing composition is preferably associated with the depending flanges of the jointing elements in the depressed areas, and the jointing elements and the stated composition are enclosed by suitable outer covering material such as a cementitious mixture, which may serve also to level such depressed areas with the exposed faces of the roof units.

The self-support of such, or equivalent, assembly of roofing units is conveniently had by molding each unit to provide flanges at and integral with the opposing edge portions of the body of each unit, which flanges when the units are assembled to form the roof, extend downwardly, to serve as purlins or equivalent load bearing elements.

The roof assembly of side-by-side units and sealed joint arrangement, aforesaid, may be supported by any suitable rafter or equivalent under-support.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings, in which

Fig. 1 is a perspective view of a preferred embodiment of the invention.

Fig. 2 is a plan view of a portion of a roof

formed of side-by-side units of the character illustrated in Fig. 1; one portion of jointing areas at contiguous edges of each unit being shown broken away to expose depressed areas, and another portion thereof in plan view indicating a manner of coordinating associated jointing elements.

Fig. 3 is a perspective view of a preferred type of jointing element.

Fig. 4 is detail sectional view, taken on line 4—4 of Fig. 3, on an enlarged scale.

Fig. 5 is a vertical sectional view through two side-by-side roof units embodying my invention, the section being taken in the direction of the slant of the roof.

Fig. 6 is a sectional view on line 6—6 of Fig. 5, through contiguous side-by-side units, the section being taken in direction transverse to the slant of the roof.

Fig. 7 is a detail sectional view on line 7—7 of Fig. 5, on an enlarged scale.

Fig. 8 is a detail sectional view on line 8—8 of Fig. 7.

Fig. 9 is a detail plan view of four contiguous side-by-side units at a stage prior to positioning of their respective jointing members.

Fig. 10 is a detail view, similar to that of Fig. 9, at a stage succeeding that of positioning their respective jointing members and prior to the completion of the joint.

Referring to preferred embodiments of my invention, illustrated in the drawings, each roofing unit 10 comprises in essential a body portion 10a, of material possessing proper compressive and load bearing strengths, the outer face 10b of such material being suitably configured, such as the indicated clapboard configuration, to serve as the finish of the unit and subject to the weather.

I prefer concrete as the material of the body of each unit, the concrete having been subjected to vibration, most preferably to vibration and compression during the molding stage, whereby its compressive and load bearing strengths are enhanced as compared with conventional tamped concrete, or conventional poured concrete, and the like. By subjection to vibration and most preferably to vibration simultaneously with compression, the texture of the resulting cementitious product is without voids and is otherwise impervious to snow, rain, moisture and the like, and/or wind, sunlight, and is otherwise resistant to erosion arising under variant weather conditions.

Advantageously, reinforcement by wire mesh, or the like, indicated at 11, may be employed, thus enabling the mean thickness of the body of each

unit to be reduced, with attendant reduced unit weight, without sacrifice of compressive and load bearing strengths.

Pursuant to my invention, each unit 10 may comprise depending integral flanges 10c, 10c, extending continuously at the edges of opposing sides in direction transverse to the slant of the roof, serving, upon side-by-side assembly of the roofing units, in the nature of purlins or equivalent functioning to support the assembled roof facing material 10a. Each roofing unit 10 may also be provided with integral flanges 10d, 10d, extending continuously and integrally with the termini of the respective flanges 10c, 10c, at the edges of the remaining opposing sides, i. e., in the direction of the slant of the roof.

As indicated, each such depending flange may be re-inforced by suitable metallic means, such as the bars 12 illustrated in the flanges 10d.

Fig. 5 shows also the depending flange 10e extending parallel to the flanges 10d, and intermediate, usually centrally spaced, relative to the two opposing edge flanges 10d, 10d, of an individual roof unit. Such flange 10e is also shown having such re-inforcing rod 12 cast in compacted relationship with the cementitious material. Such re-inforcement 12 serves admirably for the further functions of effecting mechanical anchorage of the assembled roofing units as indicated in Fig. 4, as by bolts 13, the head 13a of a bolt being mechanically positioned and locked in recessed loop 12a, formed at the end of a rod 12 and configurated in correspondence to the bolt head, the free threaded end of the bolt being passed through a suitable opening in a flange 14a of a rafter 14, beam or the like, which as indicated may be a steel shape, the bolt being secured by a nut, or by welding as indicated at 13b.

As one manner of sealing and facially mechanically interlocking the thus side-by-side assembled roof units 10, each unit is provided with relatively depressed areas, designated 15, shown exposed in plan view in Fig. 9, which areas 15 are immediately adjacent all lateral edges of each unit and form a ledge running continuously peripherally of the block. Between each such area 15 and the relatively elevated finish face 10a of each unit, is provided a groove 16 formed in the material of the unit. Thus a continuous peripheral groove is formed at the inner margin of the ledge opening into the surface of the ledge. The groove is formed substantially within the confines of the material of the ledge and has its bottom substantially opposite its opening to permit positioning of jointing elements between contiguously placed units in attaining interlocking and sealing of the units one with another.

