

June 18, 1963

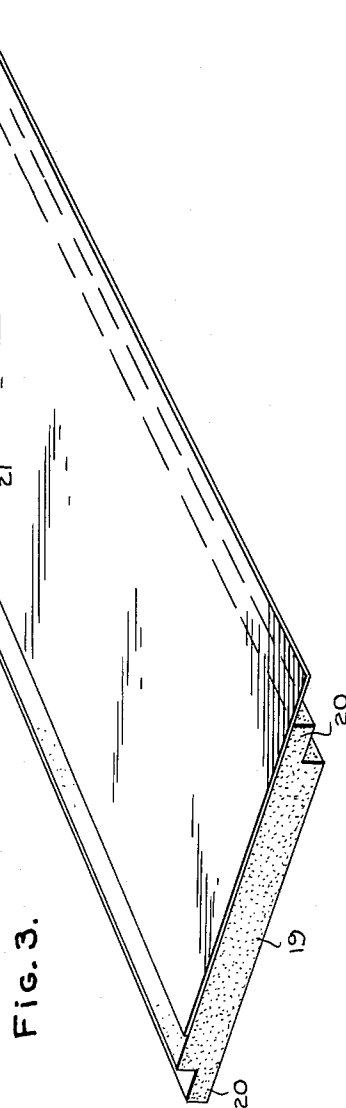
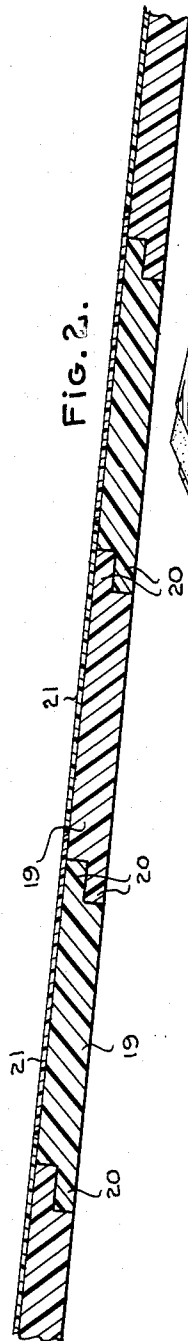
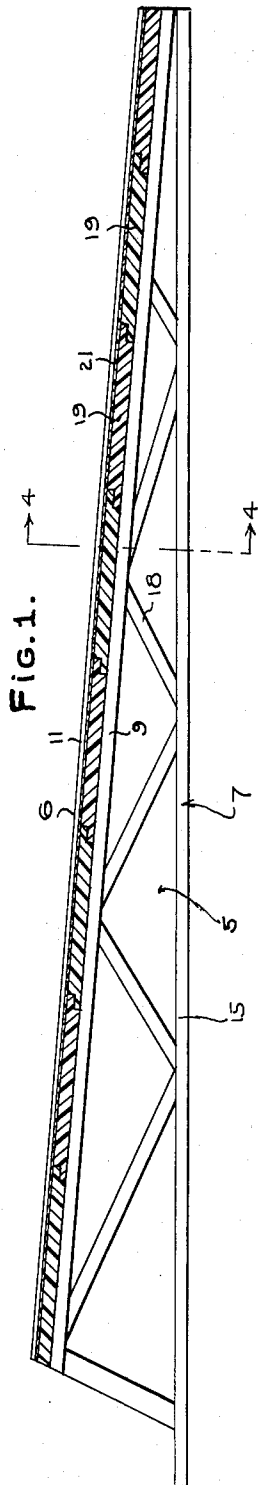
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3,093,935

