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(71) Applicant
Sealheat Flat Roofing Company Limited (United Kingdom),
Avro Way, Bowerhill Trading Estate, Melksham, Wiltshire SN12 6TP

(72) Inventor
Anthony Merrett

(74) Agent and/or Address for Service
Page & Co,
Temple Gate House, Temple Gate, Bristol BS1 6PC

(56) Documents cited
GB A 2146681 GB A 2053312 GB 1292714
GB A 2078275 GB 1336152

(58) Field of search
E1D
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Selected US specifications from IPC sub-class E04D

(54) Roofing panels

(57) Insulated roof panels are made from glass reinforced plastic (GRP) having an upper layer 10 and a lower layer 11 of GRP between which there is a layer 12 of polyisocyanurate foam. The upper layer 10 extends to form a tail 13 while the lower layer 11 extends in the opposite direction to form a lip 14. A number of panels are fixed by means of the flanges to roofing battens, in an imbricated manner with each tail 13 extending over a lower adjacent panel. Along the length of a panel, there are a number of transverse lines (17 Fig. 2) giving the appearance of individual tiles and the lip can be cut to decorative shapes.

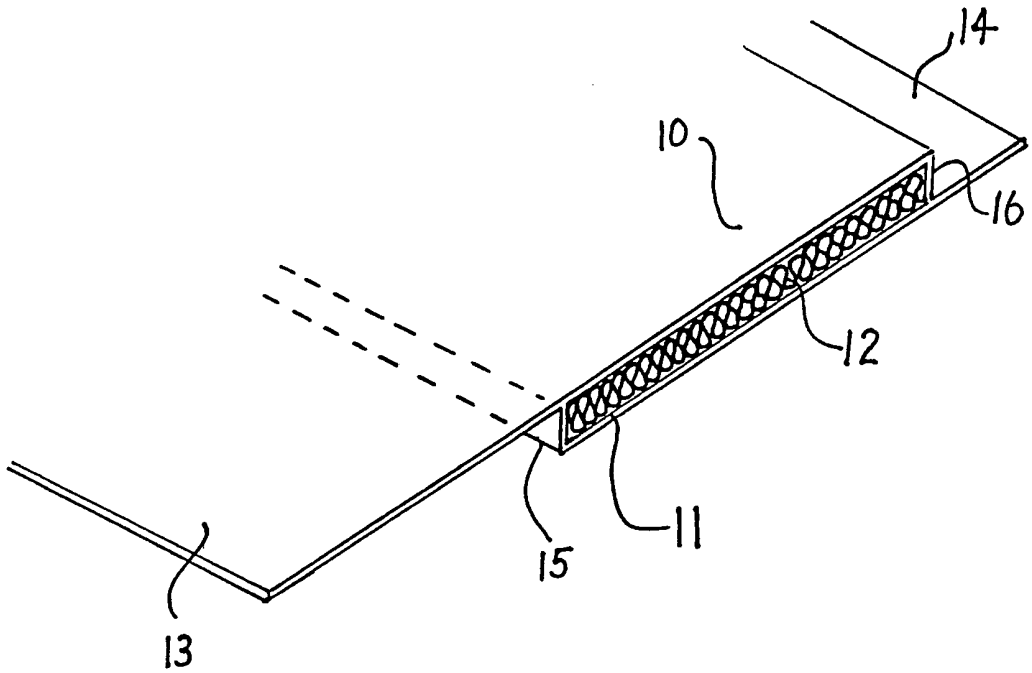

FIGURE 1

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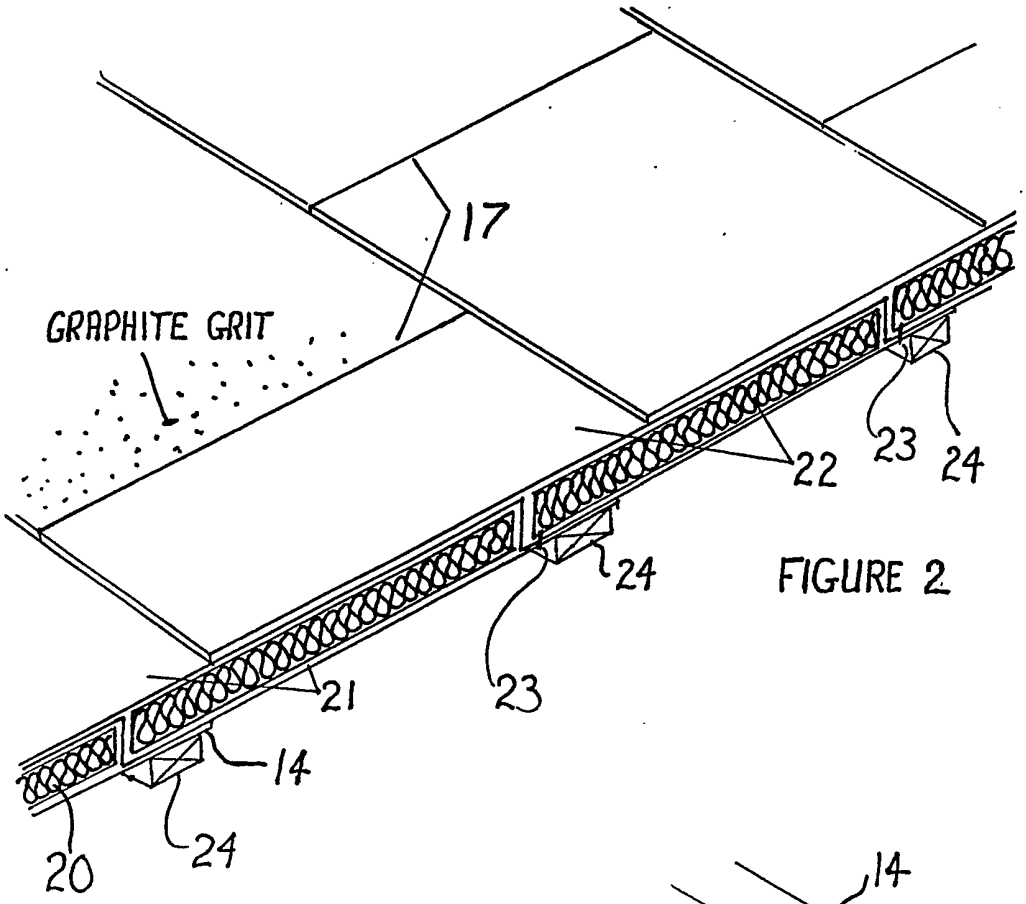

