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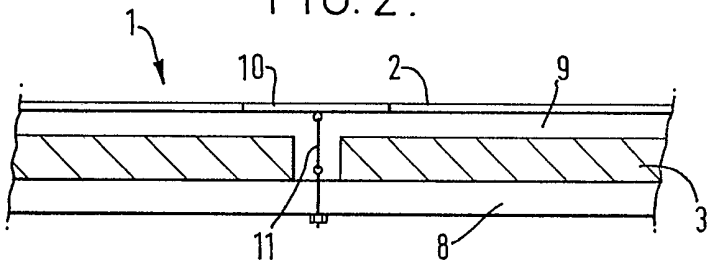
(54) Roof

(57) The roof comprises a support structure (8), and, a panel of fibreglass material (2), wherein the panel of fibreglass material (2) is secured at intervals along its periphery, and is capable of relative movement with respect to the support structure (8) through deformable couplings (11), e.g. of rubber, which permits expansion and contraction of the panel (2). Insulating boards 3 may be supported on the structure (8).

FIG. 2.



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The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

FIG. 1.

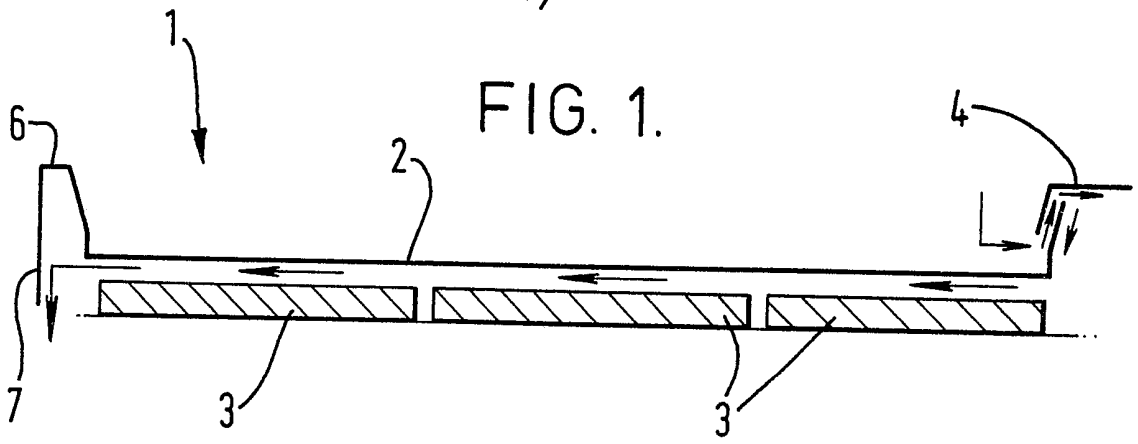


FIG. 2.

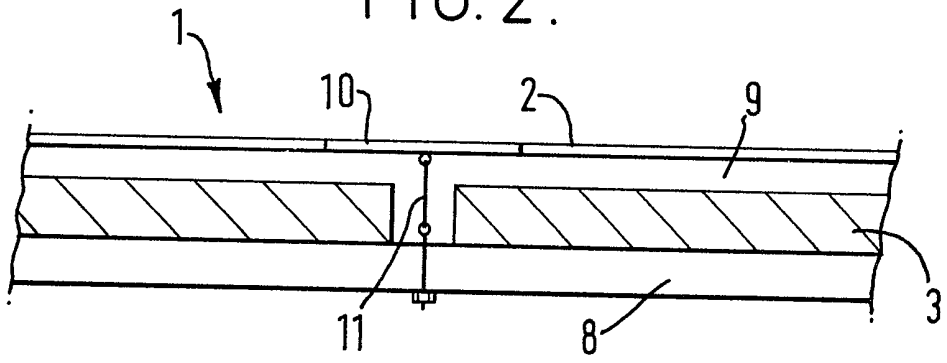
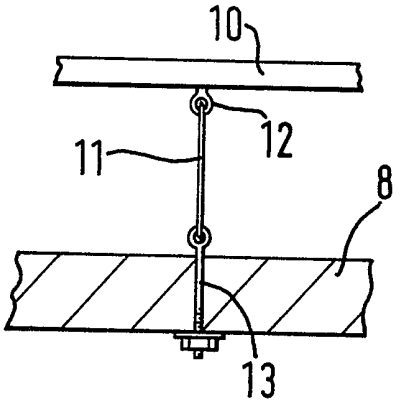


FIG. 3.



