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(54) Benævnelse: **En metode til montering af en inddækning på et ovenlysvindue og et inddækningssystem til et ovenlysvindue**

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DESCRIPTION

[0001] The present invention relates to a method for mounting a flashing for a roof window, said flashing comprising one or more flashing members each having a first leg intended for being placed against an external surface of the window frame and a second leg being arranged at an angle with respect to first leg so that it projects from the window frame and having opposite first and second edges, said first edge being connected to the first leg, and two end edges interconnecting the first and second edges. The invention further relates to a flashing system for a roof window.

[0002] Roof window flashings are typically composed of a set of flashing members or flashing frames, which are attached to the window frame one by one in an overlapping manner so as to make the joint between the window and the roof watertight. Examples of such flashings are found i.a. in DK82857C, EP0087647A1 and EP1038078B1.

[0003] A method according to the preamble of claim 1 is known from US 5,077,943 A1.

[0004] It is noted that in this the designation "flashing member" is used in its traditional meaning, namely a member arranged to engage both the roof and the window frame, whereas, for the sake of simplicity, the general term "flashing" is used for the entire set of members used for waterproofing the joint between the window and the roof, including cladding and covering members.

[0005] Traditionally, the flashing members are attached to the window frame by means of screws. This works very well with windows having wooden or plastic frames, where the screws may enter and come into a stable engagement with the frame virtually at any point.

[0006] In recent years the trend has been to explore the possibilities in using other materials, such as metals and composites, for window frames in order to improve insulating properties, minimise the frame volume, increase durability etc. and such materials are not all suited for receiving screws.

[0007] It is therefore the object of the invention to provide a method for mounting a flashing, which minimises the need for penetrating the window frame.

[0008] This object is achieved with a method comprising the steps of:

- mounting a connector element at each corner of the window frame, with an upper side of the connector element facing the exterior, a lower side facing the roof, a first end facing the window frame and a second end facing away from the window frame,
- providing at least one of the flashing members with an engagement section at one or both end edges,
- placing each engagement section in engagement with at least one connector element at

its upper side, and

- securing the flashing member to the connector element.

[0009] The engagement between the flashing member and the connector element may in principle be achieved simply by providing the end edge of the flashing with an extension projecting over the upper side of the connector element and driving screws through the flashing member into the connector element. It is, however, preferred that the flashing member is provided with bent edges serving as engagement sections. These bent edges will form surfaces, which, when brought into engagement with surfaces on the connector elements, will provide a more stable engagement, particularly with regards to rotation.

[0010] At present it is particularly preferred that such bent edges are arranged in an upwards open gutter in the upper side of the connector element so that they engage the longitudinal edges of the gutter. This will keep the flashing member from moving in a direction perpendicular to the gutter, and, if the dimensions of the gutter and the flashing member are further adapted so that the length of the gutter corresponds to the length of the end edge, also from moving in the longitudinal direction of the gutter. The securing of the flashing member need then only prevent the flashing member from coming up out of the gutter.

[0011] To ensure that two flashing members engaging the same connector element are aligned, the gutter is preferably of a rectangular shape, when seen from the upper side.

[0012] According to the invention the connector element is attached to a mounting bracket used for securing the window to the roof. Considering that the attachment of the flashing member to the connector element will, under normal circumstances, be sufficient, this means that the need for penetrating the frame for the purpose of attaching the flashing members can eliminated entirely.

[0013] When the flashing member has a length corresponding to the length of the window frame member along which it is mounted, it is sufficient to provide a connector element at each corner of the window frame. It is, however, also possible to use more flashing members, in which case additional connector elements may be employed. As an example it may be advantageous to have a separate centre-section at the bottom of a window in order to give easy access to a motor.

[0014] When mounting two or more windows side-by-side it is preferred that the flashing members used at the top and bottom of neighbouring windows, respectively, reach each other so that a separate flashing section for covering a distance between them is avoided. It is therefore preferred that in such cases the connector element is provided at the centre-line of the joint between the two windows, and accordingly the indication "at each corner of the window" is to be understood in its broadest sense.

[0015] The flashing member may be secured to the connector element by means of screws, but it is preferred to use a covering member arranged to cover the joint between neighbouring flashing members. If the connector element is provided with a gutter, the covering member should preferably cover the upwards opening of the gutter entirely. In this way a smooth surface is provided, which is not only advantageous from an aesthetic point of view, but also prevents the collection of dirt, which may deteriorate the flashing members and/or connector element. Such a covering member may be attached to the connector element in many ways including the use of screws, and the connector element and/or covering member may have sections of increased strength or thickness, engagement members or the like for allowing this attachment.

