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(54) **A FLASHING MEMBER FOR A ROOF ELEMENT, SUCH AS A ROOF WINDOW, AND A FLASHING KIT**

(57) A flashing member for a roof element, such as a roof window, and a flashing kit comprising at least one such flashing member is disclosed. It comprises a first longitudinal element (110; 310) and a second longitudinal element (120; 320). The first longitudinal element (110; 310) has an L-shaped cross-section with a first leg adapted to be arranged against the roof element raising from a plane of a roof, and a second leg to extend along said plane of the roof. Said second leg comprises a slit-shaped pocket (117; 317) with an opening towards a distal edge portion (116; 316) and a bottom (119) towards the corner of the L-shape. The second longitudinal element (120; 320) is positionable in a first mounted position, in which a first side is at a vicinity of the bottom of the pocket, a second mounted position in which the first side is remote from the bottom, and a plurality of positions in between.

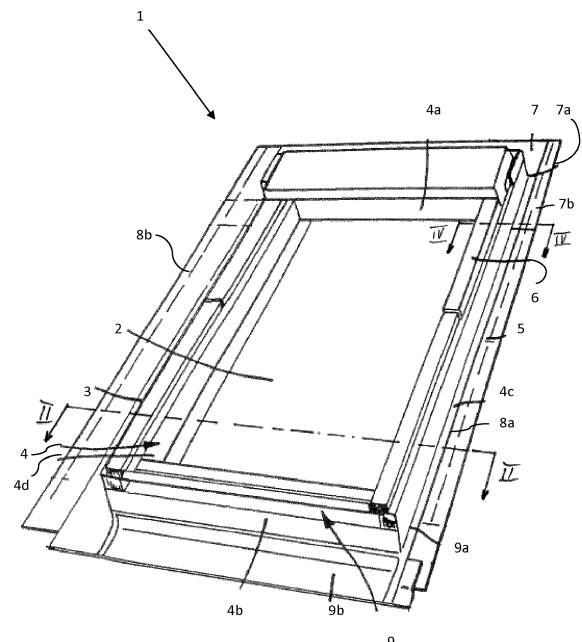


Fig. 1

Description

[0001] The present invention relates generally to installation of a roof element, such as a roof window.

[0002] In one aspect the invention relates to a flashing member for a roof element, such as a roof window, said flashing member comprising:

a first longitudinal element extending in a longitudinal direction, said first longitudinal element having a generally L-shaped cross-section with a first leg and a second leg, the first leg being adapted to be arranged against a side of the roof element raising from a plane of a roof in a mounted position, the second leg being arranged to extend along said plane of the roof in the mounted position, the first leg and the second leg being joined at a corner of the L-shape, inner sides of the first leg and the second leg relative to the L-shape defining an angle of less than 180° and outer sides of the first leg and the second leg relative to the L-shape defining an angle of more than 180°, the inner sides constituting a concave side of the flashing member, a distal edge portion of the second leg opposite the corner being bent towards the concave side, and said second leg comprising a slit-shaped pocket with an opening towards the distal edge portion and a bottom towards the corner of the L-shape; and

a second longitudinal element comprising a first side inserted into the pocket of the first longitudinal element and a second side opposite the first side, said second side comprising a second edge portion which is bent towards the concave side.

[0003] Further the invention relates to a flashing kit comprising at least one such flashing member.

[0004] A flashing member and a flashing kit of the above art are known from WO 95/28535 A1 which discloses a flashing arrangement for mounting of a roof element in a roof having a thin sheet-formed roofing. Thus in use of the flashing arrangement according to WO 95/28535 A1 a free edge of the sheet-formed material of the roofing is inserted into the pocket or slot of the first longitudinal element. The sheet-formed material of the roofing usually comprises regularly spaced ridges or fins extending in the longitudinal direction and to adapt to the position of such ridges or fins the first longitudinal element of WO 95/28535 A1 is as an important feature provided with two parallel slots at different distance from the first leg. In an embodiment the second pocket is provided by an extension element insertable in a single slot of the first longitudinal element to a fixed mounted position. Thus the flashing member and arrangement of WO 95/28535 A1 provide, in two different embodiments, two slots or pockets in two different fixed distances from the first leg. When fitting the roofing around a roof element provided with a flashing arrangement according to WO 95/28535 A1 the sheet-formed material of the roofing is

cut to fit the installed flashing arrangement.

[0005] In some situations, e.g. when installing a roof window in an array of solar collecting panels such as photovoltaic panels, it may not be possible or practical to adapt the roofing or roof covering to the flashing as taught by WO 95/28535 A1.

[0006] In a first aspect it is an object of the present invention to provide a flashing element and a flashing arrangement that avoid this problem.

[0007] This is obtained in that the second longitudinal element is positionable in a first mounted position in which the first side is at a vicinity of the bottom of the pocket, a second mounted position in which the first side is remote from the bottom of the pocket, and in a plurality of positions in between the first mounted position and the second mounted position. Hereby an overall width of the second leg, including the second longitudinal element, is adjustable to fit surrounding elements in the installation situation. The adjustability entails that the pocket has or must have a substantial depth to allow insertion of the side of the second longitudinal element to a certain minimum depth to provide a secure connection of the two longitudinal elements and still allow further insertion to a substantial further depth to provide for the adjustment.

[0008] It is acknowledged that other types of flashing elements with a variable width are known.

[0009] DE 29 29 604 A1 discloses a covering collar unit to be mounted in conjunction with windows in a roof, or collectors of solar radiation, or similar elements built into a roof. It comprises a generally L-shaped inner piece lying against the window - or other - frames. An outer compensating, shallow, generally U-shaped piece is placed beneath this, partially overlapping it, the degree of overlap being variable. The compensating piece adjoins the inner piece on the outside relative to the L-shape, and is made of sheet metal, or similar thin material, with a downward-open arch with a bent section of the inner piece protruding into the compensating piece. This construction entails that the compensating piece cannot support the adjacent side comprising said bent section of the inner piece thus involving the risk of a leak between the inner piece and the compensating piece. Other embodiments disclosed in DE 29 29 604 A1 provides for a coarse, stepwise adjustment with few steps.

[0010] WO 03/074812 A1 discloses a flashing member that provides a tight connection between a roof penetrating structure and a surrounding roofing. The flashing member comprises a sheet member, a first flange intended to be arranged against the roof penetrating structure, and a second flange arranged at a distance from the first flange, the distance defining a width. Means are provided for adjusting the width between the first and second flanges in order to allow the flashing member to be adjusted to different installation situations. In an embodiment these means are provided by two flat, hook-shaped parts mutually engaging and providing for mutual displacement. The two parts of the flashing member thus need to be assembled prior to installation.

[0011] The flashing member of the invention provides for easy separation of the two longitudinal elements and the possibility of installing first the first longitudinal element and subsequently the second longitudinal element. Yet, since the side of the second longitudinal element is inserted in a pocket in the first longitudinal element the two longitudinal elements support each other in a direction perpendicular to the plane of the roof.

[0012] In an embodiment of the present invention the bottom of the pocket is at the corner of the L-shape. This provides for a minimization of the overall width of the second leg, including the second longitudinal element, in the first mounted position.

[0013] In an embodiment the combination of the second leg and the second longitudinal element comprise only one pocket. This provides for simplicity of the construction of the flashing member facilitating simple and thus economic production thereof. Further, due to the possibility of adjusting the overall width of the second leg, including the second longitudinal element, a second pocket is superfluous, contrary to the situation of the above mentioned WO 95/28535 A1 according to which the provision of two pockets or slots were an important feature.

[0014] In an embodiment the second longitudinal element comprises a sheet material with a thickness and the pocket has a width perpendicular to a plane of the second leg, said width is more than three times said thickness. This provides for assembling with an adjacent flashing member embodied correspondingly while still connecting the first and the second longitudinal elements.

[0015] In an embodiment the second edge portion of the second longitudinal element which is bent towards the concave side, is bent to define an angle in the range of 45° to 135°, preferably less than 90° and more preferably approximately 80° with the inner side of the second leg. This provides for good sealing cooperation with external, adjacent elements in a mounted position.

[0016] In an embodiment the pocket has a depth between its opening and its bottom, the second leg has a width between a distal edge thereof and the corner of the L-shape, and said depth is more than half said width, preferably more than 3/4 of the width and more preferably approximately 85% of the width. Further in an embodiment the pocket has a depth between its opening and its bottom of more than 35 mm, preferably more than 55 mm. This provides for a large range of variation of the overall width of the second leg, including the second longitudinal element.

[0017] In an embodiment the first longitudinal element comprises a folded piece of sheet material.

[0018] In an embodiment the first leg of the first longitudinal element has a major portion with a first height from the corner of the L-shape and an end portion with a reduced height from said corner, compared to the first height. This provides for the end portion extending below the roof element in an installed position to direct water

flowing down the flashing member onto a surface of the roof.

[0019] The object of the invention is further met by a flashing kit comprising at least one flashing member according to the invention as stated above and an upper flashing member comprising a side portion and a cross portion extending crosswise to the side part, said side portion having a generally L-shaped cross-section with a first leg and a second leg wherein the first leg of the side portion is adapted to extend in a mounted position parallel to the first leg of the first longitudinal element, the second leg of the side portion comprising a second pocket adapted to receive an inner portion of the second leg of the first longitudinal element extending between the corner and the opening of the first pocket, a third pocket adapted to receive a longitudinal portion of the first side of the second longitudinal element, and a distal portion bent towards the concave side.

[0020] The flashing member and the flashing kit may e.g. be used to seal around a roof window installed in a roof, e.g. a sloping roof. When used for installing a roof member in a sloping roof, the flashing member with its first and second longitudinal elements may be installed with the longitudinal direction in the direction of the slope, i.e. at right angles to a horizontal direction of the roof. In such situation the cross portion of the upper flashing member will extend parallel to said horizontal direction and the upper flashing member will be positioned at a generally higher level than the first and second longitudinal elements.

[0021] In an embodiment the flashing kit comprises a bottom member, which preferably comprises a cross part configured to extend along a bottom element of the roof element and two side parts configured to extend a short distance along side elements of the roof element. The cross part and the side parts are preferably interconnected through beads.

[0022] In a further aspect the invention relates to a sloping roof construction comprising a roof element, such as a roof window, a roof covering comprising panels, such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles, preferably extending in a sloping direction of the roof, said roof construction further comprising

a mounting frame for the roof element, said mounting frame comprising a bottom element, a top element, two opposite side elements extending between the top element and the bottom element, said mounting frame having an upper face and a lower face provided by said bottom element, top element and side elements, said bottom element and said top element having inner side faces facing each other, slits extending from the upper face into the mounting frame being provided between the side elements and the bottom element, and between the side elements and the top element, respectively, in extension of the inner side faces of the bottom element and the top element, said roof element being attached to said mounting frame

by means of mounting brackets comprising a first bracket portion extending outwardly from the mounting frame and second angled portion extending at an angle relative to the first portion to abut an adjacent one of the inner side faces and to extend into one of the slits, and a flashing kit according to the invention flashing said roof element. Using a mounting frame of the above art ensures a correct and reliable mounting of the roof element. Further, by appropriate dimensioning of the mounting frame, a solid base for the flashing members at a level of the carrier profiles is obtained.