FIGURE 2

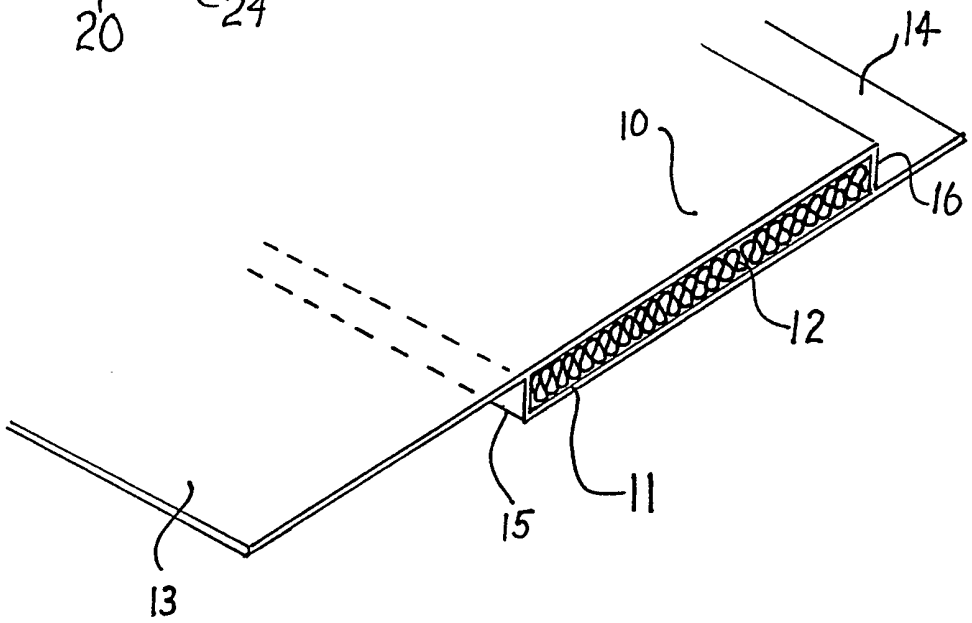

FIGURE 1

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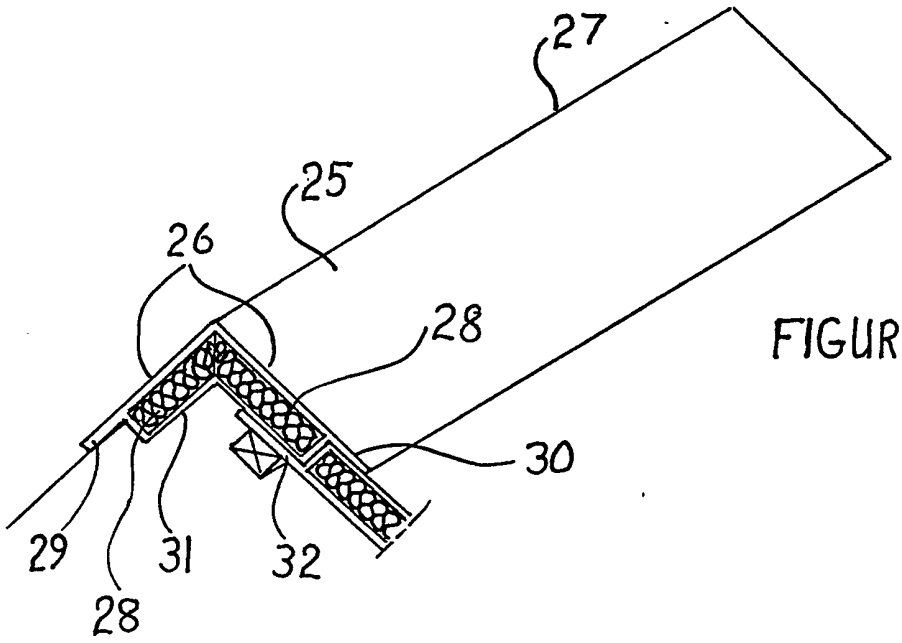

