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(54) Titel: **Undertagkrave og fremgangsmåde til at tætne samlingen mellem et tagvindue og en tagkonstruktion**

(56) Fremdragne publikationer:
DE 202004008870 U1
EP 3725971 A1
EP 3885508 A1
EP 3578727 A1

(57) Sammendrag:
An underroof collar (104) for use with a roof window (1) mounted in an inclined roof structure (11) is disclosed. Said underroof collar (104) comprises an inner portion (1041) configured for extending along the outer side of the frame (20o) of the roof window (1), and an outer portion (1042), which is configured for extending away from the roof window (1) and for overlapping with sections of an underroof (114, 115) extending along the roof window (1). The underroof collar further comprises at least one attachment member (1043), which is attached to the inner portion (1041) and which is configured for being inserted in an opening (105) at the frame (2) of the roof window. A method for sealing the joint between a roof window and an underroof is further disclosed.

Fortsættes...

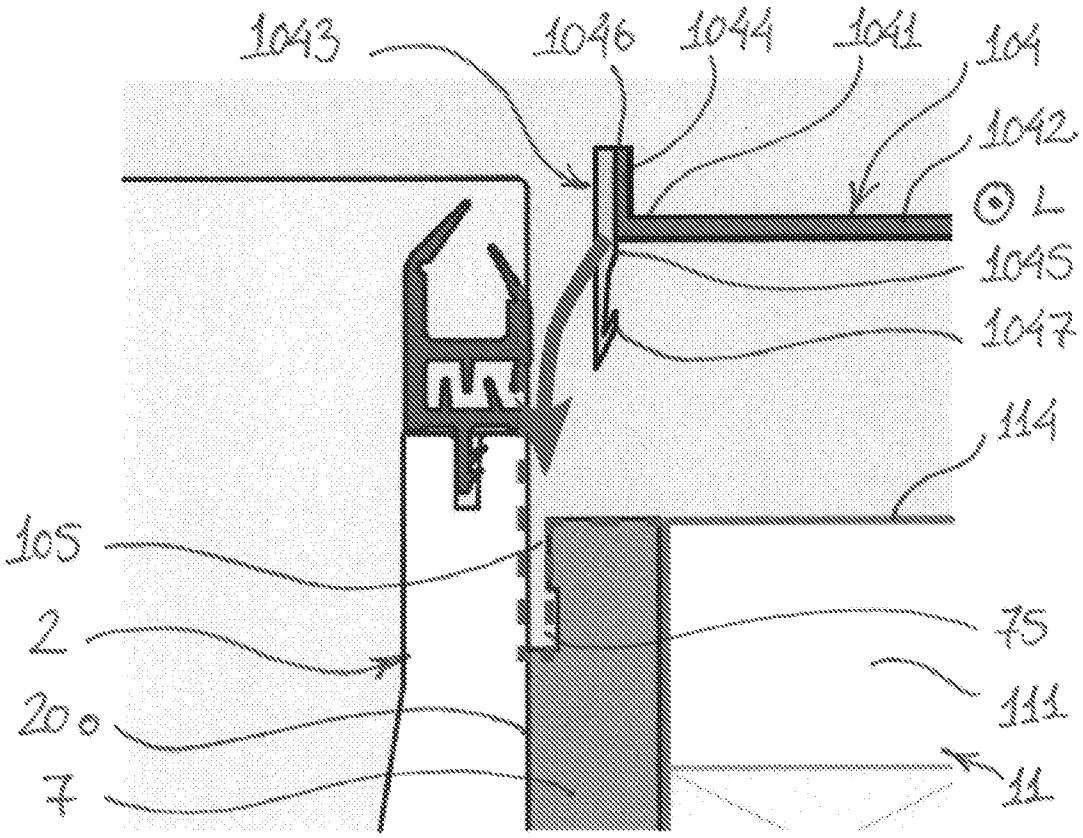
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Fig. 5

Technical Field

The present invention relates to an underroof collar for use with a roof window mounted in a roof structure inclined in a direction of inclination, wherein said roof window comprises a frame delimiting a frame opening and having an outer side facing away from the frame opening, wherein said underroof collar comprises an inner portion, which is configured for extending along the outer side of the frame of the roof window, and an outer portion, which is configured for extending away from the roof window and for overlapping with sections of an underroof extending along the roof window, said inner portion delimiting a collar opening, and wherein said underroof collar comprises a plurality of collar members each having a length direction extending along the collar opening. The invention further relates to a method for sealing the joint between a roof window mounted in a roof structure inclined in a direction of inclination and an underroof of said roof structure.

Background Art

In roofs covered by tiles and other roofing materials an underroof is typically provided underneath the roofing material to divert any precipitation penetrating through the roofing material, for example snow entering through small gaps between tiles, and any condensation forming on the interior side of the roofing material. In this context the term "interior" is used to indicate a direction towards the interior of a building covered by the roof, and the term "exterior" is used for the opposite direction, away from the interior of the building.

When a roof window is mounted in the roof, an opening is cut in the roof structure, thereby interrupting the underroof. After mounting of the roof window in said opening, an underroof collar is used for sealing the joint between the roof window and the underroof. The inner portion of the underroof collar is typically attached to the frame of the roof window, for example by

means of staples or an adhesive, and the outer portion of the underroof collar, also referred to as a skirt portion, overlaps with the sections of the underroof extending along the opening closest to the roof window. The outer portion may be attached to the roof structure, for example by means of staples, and/or to the underroof, for examples by means of adhesive tape, thereby keeping the underroof collar in its intended position. In some roof structures, laths for supporting the roofing material extend on the exterior side of the underroof. To be able to reach over such laths and down to the underroof between them, at least the outer portion of the side collar members of the underroof collar may be provided with a surplus of material, for example being made from a pleated material. Examples of underroof collars are disclosed in EP0994992B1, EP1774118B1, EP1896673B1, and EP2284329A2.

