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(54) Building panels

(57) A building panel, which comprises a wall part, a roof part or other part of a building or other construction and is primarily, but not exclusively, concerned with roof panels having a light transmitting part such as transparent or translucent part allowing at least some light to pass through, wherein the building panel has at least one edge portion and a raised or offset portion extending out of said edge portion, said raised or offset portion and said edge portion being formed as a single member.

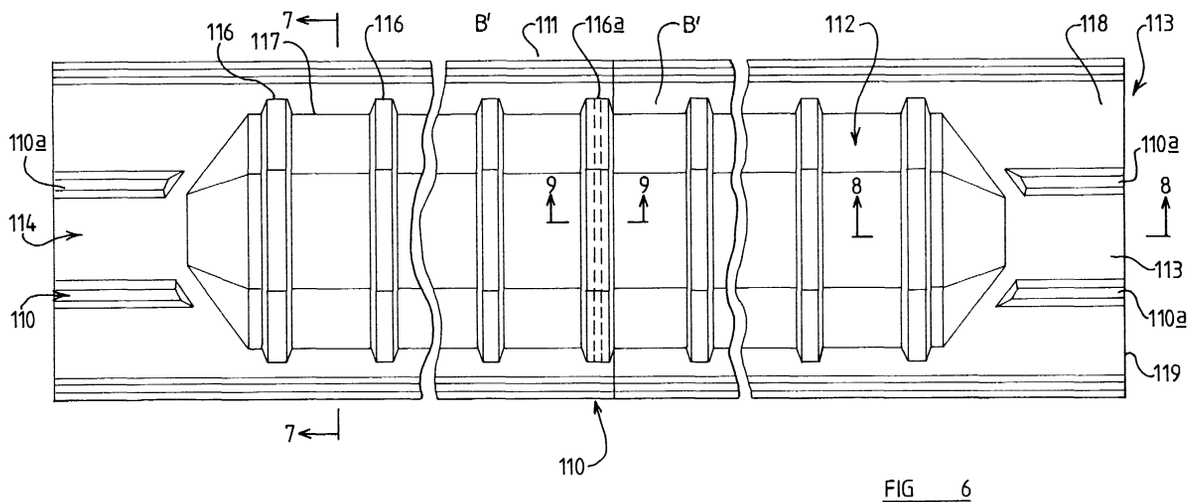

FIG 6

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Description

[0001] The present invention relates to a building panel, which comprises a wall part, a roof part or other part of a building or other construction and is primarily, but not exclusively, concerned with roof panels having a light transmitting part such as transparent or translucent part allowing at least some light to pass through.

[0002] For example, the roof of a structure in known constructions may comprise a plurality of substantially planar panels secured together and secured to a support, such as purlins or rafters, provided as a part of the roof structure. If it is desired to provide a transparent or translucent part to allow access of light to the inside the building a suitable shape may be formed from translucent or transparent material and fixed, for example, by roofing screws to the roof panel. In normal circumstances the planar panels are installed, on site, in the roof and then the transparent or translucent part is fixed to the installed panel off site.

[0003] It is one object of the present invention to provide a new or improved building panel having a light transmitting part.

[0004] According to one aspect of the invention we provide a building panel having at least one edge portion and a raised or offset portion extending out of said edge portion, said raised or offset portion and said edge portion being formed as a single member.

[0005] The edge portion of the building panel may define a surface and said raised or offset portion may be disposed so as to be raised or offset relative to said surface so as to provide said raised or offset portion of said panel.

[0006] The or each edge portion may be generally planar.

[0007] The or each edge portion may be adapted to co-operate with an edge portion of an adjacent support which may be a panel.

[0008] Preferably said panel has two edge portions each edge portion adapted to co-operate with a respective adjacent support.

[0009] Conveniently said building panel may have end portions, the end portions being adapted to co-operate with end portions of an adjacent support which may be a panel.

[0010] Preferably the edge and/or the end portions are generally or substantially planar but it is envisaged that they will probably not be completely flat but will have a profile, for example, a corrugation or corrugations which assists in providing rigidity to the building panel.

