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(71) Applicant: **VELUX Industri A/S**
**2860 Soborg (DK)**

(72) Inventor: **Edvardsen, Allan**
**8660 Skanderborg (DK)**

(74) Representative: **Carlsson, Eva et al**
**Internationalt Patent-Bureau,**
**23 Hoje Taastrup Boulevard**
**2630 Taastrup (DK)**

## (54) A window for installation in a roof structure and a mounting bracket for use in the installation

(57) The invention provides a window (1) comprising a frame with a number of frame members (2) and mounting brackets (7). Each mounting bracket has a first leg (7b) to be connected with the exterior side of a frame member and a second leg (7a) substantially perpendicular to and connected with the first leg in a connection point (7c). The exterior side of the frame members is provided with a longitudinal marking (16) extending in the longitudinal direction of the frame member, and the mounting brackets have at least one marking for cooperating with the longitudinal marking (16) of the frame member. The markings may be made as a graduated scale in the form of a millimetre graduation, a graduation in another unit or a symbol system.

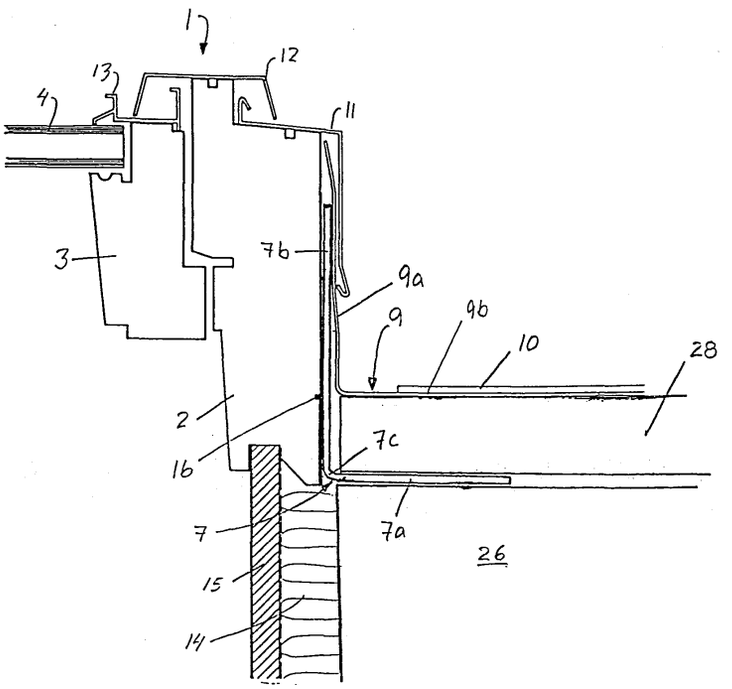


Fig. 2

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## Description

**[0001]** The present invention relates to a window for installation in a roof structure, comprising a frame with a number of frame members and a plurality of mounting brackets, each mounting bracket comprising a first leg for connection with the exterior side of a frame member and a second leg substantially perpendicular to and connected with the first leg in a connection point for connection with the roof structure, and in which the exterior side of at least the frame members to be connected with mounting brackets is provided with a longitudinal marking extending in the longitudinal direction of the frame member.

**[0002]** When installing such windows, two or three angular mounting brackets are usually screwed into each of the frame side members of the window during the installation, following which the window is placed in the roof opening and fastened by means of the second leg to the subjacent roof structure. The longitudinal marking, which may for instance be a groove and/or a coloured marking line, makes it possible to obtain a correct positioning of the brackets in the transverse direction of the frame members, such that the leg intended for connection with the roof structure is placed in the desired level in consideration of the flashing, which is necessary for ensuring tightness between the window and the surrounding roof covering.