[0023] It is foreseen that the mounting frame may be used with other types of flashing kits than the flashing kit disclosed herein.

[0024] The slits provided in the frame preferably only extend into the frame to a certain depth to ensure the integrity of the frame.

[0025] In an aspect of the invention wherein a sloping roof construction comprises a roof element, such as a roof window, a roof covering comprising panels, such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles, preferably extending in a sloping direction of the roof, said carrier profiles have upper carrier faces defining a carrier plane, said roof construction further comprises at least one carrier slat provided adjacent to the roof element to extend between adjacent carrier profiles, preferably in a horizontal direction, said carrier slat having an upper face extending in said carrier plane. In a further embodiment at least one carrier slat is provided below the roof element and at least one, preferably two, carrier slat is provided above the roof element. Hereby is obtained an extended support surface for elements mounted adjacent the roof element.

[0026] According to an aspect of the present invention a method of installing a roof element, preferably a roof window, in a sloping roof with a roof covering comprising panels, such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles, preferably extending in a sloping direction of the roof, said method comprising: providing and installing a mounting frame for the roof element, said mounting frame comprising a bottom element, a top element, two opposite side elements extending between the top element and the bottom element, preferably for said side elements to extend in a sloping direction of the roof, said mounting frame having an upper face and a lower face provided by said bottom element, top element and side elements, said bottom element and said top element having inner side faces facing each other; providing slits extending from the upper face into the mounting frame, said slits being provided between the side elements and the bottom element, and between the side elements and the top element, respectively, in extension of the inner side faces of the bottom element and the top element; attaching said roof element to said mounting frame by means of mounting brackets comprising a first bracket portion extending outwardly from the mounting frame and second angled portion extending at an angle relative to the first portion to abut an

adjacent one of the inner side faces and extend into one of the slits; installing carrier profiles adjacent and parallel to the side elements of the mounting frame; installing a panel below the roof element; and flashing said roof element, preferably by means of a flashing kit according to the present invention, including adjusting the overall width of the second leg, including the second longitudinal element to fit a distance between the roof element and the carrier profiles.

[0027] According to an aspect of the present invention a method of installing a roof element, preferably a roof window, in a sloping roof with a roof covering comprising panels, such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles, preferably extending in a sloping direction of the roof, said carrier profiles have upper carrier faces defining a carrier plane, said method comprises installing at least one carrier slat adjacent to the roof element to extend between and be attached to adjacent carrier profiles, preferably in a horizontal direction, for said carrier slat to have an upper face extending in said carrier plane. In a further method at least one carrier slat is installed below the roof element and at least one, preferably two, carrier slat is installed above the roof element.

[0028] In the following the invention will be explained in more detail by way of an example of an embodiment having reference to the accompanying drawings, in which

Fig. 1 schematically shows a roof window in a sloping roof;

Fig. 2 is a sectional view as indicated by line II-II in Fig. 1;

Fig. 3 shows an enlarged detail of Fig. 2 and additional elements;

Fig. 4 shows a sectional view as indicated by line IV-VI in Fig. 1;

Fig. 5 is a view similar to Fig. 4 with a second longitudinal element in a different position;

Figs. 6 to 8 are views similar to Figs. 3 to 5, respectively, but showing an embodiment for use together with an insulating element;

Fig. 9 is a cross section of a variant of a first longitudinal element according to the invention;

Fig. 10 is a side view of the longitudinal element of Fig. 9;

Fig. 11 is a top view of the longitudinal element of Fig. 9;

Fig. 12 is a view of a frame of a roof window installed in a sloping roof within an array of photovoltaic panels; and

Figs. 13 to 20 illustrates the installation of the roof window shown in Fig. 12.

[0029] Fig. 1 shows a generally known window 1 in the form of a skylight which is built-in in an inclined or sloping roof. The window comprises a pane 2, a glass-carrying window frame or sash 3 and a main frame 4 composed of a top element 4a, a bottom element 4b and two side

elements 4c, 4d. The main frame 4 is sealingly connected to a surrounding roof covering structure, not shown, by means of a flashing arrangement 5 which on one side is inserted under a cladding 6 of the main frame and on the other side is connected to the roof covering structure so that water and other downpour cannot penetrate under the flashing arrangement and the roof covering structure.

[0030] The flashing arrangement 5 comprises an upper flashing member 7 for connection with the top element 4a of the main frame whereby a cross portion of the upper flashing member 7 constitutes a gutter at the top of the window; two side members 8a, 8b for connection with the side elements 4c, 4d of the main frame; and a bottom member 9 for connection with the bottom element 4b of the main frame. The bottom member 9 is at the sides provided with an upright flange 9a and with a flange portion 9b protruding in the plane of the roofing which when mounted is adapted to be overlapped by corresponding flange portions on the side members 8a, 8b of the flashing arrangement. The upper member 7 is provided with side portions extending outwards in the extension of the gutter and comprising in the mounted position of the gutter an upright flange portion, or first leg, 7a and a flange portion, or second leg, 7b protruding in the plane of the roofing and on each side of the top element 4a of the main frame overlapping the side members 8a, 8b of the flashing arrangement 5. Water collected in the gutter of the upper flashing member 7 is conducted around the upper corners of the main frame, down along the side elements 4c, 4d of the main frame, over the bottom member 9 and out on the roof covering structure.

[0031] Figs. 2 to 5 show sectional views of a roof window fitted with flashing members according to the present invention, the sections providing the sectional views being placed as indicated in Fig. 1.

[0032] Thus Fig. 2 shows in a partially cut-away, sectional view a roof window 101 comprising main frame side elements 104c, 104d; a sash 103; a pane 102; and a cladding 106. The window 101 is provided with a flashing arrangement of which side members 108a, 108b are shown.

[0033] Fig. 3 shows an enlarged view of the left part of the window 101 as shown in Fig. 2 and shows further a carrier profile 200 for installation of another element next to the window 101.

[0034] Figs. 4 and 5 show further enlarged, schematic views of the left part of the window 101 shown in Fig. 2, but in a section as indicated by line IV-IV in Fig. 1.

[0035] According to the present invention the side members 108a, 108b of the flashing arrangement comprises a first longitudinal element 110 extending in a longitudinal direction, said first longitudinal element having a generally L-shaped cross-section with a first leg 112 and a second leg 113. The first leg 112 is adapted to be arranged against the side element 104c of the roof window which is raising from a plane 114 of the roof in which it is mounted. The second leg 113 is arranged to extend along said plane 114 of the roof. The first leg 112 and

the second leg 113 are joined at a corner 115 of the L-shape. Inner sides 112a, 113a of the first leg 112 and the second leg 113 relative to the L-shape define an angle α of less than 180° , such as approximately 90° and correspondingly outer sides of the first leg and the second leg relative to the L-shape defining an angle of more than 180° . The inner sides of the legs thus generally constitute a concave side of the flashing members. A distal edge portion 116 of the second leg 113 opposite the corner 115 is bent towards the inner side 113a of the second leg, and the second leg comprises a slit-shaped pocket 117 with an opening 118 towards the distal edge portion 116 and a bottom 119 near the corner 115 of the L-shape. Further the side members 108a, 108b respectively comprises a second longitudinal element 120 comprising a first side 121 inserted into the pocket 117 of the first longitudinal element 110 and a second side 122 opposite the first side 121, said second side comprising a second edge portion 123 which is bent towards the concave side.

[0036] As best seen by comparison of Figs. 4 and 5 the second longitudinal element 120 is positionable in a first mounted position in which the first side 121 is at a vicinity of the bottom 119 of the pocket 117, and a second mounted position in which the first side 121 is remote from the bottom 119 of the pocket 117. Further the second longitudinal element may be positioned in any positions in between the two positions just mentioned thus providing for step-less adjustment of the overall width of the second leg of the first longitudinal element and the second longitudinal element.

[0037] As seen in Figs. 2 to 5, in the present embodiment the bottom 119 of the pocket 117 is placed at the corner 115 of the L-shape, and the combination of the second leg 113 and the second longitudinal element 120 comprise only one pocket 117.

[0038] In the embodiment shown in Figs. 2 to 5 the second longitudinal element 120 comprises a sheet material with a thickness and the pocket 117 has a width w perpendicular to a plane of the second leg 113, and the width w is more than three times the thickness of the sheet material. In the embodiment shown all of the flashing members are made of sheet material with substantially the same thickness as the sheet material of the second longitudinal element 120. Thus in the embodiment shown the profile of the first longitudinal element 110, best seen in Fig. 3, is provided by folding a piece of sheet material.

[0039] The second edge portion 123 which is bent towards the concave side define an angle β in the range of 45° to 135° with the inner side of the second leg. In the embodiment shown the angle β is a little less than 90° , e.g. approximately 80° .

[0040] As seen in Figs. 4 and 5 the flashing arrangement comprises an upper flashing member 107 which is shaped to be connected to the side members 108a, 108b and receive a longitudinal part of the second longitudinal element 120. Thus the upper flashing member 107 comprises side portions 130 and a cross portion extending

crosswise to the side portions 130, each side portion 130 having a generally L-shaped cross-section with a first leg 131 and a second leg 132. The first leg 131 of the side portion is adapted to extend, as shown, in the mounted position parallel to the first leg 112 of the first longitudinal element 110. The second leg 132 of the side portion comprises a second pocket 133 adapted to receive an inner portion 113b of the second leg 113 of the first longitudinal element 110 extending between the corner 115 and the opening 118 of the first pocket 117; a third pocket 134 adapted to receive a longitudinal portion 135 of the first side of the second longitudinal element 120; and a distal portion 136 bent towards the concave side.

[0041] As seen in Fig. 2 to 5, the first pocket 117 has a depth d between its opening 118 and its bottom 119, and the second leg 113 of the first longitudinal element 110 has a width W between a distal edge 116a thereof and the corner 115 of the L-shape. The depth d is more than half of the width W and in the embodiment shown the depth d is more than 3/4 of the width W, especially approximately 85%. The depth d is preferably more than 35 mm and may be more than 55 mm. Likewise the depth of the third pocket 134 is preferably more than half the width W and/or more than 35 mm.