ROOF FORMING STRUCTURE

Filed Nov. 27, 1959

3 Sheets-Sheet 1



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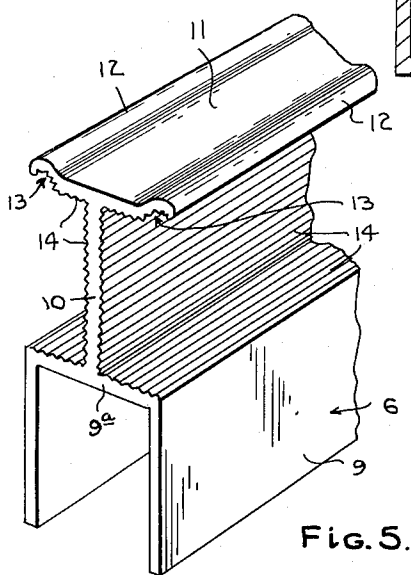
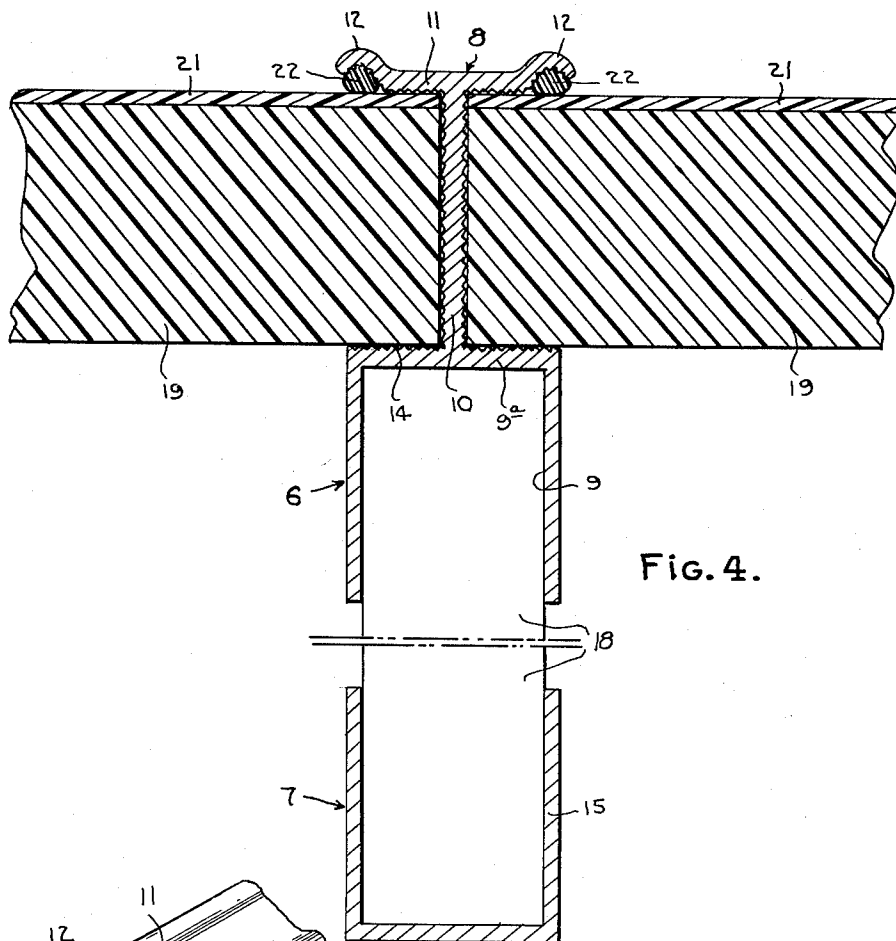
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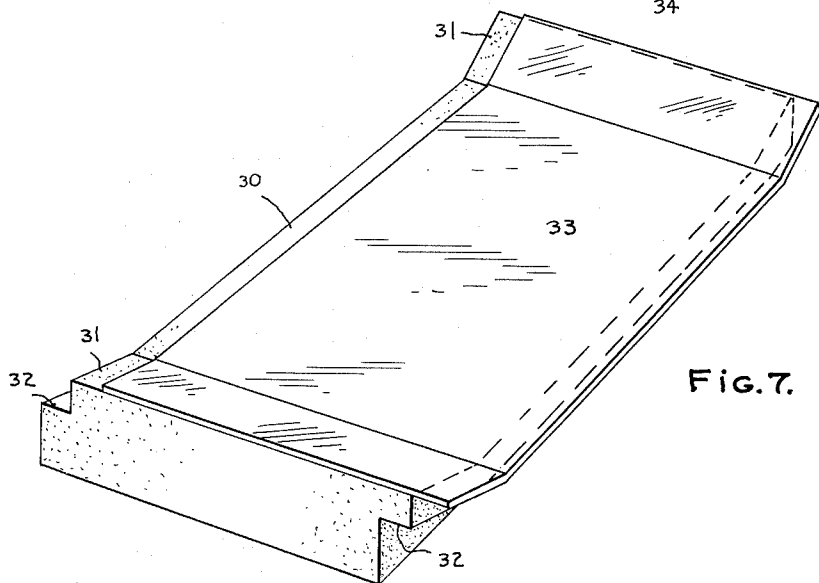
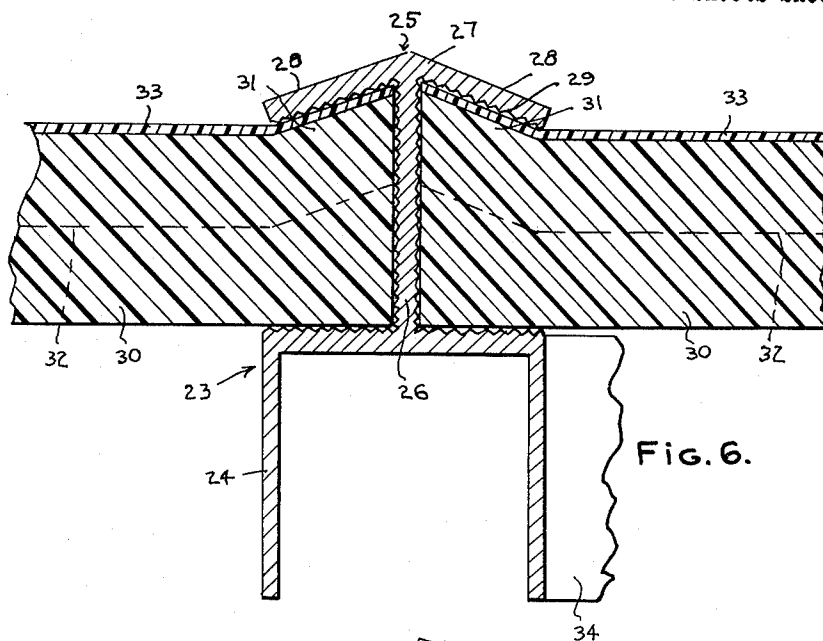
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ROOF FORMING STRUCTURE