**[0003]** This flashing is normally delivered together with the window in a condition ready for mounting and usually comprises an L-shaped portion, the first flap of which is adapted to extend upwards along the side members of the frame and thus overlaps, in a mounted position, at least partially the corresponding leg of the mounting bracket, and the second flap of which is placed in such a manner that it is sealingly overlapped by the roof covering. The second flap rests, depending on the construction of the roof structure, either directly on the corresponding leg of the mounting bracket, on an underroof or on an insulating material, which may be of different thicknesses. As it is not desirable to adjust the flashing on the site of installation, the longitudinal marking of the frame has in that connection to ensure that the fastening of the mounting bracket is carried out in such a manner that the distance between the upper surface of the frame and the abutment surface of the flashing on the roof structure is substantially constant, irrespective of the construction of the roof structure, such that the first flap of the flashing extends sufficiently far upwards on the associated frame member, which on the other hand has the effect that the fastening point of the mounting bracket on the frame member will be different depending on the construction of the roof structure.

**[0004]** For securing the mounting bracket on the frame member in question, the parts in question of the roof structure must thus be measured prior to the mounting. This measuring is an obvious source of error which may delay the mounting, as an erroneous measuring will have the effect that the mounting bracket has to be removed after the mounting of the window in the roof opening, if, as mentioned above, it is not preferable or maybe not even possible to adjust the flashing.

**[0005]** Therefore, it is the object of the invention to provide a window of the type mentioned by way of introduction, by means of which the mounting of the window is simplified and consequently made more rational, the risk of erroneous measurements being simultaneously reduced.

**[0006]** This object is according to the invention met in that each mounting bracket is provided with at least one marking for co-operation with the longitudinal marking of the frame member.

**[0007]** By such a window, a correct positioning of the mounting brackets is obtained in a simple way by the measuring of the parts in question of the roof structure being carried out by means of the marking or the markings on the mounting bracket itself, following which the mounting bracket is fastened to the frame member with this marking opposite or flushing with the longitudinal marking of the frame member, whereby it is ensured, irrespective of the positioning of the mounting bracket relative to the roof structure that a flashing extends with an equal length upwards along the side members of the frame, whereby a good sealing between the window and the surrounding roof covering is obtained.

**[0008]** To get flexibility in respect of the positioning of the mounting bracket, said marking or markings may be provided on each of the legs of the mounting brackets.

**[0009]** Preferably, each of said markings is a graduated scale in the form of a millimetre graduation, a graduation in another unit or a symbol system.

**[0010]** In windows, where the mounting bracket is fastened to the frame with the first leg extending outwards relative to the roof covering, the graduated scale preferably starts in the connection point between the legs of the mounting bracket.

**[0011]** In windows, which are mounted comparatively far down into the roof structure, and in which the mounting bracket is fastened to the frame with the first leg extending inwards relative to the roof covering, the graduated scale preferably starts near the end of the legs of the mounting bracket facing away from the connection point between the legs.

**[0012]** In an advantageous embodiment, the legs of the mounting brackets are of different lengths, which makes it possible to use a standardized mounting bracket for a wide range of different roof structures.

**[0013]** In another aspect of the invention, a mounting bracket having the features stated in claims 7-12 is provided.

**[0014]** The invention will be explained in detail in the following with reference to the schematic drawings, in which

Fig. 1 is a sectional view of a window according to the invention,

Fig. 2 a view corresponding to Fig. 1 of a different installation situation,

Fig. 3 a perspective view of a mounting bracket according to the invention,

Fig. 4 a sectional view of an alternative embodiment of the mounting bracket according to the invention.

**[0015]** The window according to the invention generally designated by 1 1 in Figs 1-3 comprises a frame, which traditionally has four frame members, one side frame member 2 of which is shown. A sash structure, here represented by a sash side member 3, is pivotally connected with the frame and encases an insulating pane 4.

**[0016]** In Fig. 1, the window 1 is mounted in a roof structure with rafters 5 and boards 6 by means of mounting brackets 7, which usually number four or six, said brackets being with a first leg 7a fastened pairwise opposite one another to opposite frame side members 2. The first leg 7a is in a connection point 7c, which is the vertex of the angle, connected with a second leg 7b extending substantially perpendicular to the first leg 7a, and by means of which the mounting bracket 7 is connected with the boards 6. An underlying roof covering 8 of traditional kind is laid out over the boards 6 and overlaps the second leg 7b of the mounting bracket 7 and extends somewhat upwards along the first leg 7a.