The underroof collars are typically made from a textile material, such as a non-woven material, which is waterproof but vapour-permeable, and flashing and covering members are arranged on top of the underroof collars to protect them from weather and mechanical wear.

Attempts have been made to facilitate mounting of an underroof collar by making the inner portion of the underroof collar from an elastic material, by fixating a pleating or folding of the outer portion of the underroof collar so that it only unfolds when the surplus of material is needed, and by packaging the underroof collar in a manner, which eases unpacking and mounting. Improved handleability of underroof collars during mounting in roof structures, however, continues to be desired by installers.

Summary of Invention

With this background, it is therefore an object of the invention to provide an alternative underroof collar, which makes the work of the installer easier.

This and further objects are achieved with a underroof collar of the kind mentioned in the introduction which is furthermore characterised in that the underroof collar further comprises at least one attachment member, which is attached to the inner portion and which is configured for being inserted in an

opening at the frame of the roof window, and that the/each attachment member is provided with a barb.

The provision of an attachment member on the underroof collar configured for being inserted in an opening not only allows for a relatively easy installation of the underroof collar as the attachment member(s) can simply be inserted in the opening(s), but it also increases the likelihood of the inner portion of the underroof collar actually being attached. Adhesive on the inner portion, as has been used in the prior art, will typically be covered by a cover strip in the state of delivery of the underroof collar, and it happens that the installer forgets to remove the cover strip. Attachment members are less likely to be overlooked or forgotten, as they will typically be more distinct from the other parts of the underroof collar, typically being made from a stiffer material. Another advantage of the attachment members over the adhesive is that there is virtually no risk of the attachment members sticking together or sticking to other parts of the underroof collar, which is a known problem with adhesives, particularly when handling underroof collars in windy conditions.

The opening at the frame of the roof window may be an opening in the frame itself, an opening in an insulating frame arranged around the frame during installation of the roof window, or an opening formed between the frame of the roof window and such an insulating frame. An opening formed between the frame of the roof window and an insulating frame may preferably extend substantially in parallel to the outer side of the frame.

It is presently preferred that at least one attachment member is provided on each collar member. This will help to ensure that all collar members are arranged correctly in relation to the frame of the roof window.

By the/each attachment member being provided with a barb the risk of the attachment member being detached from the opening, as may for example happen if wind pulls on the underroof collar during installation or if the installer pulls on other collar members to get the underroof collar in place, is reduced. The barb may be configured for engaging with an insulating frame, which is typically made from an elastic material, in which case the barb may form an indentation in the material of the insulating frame by compressing it. It is,

however, also possible to pre-form an indentation for engagement with the barb, either in an insulating frame or in the frame of the roof window. It is also, or alternatively, possible for the attachment member to be made from an elastic material, so that it may deflect during insertion into the opening and snap into a locking engagement with the frame of the roof window and/or the insulating frame. The locking engagement may be established by friction and/or by mechanical means.

The attachment member may be a local member, in which case each collar member is preferably provided with two or more attachment members, but in one embodiment an attachment member extends over substantially the entire length of a collar member in the length direction. In addition to providing a continuous attachment, an attachment member extending over substantially the entire length of the collar member may provide stiffness to the inner portion of the underroof collar, which may facilitate installation. To facilitate storage and packaging, such an attachment member may be provided with one or more hinges or weakenings allowing the collar member to be folded. Furthermore, an attachment member extending over substantially the entire length of a collar member may provide improved weather proofing compared to when using local attachment members, since the underroof collar may be kept in tight contact with the frame of the roof window over the entire length of the attachment member and hence substantially the entire length of a collar member.

An attachment member extending over substantially the entire length of a collar member will typically be inserted in a groove extending over the entire length of a corresponding member of the frame of roof window, either being formed in the frame itself or in an insulating frame or between the frame and an insulating frame, said groove constituting the opening. In case the groove is formed in an insulating frame or between the frame of the roof window and an insulating frame, the groove and possibly also the attachment member, may be slightly longer than the frame of the roof window.

In one embodiment the/each attachment member forms part of a rail member extending over substantially the entire length of a collar member in the length direction, said rail member being plate-shaped having two major

surfaces interconnected by minor surfaces. Such a rail member may be inserted in a groove extending between the frame of the roof window and an insulating frame and arranged such that a first major surface extends along the outer side of the frame and such that the outer portion of the underroof collar extends away from a second major surface, away from the frame.

For ease of installation the inner portion of the underroof collar will typically be attached to the second major surface of the rail member, facing away from the frame of the roof window in the mounted state, but it may also be attached to the first major surface, in which case it may be brought into close contact with the frame of the roof window during installation.

In one embodiment an edge section of the inner portion having a width perpendicular to the length direction of 10-100 mm, preferably 15-50 mm, is attached to a major surface of the rail member. If attached to the second major surface of the rail member, it may be arranged to extend substantially in parallel to the outer side of the frame and such that the edge of the inner portion facing away from the outer portion faces away from an interior of a building covered by the roof structure. In this way the underroof collar will extend up along the outer side of the frame, thereby forming a L-shape, which may contribute to deflecting any water being pushed up against the frame of the roof window, for example under the influence of wind. A similar or supplementary effect may be achieved by using a rail member made from a watertight material.

Depending on the design of the attachment member and the material used for the frame of the roof window and the insulating frame, if any, the attachment member may be made from different materials. Particularly the stiffness of the attachment member and the friction between the attachment member and the opening into which it is inserted can be taken into consideration when choosing the material. When using a rail member as attachment member polypropylene (PP) or a thermoplastic elastomer (TPE) may be employed.