SPECIFICATION

A fibreglass roof and a method of providing a building with a fibreglass roof

This invention relates to a fibreglass roof and a method of providing a building with a fibreglass roof, and is more particularly, although not exclusively, concerned with a fibreglass roof which is of unitary nature and is formed from a plurality of fibreglass sheets bonded together at adjacent edge regions.

Fibreglass, in association with a solid board, has previously been used as a roofing material. A solid board is sold with instructions for coating the solid board with a layer of fibreglass material; thus, fibreglass matting is placed on the board and this is formed into a solid sheet of fibreglass by the use of a resin and a suitable catalyst. The layer of fibreglass material formed is continuously bonded to the solid board with the invention of creating a waterproof panel.

The panels created may be used in the construction of a roof. These panels, which represent a layer of fibreglass material directly bonded to a board, suffer from the disadvantage which arises because of the different coefficients of expansion of the solid board and of the layer of fibreglass. Thus, the fibreglass or the board is likely to crack or blister under extremes of temperature.

Another type of roofing material which is commonly employed is felt. Felt roofs, however, suffer from a number of disadvantages, including the presence of small holes caused when the felt is tacked to the support structure of the roof; the small holes may allow water to leak through the roof. To overcome this problem several layers of felt need to be used, thereby substantially increasing the cost of the roof. Furthermore, the nature of the felt layer prevents any circulation of air within the roof itself and, as a result, moisture may build up giving rise to problems of rot.

According to the present invention there is provided a roof, or a portion of a roof, of a building, the roof or roof portion comprising:

a support structure, and, above the support structure, a panel of fibreglass material, wherein the panel of fibreglass material is secured at intervals along its periphery, and is capable of relative movement with respect to the support structure.

The panel fo fibreglass material, not being rigidly fixed to the support structure inward of the periphery of the panel, may expand in warm weather causing the panel as a whole to form a shallow dome. The doming of the panel causes air to be drawn into the space between the support structure and the panel, through gaps around the periphery of the panel, and possibly also through the layer immediately below the panel. The circulation of air caused by the aforementioned movement of the fibreglass panel serves to prevent any build up of moisture, through condensation, in the space between the panel and the support structure.

The panel of fibreglass material may be secured at intervals along its periphery, to the support structure by means of bolts, tacks or other convenient means. Additionally, the panel may be provided, at its periphery, with a rim, a downwardly extending portion of the rim being secured to the support structure. Futhermore, a lip may be provided along at least a portion of the periphery of the panel to extend under existing flashing of the building.

The panel of fibreglass material may be constructed to cooperate with other features of the roof. Thus, for example, where a drainpipe, a flue or an air inlet of the building protrude through the roof, the panel of fibreglass may be designed to accommodate this feature with the feature being sealed into the roof by the use of a shaped piece of fibreglass matting, a resin and a suitable catalyst whereby the feature is bonded to the main panel of fibreglass material.

In a preferred embodiment of the present invention, the roof further comprises an insulating layer between the panel of fibreglass material and the support structure. The insulating layer may comprise a plurality of spaced apart insulating boards which may be manufactured from a composite material which material allows air to permeate therethrough. The insulating boards may be arranged on the support structure with approximately 6mm gaps between the insulating boards. The gaps allow the circulation of air in the spaces between the panel of fibreglass and the support structure. In this embodiment, the panel of fibreglass material lies directly above the layer of insulating material and may move away from this layer as the panel of fibreglass expands during hot weather.

It is to be appreciated that very large roof areas may be covered by a single, unitary panel of fibreglass material. This single, unitary panel of fibreglass material may be formed from a plurality of fibreglass sheets bonded together at adjacent edge regions. This bonding may be effected in *in situ*.