[0016] The securing of the flashing member may also, or as a supplement to the method described above, be achieve by engagement between parts of the flashing member and connector element.

[0017] In a preferred embodiment, the connector element has an attachment part at the first end with the shape of an inverted J, which projects upwards. The height of the body of the J corresponds substantially to the height of the first leg of the flashing member and the arm projects towards the second end of the connector element. During mounting of the flashing member it is shifted and/or rotated so that the first leg is brought in underneath the arm and comes to lie with its upper edge at the inner corner of the J, where the arm and body meets, the first leg abutting the body of the J.

[0018] The projection may of course also have other shapes or the connector element could in stead be provided with a hole or recess matching the shape of a projection on the flashing member as long as it, at least locally, keeps the flashing member from movement in the upwards direction.

[0019] A projection extending upwards at the first end, however, has the advantage that it may also serve to support covering and cladding members, including those used at the side of the window.

[0020] In a preferred embodiment the gutter is open-ended at the second end of the connector element so that is may serve as a drain. If placing a lower edge of a flashing, cladding or covering member arranged at the side of the window in or above the gutter at the first end, water collected by these will end up in the gutter. The gutter will then take it across the top or bottom flashing members depending on the position of the connector element in question and discharge it onto the roof surface. The same applies to water drained via drainage channels in the window sash or frame.

[0021] To ease the use as a drain, the connector element may include an extension of the gutter at the first end, behind the attachment part, if any, and depending on the over-all design of the attachment part it may be necessary to provide it with one or more openings so that it does not block the path of the water to be drained off.

[0022] Using an open-ended gutter is an advantage even if the connector element is not used for draining water from the side of the window, as it will also drain off any precipitation forced across the upper surface of the flashing members by wind.

[0023] The connector element is preferably made from plastic, such as polyethylene (PE), polypropylene (PP) or polyvinylchloride (PVC), but materials including composites may of course be employed as long as they are able to withstand the conditions on a roof.

[0024] Depending amongst other things on the material used and the method of manufacture, the connector element may be of a hollow configuration and in that case the hollow may be filled wholly or partially with an insulating material.

[0025] Details of the making of the flashing members and connector elements will not be described here as these are considered to be readily imaginable to the skilled person.

[0026] In the following, the invention will be described with reference to the drawing in which:

Fig. 1 is a perspective view of a connector element according to the invention used for mounting a bottom flashing member,

Fig. 2 is a view corresponding to that in Fig. 1 but with a corner flashing member and a covering member added,

Fig. 3 shows the window detail of Fig. 2 seen from below in a perspective view, and

Fig. 4 is a perspective view of a connector element according to the invention used for mounting a top flashing member.

[0027] In Fig. 1 a connector element 1 according to an embodiment of the invention is used for securing a bottom flashing member 2 to a window frame 3. Here, the connector element 1 rides on a mounting bracket 31, which is intended for interconnecting the window frame to a load-bearing structure, such as a roof, but the connector element may of course also be attached directly to the window frame.

[0028] The bottom flashing member 2, which is intended for a structural skylight mounted on an upstand, comprises a first leg 21, a second leg 22 and third leg 23. The first leg 21 is arranged against an external surface of the window frame 3, while the second leg 22 projects from the window frame in order to be able to accommodate or span over the upstand. The third leg 23, which need not always be present, is intended to extend along an external side of the upstand and overlap with a roof material or another flashing member.

[0029] The connector element 1 has a substantially H-shaped cross-sectional shape, with the two lower legs lying on each side of the mounting bracket and the two upper legs forming a

gutter 11.

[0030] A bent end edge 27 of the second leg 22 of the flashing member 2 serves as an engagement section and engages a longitudinal edge of the gutter 11. This engagement keeps the flashing member 2 from moving away from the connector element 1 in the horizontal direction and at the centre of the gutter 11 is a raised part 13, which prevents it from moving in the opposite direction. The gutter 11 is open-ended at the second end of the connector element, which is furthest from the window frame 3, to allow it to be used for drainage purposes as will be explained below, but if this is not the case, the flashing member will also be kept from moving away from the window.

[0031] The first leg 21 of the flashing member 2 is located underneath a projection 12 on the connector element 1 having the shape of an inverted J, which projects upwards and serving as an attachment part. The height of the body of the J corresponds substantially to the height of the first leg 21, so that the upper edge of the first leg lies at the inner corner of the J, where the arm and body meets, the first leg abutting the body of the J. In this case, the first leg 21 has a bent edge 28 as is common to this kind of flashing members and the arm of the J corresponds in size and shape to this bent edge. The projection 12 may be elastic so that is can be bend slightly to ease the introduction of the flashing member 2.