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3 Sheets-Sheet 3



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3,093,935

ROOF FORMING STRUCTURE

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1 Claim. (Cl. 50—198)

This invention relates to a roof forming structure and contemplates in combination a novel truss element and a plurality of panels that are assembled in weathering engagement with an upper chord member of the truss to be cumulative over the entire roof area in overlapping weathering engagement with respect to each other.

The invention embodies the combination of a truss element having upper and lower chord members that are provided with the usual brace means to dispose the truss elements in a particular angularity with respect to each other and with the chord members being of the same general type disclosed in my co-pending application serial No. 803,864, filed April 3, 1959, now Patent No. 3,027,984, and embodies in a single unit the combination of an I-beam and a channel beam, such beam being relatively strong and having exceptional load bearing qualities.

The invention comprises the upper chord member as above noted and with the I-beam portion of the structure being uppermost, having a connecting web portion to the channel and with the web portion at its upper end being provided with a horizontal head portion that is inwardly channeled for its full length and with the inner surfaces of the I-beam section being serrated longitudinally to form a gripping area for the marginal portions of roof forming panels and with the channels of the head portion also adapted to receive compressible weather strips that have a weathering engagement with the upper sides of the panels.

The invention also contemplates a novel form of roof forming panel in combination with the truss beam and with the roof panels each comprising a relatively thick layer of expanded polystyrene that has an upper facing of fiberglass plastics bonded thereto and with each of the panels being stepped at their opposite marginal edges to have overlapping and interlocking engagement with adjacent panels and with the fiberglass plastic covering being bonded to the polystyrene and projecting at one marginal edge to have overlapping engagement with a next adjacent panel.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated a preferred form of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

FIGURE 1 is a longitudinal section through a roof structure and illustrating a supporting truss in side elevation,

FIGURE 2 is an enlarged section illustrating a plurality of interlocking roof forming panels,

FIGURE 3 is a perspective view of one roof forming panel,

FIGURE 4 is a fragmentary enlarged transverse section taken substantially on line 4—4 of FIGURE 1,

FIGURE 5 is a fragmentary perspective view of the upper chord member of the roof connecting truss,

FIGURE 6 is a fragmentary sectional view of a modified form of the invention, and

FIGURE 7 is a perspective view of a modified form of roof forming panel.