As in the prior art, this underroof collar may also comprise at least one side collar member made with a surplus of material to facilitate installation on roof structures comprising laths for supporting a roofing material.

A second aspect of the invention relates to a method for sealing the joint between a roof window mounted in a roof structure inclined in a direction of inclination and an underroof of said roof structure, wherein said roof window comprises a frame delimiting a collar opening and having an outer side facing away from the frame opening, and wherein an underroof collar comprises an inner portion, which is configured for extending along the outer side of the frame of the roof window, and an outer portion, which is configured for extending away from the roof window and for overlapping with sections of an underroof extending along the roof window, said inner portion delimiting a collar opening, and wherein said underroof collar comprises a plurality of collar members each having a length direction extending along the collar opening, said method comprising the steps of:

arranging the inner portion of the underroof collar so that the inner portion extends along the outer side of the frame of the roof window,

securing the underroof collar in an intended position in relation to the roof window and to the roof structure,

wherein the step of securing the underroof collar in the intended position comprises inserting at least one attachment member attached to the inner portion and provided with a barb in an opening at the frame of the roof window.

Embodiments and advantages described with reference to the first aspect of the invention also apply to the second aspect of the invention.

Brief Description of Drawings

In the following description embodiments of the invention will be described with reference to the schematic drawings, in which

Fig. 1 is a perspective view of the making of an opening in a roof structure comprising an underroof;

Fig. 2 is a perspective view of the installation of a roof window with an insulating frame in the opening in the roof structure made as in Fig. 1;

Fig. 3 is a perspective view of the installation of an underroof collar on a roof window installed as in Fig. 2;

Fig. 4 is a perspective view showing an attachment member of an underroof collar being inserted in a opening, here shown as a groove between a frame of a roof window and an insulating frame;

Figs 5 and 6 are cross-sectional views showing the installation of an underroof collar with an attachment member in a groove between a frame of a roof window and an insulating frame; and

Fig. 7 is a perspective view corresponding to Fig. 2 and showing how the underroof collar is attached to laths of the roof structure.

Description of Embodiments

Referring initially to Fig. 1, it is shown how an opening 110 is cut in a roof structure 11 for mounting a roof window. As may be seen, sections of the laths 111 used for supporting the roofing material 112 have been removed, and the underroof 113 has been interrupted by cutting. As shown at the left-hand side of the opening 110, sections 114 of the underroof previously covering the area of the opening 110 are folded over the ends of the laths 111 and the same may be the case with the sections 115 of the underroof extending along the top and bottom of the opening 110. In this case the folded over sections 114 are secured to the laths 111 by means of staples.

A roof window 1 is then mounted in the opening 110 in the roof structure 11 as shown in Fig. 2. In this case an insulating frame 7 surrounds the roof window 1 and mounting brackets 6 used for securing the frame (not visible in Fig. 2) of the roof window 1 to counter-battens 116 of the roof structure 11 span over the insulating frame 7. The insulating frame 7 may be a separate unit installed in the opening 110 in the roof structure 11 before installation of the roof window 1, or it may be pre-mounted on the frame of the roof window 1 and installed in the roof structure 11 together with the roof window 1.

After mounting of the roof window 1, an underroof collar 104 is arranged to surround the roof window 1 as shown in Fig. 3 with an inner portion 1041 extending along the roof window 1 and an outer portion 1042, also referred to as a skirt portion, extending over the roof structure 11.

As shown in Fig. 4, the inner portion 1041 is attached at the frame 2

of the roof window 1 by hand, here by inserting an attachment member 1043 in the form of a plate-shaped rail member into a groove 105 between the frame 2 of the roof window 1 and the insulating frame 7.

Turning now to Figs 5 and 6, details of the installation of an underroof collar 104 are shown. As may be seen, the attachment member 1043, which may be a rail member as in Fig. 4 or a local bracket, is inserted into a groove 105 extending between the frame 2 of the roof window 1 and the insulating frame 7 and substantially in parallel to an outer side 20o of the frame 2.

An edge section 1044 of the inner portion 1041 is attached to the major surface 1045 of the attachment member 1043 facing away from the frame 2 of the roof window 1, so that it extends substantially in parallel to the outer side 20o of the frame 2 in a mounted state and so that an edge 1046 of the inner portion 1041 facing away from the outer portion 1042 faces away from the roof structure 11. In this way the inner portion 1041 has been given an L-shape, which may facilitate diversion of water. Here, the edge section 1044 has a width perpendicular to the length direction L of 16 mm, but it will be understood that it may be smaller or larger depending for example on the construction of the roof window 1 and installation depth in the roof structure 11, and that a similar or supplementary effect may be achieved by using a rail member 1043 made from a watertight material.

In the embodiment in Figs 5 and 6, the attachment member 1043 is provided with a barb 1047 and an indentation 75 is provided in the insulating frame 7 matching the size and shape of the barb 1047. The engagement between the barb 1047 and the indentation 75, as shown in Fig. 6, will hinder a retraction of the attachment member 1043 once inserted and will thus contribute to keeping the underroof collar 104 in place, both during and after installation. If the insulating frame 7 is made from an elastic material, the indentation 75 need not be pre-formed as in Fig. 5 but may be made by the barb 1047 during installation.

In this embodiment the width of the plate-shaped attachment member 1043 corresponds to the distance from the bottom of the groove or opening 105 to the top of the frame 2, but this need not be the case. While it is considered

advantageous for insulating purposes that the groove or opening 105 is not deeper than needed for the insertion of the attachment member 1043, a deeper opening may for example allow the use of several different underroof collars having different attachment members. Likewise, if for example the frame 2 of the roof windows 1 extends in a height above the exterior side of the laths 111, the attachment member may not extend to the top of the frame 2.