[0032] The engagement between the flashing member 2 and the projection 12 prevents the flashing member from moving in the vertical direction and combined with the engagement between the bent end edge 27 and the gutter 11 the flashing member is thus fixated.

[0033] A further optimisation may be achieved by using the projection 12 to support covering and cladding members (not shown), including those used at the side of the window.

[0034] As is well known to the skilled person, windows are often provided with a drainage channel (not shown) at the side members of the window sash and/or frame for the purpose of collecting condensation as well as any water that might penetrate the system of cladding and covering members. For this purpose the connector element has an extension 15 at its first end behind the projection 12, and the projection 12 has an opening 16 at the bottom. Water received from such a drainage channel can drip into the gutter 11, which extends into the extension 15 and which has a closed upper end. From here the water passes through the opening 16 in the projection and finally exits via the open lower end of the gutter, from where it is lead onto the roof (not shown). Furthermore, water from side covering, cladding or flashing members (not shown) may be drained via the connector element in a similar manner.

[0035] In Fig. 2 a corner flashing member 4 has been added. It too has a bent edge (not visible), which has been brought into engagement with the opposite longitudinal edge of the gutter 11, just as the bent edge 27 of the bottom flashing member 2.

[0036] On top of the bent edges, and covering the gutter in the connector element, is a covering member 5, having substantially the same cross-sectional shape as the bottom

flashing member 2. The covering member is attached by means of screws 14 penetrating the projection 12 and the raised part 13, which has increased strength.

[0037] To ensure that the two flashing members 2,4 engaging the same connector element are aligned, the gutter is of a rectangular shape, when seen from above. This also contributes to a narrow joint, which is advantageous both with regards to tightness and aesthetics. If, however, an angle were desired between neighbouring flashing members, it could have been achieved by providing the longitudinal gutter edges at an angle to each other.

[0038] The attachment of the flashing members 2,4 to the connector element 1 will, under normal circumstances, be sufficient, which means that the need for penetrating the window frame for the purpose of attaching the flashing member can eliminated entirely. This, however, does not mean that a combined use of connector element and screws or the like is outside the scope of the invention.

[0039] Above the connector element has been described for use at a corner of a window facing a roof surface, but it may also be used when windows are mounted closely side-by-side, in which case the corner flashing member 4 is replaced by a bottom flashing member (not shown) of a neighbouring window.

[0040] As explained above the connector element 1 in Figs. 1 and 2 is resting on the mounting bracket 11 used for interconnecting the window to the roof structure. Referring now also to Fig. 3, where the connector element with bottom and corner flashing members is seen from below, the mounting bracket 11 shown is substantially flush with the side member of the window frame 3. This means that when mounting two windows side-by-side, their mounting brackets will lie closely along each other.

[0041] The connector element 1 has a width C between the two legs projecting downwards, which allows it to span both mounting brackets of the two neighbouring windows and in this way the connector element will come to lie at the centre of the joint between them.

[0042] This centred position of the connector element 1 entails that the joint between neighbouring flashing members will also be centred, which will lead to an aesthetical advantage, but it is of course also possible to provide a connector element at each mounting bracket. In that case a separate member will be needed for covering the space or joint between the two connector members of neighbouring windows, but this may be done by means of an extra-wide version of the covering member used for covering the gutter as described above.

[0043] Moreover, a centred connector element will also facilitate its use for draining off water collected in drainage channels between windows (not shown) and/or by covering and cladding members used at the joint.

[0044] As may also be seen from Fig. 3, a block of insulating material 6 has been provided in

the space between the two lower legs of the connector element 1, where it is not occupied by the mounting bracket(s) 31. This insulating material may be provided in the state of delivery or added in-situ. In one embodiment, the connector element is filled entirely with insulating material at delivery and then adapted for the intended use by removal or compression of some of it.

[0045] Use of a connector element 7 according to the invention at the top of a window is of course also possible. Such an embodiment is shown in Fig. 4. As may be seen the angle between the projection 72 and the gutter 71 is somewhat larger than on the connector element 1 intended for use at the bottom as shown in Fig. 1. This is due to the fact that this particular connector element 7 is intended for use with a window mounted on an upstand having a horizontal upper surface and that it must therefore compensate for the inclination of the window.