[0011] Alternatively, if desired the edge and/or the end portions may be of any non-planar shape, for example, curvilinear or angular and may be provided with a corrugation or corrugations to assist in providing rigidity to the building panel.

[0012] The raised or offset portion may be made of transparent or translucent material thereby permitting of transmittal of light through the panel to access the interior of the building and it is envisaged that the remainder of the panel may also be transparent or translucent albeit it may overlie adjacent panels which are opaque and may for example, be formed of different material. Conveniently the building panel of the present invention is made from a plastics material and conveniently said plastics material comprises polycarbonate.

[0013] The raised or offset portion of the panel may have any desired shape. For example, it may extend along an arcuate path or surface, or other curvilinear path or surface between edge regions or may comprise a plurality of planar portions or comprises a U or V shaped section as required.

[0014] It is further envisaged that the raised or offset portion may be formed with stiffening ribs.

[0015] The building panel, the subject of the present invention may comprise a single skinned unit or parts thereof may be provided with a double skin and it is envisaged that the raised or offset portion may be formed with a double skin to provide additional strength and furthermore, acoustic and thermal insulation.

[0016] It is a further object of the present invention to provide a new method of forming a building panel.

[0017] According to another aspect of the present invention we provide a method of forming a building panel comprising the steps of vacuum forming a panel against a mould, said mould having at least one edge region, which may be substantially planar, and a raised or offset portion.

[0018] Conveniently the building panel may have two edge regions and may also have two end portions.

[0019] Said edge regions and said end portions may be substantially planar portions and provide boundaries to said raised or offset portion. Conveniently, said raised or offset portion is made of a translucent or transparent material.

[0020] The invention will now be described in more detail by way of example only with reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a building panel embodying the present invention;

FIGURE 2 is a fragmentary cross-sectional view to an enlarged scale showing how a doubled wall portion may be formed;

FIGURE 3 is a cross-sectional view on the line 3-3 of Figure 1;

FIGURE 4 is an alternative section of the panel part;

FIGURE 5 illustrates a possible connection of an end to end joint of the raised formation;

FIGURE 6 is a plan view of another building panel embodying the invention;

FIGURE 7 is a cross-section taken on the line 7-7 of Figure 6;

FIGURE 8 is a section on the line 8-8 of Figure 6, and

FIGURE 9 is a cross-section, to an enlarged scale, taken on the line 8-8 of Figure 6.

[0021] Referring first to Figure 1 a building panel B is shown having a first edge region or portion 10, a second edge region or portion 11, a raised or offset portion 12 and end portions 13 and 14. The edge portions 10, 11 and the end portions 13 and 14 are substantially planar albeit they are formed with rib formations 10a of generally truncated triangular shape in cross-section adapted to co-operate with roofing sheets having similar formations (albeit the other roofing sheets may be made from different material). By providing the building panel with rib formations 10a it is readily securable to a roof structure provided with roof panels having co-operating formation along the edges and at the ends of the panel.

[0022] In between the edge regions or portions 10 and 11 and end regions or portions 13 and 14 is the raised or offset portion 12. The raised portion 12 is provided along its length with transverse ribs such as those shown at 16 and for example which can be seen in more detail in Figure 5. This provides the raised portion 12 with additional stiffness and strength.

[0023] The building panel B may be of any suitable length and is preferably formed by vacuum forming against a suitably shaped mould in conventional manner thereby allowing the manufacture of the building panel in a single simple step, thus obviating the need to bond the raised portion to the edge region of the building panel. This ensures a simple and economical manufacturing process and also overcomes the problem of possible leaks in the bonding process which may occur particularly if the edge region of the panel and the raised portion are made from different materials and continuing expansion differences can cause the bond in time to fail. This does not occur when the complete panel is made as a single element.

[0024] If it is desired to provide additional strength and/or sound and thermal insulation at least the raised portion may be provided with a double skin and a separate moulding may be bonded to the raised formation. Such an arrangement is shown in Figure 2 which illustrates a raised portion 12 having secured thereto an inner panel or skin B_1 which is bonded to the building panel B around an edge region 21 which is disposed along an inner side 10b of each rib 10a.

