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(71) Applicant: **VKR Holding A/S**
2970 Hørsholm (DK)

(72) Inventors:
- **Bertram, Jacob**
  2970 Hørsholm (DK)
- **Grønborg, Kristian Nitzsch**
  2970 Hørsholm (DK)
- **Kristensen, Lars**
  2970 Hørsholm (DK)
- **Østergaard, Iben Bjerre**
  2970 Hørsholm (DK)
- **Pedersen, Rasmus Klercke**
  2970 Hørsholm (DK)
- **Kristensen, Jens Troels Plesner**
  2970 Hørsholm (DK)

(74) Representative: **AWA Denmark A/S**
Strandgade 56
1401 Copenhagen K (DK)

(54) **A SKYLIGHT WINDOW**

(57) A skylight window for being installed in an inclined roof of a building, beneath the roof mounting surface of said inclined roof. The skylight comprising a window frame, potentially a sash, an Insulating Glazing Unit ,IGU, a weather shield (3) comprising a weather shield pane positioned on an exterior side of the IGU, at least one mounting element attached to the outer side of a first frame side and comprising a roof mounting surface for mounting the skylight window to an exterior support surface of a load bearing structure of the inclined roof, and wherein the interior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction.

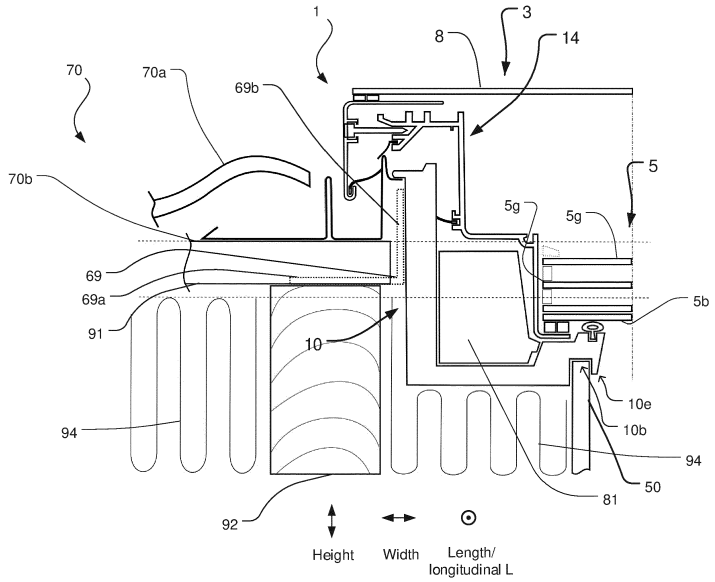

Fig. 3

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Description

[0001] The present invention relates to a skylight window for being installed in an inclined roof of a building, the skylight window comprising: a window frame having four frame side members, said frame members defining an inner opening and each frame member, having an inner side facing said inner opening and an outer side facing in an opposite direction of the inner side and away from the inner opening, an interior side for, in an installed position, facing an interior of the building, and an exterior side for facing in an opposite direction of the interior side and away from the interior of the building; an Insulating Glazing Unit (IGU) having multiple layers of glazing, said IGU having an interior major surface facing in an interior direction for facing an interior of said building in the installed position of the skylight window, said IGU further having an exterior major surface facing in an exterior direction opposite the interior direction towards an exterior in said installed position of the skylight window; where a height direction is defined as a direction that is substantially parallel to an interior-exterior direction extending between the inner and exterior side of a frame member; and a weather shield comprising a weather shield pane positioned on an exterior side of the IGU. The invention further relates to a method for installing a skylight window in an inclined roof.

[0002] There is often a desire to position one or more skylight windows in a roof of a building in order to allow daylight to reach the interior of the building. This, however, may give rise to a variety of challenges.

[0003] Inclined skylight windows are typically built into an opening in an inclined roof structure with an angle above 15 degrees with a substantial part of the inclined skylight window is positioned within the inclined roof structure in an installed position. Flat-roof skylight windows are generally installed on top of the exterior side of flat roofs of buildings, where the inclination of the roof is less than 5 degrees with respect to a horizontal plane. In general, flat-roof skylight windows are installed to cover an opening in the roof, i.e. a substantial part of the flat-roof skylight window extends above an exterior side of the flat roof structure in an installed position.

[0004] Furthermore, skylight windows of the flat-roof type often comprise a dome-shaped weather shield attached to the sash. During an opening movement, the weather shield typically follows the movement of the sash. The main purpose of the dome or weather shield is to protect the sash and frame from the weather and to avoid accumulation of precipitation and dirt on the IGU.

[0005] It is common today to use skylight windows on flat roofs and potentially cover the window portion with a dome-shaped weather shield. One example of such a skylight window is disclosed in WO 2009/080026 A1. This window comprises a standard VELUX® outwardly opening window, to the sash of which a dome-shaped weather shield is attached.