[0046] Other differences between the top and bottom connector elements 1, 7 shown in Figs. 1 and 4, respectively, are that the top connector element 7 is without the extension 15 and opening 16 and that different recesses 73,74 are provided for giving room for bolts, joints etc. on the mounting bracket (not shown) of a neighbouring window.

[0047] The connector elements 1,7 described herein and shown on the drawing are intended to be useable regardless whether the window is mounted alone or next to another window, but it is of course possible to provide different connector elements for these two installation situations.

[0048] Preferred materials for the connector elements are thermoplastics, such as high density polyethylene (PE) or polypropylene (PP), but other materials including composites and metals are also usable. Metals are, however, less preferred as they tend to form thermal bridges, which may influence the insulating properties negatively.

[0049] In the above, the invention has been explained with reference to a rectangular roof window, but it may also be used with windows having other shapes and with other types of roof penetrating structures such as solar panels.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DK82857C **[0002]**
- EP0087647A1 **[0002]**
- EP1038078B1 **[0002]**
- US5077943A1 **[0003]**

PATENTKRAV

1. En metode til montering af en inddækning på et ovenlysvindue, hvor nævnte inddækning omfatter et eller flere inddækningselementer (2, 4), som hver har et første ben (21) beregnet til blive placeret mod en ekstern overflade af vinduets karm (3), og et andet ben (22) arrangeret i en vinkel i forhold til det første ben, så det rager ud fra vinduets karm og har modsatte første og anden kanter, hvor nævnte første kant er forbundet til det første ben og to endekanter som sammenkobler den første og den anden kant,
hvor metoden omfatter trinnene:
montering af et forbindelseselement (1, 7) ved hvert af vinduets karmhjørner, hvor forbindelseselementets øvre side vender udad, en nedre side der vender mod taget, en første ende der vender mod vinduets karm, og en anden ende der vender væk fra vinduets karm,
tilvejebringelse af i det mindste et af inddækningselementerne (2, 4) med en indgrebssektion ved en eller begge endekanter,
placering af hver indgrebssektion i indgreb med i det mindste et forbindelseselement ved dets øvre side, og
sikring af inddækningselementet til forbindelseselementet **kendetegnet ved,** at forbindelseselementet (1, 7) er fastgjort til et monteringsbeslag (31, 32) anvendt til sikring af vinduet til taget.

2. En metode ifølge krav 1 **kendetegnet ved,** at indgrebssektionen er en bøjet kant (27), som er placeret til at rage ind i en tagrende (11, 71), som er åben opad, i den øvre side af forbindelseselementet (1, 7).

3. En metode ifølge et hvilket som helst af foregående krav **kendetegnet ved,** at inddækningselementet (2, 4) er sikret til forbindelseselementet (1, 7) ved hjælp af en afdækningsdel (5), fortrinsvist placeret til at dække i det væsentlige hele tagrendens (11, 71) åbning opad, hvis der er en.

4. En metode ifølge et hvilket som helst af foregående krav **kendetegnet ved,** at inddækningselementet (2, 4) under montering er flyttet og/eller drejet sådan, at det går i indgreb med et fremspring (12, 72) på forbindelseselementet, som i hvert fald lokalt holder det fra yderligere bevægelse i retningen opad.

5. En metode ifølge krav 4 **kendetegnet ved,** at fremspringet (12, 72) er placeret ved den første ende og har form af et omvendt J, og hvor inddækningselementets første ben (21) bringes ind under fremspringet, så det kommer til at ligge med sin øvre kant ved J-formens indvendige hjørne.

6. En metode ifølge et hvilket som helst af kravene 2-5 **kendetegnet ved,** at den derudover omfatter trinnet med placering af en nedre kant på et inddæknings-, beklædnings- eller afdækningselement placeret ved vinduets side i eller over tagrenden (11, 71) ved den første ende.

7. Et inddækningssystem for et ovenlysvindue omfattende et forbindelseselement (1, 7) og et eller flere inddækningselementer (2, 4),
hvor hvert inddækningselement har et første ben (21) beregnet til blive placeret mod en ekstern overflade i vinduets karm (3), og et andet ben (22) arrangeret i en vinkel i forhold det første ben, så det rager frem fra vinduets karm og har modsatte første og anden kanter, hvor nævnte første kant er forbundet til det første ben og to endekanter som sammenkobler den første og den anden kant, hvor mindst et af inddækningselementerne omfatter en indgrebssektion ved en eller begge endekanter, og hvor hvert inddækningselement er tilpasset til at blive sikret til forbindelseselementet,
hvor nævnte forbindelseselement er konfigureret til at blive monteret ved et hjørne af vinduets karm og blive fastgjort til et monteringsbeslag (31, 32) anvendt til sikring af vinduet til taget, så forbindelseselementet, når det ses i den tilsigtede anvendelsesposition, har en øvre side der vender mod ydersiden, en nedre side der vender mod taget, en første ende der vender mod vinduet og en anden ende der vender væk fra vinduet, og hvor den øvre side omfatter en