To complete the installation of the underroof collar 104, the outer portion 1042 is usually attached to the roof structure 11. This is shown in Fig. 7, where the outer portion 1042 is attached to laths 111 by means of staples.

Components of the roof window 1 and underroof collar 104 are easily disassembled and each component may in principle be reused, be recycled by appropriate environmentally responsible disposal means, or the material be recovered for other uses.

List of reference numerals

1	Roof window
104	Underroof collar
1041	Inner portion
1042	Outer portion / skirt portion
1043	Attachment member / rail member
1044	Edge section
1045	Major surface
1046	Edge
1047	Barb
105	Opening / groove
110	Opening
11	Roof structure
111	Lath
112	Roofing material
113	Underroof
114	Section of underroof
115	Section of underroof
116	Counter-batten
2	Frame
20o	Outer side of frame
6	Mounting bracket
7	Insulating frame
75	Indentation
L	Length direction

Krav

1. Undertagkrave (104) til brug med et tagvindue (1) monteret i en tagkonstruktion (11), der hælder i en hældningsretning, hvor nævnte tagvindue (1) omfatter en karm (2), der afgrænser en karmåbning og har en ydre side (20o), der vender væk fra karmåbningen, hvor nævnte undertagkrave (104) omfatter en indre del (1041), som er udformet til at strække sig langs den ydre side af karmen (20o) af tagvinduet (1), og en ydre del (1042), som er udformet til at strække sig væk fra tagvinduet (1) og at overlappe med afsnit af et undertag (114, 115), der strækker sig langs tagvinduet (1), hvor nævnte indre del (1041) afgrænser en kraveåbning, og hvor nævnte undertagkrave (104) omfatter en flerhed af kraveelementer, der hver har en længderetning, der strækker sig langs kraveåbningen,

kendetegnet ved at

undertagkraven (104) yderligere omfatter mindst et fastgørelseselement (1043), som er fastgjort til den indre del (1041) og som er udformet til at blive indført i en åbning (105) ved karmen (2) af tagvinduet (1), og at hvert fastgørelseselement / fastgørelseselementet (1043) er forsynet med en modhage (1047).

2. Undertagkrave (104) ifølge krav 1, hvor mindst et fastgørelseselement (1043) er tilvejebragt på hvert kraveelement.

3. Undertagkrave (104) ifølge et eller flere af de foregående krav, hvor fastgørelseselementet (1043) strækker sig over i hovedsagen hele længden af kraveelementet i længderetningen (L).

4. Undertagkrave (104) ifølge et eller flere af de foregående krav, hvor hvert fastgørelseselement / fastgørelseselementet (1043) udgør en del af et skinneelement, der strækker sig over i hovedsagen hele længden af kraveelementet i længderetningen (L), hvilket skinneelement er pladeformet havende to større overflader (1045) indbyrdes forbundet af mindre overflader.

5. Undertagkrave (104) ifølge krav 4, hvor den indre del (1041) er fastgjort til skinneelementet (1043).

6. Undertagkrave (104) ifølge krav 5, hvor et kantafsnit (1044) af den indre del (1041), der har en bredde vinkelret på længderetningen (L) på 10-100 mm, fortrinsvis 15-50 mm, er fastgjort til en større overflade (1045) af skinneelementet (1043).

7. Undertagkrave (104) ifølge et eller flere af de foregående krav, hvor mindst et sidekraveelement er lavet med et overskud af materiale.

8. Fremgangsmåde til at tætne samlingen mellem et tagvindue (1) monteret i en tagkonstruktion (11), der hælder i en hældningsretning, og et undertag (113) af nævnte tagkonstruktion (11), hvor nævnte tagvindue (1) omfatter en karm (2), der afgrænser en karmåbning og har en ydre side (20o), der vender væk fra karmåbningen, og hvor en undertagkrave (104) omfatter en indre del (1041), som er udformet til at strække sig langs den ydre side af karmen (20o) af tagvinduet (1), og en ydre del (1042), som er udformet til at strække sig væk fra tagvinduet (1) og at overlappe med afsnit af et undertag (114, 115), der strækker sig langs tagvinduet (1), hvor nævnte indre del (1041) afgrænser en kraveåbning, og hvor nævnte undertagkrave (104) omfatter en flerhed af kraveelementer, der hver har en længderetning (L), der strækker sig langs kraveåbningen, hvilken fremgangsmåde omfatter trinnene at:

anbringe den indre del (1041) af undertagkraven (104) således, at den indre del (1041) strækker sig langs den ydre side af karmen (20o) af tagvinduet (1),

sikre undertagkraven (104) i en tilsigtet position i forhold til tagvinduet (1) og til tagkonstruktionen (11),

kendetegnet ved at

trinnet at sikre undertagkraven (104) i den tilsigtede position omfatter at indføre mindst et fastgørelseselement (1043), der er fastgjort til den indre del (1041) og forsynet med en modhage (1047), i en åbning (105) ved karmen

(2) af tagvinduet (1).

9. Fremgangsmåde ifølge krav 8, hvor det mindst ene fastgørelseselement (1043) indføres i en åbning (105) mellem karmen (2) af tagvinduet (1) og en isoleringsramme (7), der omgiver karmen (2) af tagvinduet (1), hvor åbningen (105) fortrinsvis strækker sig i hovedsagen parallelt med den ydre side af karmen (20o).

10. Fremgangsmåde ifølge krav 8 eller 9, hvor et skinneelement, der strækker sig over i hovedsagen hele længden af et kraveelement af undertagkraven (104) og er pladeformet havende to større overflader (1045) indbyrdes forbundet af mindre overflader, anbringes således, at en første større overflade strækker sig langs den ydre side af karmen (20o), og således, at den ydre del (1042) af undertagkraven (104) strækker sig væk fra en anden større overflade, væk fra karmen (2).