[0042] In the mounted position shown in Figs. 4 and 5 the side portion 130 of the upper flashing member 107 does not abut on the first leg 112 of the side member 108a because of the cladding 106 placed in between. Accordingly, the part of the second leg 132 of the side portion 130, that comprises the third pocket 134, does not extend all the way to the bottom 119 of the first pocket 117, but to the vicinity thereof. Further accordingly, in the first mounted position the first side 121 of the second longitudinal element 120, which is inserted in the third pocket 134 which per se is positioned inside the first pocket 117, is positioned in the vicinity of the bottom 119 of the first pocket when said first side 121 in the first mounted position is in the vicinity of, or at the bottom of, the third pocket 134.

[0043] Figs. 6 to 8 show another embodiment of the flashing elements for use together with insulation elements surrounding the main frame of the window. In Figs. 6 to 8 like elements of the flashing and cladding are designated by like reference numerals as in Figs. 3 to 5 with the addition of 200 i.e. in the format 3xx. Thus Figs. 6 to 8 show the main frame side element 104c, the sash 103 and the pane 102 of the window. An insulating side element 203 of an insulation frame is abutting on the main frame side element 104c and a cladding 306 is covering part of the top of the main frame side element 104c and the insulating side element 203. A first leg 312 of a flashing side member 308a is abutting the on the insulating side element 203. Further the flashing side member 308a comprises a first longitudinal element 310 of which the first leg 312 is a part, and a second longitudinal element 320 with a first side 321 inserted in a first pocket 317 and a second side 322 with a second edge portion 323. The first longitudinal element 310 has a distal edge portion

316.

[0044] Similar to Figs. 4 and 5, Figs. 7 and 8 further show parts of an upper flashing member 307 comprising a side portion 330 with a first leg 331 and a second leg 332 with a second and a third pocket of which the third pocket 334 receives a longitudinal portion of the first side 321 of the second longitudinal element 320. As seen the first leg 331 of the upper flashing member and the first leg 312 of the first longitudinal element 310 are positioned on either side of a vertical part of the cladding 306 like it is the case with the embodiment shown in Figs. 4 and 5. The presence of the vertical part of the cladding 306 sets a limit to how close to each other these two first legs can be positioned and to how far the side portion 330 of the upper flashing member can be inserted into the first pocket 317. Further details are similar to details of the embodiment shown in Figs. 4 and 5.

[0045] Fig. 7 shows the second longitudinal element 320 in the first mounted position with the first side 321 inserted to the bottom of the third pocket 334 to provide a minimum overall width of the side flashing member including the first and the second longitudinal elements.

[0046] Fig. 8 shows the second longitudinal element 320 in the second mounted position with the first side 321 inserted in the third pocket 334 to a minimum depth to ensure safe connection between the first and the second longitudinal elements and to ensure the proper function of the flashing e.g. a depth of approximately 2 cm thereby obtaining a maximum overall width of the side flashing member including the first and the second longitudinal elements.

[0047] The flashing arrangement according to the present invention may e.g. be used in connection with installation of a roof window placed in an array of solar collecting panels such as photovoltaic panels such panels thereby being positioned above; below; and/or beside the window, panels positioned above and below the window and their supporting elements defining the width needed to be covered by the flashing side members 108a, 108b. Figs. 3 and 6 show a supporting profile element in the form of a carrier profile 200 for supporting a solar collecting panel such as a photovoltaic panel (not shown). The carrier profile 200 is mounted at a fixed position in the roof and the second longitudinal element 120; 320 is adjusted for the second edge portion 123; 323 to abut against or be close to the carrier profile 200. A gasket 201 mounted on the carrier profile 200 completes the sealing between the second longitudinal element 120; 320 and the carrier profile 200.

[0048] Figs. 9 to 11 show a variant of the first longitudinal element 110' in which the bottom 119' of the first pocket 117' has a distance to the corner 115' of the first longitudinal element 110'. The depth of the first pocket 117' is still more than 35 mm to provide for adjustment of the overall width of a flashing member provided by the combination of the first longitudinal element 110' and the second longitudinal element 120 disclosed above. Moreover, the first longitudinal element 110', and this applies

to the first longitudinal element 110 as well, has a major portion 140 with a first height and an end portion 141 with a reduced height the benefit of which will be explained below.

[0049] Fig. 12 shows a roof element, namely the main frame 4' of a roof window installed in a sloping roof having a roof covering comprising panels, namely photovoltaic panels 150.

[0050] Figs. 13 to 20 illustrates the installation of the roof window of Fig. 12 using components of the present invention. Thus Fig. 13 shows a roof construction comprising an underroof 151, counter battens 153 and battens 155. At a level the of the counter battens 153 a suspension frame 157 is provided defining an opening 159 in the roof. A mounting frame 161 is provided on top of the suspension frame to extend above the level of the counter battens. The mounting frame comprises a bottom element 162, a top element 163 and two side elements 164 extending between the top element and the bottom element. The mounting frame 161 has an upper face 165 and a lower face provided by the bottom element 162, the top element 163, and the side elements 164. The bottom element 162 and the top element 163 have inner side faces 162', 163' facing each other. Slits 166 extending from the upper face 165 into the mounting frame 161, are provided between the side elements 164 and the bottom element 162, and between the side elements 164 and the top element 163, respectively, in extension of the inner side faces 162', 163' of the bottom element and the top element. These slits 166 may be provided by sawing as indicated in Fig. 13.

[0051] Referring to Fig. 14, an optional insulation frame 167 may in a manner known per se be inserted in the mounting frame 161 to provide insulation between the mounting frame 161 and the main frame 4' of the roof window.

[0052] The main frame 4' is subsequently inserted in the mounting frame 161, as indicated in Fig. 14 together with Fig. 15, to be attached to the mounting frame 161 by means of mounting brackets 168 comprising a first bracket portion 169 extending outwardly from the main frame 4' and second angled portion 170 extending at an angle relative to the first portion to abut an adjacent one of the inner side faces 162, 163 and to extend into one of the slits 166. The mounting brackets 168 are fastened to the mounting frame e.g. by screws not shown.

[0053] It is noted that the slits 166 should extend into the mounting frame 161 to a sufficient depth to receive the angled portions 170, but the slits should preferably not extend through the mounting frame and should preferably separate the elements of the mounting frame.

[0054] Referring to Fig. 16, an underroof collar 171 has in a manner known per se been attached to the main frame 4'. Further, carrier profiles 200 for supporting photovoltaic panels 150 have been mounted on either side of the main frame 4' whereby the carrier profiles 200 are extending in the sloping direction of the roof. Since specific photovoltaic panels have specific dimensions, es-

pecially a specific width, or width dimension, in a direction perpendicular to the sloping direction of the roof, the carrier profiles 200 are mounted with a mutual distance corresponding to the width of the photovoltaic panels 150.

[0055] The carrier profiles 200 have upper carrier faces for supporting the photovoltaic panels 150, said upper carrier faces defining a carrier plane. At least one carrier slat 172 is provided adjacent to the main frame 4' to extend between adjacent carrier profiles, preferably in a horizontal direction, said carrier slat having an upper face extending in said carrier plane. In the embodiment shown one carrier slat 172 is provided below the main frame 4' and two carrier slats 172 are provided above the main frame 4'.

[0056] The carrier slats 172 are in the embodiment shown connected to the carrier profiles 200 by means of pegs 173 extending from the ends of the carrier slats 172. The pegs 173 may be integrated with the carrier slats or mounted on the carrier slats 172 before mounting of the latter, whereby the pegs 173 are inserted into holes provided in the carrier profiles 200. These holes may e.g. be drilled during the process of mounting the carrier profiles 200 as a step of said mounting process. In the alternative, pegs, screws, or the like, may be inserted through holes provided in the carrier profiles 200 and into the ends of the carrier slats 172 after the mounting of the carrier profiles 200.

[0057] The carrier slats 172 provide support for elements subsequently mounted as indicated in Figs. 17 and 18. Fig. 17 is a view in direction of arrow XVII in Fig. 16, the outlines of the carrier profile 200 being shown in broken lines for more clear distinction. Fig. 18 is a view in the direction of arrow XVIII in Fig. 16, the outlines of the carrier profile 200, the carrier slats 172, and the pegs 173 being shown in broken lines for more clear distinction.

[0058] It is noted that in Figs. 17 and 18 line 200' indicates a protrusion on top of the carrier profile 200 for mounting of the gasket 201, cf. Figs. 3 and 6.

[0059] Thus, as shown in Fig. 17 the carrier slat 172 below the main frame 4' provides support for a photovoltaic panel 150a mounted immediately below the main frame 4' and for an additional support plate 174 with a hook element 175, the latter catching below the carrier slat. The support plate 174 per se covers a gap between the carrier slat and the bottom element 162 of the mounting frame and provide support for elements subsequently mounted above said gap.

[0060] As shown in Fig. 18 the two carrier slats 172 mounted above the main frame 4' provide support for an upper flashing member 107 and for the photovoltaic panel 150b mounted immediately above the main frame 4', said photovoltaic panel 150b comprising a hook element 176 catching below the uppermost of the carrier slats 172.

[0061] When the carrier profiles 200 and the carrier slats 172 are mounted, the photovoltaic panel 150a may be mounted, whereas the upper flashing member 107 should be mounted at a later stage as explained below.

[0062] Thus, after the photovoltaic panel 150a mounted immediately below the main frame 4' has been mounted a bottom member, or bottom flashing member, 180 may be mounted, as indicated in Fig. 19 which shows a perspective view of the bottom part of the main frame 4' and the immediate surroundings thereof. The bottom member 180 comprises a cross part 181 extending along a bottom element of the main frame 4' and two side parts 182 extending a short distance along the side elements of the main frame 4'. The cross part 181 and the side parts 182 are, in the embodiment shown, interconnected through beads 183. The bottom member 180 extends from the main frame 4' and onto the upper surface of the photovoltaic panel 150a to ensure that water, such as rain, does not penetrate into the under lying roof construction.

[0063] After the bottom member 180 has been mounted, side members, or side flashing members, may be mounted, as indicated in Fig. 20. The side members may be configured like the side members 108a, 108b shown in Figs. 2-5, but in the embodiment shown in Figs. 12 and 20, the first longitudinal element of the side members are configured as disclosed in Figs. 9-11. Thus, as shown in Fig. 20 the first longitudinal element 110' is mounted along the side of the main frame 4', whereby the end portion 141 with reduced height extends along the bead 183, thus ensuring that water, such as rain water, flowing down the roof and down the first longitudinal element 110' is directed to the upper surface of the photovoltaic panel 150a below rather than flowing between the first longitudinal element 110' and the bottom member 180, into the underlying roof construction.

[0064] In Fig. 20 only the first longitudinal element 110' is shown but it should be understood that also the second longitudinal element 120 is mounted either after the first longitudinal element has been mounted or simultaneously therewith.

[0065] The position of the second longitudinal element 120 in the pocket 117 is adjusted so that the side flashing member covers the gap between the side of the main frame 4' and the carrier profile 200 as indicated in Fig. 3.