tagrende (11, 71), som er åben opad,
hvor indgrebssektionen er en bøjet kant (27), som er konfigureret til at blive anbragt til at rage ind i en tagrende, som er åben opad på den øvre side af forbindelseselementet, så indgrebssektionen er i indgreb med i det mindste et forbindelseselement ved dets øvre side.

8. Et inddækningssystem ifølge krav 7 **kendetegnet ved**, at forbindelseselementet (1, 7) har en i det væsentlige rektangulær form, når det ses oppefra i den tilsigtede anvendelsesposition.

9. Et inddækningssystem ifølge krav 7 eller 8 **kendetegnet ved**, at forbindelseselementet (1, 7) omfatter en fastgørelsesdel i form af et fremspring (12, 72) for at holde et inddækningselement (2, 4) fra at bevæge sig i retningen opad, hvor fremspringet fortrinsvist skal være placeret ved den første ende og have form som et omvendt J.

10. Et inddækningssystem ifølge krav 9 **kendetegnet ved**, at fremspringet (12, 72) har anordninger til fastgørelse af et afdækningselement.

11. Et inddækningssystem ifølge et hvilket som helst af kravene 7-10 **kendetegnet ved,** at tagrenden (11, 71) har en åben ende i den anden ende af forbindelseselementet.

12. Et inddækningssystem ifølge et hvilket som helst af kravene 7-11 **kendetegnet ved,** at forbindelseselementet (1, 7) derudover omfatter en forlængelse (15) af tagrenden (11) ved den første ende.

13. Et inddækningssystem ifølge kravene 9 og 12 **kendetegnet ved,** at fastgørelsesdelen (12) har en gennemgående åbning (16) ved bunden tættest på tagrenden (11).

14. Et inddækningssystem ifølge et hvilket som helst af kravene 7-13 **kendetegnet ved,** at forbindelseselementet (1, 7) er en hul konfiguration og/eller lavet med en kerne (6) af et isoleringsmateriale.