[0025] Figure 3 shows a sectional view along such a roofing panel B, B1 and in the view shown a panel of double thickness is shown having a building panel B with an inner panel B1 to provide a raised or offset portion 20. In this case, the inner skin is also continued to the end regions so that the two end regions or portions of the panel has a lower skin one of which is shown at 22 as well as upper skin end portions, one of which is shown at 13.

[0026] Figure 4 shows an alternative arrangement in which the building panel has a raised or offset part 25, and in this case only a single skin is provided over the whole panel.

[0027] If desired, in a modification, only the raised or offset part may be formed with a double skin but the end region may have only a single skin 29.

[0028] Where it is required to join panels end to end it will be seen that the end regions 13 and 14 allow a building panel embodying the invention to overlie adjacent such building panels or alternatively, a building panel embodying the invention may overlie or underlie an adjacent panel of the roof structure but not embodying the invention. Particularly when the building panel are of a different material, for example polycarbonate, to that of adjacent panels, which may be aluminium, plastics material or steel and a differential in expansion is likely due to changes in temperature, some region of overlap may be provided to permit of substantial differences without causing damage to any roof structure of which it forms a part.

[0029] In the case where it is desired to secure together building panels of the present invention in end to end relationship so that the raised portion is continuous an overlapping joint may be provided such as that shown in Figure 5 and an end portion of one of the roofing panels may be provided with an oversized rib such as that shown at 30 which will overlie the rib 31, which is an end one of the ribs 16, and also provide clearance areas such as those shown at 32 and 33 to permit of some relative movement between the panels for example, due to thermal expansion without causing damage to either panel. In order to provide additional weather proofing, neoprene or other seals may be provided if required.

[0030] Referring now to Figure 6 two building panels B_1 are shown each having a first edge portion 110, a second edge portion 111a raised or offset portion 112 and end portions 113, 114 respectively. The edges portions 110, 111 and the end portions 113 and 114 are substantially planar albeit they are formed with the formations 110a of generally truncated triangular configuration and adapted to co-operate with roofing sheets having similar formations albeit the other roofing sheets may be made of different of different material.

[0031] In between the edge regions or portions 110, 111 and the end regions of portions 113 or 114 is the raised or offset portion 112. The raised or offset portion 112 is provided along its length with transverse ribs such as those shown at 116 also of truncated triangular configuration. As can best be seen in Figure 7 the raised portion 112 is also of truncated triangular configuration as opposed to the arcuate configuration of the first embodiment. As in the first embodiment the ribs 116 provide the portion 112 with additional stiffness and strength.

[0032] The building panels may be of any suitable length and are preferably formed by vacuum forming in a suitable synthetic plastics material against a suitably shaped mould in conventional manner thereby allowing the manufacture of the building panel in a single step as in the case of the first embodiment. Thus, the advantages mentioned in connection with the first embodiment relating to making the panel in a single step as a single integral panel of edge portion and raised or offset portion

applies equally to the second embodiment.

[0033] In the second embodiment two second panels B'1 are moulded or otherwise made of similar configuration to the panels B' hereinbefore described with reference to Figure 7 but with transverse ribs 116b. The panels B' and B'_1 are disposed so that the surface of the panel B' is spaced by a small distance, for example, in the range 10-50 mm and about 20 mm in the example, from the corresponding upper surface panel B'_1.

[0034] At the side 110, the panel B' is adhesively secured to panel B'1 by adhesive applied along the extreme edge portion thereof 119a, 119b whilst along the edge 111 of the panel two panels B', B'1 are adhesively secured together by adhesive applied between an upturned flange 119c and a limb 110b of the rib 110a extending along the edge of the panel 111.

[0035] At the end regions 113, 114 the configurations are similar and so only the configuration at the end 113 will now be described with particular reference to Figure 9.

[0036] As can be seen from Figure 8 the inner panel B'1 is provided with a vertically upwardly extending part 121 which is connected to a horizontally extending flange 122 terminating in a downwardly lip 124. The flange 122 is adhesively bonded to the undersurface of the end portion 113, both to the ribs 110a and to the portions 118 of the surface of the edge portion between the ribs 110a, at a position spaced inwardly from the extreme end 119 of the panel.