[0066] When the side flashing members are mounted the upper flashing member 107 may be mounted.

[0067] It is noted that the order of mounting flashing members around a roof element, such as a roof window, is a well-known procedure to the skilled person to ensure a water proof flashing of the roof element.

[0068] After mounting of the upper flashing member 107 the photovoltaic panel 150b mounted immediately above the main frame 4' may be mounted as shown in Fig. 18.

[0069] At this stage the main frame 4' has been flashed and photovoltaic panels has been mounted on three sides of the main frame 4', as shown in Fig. 12. Thereafter covering of the roof to the right of the main frame 4', as seen in Fig. 12 can continue in a manner known per se.

Claims

1. A flashing member for a roof element, such as a roof window (1), said flashing member comprising:

a first longitudinal element (110; 310) extending in a longitudinal direction, said first longitudinal element having a generally L-shaped cross-section with a first leg (112; 312) and a second leg (113), the first leg (112; 312) being adapted to be arranged against a side of the roof element (104c) raising from a plane (114) of a roof in a mounted position, the second leg (113) being arranged to extend along said plane (114) of the roof in the mounted position, the first leg and the second leg being joined at a corner (115) of the L-shape, inner sides of the first leg and the second leg relative to the L-shape defining an angle of less than 180° and outer sides of the first leg and the second leg relative to the L-shape defining an angle of more than 180°, the inner sides constituting a concave side of the flashing member, a distal edge portion (116; 316) of the second leg opposite the corner (115) being bent towards the concave side, and said second leg (113) comprising a slit-shaped pocket (117; 317) with an opening towards the distal edge portion (116; 316) and a bottom (119) towards the corner of the L-shape; and

a second longitudinal element (120; 320) comprising a first side (121; 321) inserted into the pocket (117; 317) of the first longitudinal element (110; 310) and a second side (122; 322) opposite the first side (121; 321), said second side comprising a second edge portion (123; 323) which is bent towards the concave side, **characterized in that**

the second longitudinal element (120; 320) is positionable in a first mounted position in which the first side (121; 321) is at a vicinity of the bottom (119) of the pocket (117; 317), a second mounted position in which the first side (121; 321) is remote from the bottom (119) of the pocket, and in a plurality of positions in between the first mounted position and the second mounted position, thereby providing an overall width of the second leg, including the second longitudinal element, that is adjustable to fit surrounding elements in an installation situation.

2. A flashing member according to claim 1, **characterized in that** the bottom (119) of the pocket (117; 317) is at the corner (115) of the L-shape.
3. A flashing member according to claim 1 or 2, **characterized in that** the combination of the second leg (113) and the second longitudinal element (120) comprise only one pocket (117).

4. A flashing member according to any one of claims 1 to 3, **characterized in that** the second longitudinal element (120; 320) comprises a sheet material with a thickness and that the pocket (117; 317) has a width perpendicular to a plane of the second leg, said width is more than three times said thickness. 5
5. A flashing member according to any one of claims 1 to 4, **characterized in that** said second edge portion (123; 323) which is bent towards the concave side define an angle in the range of 45° to 135°, preferably less than 90° and more preferably approximately 80° with the inner side of the second leg. 10
6. A flashing member according to any one of claims 1 to 5, **characterized in that** the pocket (117; 317) has a depth (d) between its opening and its bottom, the second leg has a width (W) between a distal edge thereof and the corner of the L-shape, and said depth (d) is more than half said width (W), preferably more than 3/4 of the width (W) and more preferably approximately 85% of the width (W). 15 20
7. A flashing member according to any one of claims 1 to 6, **characterized in that** the pocket (117; 317) has a depth (d) between its opening and its bottom of more than 35 mm, preferably more than 55 mm. 25
8. A flashing member according to any one of claims 1 to 7, **characterized in that** the first longitudinal element (110; 310) comprises a folded piece of sheet material. 30
9. A flashing member according to any one of claims 1 to 8, **characterized in that** the first leg of the first longitudinal element (110') has a major portion (140) with a first height from the corner (115') of the L-shape and an end portion (141) with a reduced height from said corner, compared to the first height. 35 40
10. A flashing kit comprising at least one flashing member according to any one of claims 1 to 9 and an upper flashing member (107; 307) comprising a side portion (130; 330) and a cross portion extending crosswise to the side portion, said side portion (130; 330) having a generally L-shaped cross-section with a first leg (131; 331) and a second leg (132; 332) wherein the first leg of the side portion is adapted to extend in a mounted position parallel to the first leg (112; 312) of the first longitudinal element (110; 310), the second leg (132; 332) of the side portion comprising a second pocket (133) adapted to receive an inner portion (113b) of the second leg of the first longitudinal element extending between the corner (115) and the opening (118) of the first pocket (117), a third pocket (134; 334) adapted to receive a longitudinal portion of the first side (121; 321) of the second longitudinal element, and a distal portion (136) bent towards the concave side. 45 50 55
11. A sloping roof construction comprising a roof element (4'), such as a roof window, a roof covering comprising panels (150, 150a, 150b), such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles, preferably extending in a sloping direction of the roof, said roof construction further comprising a mounting frame (161) for the roof element, said mounting frame comprising a bottom element (162), a top element (163), two opposite side elements (164) extending between the top element and the bottom element, said mounting frame (161) having an upper face (165) and a lower face provided by said bottom element, top element and side elements, said bottom element and said top element having inner side faces (162', 163') facing each other, slits (166) extending from the upper face (165) into the mounting frame being provided between the side elements (164) and the bottom element (162), and between the side elements (164) and the top element (163), respectively, in extension of the inner side faces (162', 163') of the bottom element and the top element, said roof element (4') being attached to said mounting frame (161) by means of mounting brackets (168) comprising a first bracket portion (169) extending outwardly from the roof element (4') and second angled portion (170) extending at an angle relative to the first portion to abut an adjacent one of the inner side faces (162', 163') and to extend into one of the slits (166), and a flashing kit according to claim 10 flashing said roof element.
12. A sloping roof construction according to claim 11, wherein said carrier profiles (200) have upper carrier faces defining a carrier plane, and at least one carrier slat (172) is provided adjacent to the roof element (4') to extend between adjacent carrier profiles (200), preferably in a horizontal direction, said carrier slat (172) having an upper face extending in said carrier plane.
13. A sloping roof construction according to claim 12, wherein at least one carrier slat (172) is provided below the roof element (4') and at least one, preferably two, carrier slat (172) is provided above the roof element (4').
14. A method of installing a roof element, preferably a roof window, in a sloping roof with a roof covering comprising panels (150, 150a, 150b), such as solar collecting panels, especially photovoltaic panels, carried by carrier profiles (200), preferably extending in a sloping direction of the roof, said method comprising:

providing and installing a mounting frame (161) for the roof element, said mounting frame comprising a bottom element (162), a top element (163), two opposite side elements (164) extending between the top element and the bottom element, preferably for said side elements to extend in a sloping direction of the roof, said mounting frame (161) having an upper face (165) and a lower face provided by said bottom element, top element and side elements, said bottom element and said top element having inner side faces (162', 163') facing each other; providing slits (166) extending from the upper face (165) into the mounting frame, said slits (166) being provided between the side elements (164) and the bottom element (162), and between the side elements (164) and the top element (163), respectively, in extension of the inner side faces (162', 163') of the bottom element and the top element;

attaching said roof element (4') to said mounting frame (161) by means of mounting brackets (168) comprising a first bracket portion (169) extending outwardly from the roof element and second angled portion (170) extending at an angle relative to the first portion to abut an adjacent one of the inner side faces (162', 163') and extend into one of the slits (166);

installing carrier profiles (200) adjacent and parallel to the side elements of the mounting frame (161);

installing a panel (150a) below the roof element (4'); and

flashing said roof element by means of a flashing kit according to claim 10, including adjusting the overall width of the second leg, including the second longitudinal element to fit a distance between the roof element and the carrier profiles.

15. A method according to claim 14, wherein said carrier profiles (200) have upper carrier faces defining a carrier plane, and at least one carrier slat (172) is installed adjacent to the roof element to extend between and be attached to adjacent carrier profiles (200), preferably in a horizontal direction, said carrier slat (172) having an upper face extending in said carrier plane.
16. A method according to claim 15, wherein at least one carrier slat (172) is installed below the roof element (4') and at least one, preferably two, carrier slat (172) is installed above the roof element (4').