Referring specifically to the drawings, the numeral 5 designates a truss having upper and lower chord members 6 and 7.

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The upper chord member embodies an integral combination I-beam 8 and a channel member 9. The I-beam 8 is provided with a vertical web portion 10 and a head portion 11. The web portion 10 is formed integral with the channel member 9 intermediate the width of the channel. The head portion 11 along its marginal edges is upwardly and downwardly curved as indicated at 12, forming grooves 13. The grooves, the inner faces of the head 11, the web portion 10 and the upper surface of the head portion 9a of the channel are provided with closely arranged and longitudinally extending serrations 14. The lower chord member 7 is inverted with respect to the chord member 6 and embodies an upwardly facing channel 15. The chord members 6 and 7 are braced apart by diagonal bracing 18, as is customary in truss constructions.

Adapted to have engagement within the channels formed by the eye beam, are a plurality of roof forming panels 19. The panels 19, see particularly FIGURE 3, comprises elongated and relatively thick sheets of expanded polystyrene that has a high degree of insulating qualities and also permitting the transmission of a certain degree of light. The longitudinal edges of the panels are stepped, as indicated at 20, to have an overlapping and interlocking engagement with adjacent panels. Bonded to the upper surface of the panels 19 are relatively thin sheets of fiberglass plastic 21. The sheets 21 have one edge terminating inwardly of the stepped portion 20 while its opposite edge projects outwardly beyond the step portion of the adjacent edge so that the sheets 21 extend and have an overlapping engagement with a next adjacent lower panel. The several panels in assembly are suitably cemented together at their point of stepped engagement and the extended end of the sheets 21 are likewise cemented or bonded to the next adjacent lower panel 19 as the roof panels are assembled with respect to the truss.

In the use of the structure so far described, the trusses 5 are constructed for subsequent mounting at spaced apart points over the area to be covered. One truss is positioned and fixed with respect to a supporting structure, at which time the several panels have their end portions forced into the channels of the I-beam portion of the upper chord, having a frictional engagement with the serrations 14, and establishing a relatively satisfactory sealing against the entry of water to the interior of the structure. The end portions of the panels are preferably coated with an adhesive to additionally engage the serrations as a waterproofing medium. With the several panels assembled with respect to the I-beam 8, a next truss is then disposed to receive the opposite ends of the panels in a similar manner. With the several panels being supported at their opposite ends in the I-beam section, preferably vinyl weather stripping 22 is forced into the channels 13, compressing the weather stripping and binding the same against the fiberglass sheet 21 and the serrations of the channels 13, thus effectively retarding the entrance of any water to the channels of the I-beam. As the several panels are assembled in overlapping and interlocking relation, they are cemented or bonded together along their joints and the extended edges of the fiberglass sheets 21 are likewise bonded with respect to the next adjacent panel.

Referring now to FIGURES 6 and 7, there has been provided a supporting truss member indicated as a whole by the numeral 23. The truss member 23 embodies a downwardly facing channel member 24 and an upwardly extending I-beam, indicated as a whole by the numeral 25. The I-beam 25 and the channel 24 are integrally formed, as in the first form of the invention. The I-beam embodies a vertical web portion 26 and a head portion 27. The lateral flanges of the head portion 27

are inclined downwardly, as indicated at 28. The inner surfaces of the I-beam 25 are serrated longitudinally, as indicated at 29 whereby to frictionally receive roof panels in interlocking engagement for weathering engagement with the serrations 29. The panels 30, see particularly FIGURE 7 are also formed of relatively thick molded expanded polystyrene. The panels 30 at their end portions are angled upwardly as indicated at 31 and with the angularity being substantially identical to the angularity of the flanges 28. The several panels 30 are stepped at their longitudinal edges as indicated at 32 whereby to have interlocking and overlapping engagement with adjacent panels, similar to that previously described. The several panels 30 have bonded or otherwise connected thereto relatively thin sheets of fiberglass plastics 33 and with the plastics sheets 33 being co-extensive in length with the panels 30 throughout their upper surfaces, including the angled portion 31. As in the first form of the invention, the sheets 33 project outwardly beyond one marginal edge of the panels 30 to form an overlap for a next adjacent panel. The opposite edge of the sheets 33 terminate inwardly from the opposite step portion 32 of the panel.