To attain the stated sealing and mechanical interlocking, my invention provides jointing means coordinating with such grooves 16 at juxtaposed edges of contiguous units, such as the jointing elements 17, one of which is shown in perspective in Fig. 3, each such jointing element preferably having depending flanges 17a extending longitudinally thereof, for reception respectively in such grooves 16, see Fig. 10, and secured therein by suitable plasticized composition indicated at 18.

As one manner of sealing the joints at the "corners" of four (or other plurality) of such side-by-side assembled units 10, each jointing element 17 is provided at its opposite longitudinal ends with extensions 17b, 17b, such ex-

tensions 17b, four in number in the illustrated embodiment, see Figs. 7, 8 and 10, shown in enlarged views, being superposed one upon another.

Upon completion of such or equivalent assembly of the jointing elements 17, suitable cementitious mixture, see 19 in Figs. 4, 7, and 8, shown in enlarged views, is applied upon the upper faces of the jointing elements 17 inclusive of the upper faces of the upmost extensions 17a of the respective sets of superposed extensions. Preferably, such cementitious material 19 is of a character of the cementitious material of the units 10, to effect visual continuity of the whole of the exposed face of the resulting roof unit assembly, as well as to cementitiously bond therewith, the applied cementitious material 19 being preferably leveled off in conformity with the facial configuration 10a.

Such jointing elements 17 may be any suitable material, usually metal, such as steel, copper or the like.

The plasticized composition 18 is preferably a suitable elastic cement, which by reason of the above or equivalent mechanically interlocking assembly, is completely protected from sunlight and heat supplied interiorly of the house or other structure, as well as from snow, rain, dew, fog precipitation and like atmospheric conditions, thus preserving the elastic characteristic of such composition 18.

From the above, it appears that the roof structure assembled as above set out is self-supported, in that the material of the body of each unit is weather resistant, i. e., has its exposed face weather resistant, the body of each unit serving as a load bearing element, which function is enhanced by the depending flanges of each unit.

The respective jointing elements bridging the respective joints at juxtaposed edges of adjacent units mechanically interconnect the units to one another, such mechanical interconnection being particularly adapted to roofs or like structures which are subject to wind pressures, snow and rain loads, and other atmospheric conditions, including expansion and contraction arising from varying temperature conditions, settling, etc., by reason of the flexible character of their interconnection, including the reception of their flanges or other laterally extending portions in grooves, the applied elastic composition binding the body of each jointing element relative to the depressed areas, also binding such laterally extending portions relative to the grooves.

Whereas, I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. Roof structure, comprising a plurality of units assembled side by side and end to end, each of said units having a slab portion the exposed face of which is weather resistant and serves as a portion of the roof surface, the said exposed face of each block having its margins depressed to form a ledge running continuously peripherally of the block, each block having, further, a continuous peripheral groove formed substantially within the confines of the material of the said ledge along the inner margin thereof opening into the surface of the ledge and having its bottom substantially opposite its opening, and means for sealing against weather conditions the joints at juxtaposed edges of adjacent units, said sealing means including channel elements re-

spectively bridging said joints, each channel element being of a length co-extensive with its respective joint between individual adjacent units, the ends of said channel elements being without flanges to provide an area of over-lap with similar ends of like channel elements meeting at a common point of joinder, said channel elements being disposed over said joints with their flanges residing within the grooves of respective adjacent units to position such channel elements below the normal level of the roof surface, composition binding the said flanges of the channel elements relative to said grooves, and composition covering said channel members to raise the joint areas to the normal level of the roof surface.

2. Roof structure, comprising a plurality of units assembled side by side and end to end, each of said units having a slab portion the exposed face of which is weather resistant and serves as a portion of the roof surface, the said exposed face of each block having its margins depressed to form a ledge running continuously peripherally of the block, each block having, further, a continuous peripheral groove formed substantially within the confines of the material of the said ledge along the inner margin thereof opening into the surface of the ledge and having its bottom substantially opposite its opening,

and means for sealing against weather conditions the joints at juxtaposed edges of adjacent units, said sealing means including channel elements respectively bridging said joints, each channel element being of a length co-extensive with its respective joint between individual adjacent units, the ends of said channel elements being without flanges to provide an area of over-lap with similar ends of like channel elements meeting at a common point of joinder, said channel elements being disposed over said joints with their flanges residing within the grooves of respective adjacent units to position such channel elements below the normal level of the roof surface, elastic waterproof composition binding the said grooves, and a cementitious material covering said channel members to raise the joint areas to the normal level of the roof surface.

3. For use in roof construction a building unit comprising, a slab portion having one major face weather resistant, the margin of the said face being depressed to form a ledge running continuously peripherally of the unit; and a continuous peripheral groove formed substantially within the confines of the material of the said ledge along the inner margin thereof, opening into the surface of the ledge and having its bottom substantially opposite its opening.

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