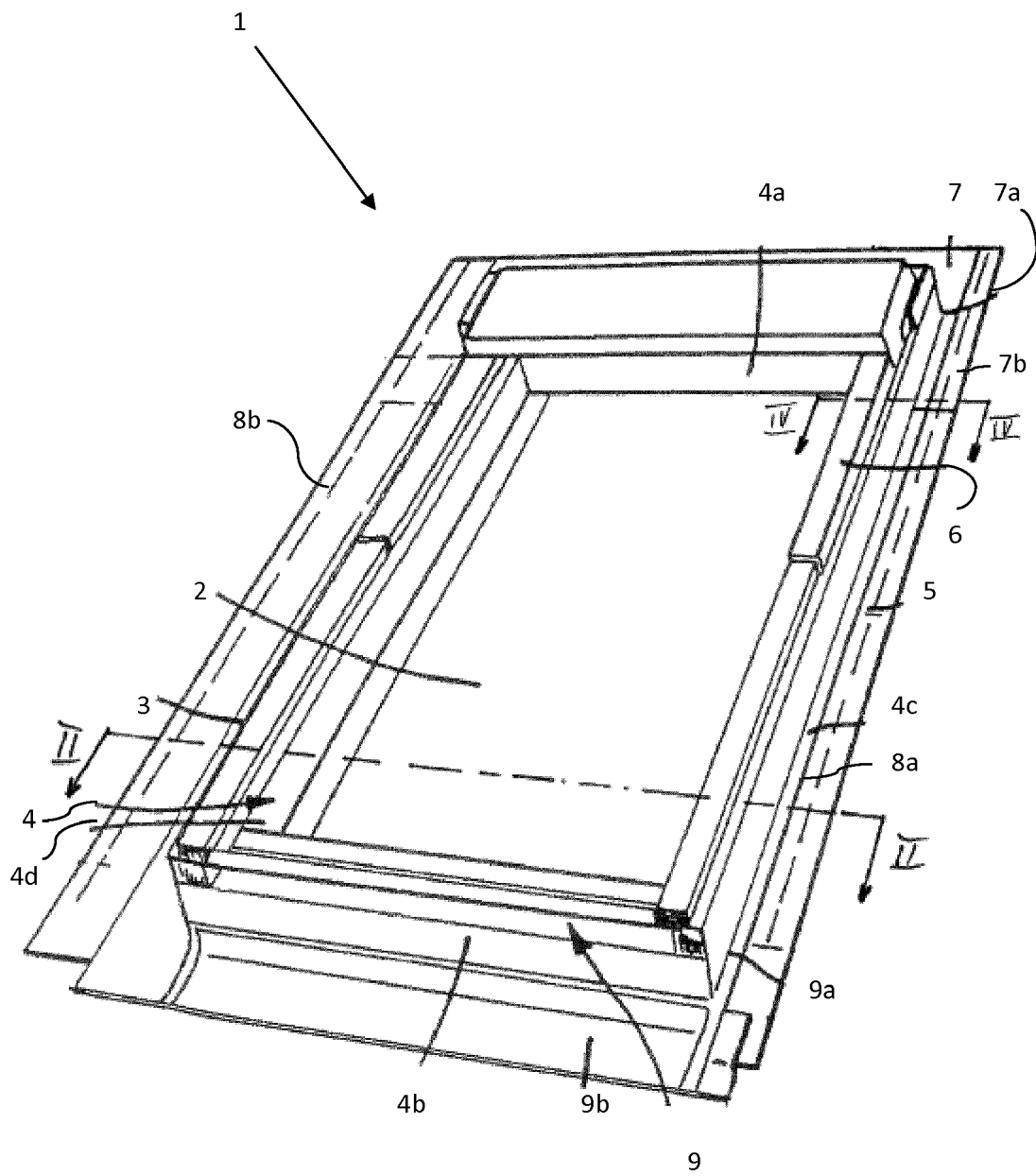


Fig. 1

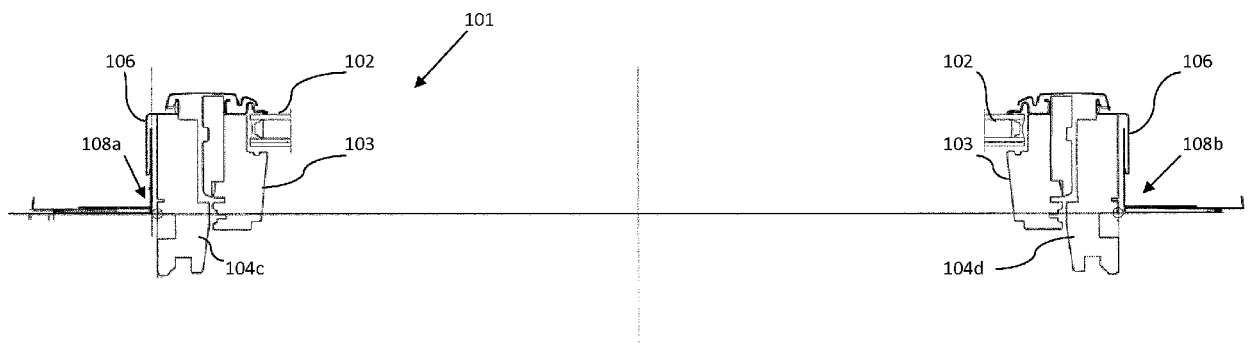


Fig. 2

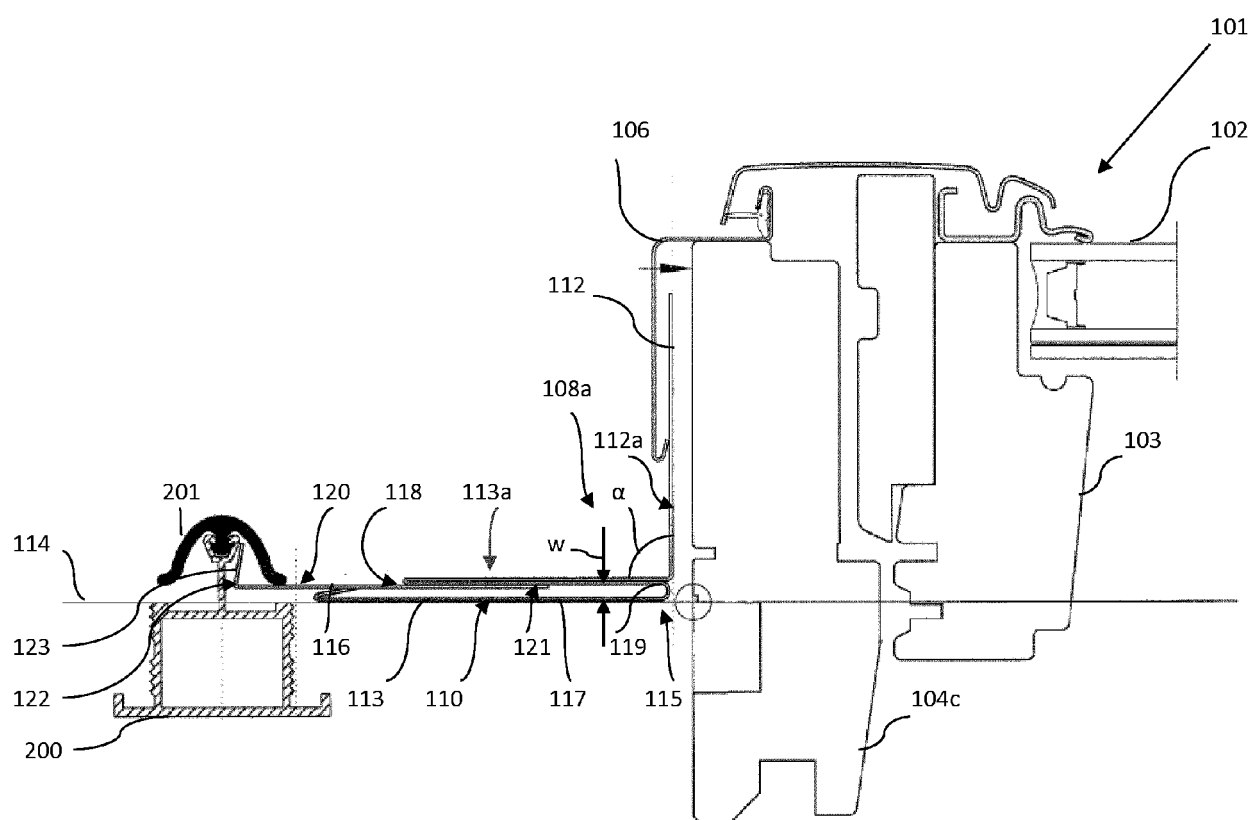


Fig. 3

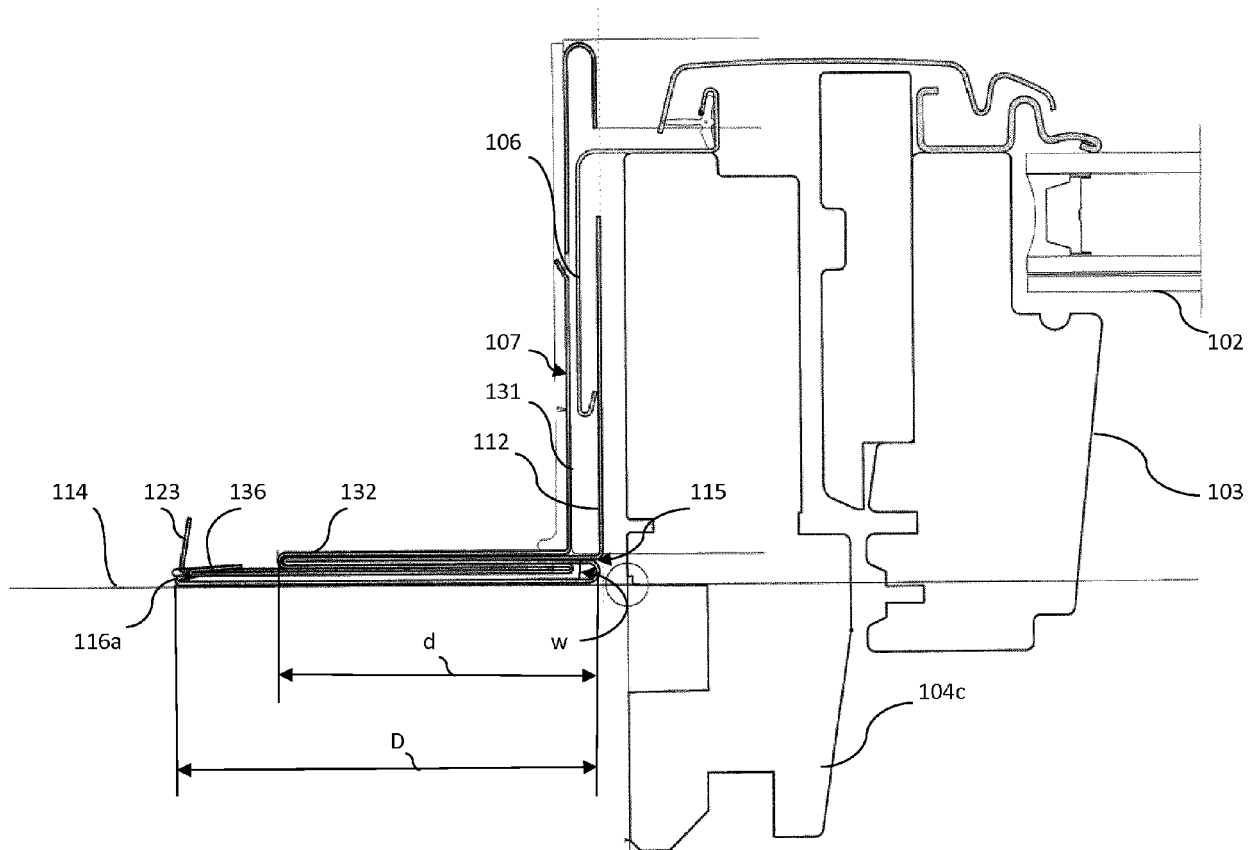


Fig. 4

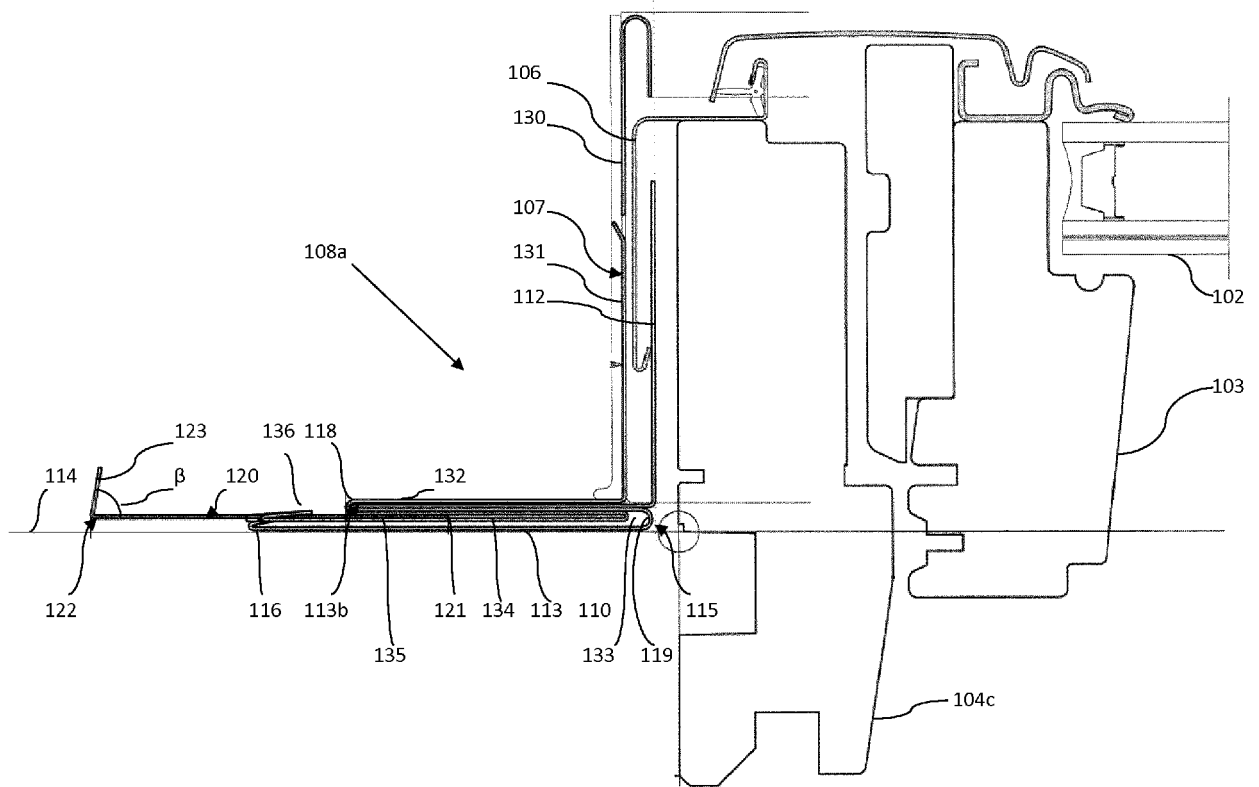


Fig. 5

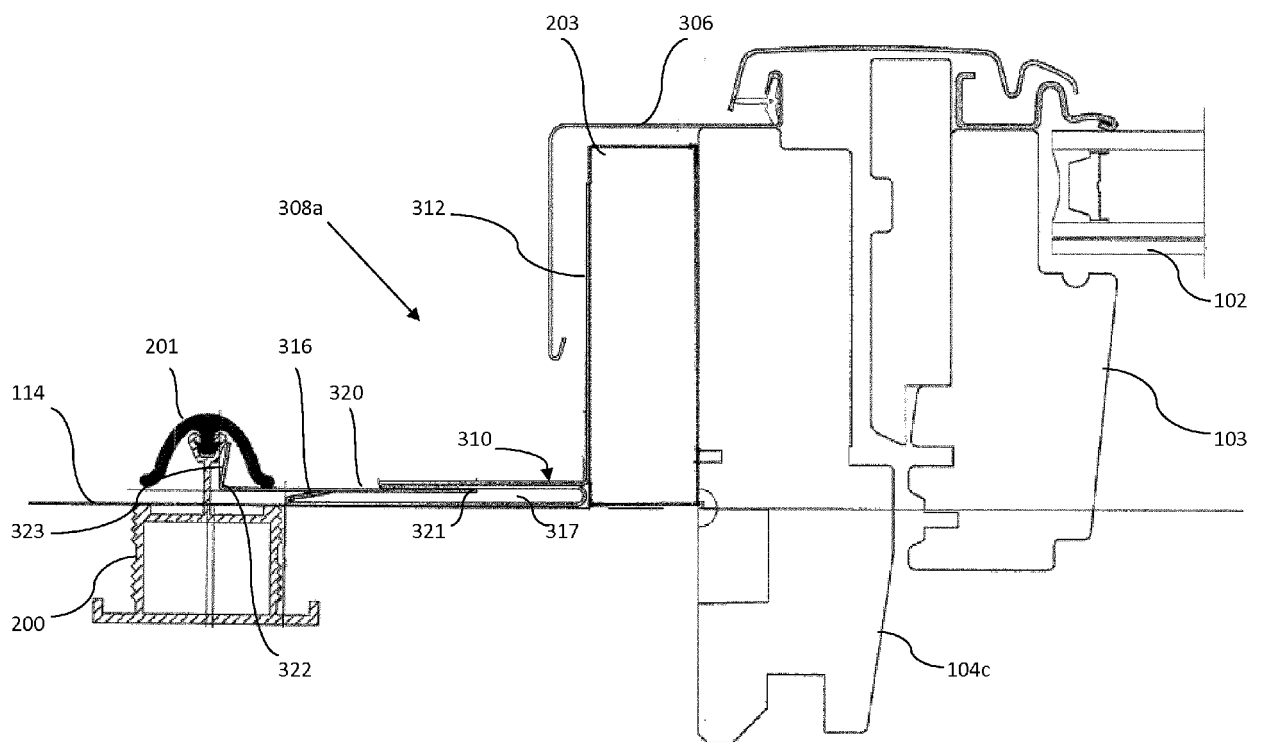


Fig. 6

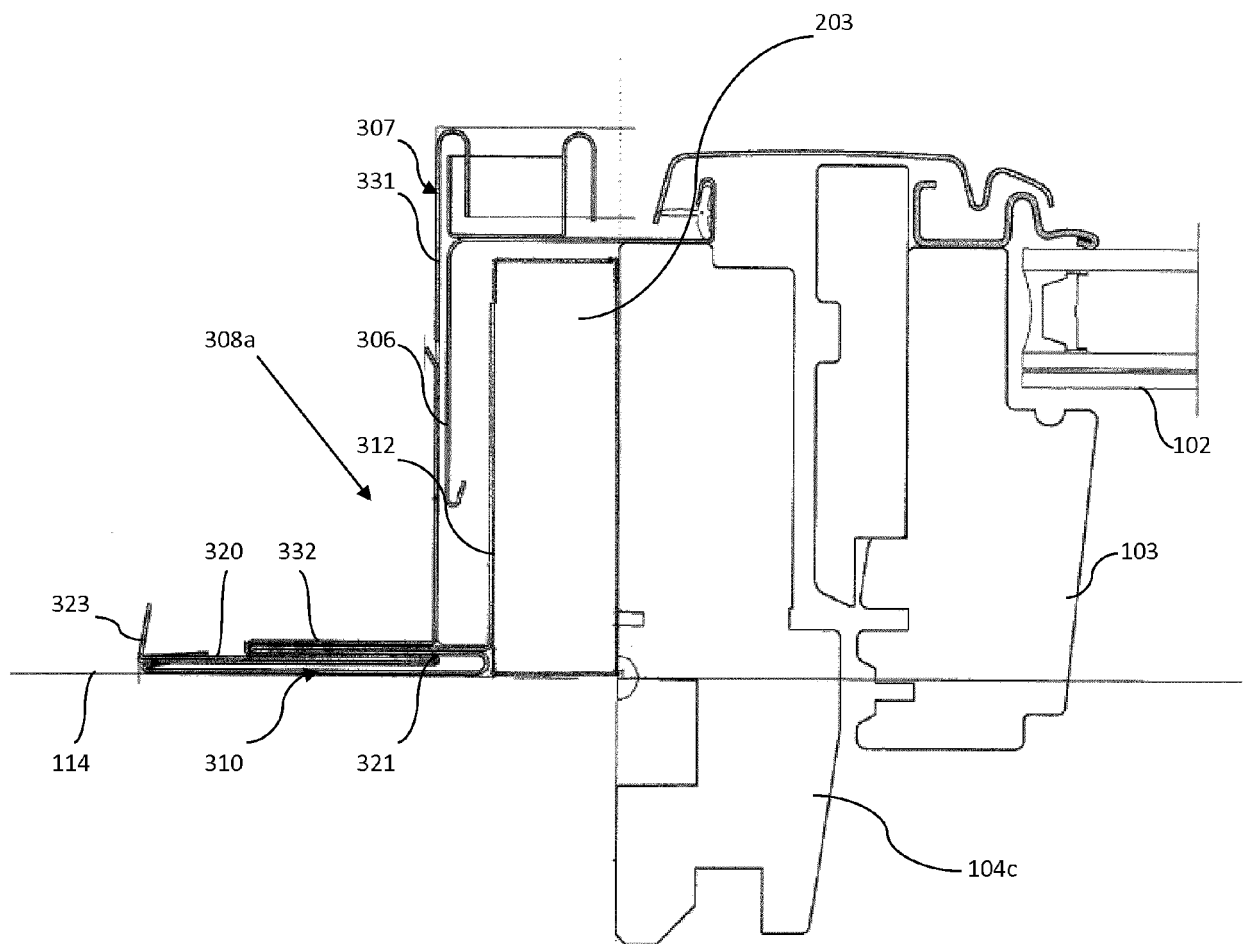


Fig. 7

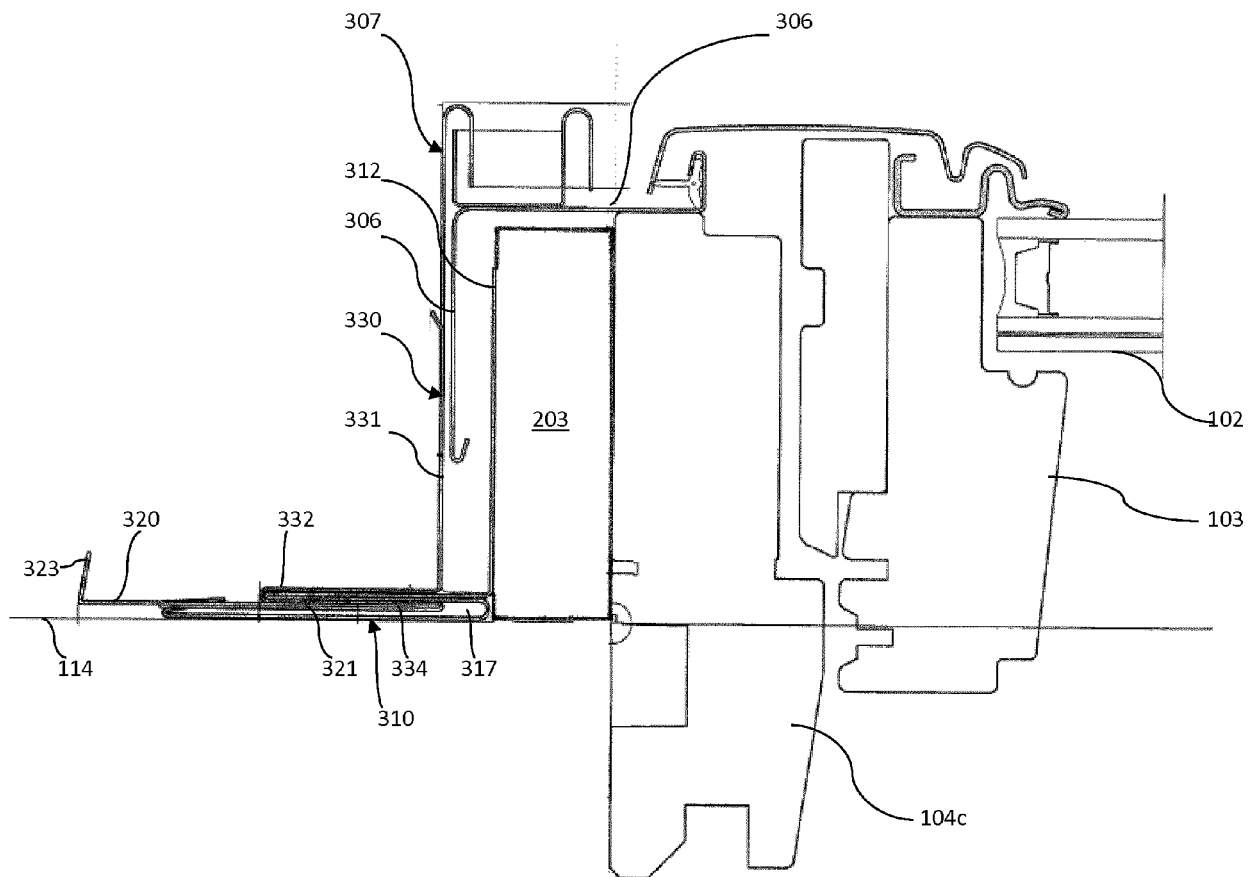


Fig. 8