In this form of the invention, the truss members 23 are installed at spaced apart points over the entire area to be enclosed. The beams may be fixedly spaced apart against distortion by transverse purlins 34. In relatively wide spacing of the beams 23, it may be found desirable to install a purlin 34 transversely between the beams to underlie the several panels 30 to support the panels longitudinally throughout the exposed length. With the beams 23 installed, the panels 30 are progressively inserted in an endwise manner to engage the channels of two opposed beams, with the inclined portions 31 having interlocking engagement with the incline flanges 28. It may be found desirable to coat the end portions of the panels 30 and the end portions of the sheets 33 with a suitable adhesive or other waterproofing medium to additionally provide a weather tight joint between the panels and the serrations. The structure in this form of the invention avoids the use of the weather stripping 22, since any leakage is avoided due to the inclined ends of the panels and the inclined flanges 28, it being obvious that water will flow freely from the roof structure and there will be no tendency for the water to flow upwardly between the flanges 28 and the inclined ends of the panels. The structure therefore offers a very desirable roof forming medium whereby the panels have interlocking engagement with the I-beam section 25 that effectively maintains the beams 23 in accurate parallel alignment. The use of the purlins 34 are a supplemental means that might be found necessary to support the panels 30 against downward flexing, when the panels are of relatively long lengths. As in the first form of the invention, the step portions 32 have interlocking engagement with the next adjacent panels to be cemented together and with the extended ends of the sheets 33 being cemented or otherwise bonded to the next adjacent panels.

It will be apparent from the foregoing that a very desirable roof structure has been provided. The truss element embodying the combination I-beam and channel is exceptionally strong and capable of spanning the area to be enclosed without additional supports. The weathering of the panels with respect to the I-beam section is believed to be novel and the panels likewise are believed to be novel. The truss structure may be formed of extruded aluminum while the panels are formed in a con-

ventional manner and embodies the combination of the expanded polystyrene and the protective fiberglass plastics covering. The device is heat-insulating and light-transmitting and provides a very desirable roof structure for use in connection with roof coverings for patios, swimming pools and other outdoor areas to be protected. Purlins may be employed to extend transversely between the beams as may be found necessary and are suitably fixedly connected to the channel members 9 and 24. It should be borne in mind that the polystyrene panels are inherently waterproof and are precision molded, especially at their stepped edges to have an exceptionally accurate overlap and it is conceivable that the panels could be assembled in weathering engagement with each other without the benefit of cement.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claim.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

In a roof construction, in combination, a truss member comprising an inclined chord member having a downwardly opening channel for receiving ends of truss struts therein and including an upper I-beam cross-section having laterally opening, opposed roof panel-receiving channels sealingly embracing the edges of roof panels disposed therein, and a plurality of rectangular roof panels being frictionally embraced at one edge in said roof panel-receiving channels, said roof panels comprising a lower sheet of expanded polystyrene-like material bonded to an upper thin sheet of fiberglass-like material, said lower sheet including at the edges normal to said one edge reversely stepped portions therealong and in sealed engagement with complementary stepped portions of immediately adjacent roof panels, said upper sheets including a lower marginal portion projecting beyond the stepped portion at one of said normal edges and terminating at an upper marginal portion disposed inwardly and parallel to said other normal edge, adjacent upper sheets being sealingly secured at their lower marginal portion on said lower sheets of the next adjacent panel and disposed in said roof panel-receiving channels on said inclined chord below said engaged complementary stepped portions of said lower sheets, said upper I-beam cross-section comprising an upper flange including downwardly and laterally opening grooves bordering longitudinal edges thereof, and a pair of plastic sealing elements sealingly engaged in said grooves and on the upper surfaces of said upper thin sheets and spanning the joint between adjacent panels.

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