[0006] In general, skylight windows of the prior art may be associated with relatively poor insulating properties of the finished roof structure with the skylight window. This may be attributed to the manner, in which flat-roof skylight windows are installed, resting on top of the roof structure of a building, which generally results in a relatively large proportion of the skylight window being exposed to the surrounding environment.

[0007] Also, limited inflow of light into an interior of the building on which the flat-roof skylight window is installed, as well as limited visibility through the window from the interior of the building and limited compatibility with different roof angles may be a problem. Furthermore, with a weather shield attached to the top of the skylight, there are more layers of glazing which may result in a long travel path for light entering the flat-roof skylight window into the interior of the building.

[0008] It is therefore an object of the invention to provide a skylight window in which the insulation properties are improved. A further object of the invention is to provide a method for installing a skylight window, which leads to improved insulation properties of a roof structure with a skylight window installed therein. A still further object is to provide improved inflow of light into a building.

[0009] In a first aspect of the invention at least the first mentioned object is achieved with a skylight window, wherein at least one mounting element attached to the outer side of a first frame side and comprising a roof mounting surface for mounting the skylight window to an exterior support surface of a load bearing structure of the inclined roof, wherein said roof mounting surface is substantially perpendicular to the height direction and extends away from the outer side of the first frame side member and the inner opening, and wherein the interior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction.

[0010] By the interior major surface of the IGU being located below the roof mounting surface of the mounting element when seen in the height direction, i.e. further towards the interior of the building in the interior direction, the IGU will be located substantially in plane with the roof structure. This means that the excellent insulating properties of the IGU will be better utilized than when the IGU is located above the roof mounting surface of the mounting element and hence above the exterior side of the roof structure.

[0011] The at least one mounting element may for example be one or more mounting brackets attached to one or more frame side members or one or more curb flanges attached to or integrated in one or more frame side members.

[0012] The exterior support surface of a load bearing structure is here understood as the surface on which the window frame of the skylight rest in a mounted condition. It is not necessarily identical to the exterior side of the roof as such, as the load bearing structure will typically be covered with a roofing material after the installation of the skylight window. The roofing could for example be

a roofing felt, shingles, tiles or the like.

[0013] If the load bearing structure is of the type comprising at least one batten and at least one rafter, the support surface of the load bearing structure could for example be an exterior side of at least one batten.

[0014] The term IGU is an abbreviation of "Insulating Glazing Unit" and is a concept well-known to the skilled person.

[0015] The IGU (Insulated Glazing Unit) may have multiple layers of glass or tempered glass which define a volume comprising an inert gas or aerogels or vacuum. The IGU may in a conventional manner comprise one or, preferably two, three or more layers of glazing positioned at a distance from each other to form one or more sealed spacings or cavities between them. This spacing may be filled with an inert gas or may hold a vacuum to improve insulation. One or more of the layers of glazing may have a low emissivity coating or coating stack. One or more of the layers of glazing may be laminated e.g. the interior layer of glazing. One or more of the layers of glazing may be tempered. Similarly, the weather shield pane may be tempered. The IGU may be see-through transparent to provide a view out. The exposed interior major surface of the IGU may in that case be a lower major surface of a lowermost of the layers of glazing. Sealing and/or supporting members may be provided at one or more of four peripheral sides of the IGU between the layers of glazing. The sealing and/or supporting members may distance adjacent layers of glazing from each other and may together with lateral edges of the window glazing layers form respective side or lateral surfaces of the IGU. These side surfaces may be substantially plane and extend substantially in the height dimension as defined herein.

[0016] In one embodiment, the exterior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction, so that the entire IGU is located below the roof mounting surface. This will provide particularly good insulating properties.

[0017] In another embodiment 10% or more of the total height of the IGU is located below the roof mounting surface of the mounting element, said total height extending from the interior major surface of the IGU to the exterior major surface of the IGU in the height direction. This may be advantageous in order to make room for other parts of the skylight window and/or to achieve a desired distance between the IGU and the weather shield pane, which may for example allow for an improved inflow of light. Other relative locations with for example 25%, 50%, or 75% of the total height of the IGU located below the roof mounting surface of the mounting element are also possible.

[0018] In order to allow a good inflow of light, the weather shield pane is preferably a transparent cover member, preferably a dome of glass or a clear polymer. Alternatively or additionally, the weather shield pane may be a transparent window pane that of glass or hardened glass.

[0019] It is, however, also possible to use a weather shield having an exterior shield surface, which is substantially parallel with at least one of the major surfaces of the IGU.

[0020] A space between the weather shield and the IGU is typically ventilated, whereas the IGU comprises a sealed gas-filled spacing pane layers. The weather shield pane may also include two or more layers with a gas filled space between them. The weather shield pane may comprise only one single layer of glazing.