Where the panel of fibreglass is relatively large, then as the fibreglass expands on heating the panel will form a dome. The larger the panel of fibreglass is, the higher the dome will extend. In order to prevent the formation of a large dome on such a roof, the roof may also include at least one elastic restraining means, inward of the periphery of the panel, connecting the support structure and the panel of fibreglass material, but nonetheless permitting relative movement between the panel and the support structure. The restraining means may be fixed to the panel of fibreglass material by means of a eye which is fixed to a steel plate cast into the panel of fibreglass material. Attachment to the support structure may be by means of a ring bolt which is bolted through the support structure or screwed into the support structure. Conveniently, the restraining means is formed of a rubber material.

The panel of fibreglass material may be provided, on the weather side thereof, with a coat of a waterproof gel.

The roof, or portion of roof, according to the present invention may be flat, or slightly sloped,

roof in which case the entire roof may covered by a single, unitary flat piece of fibreglass material. For a pitched roof of conventional construction, a single panel of fibreglass may be used to cover each separate sloping face of the roof, with each panel being joined at the ridges of the roof with fibreglass matting, resin and a suitable catalyst.

In accordance with a second aspect of the present invention, there is provided a method of roofing a building, which method comprises positioning a panel of fibreglass material above a support structure, and securing the panel of fibreglass material at its periphery, whilst leaving provision for relative movement between the panel and the support structure.

The panel of fibreglass may conveniently be of a unitary nature in which case the panel may be formed from a plurality of fibreglass sheets bonded together at adjacent edge regions. The fibreglass sheets may be bonded together with fibreglass matting, a resin and a suitable catalyst.

As a final step in the aforementioned method, the panel of fibreglass may be coated on its weather side with a waterproof gel coating.

As can be appreciated, the method of the present invention allows a roof to be rapidly and efficiently constructed *in situ*, with sheets of fibreglass material of a standard size being constructed at a workshop removed from the building to be roofed. A presently preferred size of fibreglass sheet is 8 × 4ft. Such sheets are transported to the building where they are placed on top of the support structure or, if an insulating layer is to be included, over the insulating layer, and bonded together with fibreglass matting resin and a suitable catalyst. On a flat roof, for example, a fibreglass rim may be bonded to the periphery of the panel of fibreglass, with a downwardly extending portion of the rim being secured to the support structure. A gel coating may then be applied to waterproof the entire roof.

Reference will now be made to the accompanying drawings in which:

Figure 1 illustrates a section through a flat roof according to the present invention;

Figure 2 illustrates a section through a flat roof according to the present invention also including a restraining means; and

Figure 3 shows a detailed view of the restraining means as illustrated in Figure 2.

With regard to Figure 1, a flat roof 1 is provided with a panel of fibreglass material 2. The panel of fibreglass 2 lies above an insulating layer 3. The insulating layer 3 comprises a plurality of spaced apart insulating boards. The insulating boards 3 which are supported on a support structure (not shown) may be spaced at 6mm intervals. The panel of fibreglass 2 is constructed to cooperate with existing features of the roof. Thus, for example, an existing flashing 4 of the roof cooperates with a rim 5 of the panel. A small gap may be left between the flashing 4 and the rim 5 to allow air to pass into the space between the panel 2 and the insulating layer 3. Thus, as the panel 2 expands in hot weather, the panel 2 forms a dome, with air being sucked in through the gap between the flashing 4 and the rim 5. The flow of air acts to prevent any build up of condensation or moisture in the space between the panel 2 and the support structure (not shown). Around the periphery of the panel 2, a rim 6 is provided; this rim 6 has a downwardly extending portion 7 which may be secured to the support structure (not shown).

With regard to Figure 2, the support structure 8 is shown. The insulating boards 3 rest upon the support structure 8 and the panel of fibreglass 2 is, in this embodiment, slightly spaced from the insulating board leaving an air passage 9. Into the panel 2, there is cast a steel plate 10. The steel plate 10 us secured to the support structure by means of a rubber restraint 11 which permits but generally counters any uplift, due to expansion, of the panel of fibreglass 2.