11. Fremgangsmåde ifølge krav 10, hvor skinneelementet anbringes således, at et kantafsnit (1044) af den indre del (1041), som har en bredde vinkelret på længderetningen (L) på 10-100 mm, fortrinsvis 15-50 mm, og som er fastgjort til den anden større overflade af skinneelementet (1043), strækker sig i hovedsagen parallelt med den ydre side af karmen (20o) og således, at den kant (1046) af den indre del (1041), der vender væk fra den ydre del (1042), vender væk fra et indre af en bygning, der er dækket af tagkonstruktionen (11).

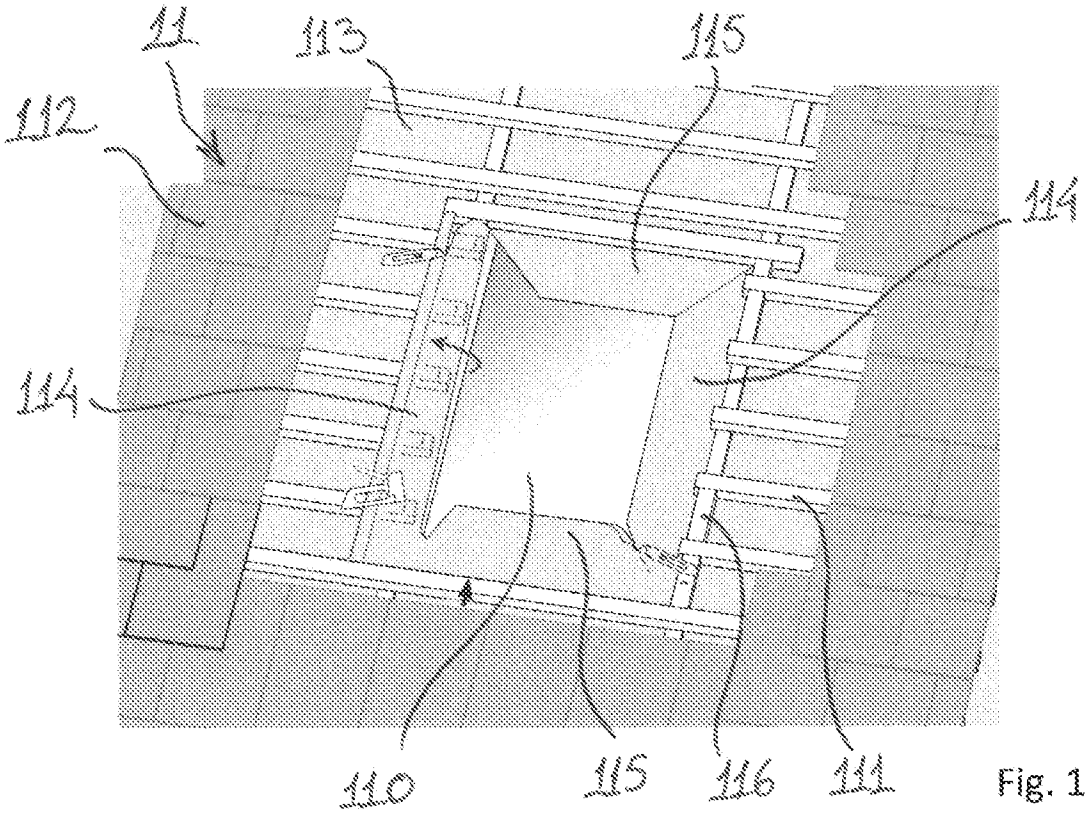

Fig. 1

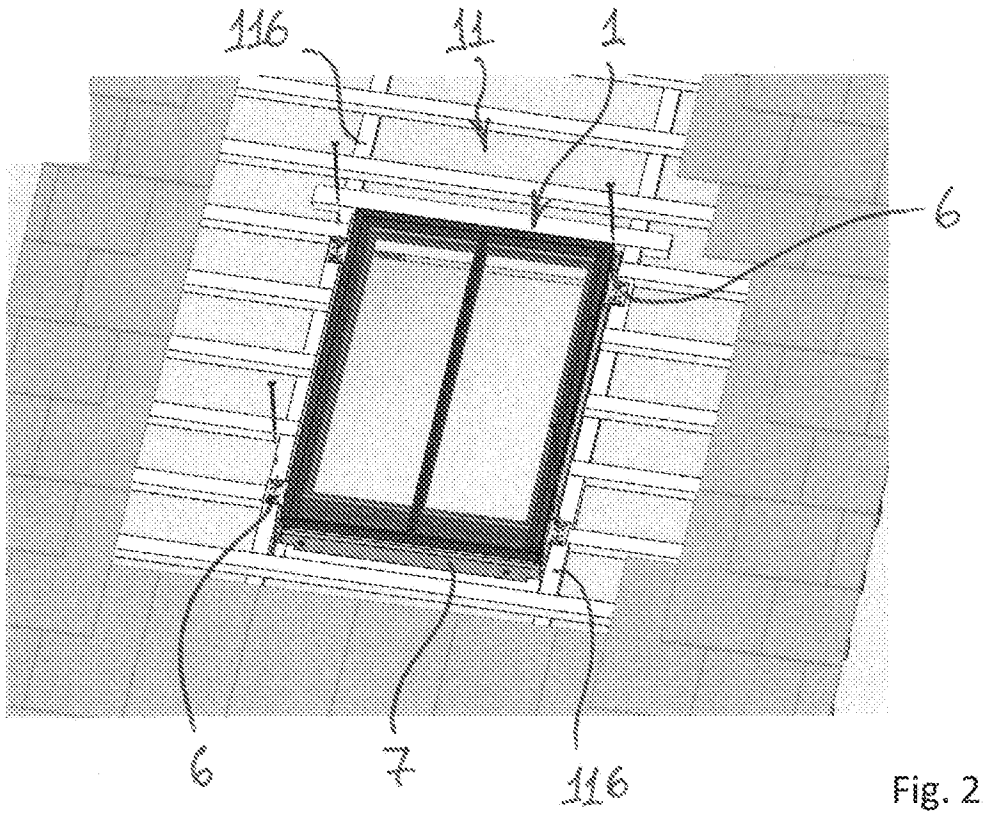