**[0017]** In the installation situation shown in Fig. 2 of the window 1, the roof structure comprises a concrete member 26, on top of which an insulation 28 is placed.

**[0018]** In view of providing a substantially weatherproof transition between the window 1 and the surrounding roof covering 10, a flashing arrangement is placed along the frame members. At the frame side members 2 the flashing arrangement comprises an L-shaped flashing 9 with a first flap 9a extending upwards along the frame side member 2 and thereby overlapping the first leg of the mounting bracket 7, and a second flap 9b, which in Fig. 1 rests on the underlying roof covering 8 and in Fig. 2 on the insulation 28, and which is sealingly overlapped in a manner known per se by the plane roof covering 10. The first flap 9a of the L-shaped flashing 9 is overlapped at the upper end by a metal cap 11, which together with corresponding caps 12 and 13 forms a shield for the frame and sash against the weather. The frame side member 2 is inwardly connected with an inclined wall (not shown) through an insulating layer 14 and a light opening panel 15.

**[0019]** Finally, the frame side member 2 is provided with a longitudinal marking 16 extending in the longitudinal direction of the frame side member, said marking being in particular a coloured groove.

**[0020]** In the following, the fastening of the mounting bracket 7 to the frame member and the subsequent installation of the window in a roof opening will be explained in detail.

**[0021]** Firstly, the thickness of the element or elements separating the abutment surface of the mounting bracket 7 on the roof structure from the abutment surface of the second flap 9b of the L-shaped flashing 9 is determined, i.e. the underlying roof covering 8 in Fig. 1 and the insulation 28 in Fig. 2, respectively, by means of a mounting bracket 7 illustrated most distinctly in Fig. 3. To that end, the mounting bracket 7 is on each leg 7a, 7b provided with a marking, which is a graduated scale 17,18 in the form of a millimetre graduation. This graduation may also be in another unit, or the graduated scale may be made as a symbol system. Each graduated scale 17,18 starts in the connection point 7c between the legs 7a,7b of the mounting bracket, and the graduated scale 17 on the first leg 7a comprises values for instance in the range of 0-50 mm, whereas the graduated scale 28 on the second leg 7b comprises values for instance in the range of 50-90 mm. To ensure that the mounting bracket, in case of small thicknesses, does not project over the upper side of the frame side members, thus getting in conflict with the metal cap 11, one leg of the mounting bracket 7 is shorter than the second one, and in this case the leg 7a is thus shorter than the leg 7b.

**[0022]** In the installation situation shown in Fig. 1 with an underlying roof covering 8, the first leg 7a of the mounting bracket 7 is placed in abutment against the frame side member 2 in flush with the longitudinal marking groove 16 of the frame side member 2. The mounting bracket 7 is fastened to the frame side member 2 by means of screws (not shown), which are screwed into the frame member through screw holes 19 into the leg 7a. When the desired number of mounting brackets has been fastened to the frame in this manner, the window is placed into the opening made therefor in the roof, and the mounting bracket 7 is anchored to the roof structure by means of screws (not shown), which are screwed into screw holes 20 in the leg 7b and further down into the boards 6. Finally, the underlying roof covering 8 is laid over the mounting bracket 7, the flashing 9 and the metal caps 11-13 are mounted and the roof covering 10 is put in place.

**[0023]** The installation of the window 1 in the roof structure shown in Fig. 2 is carried out in the same manner as described above. Firstly, the thickness of the insulation 28 is measured and read by means of the markings on the mounting bracket 7, in this case by the graduated scale 18 on the longer leg 7b, following which this leg is placed in abutment against the frame side member 2 with the scale value read in flush with the longitudinal marking groove 16 on the frame side member 2. Subsequently, the mounting bracket 7 is screwed onto the frame side member 2 by means of the screw holes 20 in the longer leg 7b, which in this case thus constitutes the first leg. The remaining part of the installation takes place as described above.

**[0024]** It turns out that the distance between the upper side of the frame side member 2 and the abutment surface for the second flap 9b of the flashing 9 is substantially identical in the two installation situations, and it is

thus ensured that the first flap 9a of the L-shaped flashing 9 extends with an equal and appropriate distance upwards on the frame side member 2.