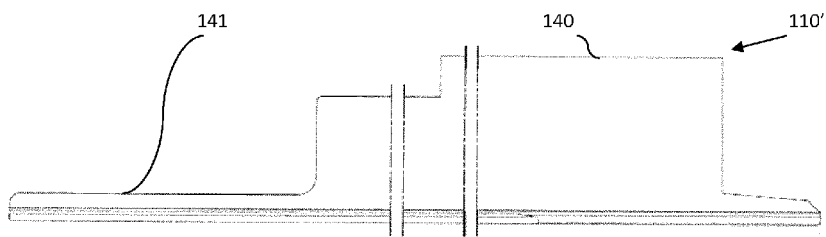


Fig. 10

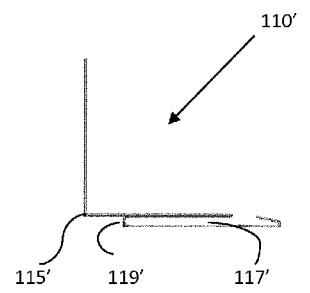


Fig. 9

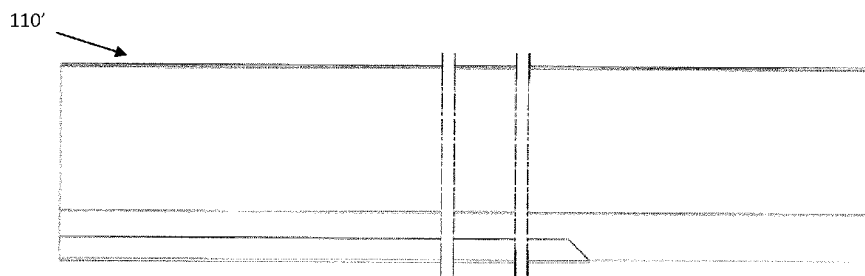


Fig. 11

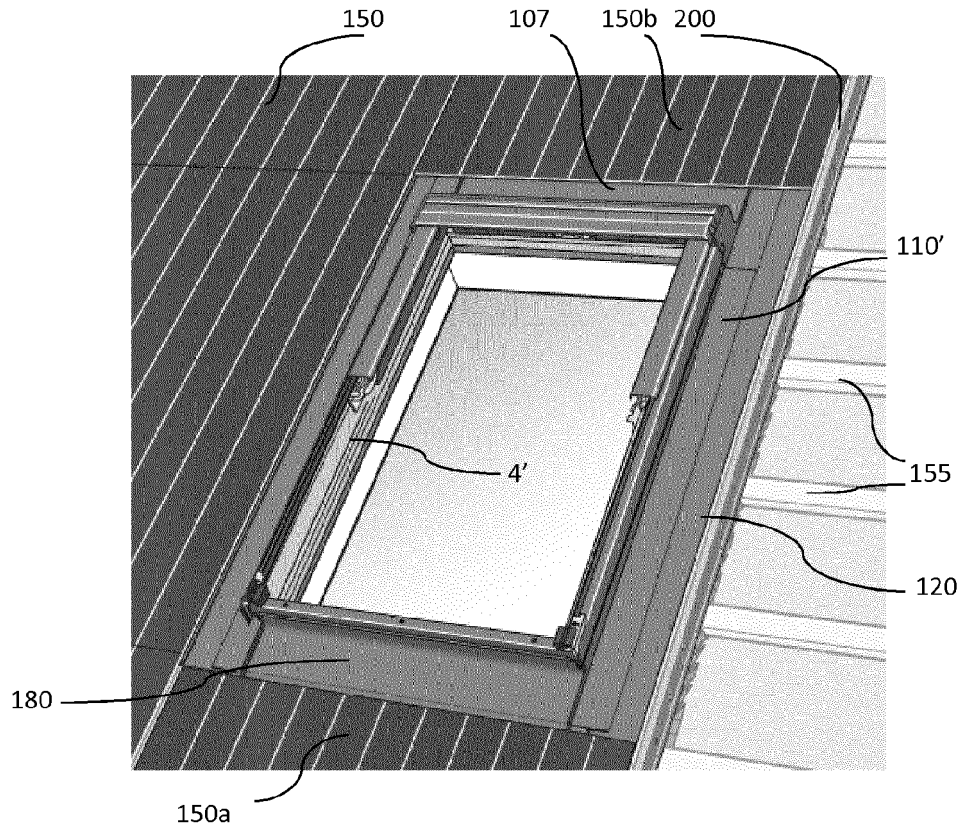


Fig. 12

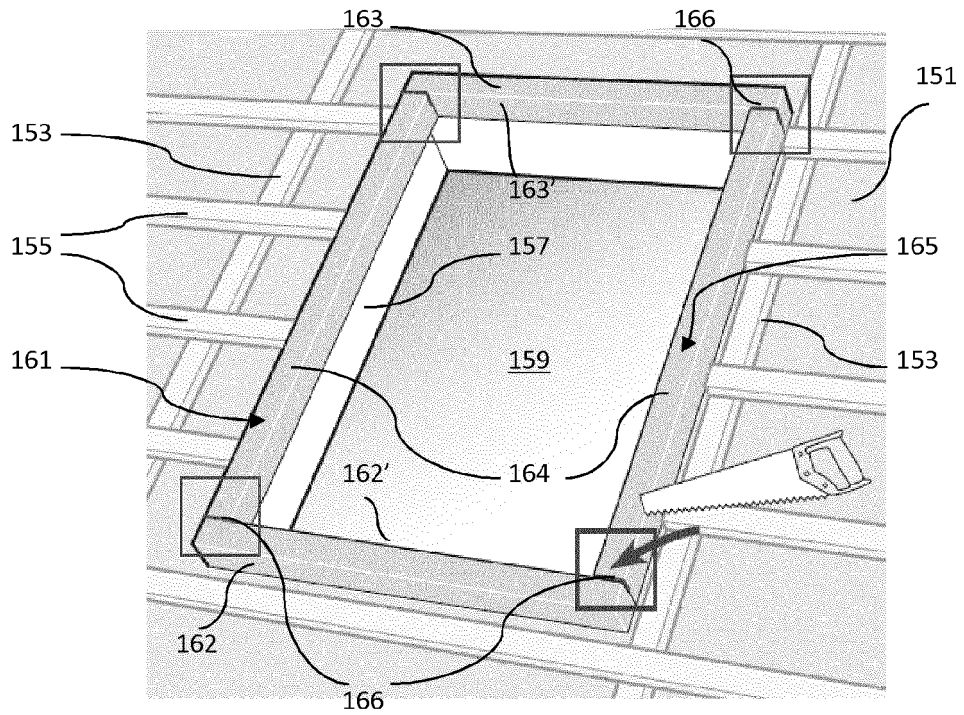


Fig. 13

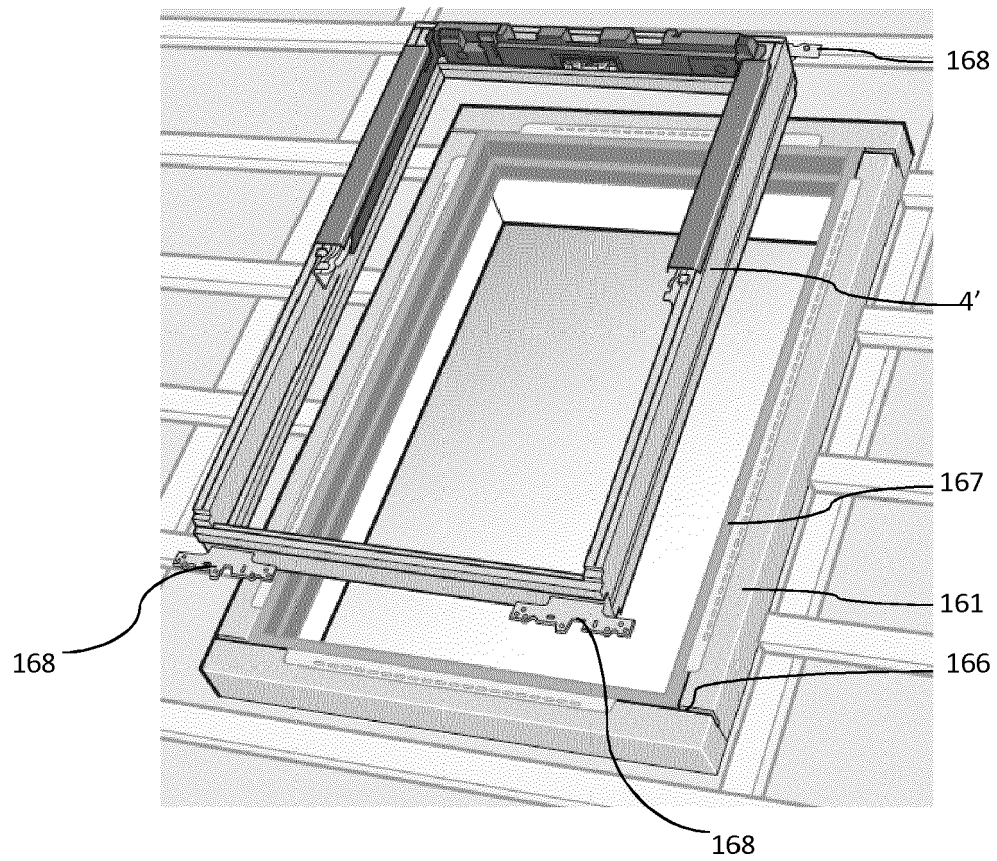


Fig. 14

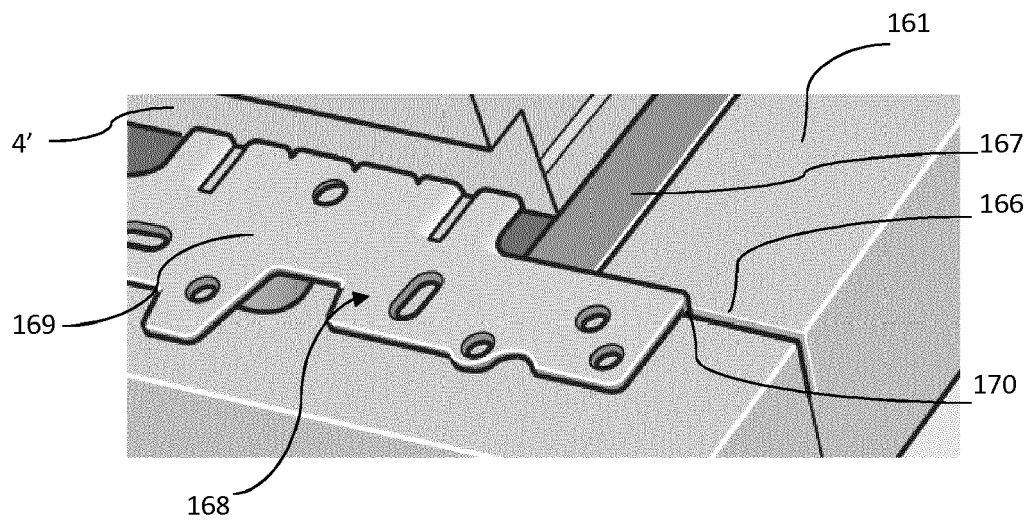
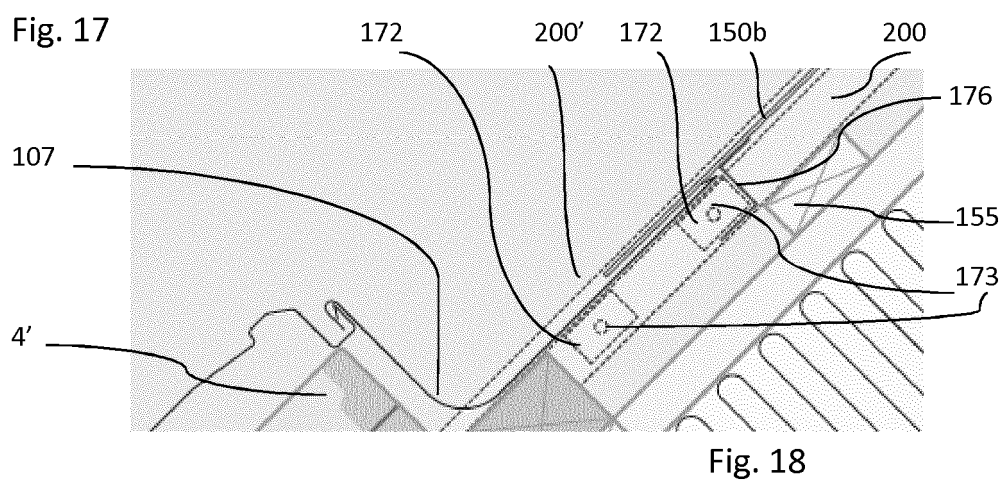