[0021] The weather shield may be provided as a unitary structure, which is detachably attached to the to the sash. The weather shield may be attached detachably to the sash, providing for access to clean the IGU; this may also be of advantage during mounting of the skylight window, e.g. when positioning or attaching the window portion or when attaching roofing felt to cover a potential gap between the frame and the roof structure.

[0022] The weather shield pane may be attached to the window frame so as to protect a window portion of the skylight window, the window portion comprising the frame and the IGU, and/or may form part of the IGU.

[0023] The weather shield may be provided without a sealed gas-filled spacing between the weather shield pane and the IGU.

[0024] The weather shield may comprise a weather shield pane that may be surrounded by a weather shield skirt that may extend on an outer side of all four sides of the frame, i.e. of the respective frame side members. The skirt may be manufactured from or include metal. The weather shield pane may curve upwardly in relation to the window portion or the IGU to allow for rain and snow to slide or flow off of the weather shield pane.

[0025] In one embodiment, the exterior major surface of the IGU has a major surface perimeter and the weather shield has a weather shield perimeter, and the weather shield perimeter extends beyond the major surface perimeter along the entirety of the major surface perimeter. This allows the weather shield to cover the IGU entirely and protect it from dirt and precipitation.

[0026] In order to allow rain water etc. to be drained off the skylight window and onto the roof surface it is presently preferred that, in the closed position of the skylight window, the weather shield pane is positioned above the roof mounting surface in the height direction. However, it may be desired to make the total skylight window protrude as little above the exterior side of the roof as possible.

[0027] If wishing to provide an openable skylight window it may further comprises a window sash supporting the IGU, said window sash being movable in relation to the window frame between an open and a closed position of the skylight window. The sash may comprise four sash side members each extending along one peripheral edge of the IGU.

[0028] In one embodiment, one or more sash side members may comprise one or more thermal breaks in order to further improve the insulating properties of the skylight window.

[0029] The thermal break may be made from a material of a lower thermal conductivity than other parts of the first sash side member. The thermal break may be a joint joining parts of the sash. This may have the advantage of improving the insulation properties of the skylight as a lower thermal conductivity through the supporting section or sash member may be achieved. Thermal breaks may also be used for interconnecting the window frame and the sash. The thermal break may be substantially made from or comprise a polymer or foam.

[0030] If the skylight window is openable, it is preferred that in the installed and closed position of the skylight window, the interior major surface of the IGU is located below the support surface of the loading bearing structure of the roof in the height direction, and the weather shield pane is positioned above the support surface of the load bearing structure of the roof in the height direction.

[0031] Specifically, it is preferred that in the installed and closed position of an openable skylight window, 5% of the IGU height is located below the support surface of the load bearing structure of the roof in the height direction, said height direction being substantially perpendicular to at least one of the major surfaces of the IGU.

[0032] If openable, it is presently considered advantageous that the sash moves outwards towards the exterior, when moving away from the frame.

[0033] The skylight may have hinges in an openable version. Hinges may be linear displacement mechanisms or multi-link mechanisms. The skylight window may be hinged to open in the exterior direction i.e. away from the interior of the building.

[0034] The skylight window is preferably configured for installation in an inclined roof having an inclination between 10 and 90 degrees relative to horizontal.

[0035] In one embodiment, the first frame side member comprises a first leg extending in the height direction and a secondary leg extending in a lateral direction along and substantially parallel to the interior major surface of the IGU and supporting the IGU, said secondary leg being located below the roof mounting surface in the height direction in the installed position of the skylight window.

[0036] The frame side members and/or the sash side members may comprise or substantially consists of metal, such as steel or aluminium and/or polymer fibre-reinforced polymer, PUR, pultruded, glass fibre, aluminium, polyester or composite. The use of fibre-reinforced plastic, such as glass-fibre reinforced PUR is also envisaged.

[0037] However, it is presently preferred that the frame side members are made comprises wood, a wood-based material and/or a polymer-based material, such as polyvinylchloride or polyurethane (PUR), or combinations thereof, such as a fibre-reinforced plastic. Specifically, it is presently contemplated that the first frame side members may comprise a core of a wooden or wood-based material encapsulated in a PUR shell, as this may provide a first frame side member which is rigid and strong, and which can support the skylight window. The core provides rigidity and strength, while the shell protects the core from adverse conditions such as water, humidity and/or sunlight.