**[0025]** In the alternative embodiment shown in Figs 4 and 5 of the window 100 with associated mounting brackets 107, the window is placed further down in the roof structure than in the embodiment shown in Figs 1-3. Parts having the same or analogous function carry identical reference numerals but with a 100 added.

**[0026]** The window 100 is in this case built into a roof structure comprising rafters 105 and battens 108a and possibly counter-battens 108b.

**[0027]** In this embodiment the marking in the first leg 107a of the mounting bracket 107 is likewise made as a graduated scale 117 in the form of a millimetre graduation, but in this case the scale starts near the end of the legs of the mounting bracket facing away from the connection point 107c between the legs 107a and 107b. Measurements are made of the elements which in the mounted position of the window separate the abutment surface of the mounting bracket 107 on the roof structure from the abutment surface of the second flap 109b of the L-shaped flashing 109, i.e. the thickness of the batten 108a and the counter-batten 108b.

**[0028]** Then the mounting bracket 107 is placed with its first leg 107a in abutment on the frame side member 102, said leg extending inwards relative to the roof covering and the scale value read on the graduated scale 117 in flush with the longitudinal marking groove 116 on the frame side member 102. Subsequently, the mounting bracket 107 is fastened to the frame side member 102, and the remaining part of the installation is made in the same way as described above.

**[0029]** Like in case of the embodiment described above, both legs 107a,107b of the mounting bracket 107 may be provided with markings and the legs may be of different lengths.

**[0030]** The mounting bracket according to the invention may also find use in connection with other types of roof-penetrating elements than the window shown.

## Claims

1. A window (1;101) for installation in a roof structure, comprising a frame with a number of frame members (2;102) and a plurality of mounting brackets (7; 107), each mounting bracket comprising a first leg (7a,7b;107a) for connection with the exterior side of a frame member, and a second leg (7b,7a;107b) substantially perpendicular to and connected with the first leg in a connection point (7c;107c) for connection with the roof structure, and in which the exterior side of at least the frame members to be connected with mounting brackets is provided with a longitudinal marking (16;116) extending in the longitudinal direction of the frame member, **characterized** in that each mounting bracket has at least one marking (17,18;117) for cooperating with the longitudinal marking (16;116) of the frame member.

2. A window according to claim 1, **characterized** in that said marking or markings (17,18) are provided on each of the legs of the mounting bracket (7a,7b).

3. A window according to claim 1 or 2, **characterized** in that each of said markings is a graduated scale (17,18;117) in the form of a millimetre graduation, a graduation in another unit or a symbol system.

4. A window according to claim 3, **characterized** in that each graduated scale (17,18) starts in the connection point (7c) between the legs (7a,7b) of the mounting bracket.

5. A window according to claim 3, **characterized** in that each graduated scale (117) starts near the end of the legs (107a) of the mounting bracket facing away from the connection point (107c) between the legs (107a,107b).

6. A window according to any of the preceding claims, **characterized** in that the legs (7a,7b) of the mounting bracket are of differing lengths.

7. A mounting bracket for installation of an element, in particular a window, in a roof structure, comprising a first leg (7a,7b;107a) to be connected with the exterior side of the element and a second leg (7b,7a; 107b) substantially perpendicular to and connected with the first leg in a connection point (7c;107c) for connection with the roof structure, **characterized** in that each mounting bracket is provided with at least one marking (17,18;117) for co-operating with a marking (16;116) on the element.

8. A mounting bracket according to claim 7, **characterized** in that said marking or markings (17,18) are provided on each of the legs (7a,7b) of the mounting bracket.

9. A mounting bracket according to claim 7 or 8, **characterized** in that each of said markings is a graduated scale (17,18;117) in the form of a millimetre graduation, a graduation in another unit or a symbol system.

10. A mounting bracket according to claim 9, **characterized** in that each graduated scale (17,18) starts in the connection point (7c) between the legs (7a, 7b) of the mounting bracket.