Figure 3 shows the rubber restraint 11 in more detail. As illustrated in Figure 3, the steel plate 10 has, welded therein, an eye 12. The support structure 8 has a ring bolt 13 which is bolted through the support structure in this embodiment but which, in another embodiment, may be screwed into the support structure. The rubber restraint 11 which acts as a "shock cord" connects the steel plate and the support structure.

A large roof which is constructed from a number of fibreglass sheets joined together can be envisaged. In order to prevent such a roof from doming, several restraining means as illustrated in Figures 2 and 3 may be provided at spaced apart intervals inward of the periphery of the panel of fibreglass material. This allows the expansion to be spread over the entire panel of fibreglass material so that, rather than the whole panel forming a single large dome, the whole panel rises by a small, less significant, amount.

Experiments conducted on a single 8 × 4ft sheet of fibreglass show that increasing the temperature of the sheet from room temperature to 200°F causes the centre of the sheet to srise 1 inch (25 mm) if the periphery of the sheet is secured. It can be appreciated that a single panel of much greater size as a roof panel would rise a significant amount were it not for the provision of the restraining means.

CLAIMS

1. A roof, or a portion of a roof, of a building, the roof or roof portion comprising:

a support structure, and, above the support structure, a panel of fibreglass material, wherein the panel of fibreglass material is secured at intervals along its periphery, and is capable of relative movement with respect to the support structure.

2. A roof, or a portion of a roof, as claimed in Claim 1, wherein the panel of fibreglass material cooperates with other features of the roof.

3. A roof, or a portion of a roof, according to Claim 1 or 2, wherein the roof further comprises an insulating layer between the panel of fibreglass material and the support structure.

4. A roof, or a portion of a roof, according to

Claim 3, wherein the insulating layer comprises a plurality of spaced apart insulating boards.

5. A roof, or a portion of a roof, according to Claim 4, wherein the insulating boards are manufactured from a composite material which material allows air to permeate therethrough.

6. A roof, or a portion of a roof, according to any preceding claim, which also includes at least one elastic restraining means inward of the periphery of the panel and connecting the support structure and the panel of fibreglass material, which permits relative movement between the panel and the support structure.

7. A roof, or a portion of a roof, according to Claim 6, wherein the restraining means is fixed to the panel of fibreglass material by means of an eye which is fixed to a steel plate cast into the panel of fibreglass material.

8. A roof, or a portion of a roof, according to Claim 6 or 7, wherein the restraining means is fixed to the support structure by means of a ring bolt which is bolted through the support structure.

9. A roof, or a portion of a roof, according to Claim 6 or 7, wherein the restraining means is fixed to the support structure by means of a ring bolt which is screwed into the support structure.

10. A roof, or a portion of a roof, according to any one of Claims 7 to 9, wherein the restraining means is formed of a rubber material.

11. A roof, or a portion of a roof, according to any preceding claim, wherein the panel of fibreglass material is covered, on the side thereof which forms the outside of the roof, with a coat of a waterproof gel.

12. A roof, or a portion of a roof, according to any preceding claim, wherein the panel of fibreglass material is of unitary nature.

13. A roof, or a portion of a roof, according to Claim 12, wherein the panel of fibreglass material, which is of unitary nature, is formed from a plurality of fibreglass sheets bonded together at adjacent edge regions.

14. A method of roofing a building, which method comprises positioning a panel of fibreglass material above a support structure, and securing the panel of fibreglass material at its periphery, whilst leaving provision for relative movement between the panel and the support structure.

15. A method according to Claim 14, wherein the panel of fibreglass is of unitary nature.

16. A method according to Claim 15, wherein the panel of fibreglass material is formed from a plurality of fibreglass sheets bonded together at adjacent edge regions.

17. A method according to Claim 16, wherein the fibreglass sheets are bonded together with fibreglass matting, a resin and a catalyst.

18. A method according to any one of Claims 14 to 17, wherein the panel of fibreglass is coated on its weatherside with a waterproof gel coating.

19. A roof, or a portion of a roof, substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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