[0038] In a second aspect of the invention at least the further object is achieved with a method comprising the steps of:

providing a skylight window for being installed in an inclined roof of a building, the skylight window comprising:

a window frame having four frame side members, said frame members defining an inner opening and each frame member, having an inner side facing said inner opening and an outer side facing in an opposite direction of the inner side and away from the inner opening, an interior side for, in an installed position, facing an interior of the building, and an exterior side for facing in an opposite direction of the interior side and away from the interior of the building,

an Insulating Glazing Unit (IGU) having multiple layers of glazing,

said IGU having an interior major surface for facing an interior of said building in the installed position of the skylight window,

said IGU further having an exterior major surface facing in an opposite direction of the interior direction towards an exterior in said installed position of the skylight window,

wherein a height direction is defined as a direction that is substantially parallel to an interior-exterior direction extending between the inner and exterior side of a frame member,

a weather shield comprising a weather shield pane positioned on an exterior side of the IGU,

at least one mounting element attached to the outer side of a first frame side and comprising a roof mounting surface for mounting the skylight window to an exterior support surface of a load bearing structure of the inclined roof, wherein said roof mounting surface is substantially perpendicular to the height direction and extends away from the outer side of the first frame side member and the inner opening, wherein the interior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction,

providing an opening in the inclined roof adjacent to a load bearing structure of the inclined roof,

arranging the window frame of the skylight window on the load bearing structure of the inclined roof such that the roof mounting surface of the mounting element abuts the support surface of the load bearing structure of the roof and the interior major surface of the IGU is located below the support surface of the load bearing structure of the roof in the height direction, and

mounting the skylight window to the load bearing structure by attaching the at least one mounting element of the skylight window to the load bearing structure.

[0039] The advantages and embodiment described with reference to the first aspect of the invention also applies to the second aspect of the invention and vice versa unless otherwise stated.

[0040] In one embodiment the supporting surface is covered with roofing such as roofing felt, shingles, tiles or the like after the installation of the skylight window.

[0041] In order to facilitate the attachment of the at least one mounting element of the skylight window roof to the load bearing structure, the weather shield may be removed prior to arranging the window frame of the skylight window on the load bearing structure of the inclined roof. This will for example allow a mounting bracket to be secured to a frame side member or a previously attached mounting bracket to be unfolded or adjust to a desired installation depth or to a particular roof type. Also, a removal of the weather shield may allow the installation of a flashing to make the finished roof structure water tight. After installation/adjustment of such elements, the weather shield is re-attached. It will of course also be possible to provide the weather shield separately and to only connect it the to the rest of the skylight window when such installation/adjustment steps have been completed.

[0042] In an embodiment, the first frame side member further comprises a lining panel protrusion located lower than the exposed interior major surface of the IGU in the height direction,

wherein the interior pane comprises a side surface extending substantially along the first frame and sash side members,

wherein the lining panel protrusion protrudes away from the IGU, the lining panel protrusion comprising a first surface for abutting a surface of reveal panel or lining panel so as to position the reveal panel or lining panel, and

wherein, in the closed position of the skylight window, the first surface of the lining panel protrusion in a lateral direction extending along the exposed interior major surface of the IGU is positioned farther away from the side surface of the interior pane than the supporting leg.

[0043] Such protrusion can help an installer install a lining panel at the skylight window by guiding an upper end of the lining panel into contact with a first side of the protrusion, and may further ease the installation by hiding the upper end of said lining panel e.g. if the upper end is not flush with the interior side of the skylight window. The lining panel can be used to hide the skylight frame, for viewers, including insulation elements such as an insulting block and can thus, allow for improving the insulating properties of the skylight window as a whole.

[0044] The skylight window may further comprise a second protrusion next to the first protrusion to create a lining panel recess for receiving a lining panel to be installed. Said lining panel recess would add to the guidance and ease of installation of the lining panel.

[0045] The skylight window may comprise a removable lining panel protrusion and/or recess. The removable lining panel protrusion and/or recess may be separately affixed to the frame and may be a part that is separate from the frame i.e. not an integral part of the frame.

[0046] In an embodiment an outer surface of one or more frame side members may be flat and allow the attachment of a curb flange. The curb flange may be a detachably attachable curb flange. The term "detachably attachable" may be understood as the curb flange being attachable and detachable without causing substantial and/or permanent damage to the curb flange or skylight window.

[0047] In an embodiment of the skylight window being openable and comprising a sash, it may further comprise a motor-driven actuator comprising an elongated lifting element connecting the frame and the sash for moving the sash between the open position and the closed position, said elongated lifting element having a top end and a first position in which the skylight window is in the closed position and a second position in which the skylight window is in the open position. The top end of the elongated lifting element may abut or be attached to the sash. The motor-driven actuator may be positioned between the IGU and the frame in a direction parallel with the exposed interior major surface of the IGU in the closed position of the skylight window. The motor-driven actuator may be a chain actuator, the elongated lifting element may be a chain, and the top end may be a top end of a top joint of the chain. The lifting element in the closed position may be collapsed, rolled-up, folded-up, telescopically retracted or in another way compacted. The lifting element may be unrolled, unfolded, telescopically extended, or in another way extended in the open position.