[0037] In the example illustrated the length of a panel is approximately 6 metres whilst the surrounding support panels of the roof structure, not illustrated, provide an aperture approximately 12 metres long.

[0038] To this end two panels B', B_1' are provided which are handed so that the panels overlap as best shown in Figure 7. The left hand panel B' of Figure 6, is provided with an end rib 116a which is similar to the ribs 116. The lower panel B'1 is provided with an end flange 130 which is adhesively secured to the undersurface of the upper panel B' in the region 131 as illustrated. The right hand panel B' is formed with an end rib formation 116b which differs from that of the conventional ribs by being of smaller longitudinal extent whilst the rib 116a is of slightly larger longitudinal extent so that it can fit within the rib 116a with a seal 132. The rib 116b has a downwardly extending side 116c and a end flange 133 which is adhesively secured to an end flange 134 of the inner skin B1' which is provided with a rib 116' similar to the other ribs 116'. In this embodiment the raised or offset portion is of double skin configuration whilst the edge portions 113, 114 are of single skin configuration.

[0039] In other respects the embodiment described with reference to Figures 6-8 is similar to that of Figures 1-5 but modified mutatis mutandis as appropriate.

[0040] Whereas the building panel of the present invention has been shown in relatively simple forms of one or two wall thickness sheets made preferably from a polycarbonate material it will be appreciated that it may comprise a composite material. The raised portion may be transparent or translucent and the remainder opaque and the substantially planar but ribbed or corrugated edge regions may be provided with an additional layer of foam like material for example to provide additional thermal and/or acoustic insulation.

[0041] Although a roof panel has been primarily described hereinbefore a panel embodying the invention may be utilised in any desired part of the building.

[0042] In the present specification "comprise" means "includes or consists of" and "comprising" means "including or consisting of'.

[0043] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A building panel having at least one edge portion and a raised or offset portion extending out of said edge portion, said raised or offset portion and said edge portion being formed as a single member.

2. A building panel according to Claim 1 wherein the edge portion of the building panel defines a surface and said raised or offset portion is disposed so as to be raised or offset relative to said surface so as to provide said raised or offset portion of said panel.

3. A building panel according to Claim 1 or Claim 2 wherein the or each edge portion is generally planar.

4. A building panel according to any of the preceding claims wherein the or each edge portion is adapted to co-operate with an edge of an adjacent support.

5. A building panel according to any one of the preceding claims wherein said panel has two edge portions each edge portion being adapted to co-operate with a respective adjacent support.

6. A building panel according to any one of the preceding claims wherein said building panels have end portions the end portions being adapted to co-operate with end portions of an adjacent support, which may be a panel.

7. A building panel according any one of the preceding claims wherein the edge and/or the end portions are generally or substantially planar.

8. A building panel according to Claim 7 wherein said portions have a profile.

9. A building panel according to Claim 8 wherein said profile comprises at least one corrugation which assists in providing rigidity to the building panel.

10. A building panel according to any one of Claims 1 to 6 wherein the edge and/or the end portions are of any non-planar shape.

11. A building panel according to Claim 10 wherein said portions are provided with at least one corrugation to assist in providing rigidity to the building panel.

12. A building panel according to any one of the preceding claims wherein the raised or offset portion is made of transparent or translucent material thereby permitting transmittal of light through the panel.

13. A building panel according to any one of the preceding claims wherein the building panel is made from a plastics material which may comprise polycarbonate.

14. A building panel according to any one of the preceding claims wherein the raised or offset portion of the panel extends along an arcuate path or surface, or other curvilinear path or surface between edge regions or comprises a plurality of planar portions all comprising a U or V-shaped section.

15. A building panel according to any one of the preceding claims wherein the raised or offset portion is formed with stiffening ribs.

16. A building panel according to any one of the preceding claims wherein the building panel comprises a single skinned unit.

17. A building panel according to any one of Claims 1 to 15 wherein the building panel comprises parts provided with a double skin.