FIGURE 3

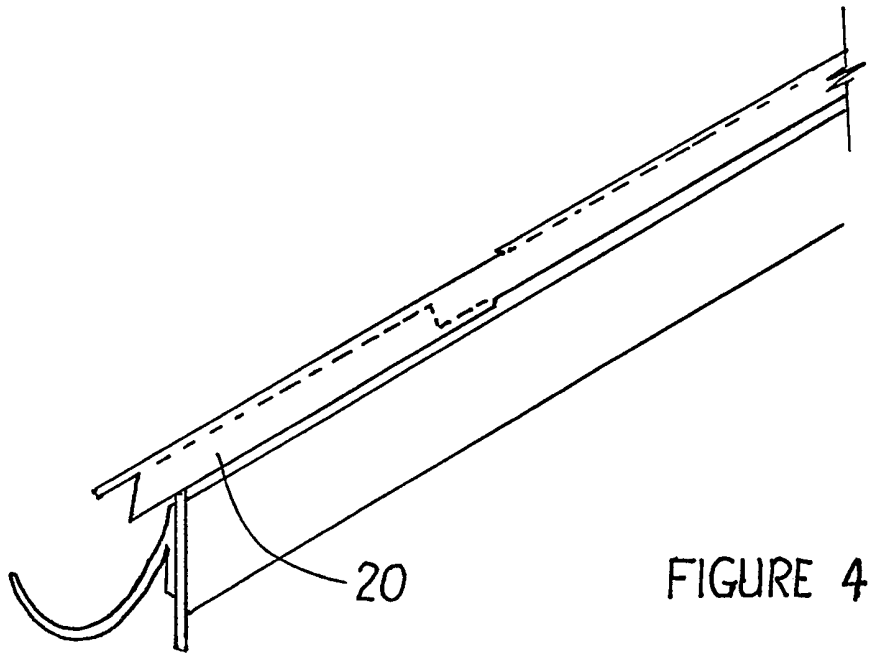

FIGURE 4

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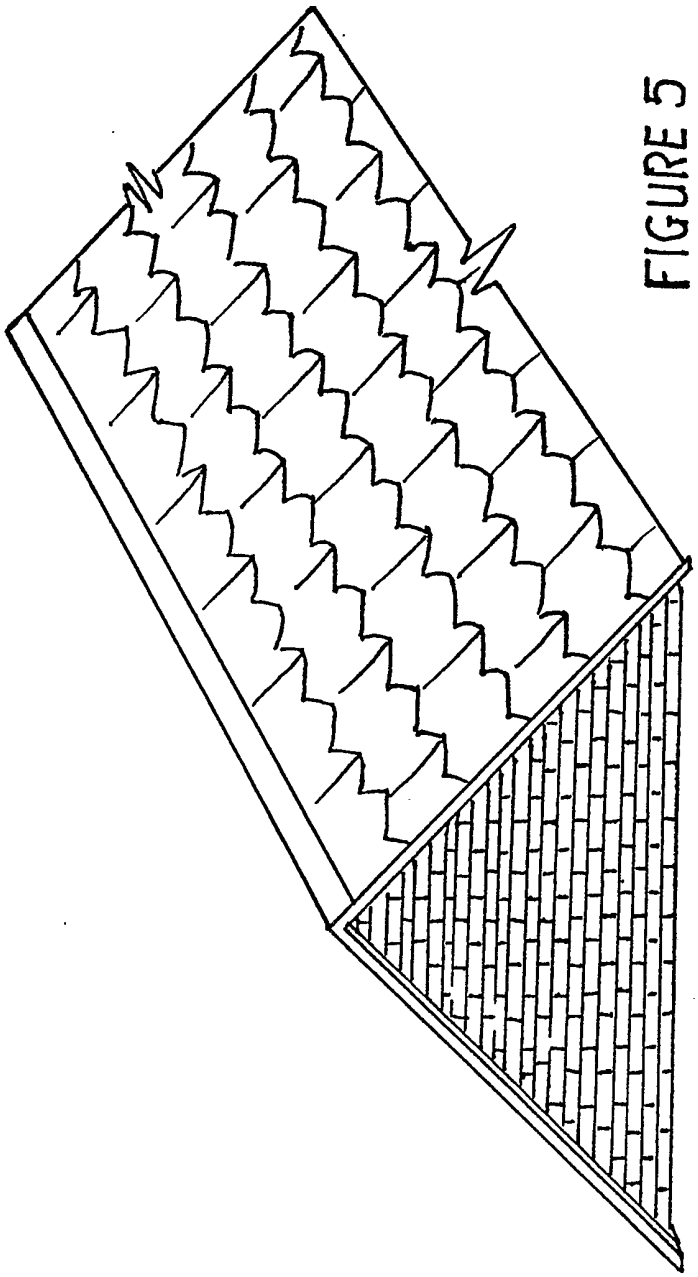

FIGURE 5

SPECIFICATION

Roofing panels

This invention relates to insulated roof panels made from glass reinforced plastic (GRP) and tiles or slate simulated from these.

Traditional roof tiles and slates suffer from the disadvantages that they are normally used with a layer of underfelt to prevent draughts. Also, because they are small, roofing with them incurs high labour costs. They also require roofing battens at closely spaced intervals, suffer from frost damage, are brittle and easily cracked, and normally require separate roof insulation. The present invention seeks to overcome some of the disadvantages associated with traditional tiles and slates.

According to the present invention a panel is provided for the construction of roofs comprising a layer of heat insulating material covered by an upper layer of glass reinforced plastics material (GRP) bonded thereto and extending beyond one edge thereof to form a tail, such that when in use, a plurality of such panels lie in an imbricated manner with the tail of each panel extending over the adjacent panel.