[0048] The chain actuator may comprise a push-pull chain which can extend and retract to open and close the skylight window. Such a chain may be referred to as a trust chain as it may transmit a push force. The chain may be driven by an electric motor. A reduction gear may be provided. The reduction gear may comprise a worm and/or multiple gear drive. A final sprocket gear may engage the chain. A spindle may be used to drive the chain. The chain actuator may fold the chain when the chain is retracted and stored. The chain may be stored to substantially extend in a storing direction or such that one or more lengths of the chain extend substantially in a storing direction. The chain extending to open the skylight window may extend substantially perpendicularly to the storing direction. The storing direction may be the same as the longitudinal direction, in which case the chain may be stored to substantially extend in the longitudinal direction along a frame side member. This may provide a compact solution.

[0049] The chain actuator may be hidden inside a window frame or sash or otherwise arranged out of sight, e. g. outside a periphery of the skylight window. The chain actuator may be arranged in a spacing defined between the sash and the frame in the closed position of the skylight window. Preferably the chain actuator may be arranged inside a frame profile or inside a sash profile. The chain actuator may comprise an actuator housing. The

chain may extend and retract through an opening in the actuator housing. The actuator housing may be an elongated actuator housing. The actuator housing may extend substantially extend in parallel with the storing direction. The chain extending to open the skylight window may extend substantially perpendicularly to the actuator housing. The chain actuator housing may be hinged to the skylight window so the chain can tilt during movement such as extending and/ or retracting to open and/or close the skylight window. The chain actuator may be self-locking and support and/or hold the weight of sash and IGU. The chain actuator may also be assisted by a spring to carry some of the weight of sash and IGU. The chain actuator may comprise a locking mechanism and/or brake to lock-up the chain. Besides the compact design a chain actuator may have other advantages. The chain actuator may provide a stable opening force from the very beginning of the opening movement.

Detailed Description

[0050] In the enclosed drawings, which show non-binding examples of embodiments of the present invention,

Fig. 1 is a perspective view from above of an embodiment of a skylight window according to the present invention,
Fig. 2 is a cross-sectional side view taken along the line II-II of Fig. 1 showing a detail of the window according to Fig. 1,
Fig. 3 is a cross-sectional side view taken along the line II-II of Fig. 1 showing the skylight window installed in an inclined roof,
Fig. 4 is a cross-sectional side view taken along the line II-II of Fig. 1 showing a fixed i.e. non-openable skylight window according to the invention,
Fig. 5 is a cross-sectional side view taken along the line II-II of Fig. 1 showing the skylight window with a box structure, and
Fig. 6 is a cross-sectional side view of the skylight window, with a shade, with a cut-out to show details.

[0051] Fig. 1 shows an embodiment of a skylight window 1 according to the present invention for installation in an inclined roof of a building (not shown) and comprising a weather shield 3. The inclined roof having an inclination between 10 and 90 degrees relative to horizontal. The skylight window 1 further comprises a window portion 4, which includes a transparent IGU 5, a sash 6 visible through the IGU 5, and a frame 7. The weather shield 3 comprises a transparent weather shield pane 8 and a skirt 9.

[0052] The interior major surface and exterior exposed major surfaces of the IGU 5 are sub-stantially parallel with a plane defined by the roof surface, i.e. the upper roof surface level.

[0053] The frame 7 comprises four frame side members of which two 10, 11 are visible in Fig. 1. Each frame side member is respectively associated with one of four corresponding sash side members of which two 12, 13 are visible in Fig. 1. The frame side member 10 is associated with the sash side member 14. The frame side member 10 is the embodiment of the first frame side member of the skylight window according to the invention. The sash side member 14 is the embodiment of the first sash side member according to the invention.

[0054] The window sash 6 supports the IGU 5 and is movable in relation to the window frame 7 between an open and a closed (not shown) position of the skylight window 1. The window is shown in the closed position in all of the figures.

[0055] Fig. 2 is a cross-sectional side view showing a detail of the window according to Fig. 1 taken along the line II-II of Fig. 1, the cross-sectional plane being perpendicular to a longitudinal direction L of the frame side member 10, the direction L being the direction in which the frame side member 10 extends along a first peripheral side 5a of the IGU 5, see Fig. 1. Fig. 2 specifically shows a cross-section of the frame side member 10 and of the sash side member 14 as well as part of the weather shield 9 and part of the IGU 5 of Fig. 1.

[0056] The frame side member 10 comprises a bottom surface 10a, which beneath the level of the roof surface 70b. This bottom surface 10a faces downwards and comprises a protrusion 10e, extending away from the IGU, with a first side 10c for facing a side of an upper end of a reveal or lining panel.

[0057] The first lining panel protrusion 10e comprises a first surface 10c that abuts an inwardly facing surface of the lining panel 50. The peripheral side 5a of the IGU 5 is located, in the outward direction, beyond said first surface 10c of the protrusion 10.