DRAWINGS

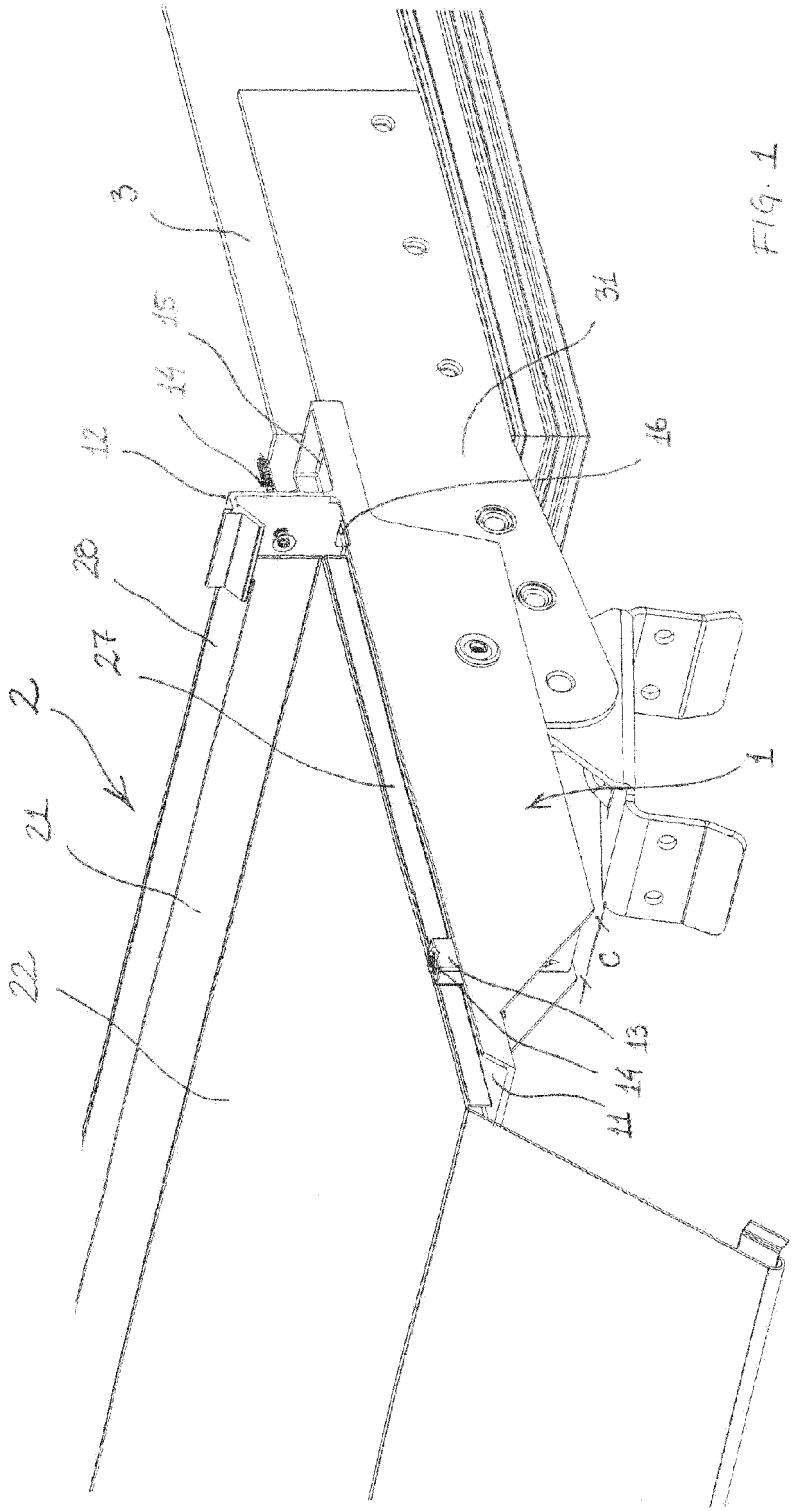

FIG. 1