Fig. 2

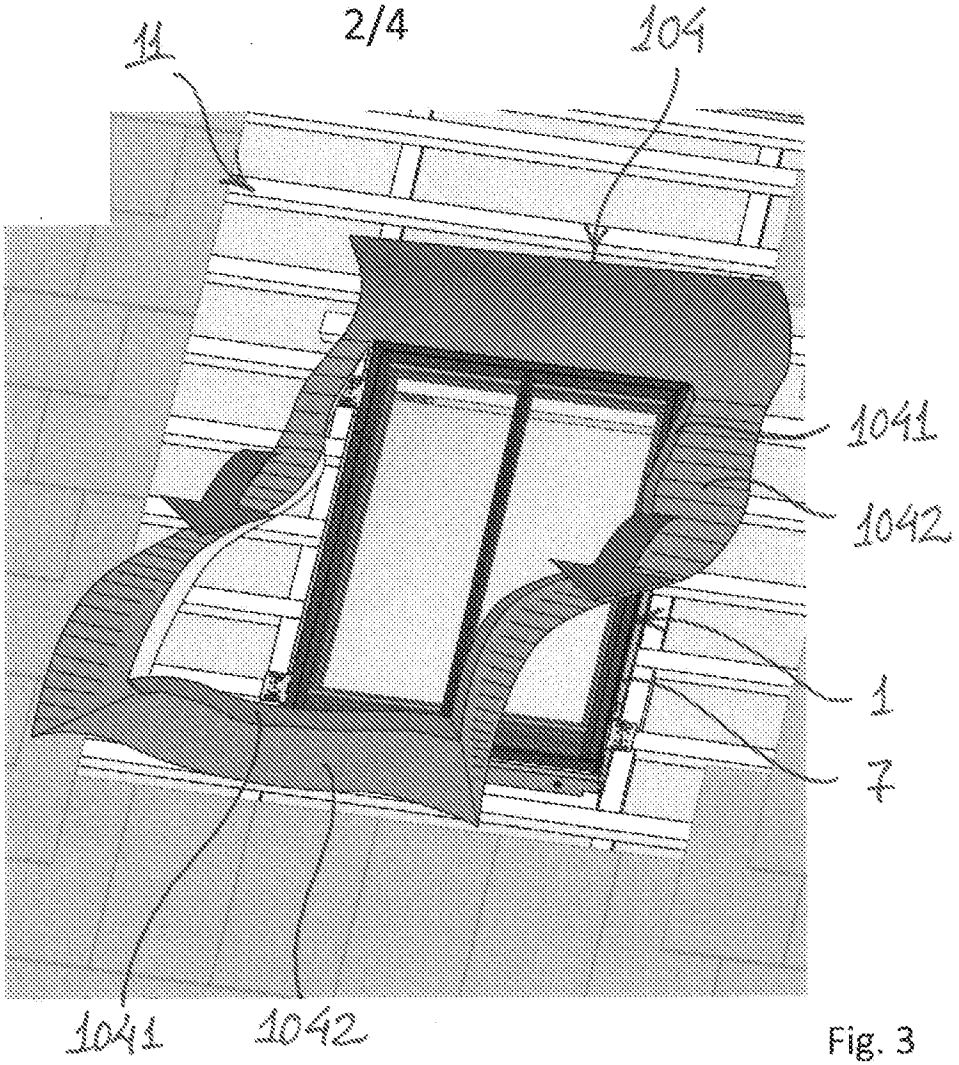

Fig. 3

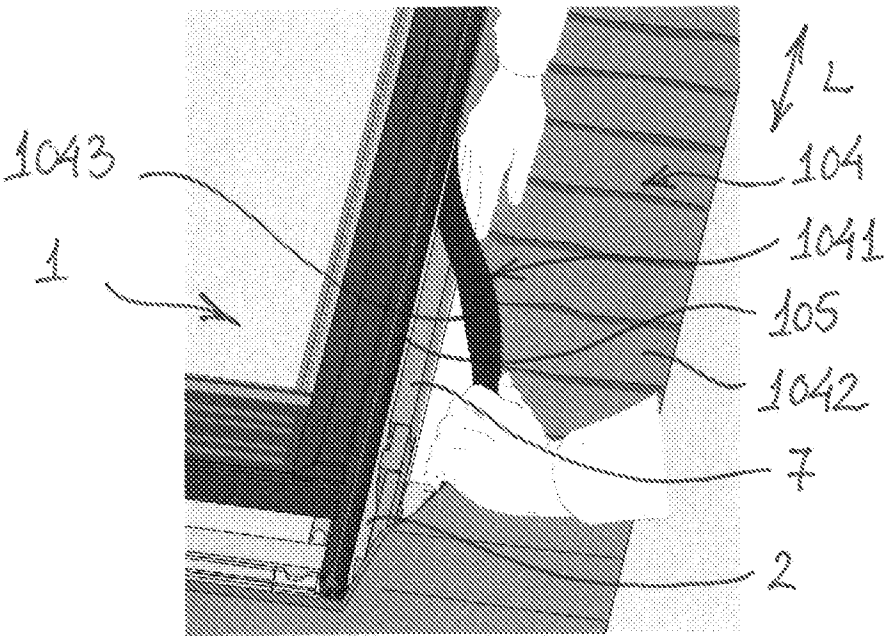

Fig. 4

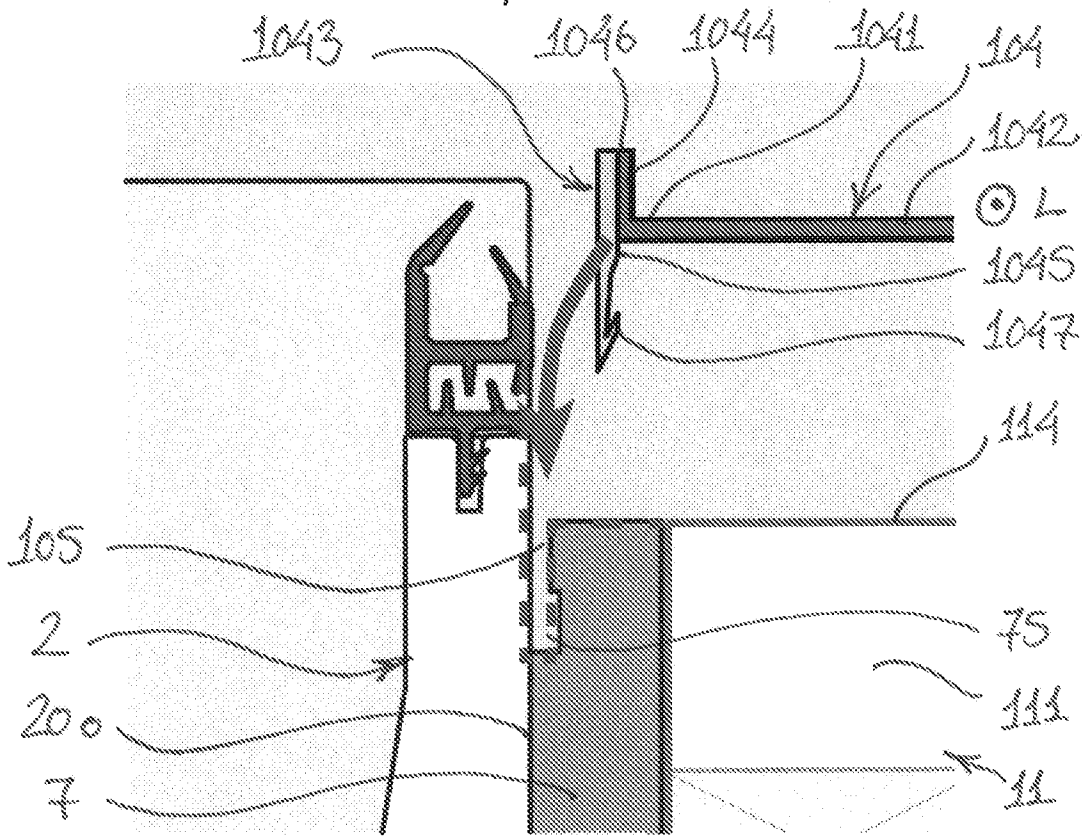
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Fig. 5

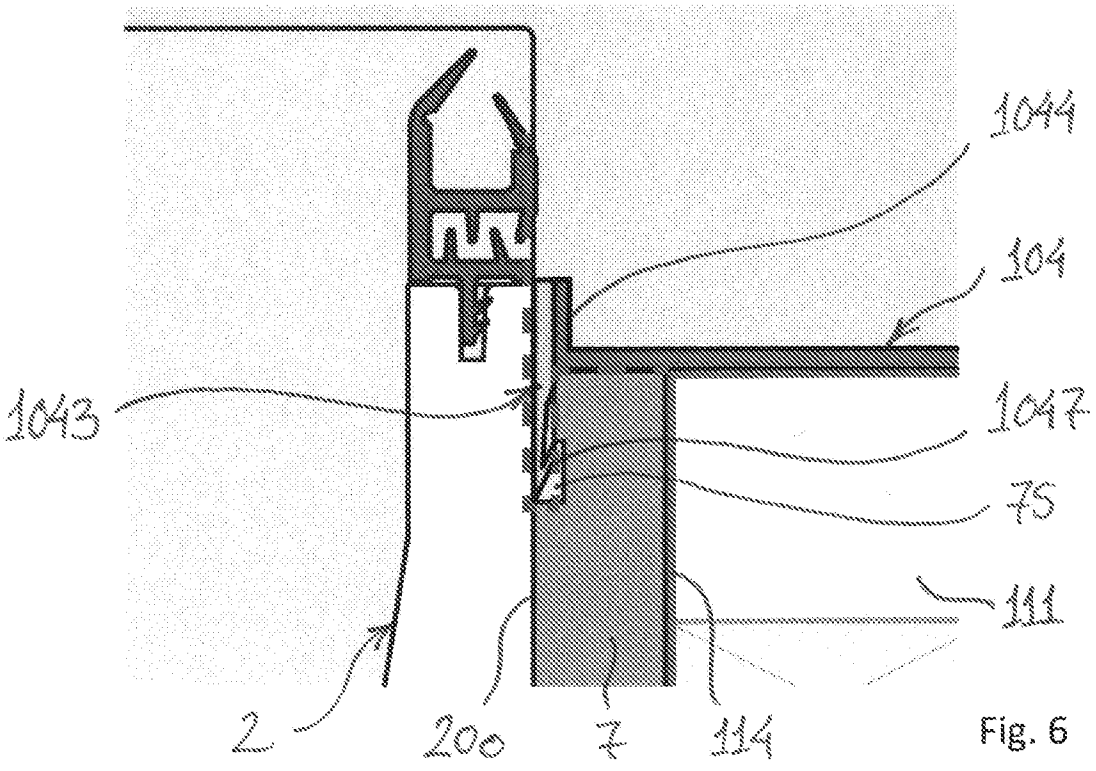
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Fig. 6