11. A mounting bracket according to claim 9, **characterized** in that each graduation scale (17,18) starts near the end of the leg (107a) of the mounting bracket facing away from the connection point

(107c) between the legs (107a,107b).

**12.** A mounting bracket according to any of the claims 7 - 11, **characterized** in that the legs (7a,7b) of the mounting bracket are of different lengths.

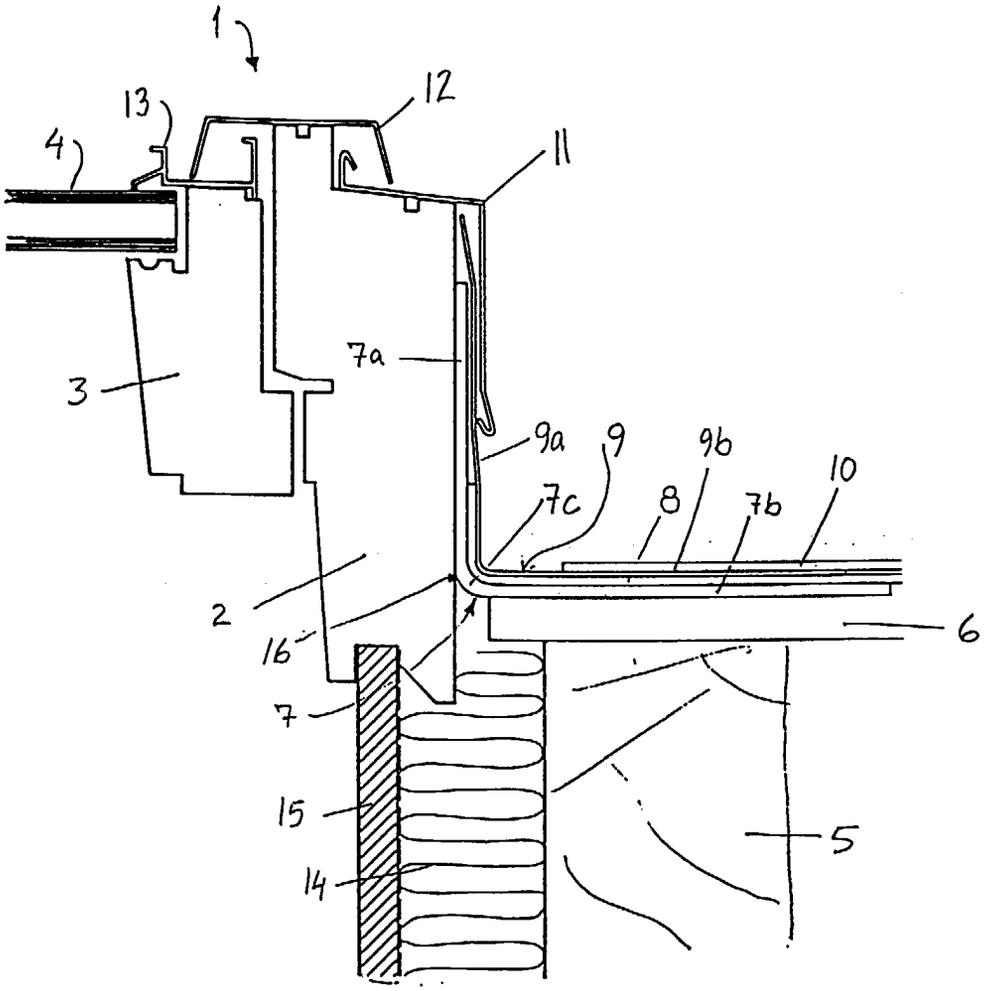


Fig. 1

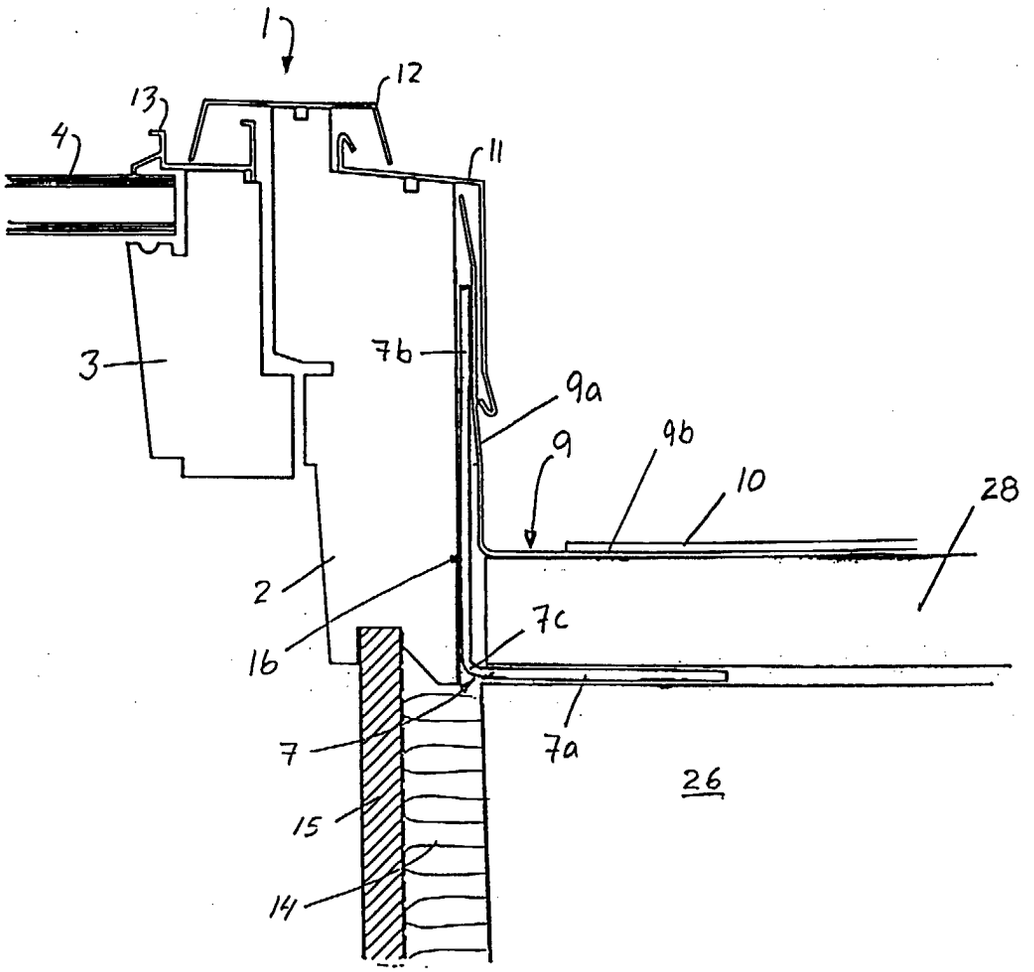


Fig. 2

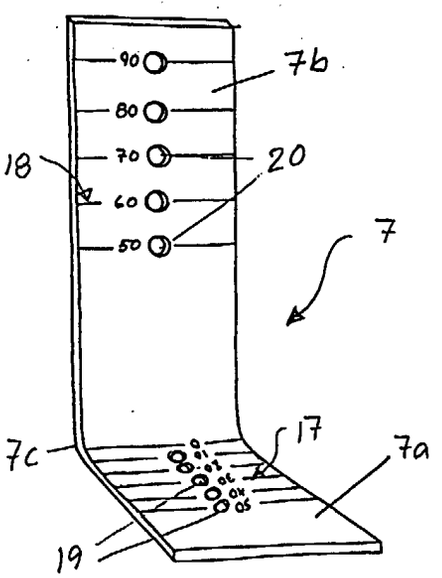
90
80
70