18. A building panel according to Claim 17 wherein said raised or offset portion is formed with a double skin.

19. A building panel substantially as hereinbefore described with reference to Figures 1-5 or 6-9 of the accompanying drawings.

20. A method of forming a building panel comprising the steps of vacuum forming a panel against a mould, said mould having at least one edge region, which may be substantially planar, and a raised or offset portion.

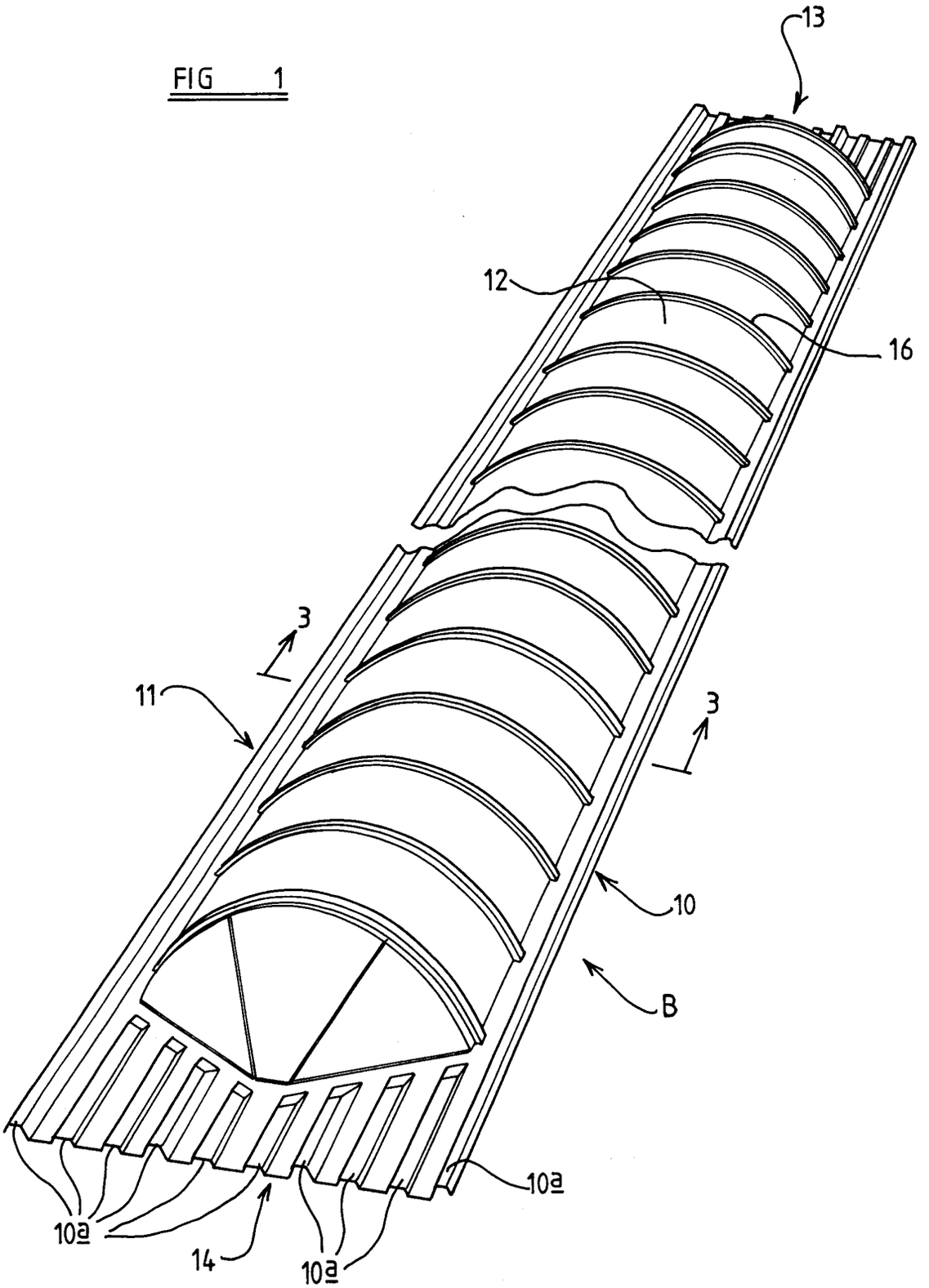
21. A method according to Claim 20 wherein the building panel has two edge regions.