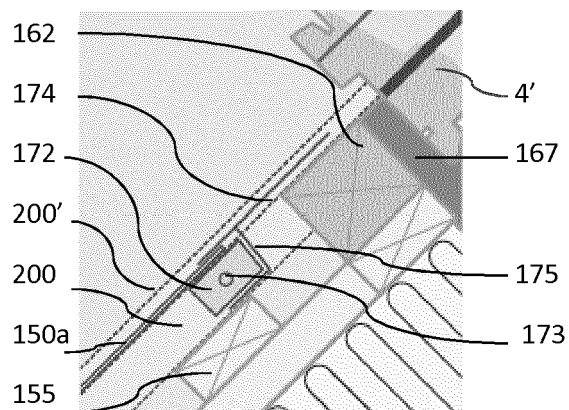
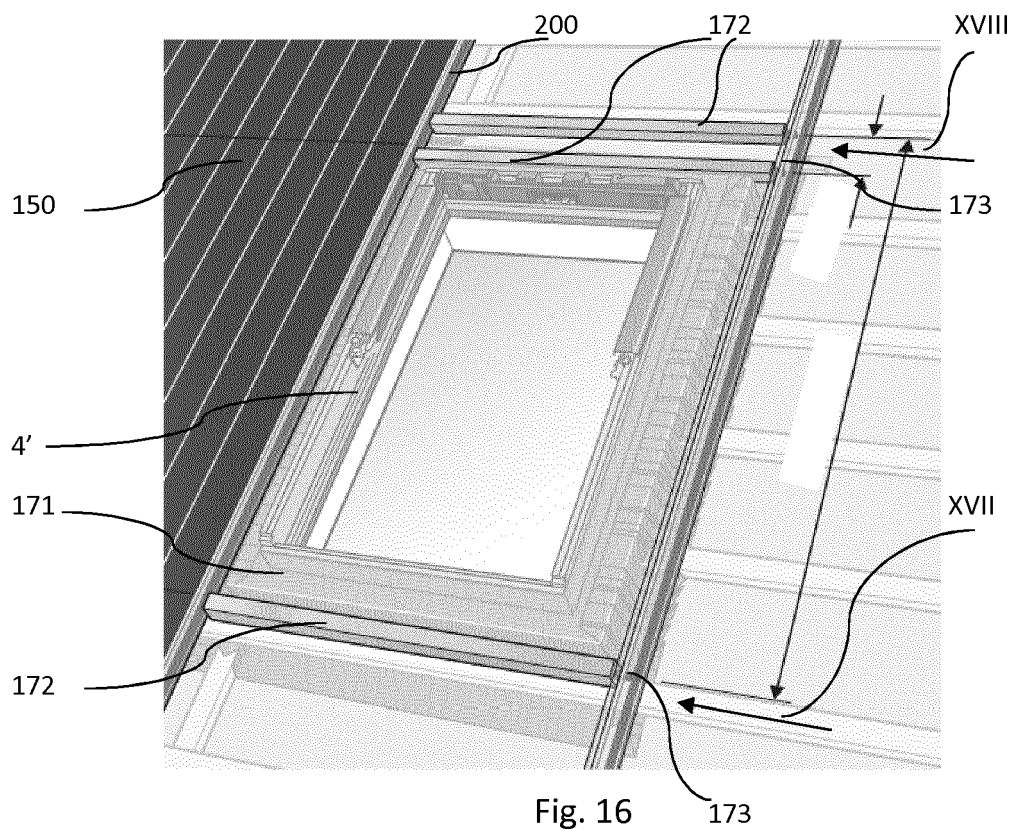


Fig. 15



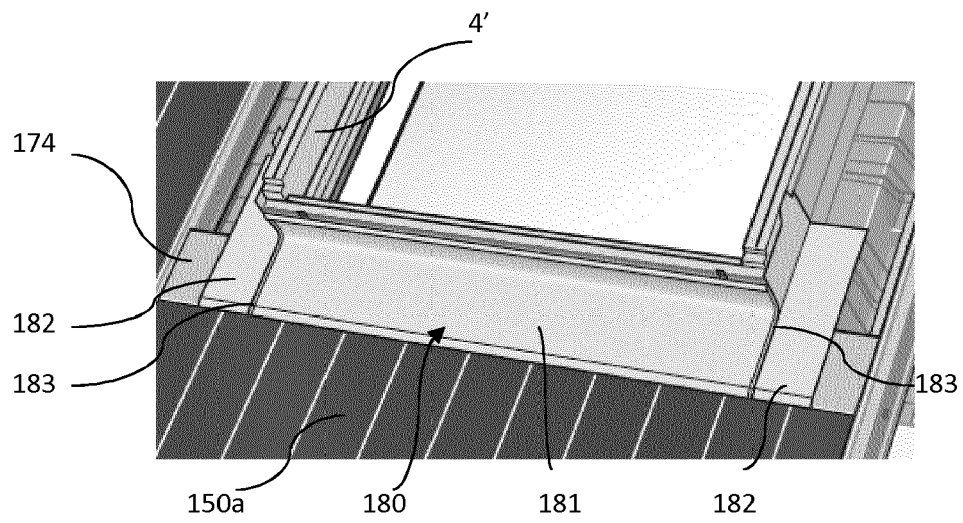


Fig. 19

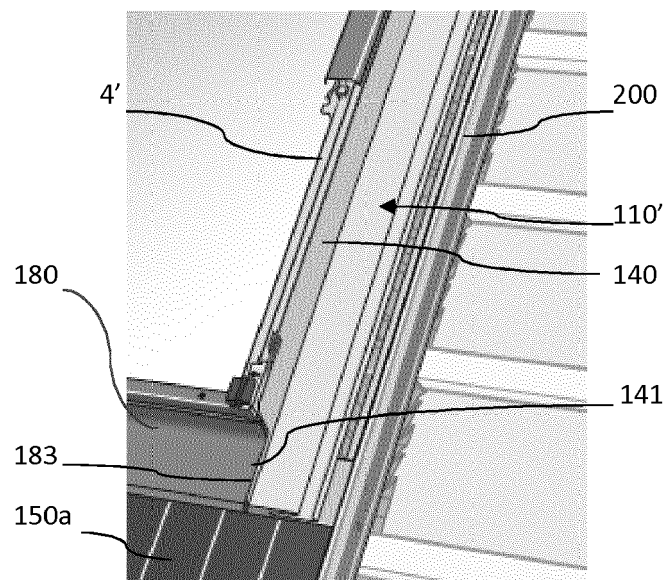


Fig. 20



EUROPEAN SEARCH REPORT

Application Number
EP 18 20 3347

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D A	WO 95/28535 A1 (RASMUSSEN KANN IND AS [DK]) 26 October 1995 (1995-10-26) * figures 2,3,6 * * from page 7, last paragraph, to page 8, end of first paragraph * -----	1-13 14-16	INV. E04D13/147
			TECHNICAL FIELDS SEARCHED (IPC)
			E04D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 March 2019	Examiner Tran, Kim Lien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 20 3347

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-03-2019

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