60
50
7b
18
20
7
7c
17
7a
19

Fig. 3

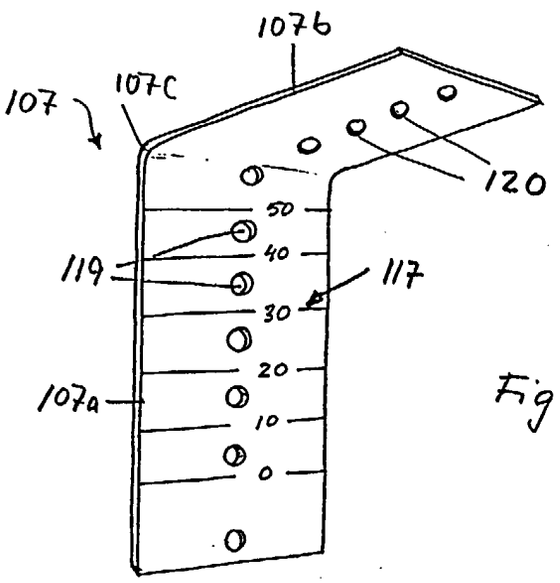
1076
107
107C
120
50
40
119
117
30
20
107a
10
0

Fig. 5

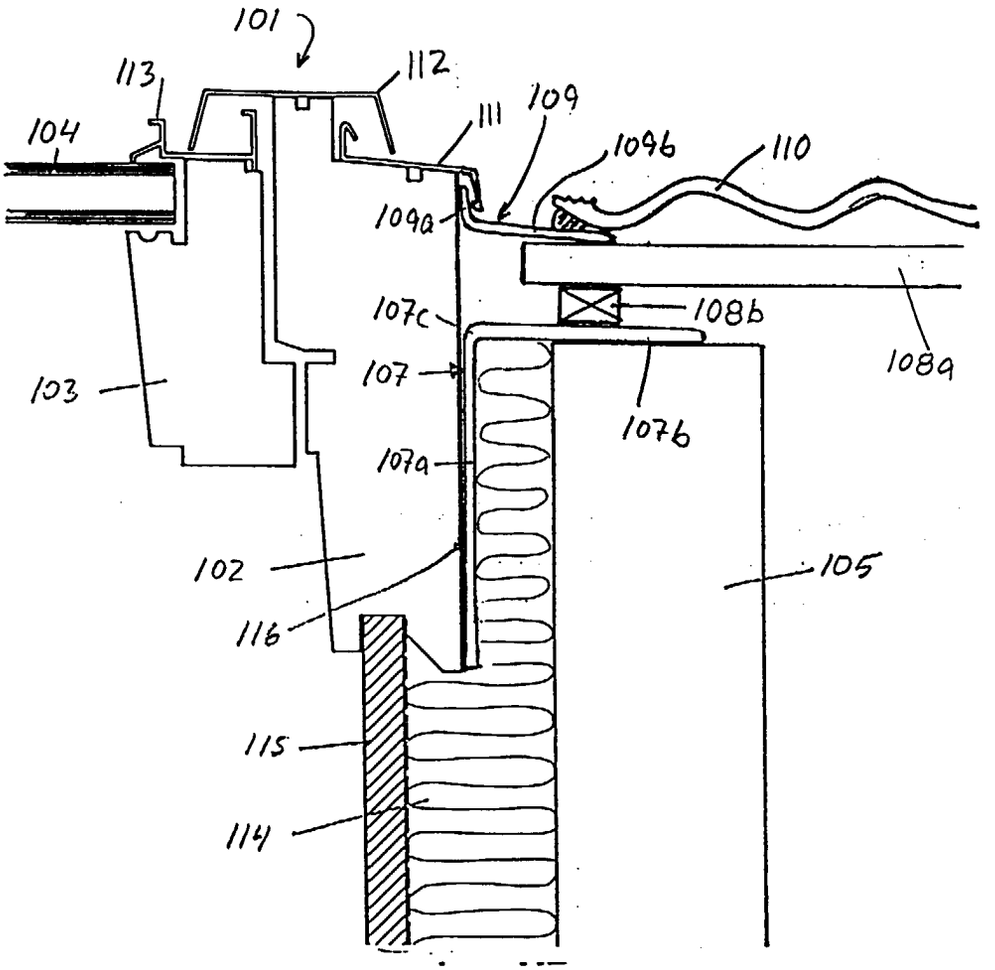
101
113
112
104
111
109
109b
110
109a
107c
108b
108a
103
107
107b
107a
102
105
116
115
114

Fig. 4