22. A method according to Claim 20 or Claim 21 wherein the building panel has two end portions.

23. A method according to Claim 22 wherein said edge regions and said end portions are substantially planar portions and provide boundaries to said raised or offset portion.

24. A method according to any one of the preceding claims wherein said raised or offset portion is made of a translucent transparent material.

FIG 1



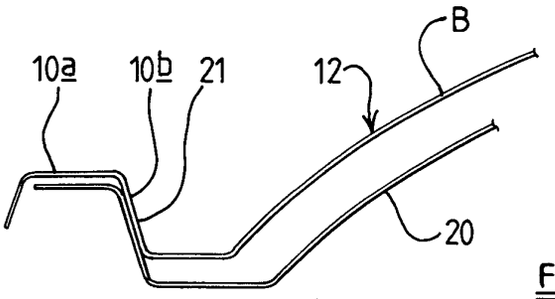


FIG 2

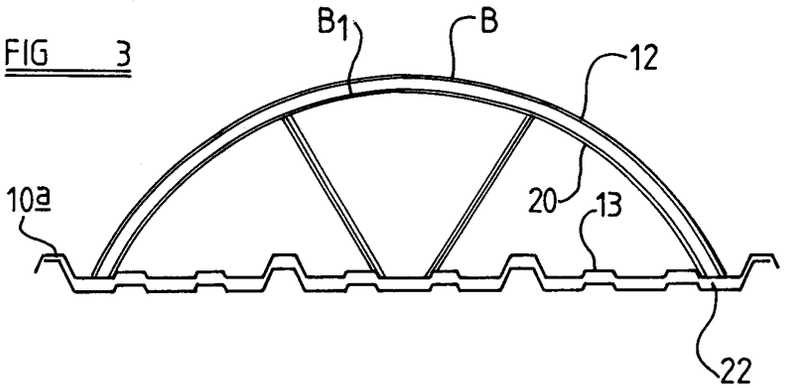


FIG 3

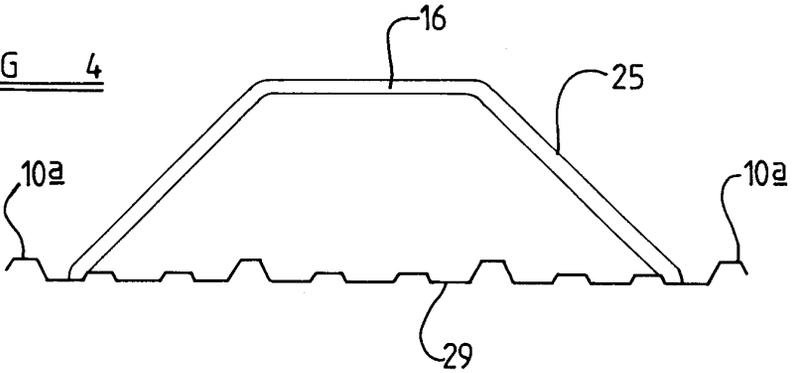


FIG 4

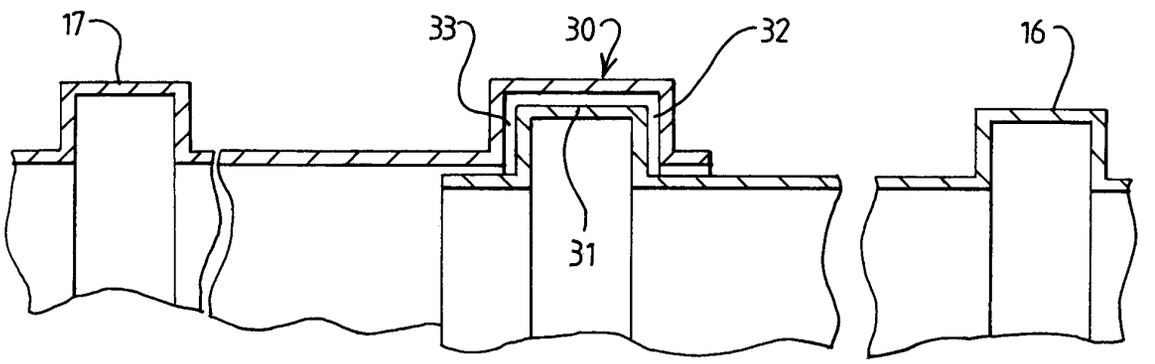


FIG 5

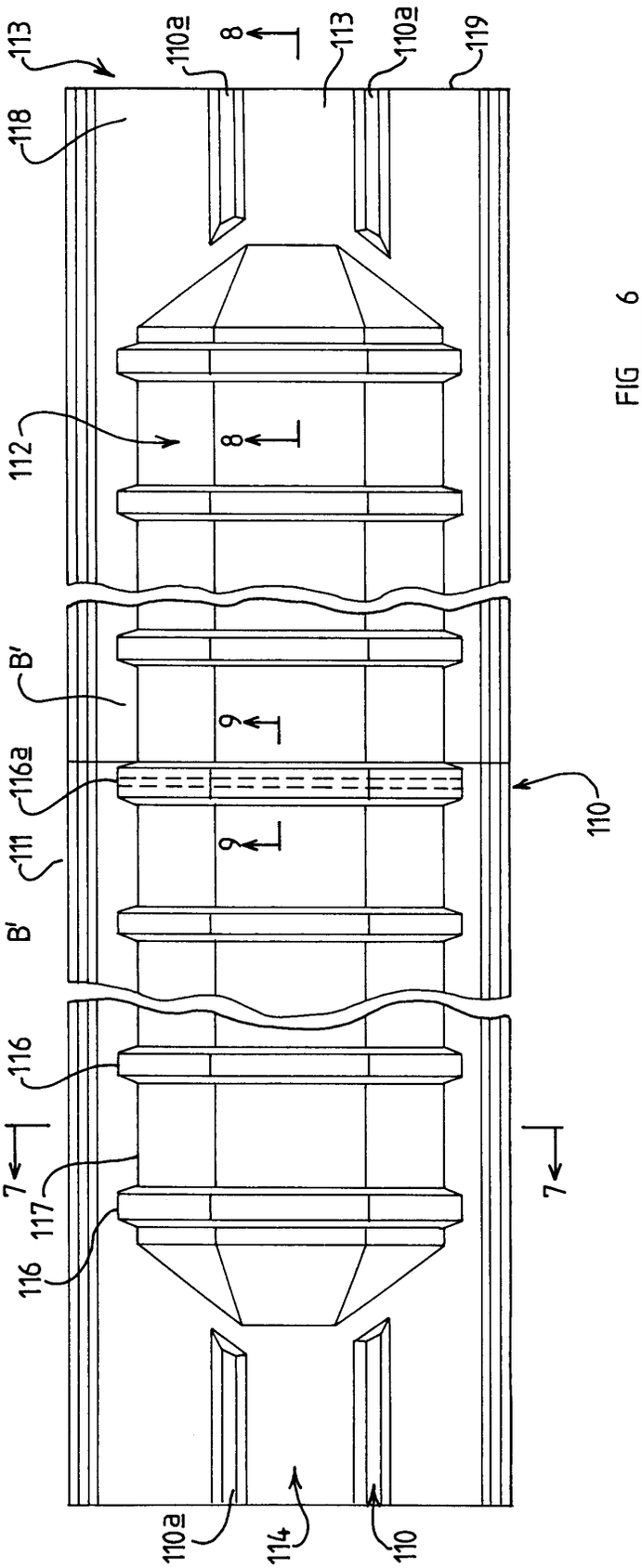
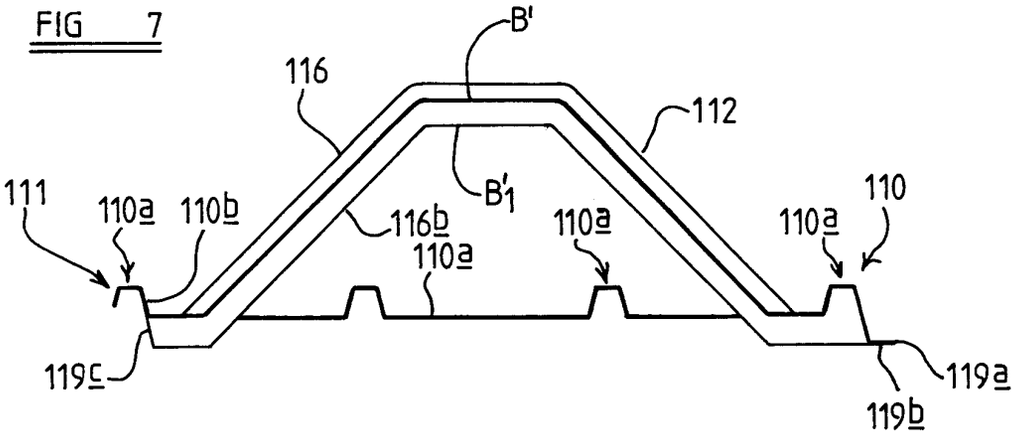