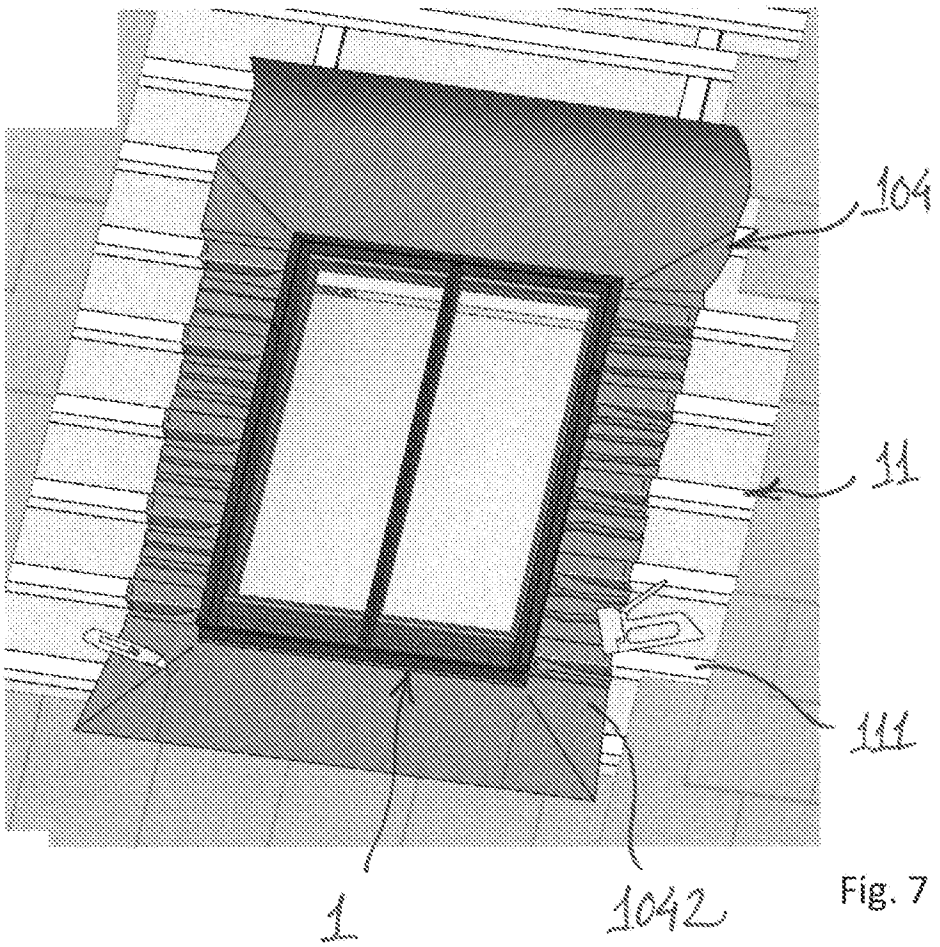

Fig. 7

DANISH PATENT AND TRADEMARK OFFICE

SEARCH REPORT - PATENT	Application No. PA 2022 70174

1. ☐ Certain claims were found unsearchable (See Box No. I).

2. ☐ Unity of invention is lacking prior to search (See Box No. II).

A. CLASSIFICATION OF SUBJECT MATTER

E04D 13/147 (2006.01), E04D 13/03 (2006.01), E04D 13/035 (2006.01)

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

PCT-minimum documentation searched (classification system followed by classification symbols)

IPC&CPC: E04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

DK, NO, SE, FI: IPC-classes as above.

Electronic database consulted during the search (name of database and, where practicable, search terms used)

EPODOC, WPI, FULL TEXT: ENGLISH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant for claim No.
X	DE 202004008870 U1 (H H, HEIM et al.) 2004.09.09. See especially paragraph 0020 and 0022 together with figures 1-2 and claim 1	1-2 and 9-10
A	EP 3725971 A1 (VKR HOLDING AS) 2020.10.21. See whole document	-
A	EP 3885508 A1 (VKR HOLDING AS) 2021.09.29. See whole document	-
A	WO 02/16706 A1 (VKR HOLDING AS et al.) 2002.02.28. See whole document	-

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"P" Document published prior to the filing date but later than the priority date claimed.
"A" Document defining the general state of the art which is not considered to be of particular relevance.	"T" Document not in conflict with the application but cited to understand the principle or theory underlying the invention.
"D" Document cited in the application.	"X" Document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone.
"E" Earlier application or patent but published on or after the filing date.	"Y" Document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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01 November 2022

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SEARCH REPORT - PATENT		Application No. PA 2022 70174
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant for claim No.

SEARCH REPORT - PATENT	Application No. PA 2022 70174

Box No. I Observations where certain claims were found unsearchable

This search report has not been established in respect of certain claims for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched, namely:

2. ☐ Claims Nos.:
because they relate to parts of the patent application that do not comply with the prescribed requirements to such an extent that no meaningful search can be carried out, specifically:

3. ☐ Claims Nos.:
because of other matters.

Box No. II Observations where unity of invention is lacking prior to the search

The Danish Patent and Trademark Office found multiple inventions in this patent application, as follows:

SEARCH REPORT - PATENT	Application No. PA 2022 70174

SUPPLEMENTAL BOX

Continuation of Box [.]