[0058] Bottom surface 10a further comprises a second lining panel protrusion next to the first lining panel protrusion to create a lining panel recess 10b for receiving a lining panel to be installed. Said lining panel recess would add to the guidance and ease of installation of the lining panel.

[0059] The second lining panel prutrusion comprises a second surface 10d positioned oppositely from said first surface for abutting an outwardly facing surface of said reveal panel or lining panel when received in said recess. The first and second surfaces 10c, 10d of the recess 10b extend substantially in the height dimension and are substantially linear. A distance between these first and second surfaces defines a width of the recess, which width corresponds to a width of the upper part 50 of the lining panel 50 in order to accommodate the lining panel upper part 50 in the recess 10b. The remaining three frame side members are provided with similar recesses accomodating respective similar panels. These panels define the reveal or aperture, or light well or light shaft, which extends through an entire height of the roof 2 so as to provide the opening in the roof structure, which leads to the window 1 itself.

[0060] The weather shield 3 is provided as a unitary structure, which is separate from the window portion 4. The weather shield 3 is mounted on the window portion 4 for covering and weather protecting the window portion 4 in the installed state of the skylight window 1. The weather shield pane 8 is curved outwardly, i.e. upwardly in Fig. 1, in relation to the window portion 4. The weather shield pane 8 is a transparent IGU of hardened glass.

[0061] The weather shield pane 8 is attached to the first sash side member 14 so as to protect a window portion 4 of the skylight window 2, the window portion 4 comprising the frame and the IGU.

[0062] Fig. 3 shows a similar cross-sectional view as Fig. 2, but installed in an inclined roof 70.

[0063] The inclined roof comprising a rafter 92 as the primary support positioned outwards from the window frame member 10. A batten is on top of the rafter 92 in the height direction as the secondary roof support. The upper surface of the batten facing the exterior works as the roof mounting surface 70b of the roof 70. Shingles 70a is mounted on the roof mounting surface 70b, there may be installed roof felt (not shown) on the exterior side of the battens underneath the shingles.

[0064] Roof insulation 94 is in the spacings under the batten 91 between the rafter 92 and in an outwards direction towards a second rafter (not shown), and between the rafter 92 in an inwards direction towards the lining panel 50. The top end of the lining panel being positioned in the recess 10b made up of the first frame member 10 and the protrusion 10e.

[0065] The IGU 5 has an exposed interior major surface 5b facing downwards towards an interior of the building, and an opposite exterior major surface 5g facing upwards towards the exterior in the shown installed position of the skylight window 1. An insulating block is between the first peripheral side 5g of the IGU and the first frame side member 10 in an outwards direction.

[0066] The skylight window 1 comprising the IGU 5, the first frame side member 10, the sash 14 and a flat weather shield 8, is mounted to the inclined roof 70 with a mounting bracket 69. The mounting bracket 69 being substantially L-shaped and may extend in the longitudinal direction. Several mounting brackets (not shown) may be used to mount the skylight window 1 to the inclined roof 70 on the same side and on the other three sides of the skylight window 1.

[0067] The mounting bracket 69 is mounted on top of the rafter 92 with its first side 69a of the L-shape. The second side 69b of the mounting bracket 69 is mounted to the first frame side member 10, where the second side 69b is extending upwards. The mounting bracket 69 may be flipped upside down (not shown) such that the second side 69b is extending downwards, this can change the postioning of the skylight window 2 relative to the roof mounting surface 70 in the height direction. The second side 69b of the mounting bracket 69 can have different lenghts (not shown), where a very short length will result in a small extension in the height direction, such the skylight window 2 can be positioned even deeper in the roof (not shown).

[0068] In Fig. 3, the interior major surface 5b of the IGU 5 is located below the roof mounting surface 70b of the mounting element 69 when seen in the height direction. Further, is the exterior major surface 5g, the protrusion 10e, the top end of the lining panel 50, the bottom of the sash 14 and the bottom of the frame 10 located below the roof mounting surface 69. As both the interior major surface 5b and the exterior major surface 5g of the IGU is under the roof mounting surface 70b, 100% of the IGU 5 is beneath the roof mounting surface. The first frame side member's 10 position relative to the second side 69b of the mounting bracket 69 can be adjusted up and down in the height direction by using different holes (not shown) for fasteners in the bracket.

[0069] In the closed position of the skylight window 2, the weather shield pane 8 is positioned above the roof mounting surface and the roofing in the height direction.

[0070] The load bearing structure in Fig. 3 is made up of the batten 91 and the rafter 92. The load bearing structure could in other installations (not shown) be of concrete such as a concrete plate, metal or any other roof structure. The interior major surface 5b of the IGU 5 is located below the support surface of the load bearing structure of the roof in the height direction.

[0071] The weather shield 3 perimeter of the extends beyond the major surface perimeter along the entirety of the exterior major surface perimeter 5c.