113
110a
8
113
110a
119
118
112
8
B'
9
116a
110
111
9
B'
116
7
7
117
116
110a
114
110

FIG 6

FIG 7



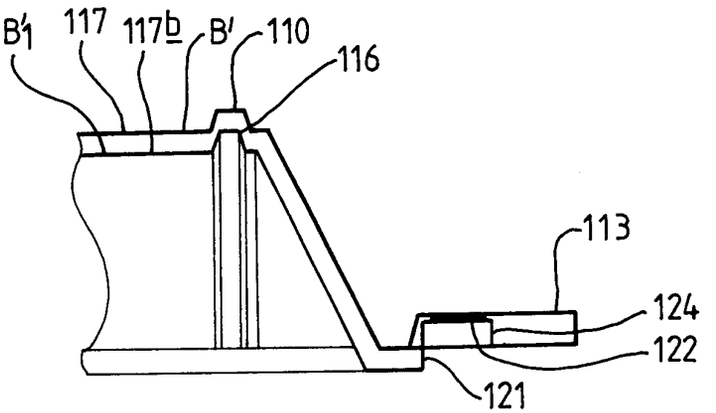


FIG 8

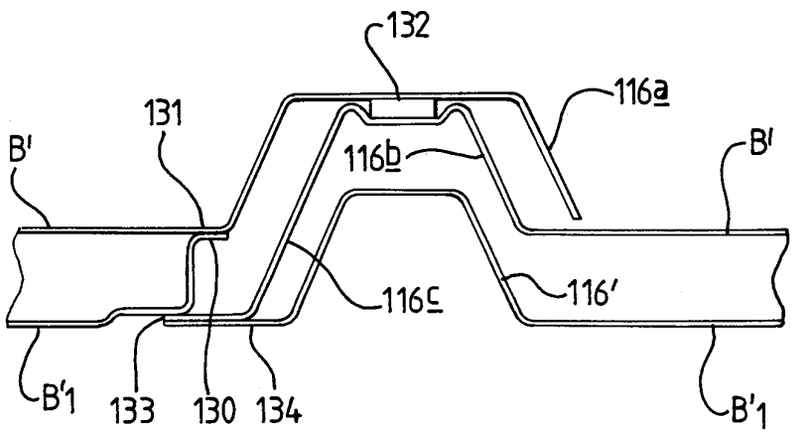


FIG 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 31 1322

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 344 261 A (WEISNER ET AL.) 17 August 1982 (1982-08-17)	1-3,7, 12-14, 16-18, 20-24	E04D3/28
Y	* column 2, line 58 - column 5, line 1; figures 1,2,7 *	4-6,8, 10,11	
Y	DE 38 32 995 A (BÜSSGEN) 23 November 1989 (1989-11-23) * the whole document *	4-6,8, 10,11	
A	BE 883 519 A (BOGAERT) 15 September 1980 (1980-09-15) * figures 1-3 *	9,15	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 March 2001	Mysliwetz, W

CATEGORY OF CITED DOCUMENTS

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20-03-2001

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