Preferably, the panel further comprises a lip of GRP extending from the lower face of the insulating material layer on a side away from said tail, for fastening the panel in use, the said lip being attached to the said upper layer of GRP by a first side edge of GRP and more preferably a lower layer of GRP, bonded to the lower face of the insulating material and attached to the underside of the tail by a second side edge of GRP such that the insulating material is enclosed on four sides.

According to a second aspect of the invention, a roof is provided comprising a plurality of panels as described above arranged in an imbricated manner wherein sealant is disposed between adjacent faces of adjacent panels.

According to a third aspect of the invention, a method of constructing a roof is provided comprising the steps of fastening a panel of the preferred description to structural members of the roof, by means of the panel lip, applying sealant to the upper surface of the lip and the said first side edge, laying a second panel on top of the sealant, with its lip partly overlapping the first panel, fastening the panels together by means of rivets passing through the lip of the first panel and the said lower layer of GRP and repreating the process for the second and further panels.

According to a fourth aspect of the invention, a ridge panel is provided for a roof comprising an angled layer of heat insulating material covered by an angled upper layer of GRP bonded thereto and extending beyond two edges thereof, away from the ridge, to form two tails for overlapping further adjacent panels when in use, wherein the ridge is flexible to accomodate different pitches of roof

A preferred embodiment of a roofing panel according to the invention is now described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is an isometric view of part of a single panel according to the invention.

Figure 2 is an isometric view of part of a roof according to the invention.

Figure 3 is a perspective view of part of the ridge of a roof according to the invention.

Figure 4 is an end elevation view of a pitch roof according to the invention showing the eaves.

Figure 5 is a perspective view of part of a roof according to an alternative embodiment of the invention.

Referring first to Fig. 1, a roofing panel is shown comprising an upper layer 10 of GRP, a lower layer 11 also of GRP and a foam insulation layer 12 between these layers, which is preferably polyisocyanurate foam of 25 mm thickness (e.g. "Quelflam 35').

The upper layer 10 extends beyond the foam layer 12 to form a tail 13 and the lower layer 11 extends in the opposite direction to form a lip 14. The ends of the foam filling 12 between the lower layer 11 and the tail 13 and between the upper layer 10 and the lip 14 are each closed by an edge layer of GRP, 15 and 16 respectively.

Typical dimensions of the panel may be as follows. All GRP layers 10, 12, 13, 14, 15, 16 may be about 3 mm thick, the tail may extend from about 100 mm to 230 mm beyond the foam layer 12 and the lip 14 may extend about 75 mm beyond the foam layer 12. For domestic purposes, the foam layer may be 305 mm wide. The panel may be made in standard lengths of 3.05 m but other lengths may be manufactured as required. These measurements would give dimensions for the foam area of about 3.05 m × 0.30 m but for industrial use, these could be about 4.5 m × 0.61 m.

Each panel is scored with lines 17 in the GRP layer 10, so as to simulate individual tiles.

The panel is made as follows. A polyester resin mix of the type known as "Synolac 6357" is applied to a mould, followed by a layer of fibreglass matting. Further resin mix is applied and consolidated. the foam layer is laid onto the consolidated matting and is then covered with three layers of matting and resin mix which is consolidated to encase the insulation. The panel is removed from the mould, trimmed and shaped to requirements and transverse lines are scored in it. A layer of gel, preferably according to British Standart 476, case 7 part 2 (e.g. "Synolac 6420 Gel"), with a required colour pigment added, if desired, is applied to the upper layer 10 and the upper and lower surfaces of the tail 13. For a pleasing finish, graphite grit can be

added to the upper surfaces while the gel is wet.

In the roof shown in Fig. 2, a number of panels 20, 21 and 22 are shown in use. the roof slopes such that panel 22 is higher than panel 20. The sections are riveted together at 23 from the underside and fixed to horizontally extending battens 24.