[0072] Fig. 4 shows a skylight window 1 accoding to the present invention in cross-sectional view. The skylight window 1 being fixed i.e. non-openable, and thus, does accordingly not include a sash 6 nor a first side sash member 14. In Fig. 4, at least part of the IGU 5 and the weather shield 3 are, carried directly by the first frame side member 10, i.e. no first sash side member 6 is provided between them. To carry the weather shield 3 on the first frame side member 10, the weather shield 3 in Fig. 4 includes a weather shield support 65. Other parts of Fig. 4 is identical or similar to the previous figures, unless stated otherwise in the following.

[0073] The weather shield support 65 shown in Fig. 4 is positioned between the first frame side member 10 and the weather shield 3 in the height direction H. The weather shield support 65 extends along the length of the first frame side member 10. The weather shield support 65 engages both the first frame side member 10 and the weather shield 3, the weather shield support 65 carrying at least part of the weather shield 3 and the first fram side member 10 carrying the weather shield support 65 and at least part of the weather shield 3. The weather shield support 65 abuts an upper part of the first frame frame side member, and a the weather shield support foot extends along a part of the first frame side member 10 in the height direction, inwards to the top end of the first frame side member.

[0074] In Fig. 4, the weather shield support 65 has a recess 65b which receives a protrusion 10t of the first

frame side member 10. The recess 65b and protrusion 10t being provided to faciliate the positioning of the weather shield support 65 on the first frame side member 10.

[0075] The weather shield pane 8 is attached to the first frame side member 10 so as to protect the window portion 4 of the skylight window 1, the window portion 4 comprising the first frame side member 10 and the IGU 5.

[0076] The weather shield pane 8 is curved outwardly, i.e. upwardly in Fig. 4, in relation to the window portion 4. The weather shield pane 8 is a transparent IGU of hardened glass, polymer or the like.

[0077] The weather shield 3 may be removed prior to arranging the first frame side member 10 on a load bearing structure (not shown) of an inclined roof (not shown).

[0078] Referring to Fig. 5, the most exterior IGU pane 5c, having the exterior major surface 5g of the IGU 5, also acts as the weather shield pane 8. Thus, the weather shield 3 is made up of the most exterior pane 5g of the IGU and the weather shield skirts 9. This allows for the IGU 5 to be positioned high, in the height direction, in the skylight window 1 and makes it possible to have the lining panel protrusion 10e above the bottom surface 10a, in the height direction, of the first frame side member. Thus, the top end of the lining panel 50 is above the bottom surface 10a. At the top, in the height direction, of the lining panel protrusion 10e, a sealing member 22 abuts to the IGU and hereby hides the first side member for a viewer viewing the skylight window, in an installed position, from the interior towards the exterior. The sash 14 being in the space between the first frame side member 10, the IGU 5 and the weather shield 3. The top pane of the IGU 5c has a larger perimeter than the other panes of the IGU 5 in the plane of the interior major surface 5b of the IGU.

[0079] Fig. 6 shows a perspective view of an embodiment of the skylight window 1 according to the present invention installed in a roof 2 (not shown), where a part of the window has been removed for illustration purpose. The window frame 7 and the window sash 6 correspond to the ones shown in Fig. 8. The weather shield pane 8 here has been removed for clarity. Fig. 11 also shows a screening device 34, which is mounted in a spacing delimited in the width direction W by the first sash side member 14 and the remaining sash side members. It is to be understood that the remaining sash members are substantially identical to the first sash side member 14 so that the exterior sides of the sash side members together define an exterior side of the sash 6 which extends substantially in parallel to the exterior major surface 5g of the IGU 5.

[0080] Towards the interior the spacing is delimited in Fig. 11 by the first sash side member 14. The sash side member thus serves as a screening device support section. The screening device 34 is here depicted as a roller curtain in which the screening body 36 is a covering cloth, which at least partially rolled up on a collection device 35 in the form of a collection roller in the first non-screening, end position, but which is here shown in a second, screening end position, where it is extended towards a second sash side member 6 for covering the IGU 5. The screening device 34 might, however, also be another type of blind or a shutter. A fixation member 39 is attached to the first sash side member 14 and extending towards the second sash side member. The fixation member 39 contributes to retaining a top casing of the screening device 34 by preventing it from moving upwards, away from the exterior major surface 5g of the IGU.