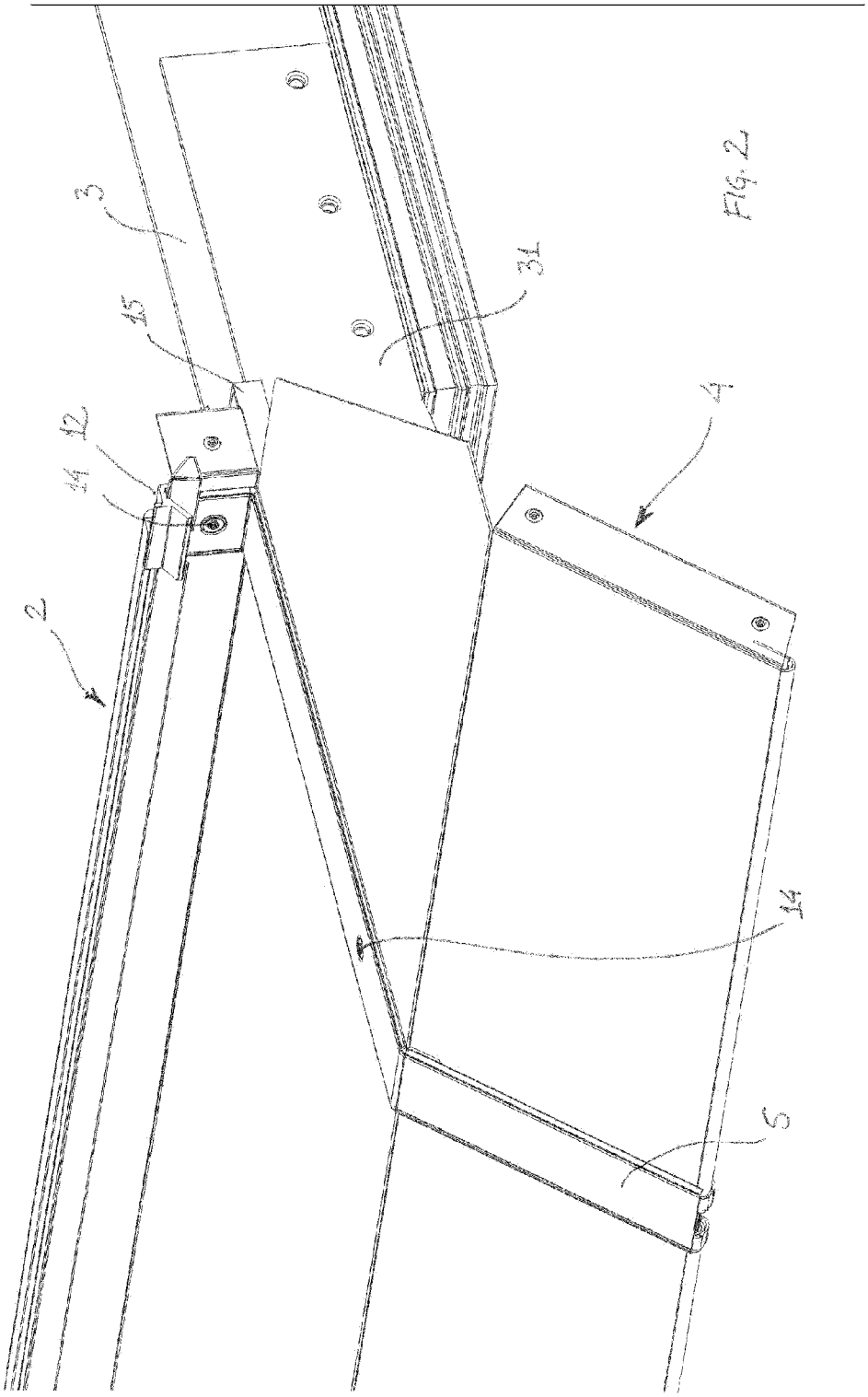

Fig. 2

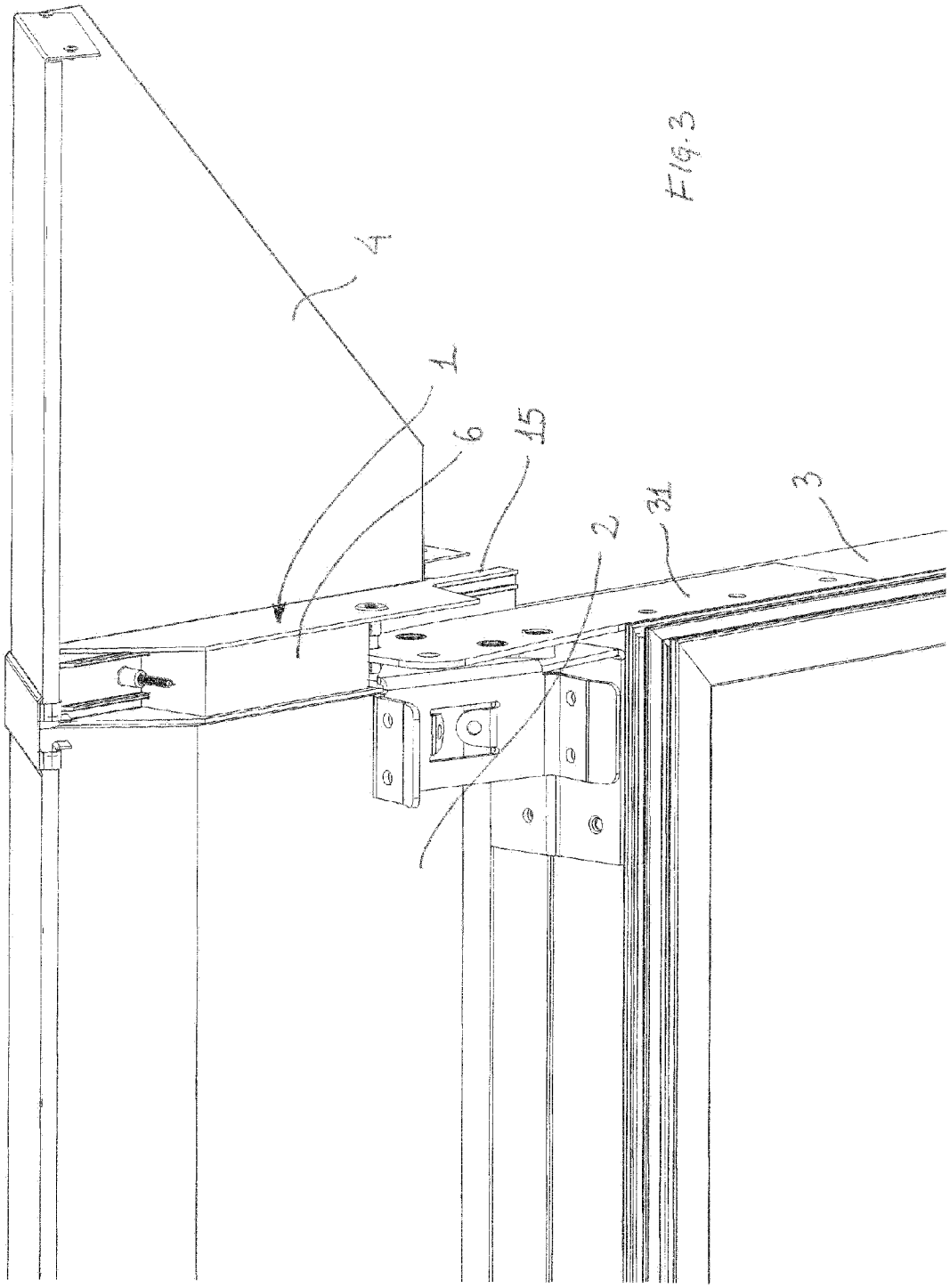