The panels are fitted to form the roof by starting at the lower edge of the roof; the lowermost panel 20 is fixed with nails through the upper lip 14 to battens 24 or directly to the rafters or trusses, if these are not more than about 45 cm apart. Self curing foam (e.g. Humbro Universal Filler Foam from an aerosol cannister) is applied to the uppersurface of the lip 14 and to the edge 16 and the next panel 21 is laid with its edge 15 adjacent the edge 16 of the lower panel 20 and the panels are fixed together by pop rivets through the lip 14 and the lower layer 11. This next panel 21 is likewise fastened to a batten or truss by its lip 14.

At the apex of the roof, a specially formed ridge panel 25 is fixed by means of rivets from inside the roof, as shown in Fig. 3.

The ridge panel comprises a continuous upper layer of GRP 26 angled along the ridge 27 with a layer of insulating foam 28 underneath which may be folded or cut in two halves along the ridge. The upper layer 26 extends beyond the insulating layer on both sides of the ridge to form two tails 29 and 30. The foam layer 28 is encased by lower layers of GRP 31 and 32 which do not join along the underside of the ridge 27, so as to allow the panel to flex along the ridge 27 and fit different pitches of roof.

Finally, a semi-circular ridge covering may be fixed by drilling through the top surface into the lower ridge panel and securing with a non ferrous metal screw which is then sealed with a covering of gel.

Fig. 4 shows the detail at the eaves. The lowermost tile 20 has no tail 13. The exposed edge of the panel is sealed with a strip of GRP. Where two panel lengths are required to be joined end to end, a run of mastic is applied to the lower edges of the abutting panels. The mastic is flexible and forms a barrier against resin dripping through the join. These panels are then fixed with nails and pop rivets, resin mix is then inserted into the join followed by a covering of gel.

Fig. 5 illustrates how a pattern can be made in the roof by shaping the tail 13. Many other patterns can be made in this way, as desired.

The panels have a number of advantages over known tiles: they reduce condensation on the interior by virtue of their insulating property; the association between panels does not suffer from the effects of capillary attraction; they are hard-wearing, rust free and require no cement or mortar; they are lightweight, heat insulating and increase sound proofing and they are generally extremely water tight.

It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope and spirit of the invention.

CLAIMS

1. A panel for the construction of roofs comprising a layer of heat insulating material covered by an upper layer of glass reinforced plastics material (GRP) bonded thereto and extending beyond one edge thereof to form a tail, such that when in use, a plurality of such panels lie in an imbricated manner with the tail of each panel extending over the adjacent panel.

2. A panel according to claim 1 further comprising a lip of GRP extending from the lower face of the insulating material layer on a side away from said tail, for fastening the panel in use, the said lip being attached to the said upper layer of GRP by a first side edge of GRP.

3. A panel according to claim 2 further comprising a lower layer of GRP, bonded to the lower face of the insulating material and attached to the underside of the tail by a second side edge of GRP such that the insulating material is enclosed on four sides.

4. A roof comprising a plurality of panels according to any one of claims 1 to 3 arranged in an imbricated manner wherein sealant is disposed between adjacent faces of adjacent panels.

5. A method of constructing a roof comprising the steps of fastening a panel according to claim 3 to structural members of the roof, by means of the panel lip, applying sealant to the upper surface of the lip and the said first side edge, laying a second panel on top of the sealant, with its lip partly overlapping the first panel, fastening the panels together by means of rivets passing through the lip of the first panel and the said lower layer of GRP and repeating the process for the second and further panels.

6. A ridge panel for a roof comprising an angled layer of heat insulating material covered by an angled upper layer of GRP bonded thereto and extending beyond two edges thereof, away from the ridge, to form two tails for overlapping further adjacent panels when in use, wherein the ridge is flexible to accomodate different pitches of roof.

7. A panel substantially as hereinbefore described with reference to Fig. 1 of the accompanying drawings.

8. A roof substantially as hereinbefore described with reference to Fig. 2 of the accompanying drawings.

9. A ridge panel substantially as hereinbefore described with reference to Fig. 3 of the accompanying drawings.

10. A method of constructing a roof substantially as hereinbefore described with reference to the accompanying drawings.

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