Fig. 3

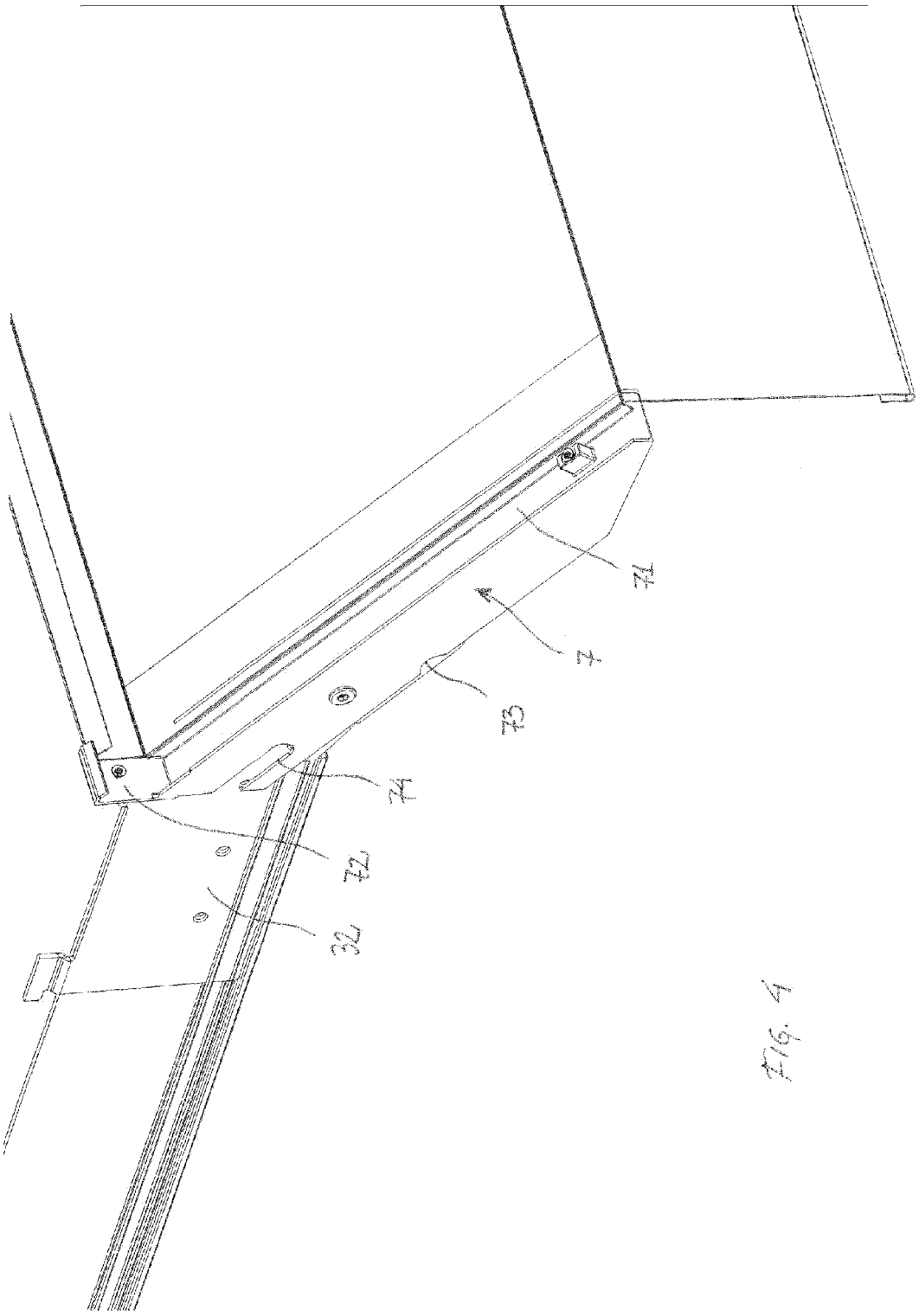

Fig. 4