Claims

1. A skylight window (1) for being installed in an inclined roof of a building, the skylight window (1) comprising:

   a window frame (7) having four frame side members, said frame members defining an inner opening and each frame member, having an inner side facing said inner opening and an outer side facing in an opposite direction of the inner side and away from the inner opening, an interior side for, in an installed position, facing an interior of the building, and an exterior side for facing in an opposite direction of the interior side and away from the interior of the building,
   an Insulating Glazing Unit (IGU) having multiple layers of glazing,
   said IGU having an interior major surface (5b) facing in an interior direction for facing an interior of said building in the installed position of the skylight window,
   said IGU further having an exterior major surface (5g) facing in an exterior direction opposite the interior direction towards an exterior in said installed position of the skylight window,
   where a height direction is defined as a direction that is substantially parallel to an interior-exterior direction extending between the inner and exterior side of a frame member,
   a weather shield (3) comprising a weather shield pane positioned on an exterior side of the IGU,
   at least one mounting element attached to the outer side of a first frame side and comprising a roof mounting surface for mounting the skylight window to an exterior support surface of a load bearing structure of the inclined roof, wherein said roof mounting surface is substantially perpendicular to the height direction and extends away from the outer side of the first frame side member and the inner opening, and wherein,
   the interior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction.

2. A Skylight window according to any of the preceding claims, wherein the exterior major surface of the IGU

is located below the roof mounting surface of the mounting element when seen in the height direction.

3. A Skylight window according to any of the preceding claims, wherein the IGU has a total height extending from the interior major surface to the exterior major surface of the IGU in the height direction, wherein 10% or more of the total height of the IGU is located below the roof mounting surface of the mounting element.

4. A Skylight window according to any of the preceding claims, wherein the weather shield pane is attached to the window frame so as to protect a window portion (4) of the skylight window, the window portion (4) comprising the frame and the IGU.

5. A Skylight window according to any of the preceding claims, wherein the exterior major surface of the IGU has a major surface perimeter and the weather shield has a weather shield perimeter,
wherein the weather shield perimeter extends beyond the major surface perimeter along the entirety of the major surface perimeter.

6. Skylight window according to any of the preceding claims, where the skylight window further comprises a window sash (6) supporting the IGU, said window sash being movable in relation to the window frame between an open and a closed position of the skylight window.

7. A Skylight window according to any of the preceding claims, wherein, in the closed position of the skylight window, the weather shield pane is positioned above the roof mounting surface in the height direction.

8. A Skylight window according to previous claim, wherein in the installed and closed position of the skylight window, the interior major surface of the IGU is located below the support surface of the load bearing structure of the roof in the height direction, and the weather shield pane is positioned above the support surface of the load bearing structure of the roof in the height direction.

9. A Skylight window according to claims 7 and 8, wherein in the installed and closed position of the skylight window, the IGU has an IGU height extending in a height direction substantially perpendicular to at least one of the major surfaces of the IGU,
wherein 5% of the IGU height is located below the support surface of the load bearing structure of the roof in the height direction.

10. A skylight window according to any of the preceding claims being configured for installation in an inclined roof having an inclination between 10 and 90 degrees relative to horizontal.

11. A method for installing a skylight window in an inclined roof, comprising the steps of:
providing a skylight window (1) for being installed in an inclined roof of a building, the skylight window (1) comprising:

a window frame (7) having four frame side members, said frame members defining an inner opening and each frame member, having an inner side facing said inner opening and an outer side facing in an opposite direction of the inner side and away from the inner opening, an interior side for, in an installed position, facing an interior of the building, and an exterior side for facing in an opposite direction of the interior side and away from the interior of the building,
an Insulating Glazing Unit (IGU) having multiple layers of glazing,
said IGU having an interior major surface (5b) for facing an interior of said building in the installed position of the skylight window,
said IGU further having an exterior major surface (5g) facing in an opposite direction of the interior direction towards an exterior in said installed position of the skylight window,
wherein a height direction is defined as a direction that is substantially parallel to an interior-exterior direction extending between the inner and exterior side of a frame member,
a weather shield comprising a weather shield pane positioned on an exterior side of the IGU,
at least one mounting element attached to the outer side of a first frame side and comprising a roof mounting surface for mounting the skylight window to an exterior support surface of a load bearing structure of the inclined roof, wherein said roof mounting surface is substantially perpendicular to the height direction and extends away from the outer side of the first frame side member and the inner opening, wherein the interior major surface of the IGU is located below the roof mounting surface of the mounting element when seen in the height direction,
providing an opening in the inclined roof adjacent to a load bearing structure of the inclined roof,
arranging the window frame of the skylight window on the load bearing structure of the inclined roof such that the roof mounting surface of the mounting element abuts the support surface of the load bearing structure of the roof and the interior major surface of the IGU is located below the support surface of the load bearing structure of the roof in the height direction, and
mounting the skylight window to the load bearing structure by attaching the at least one mounting

element of the skylight window to the load bearing structure.

12. A method according to claim 11, where the weather shield pane is positioned above the support surface of the load bearing structure of the roof in the height direction

13. A method according to one or more of claims 11-12, where the supporting surface is covered with roofing such as roofing felt, shingles, tiles or the like after the installation of the skylight window.

14. A method according to one or more of claims 11-13, where the weather shield may be removed prior to arranging the window frame of the skylight window on the load bearing structure of the inclined roof.

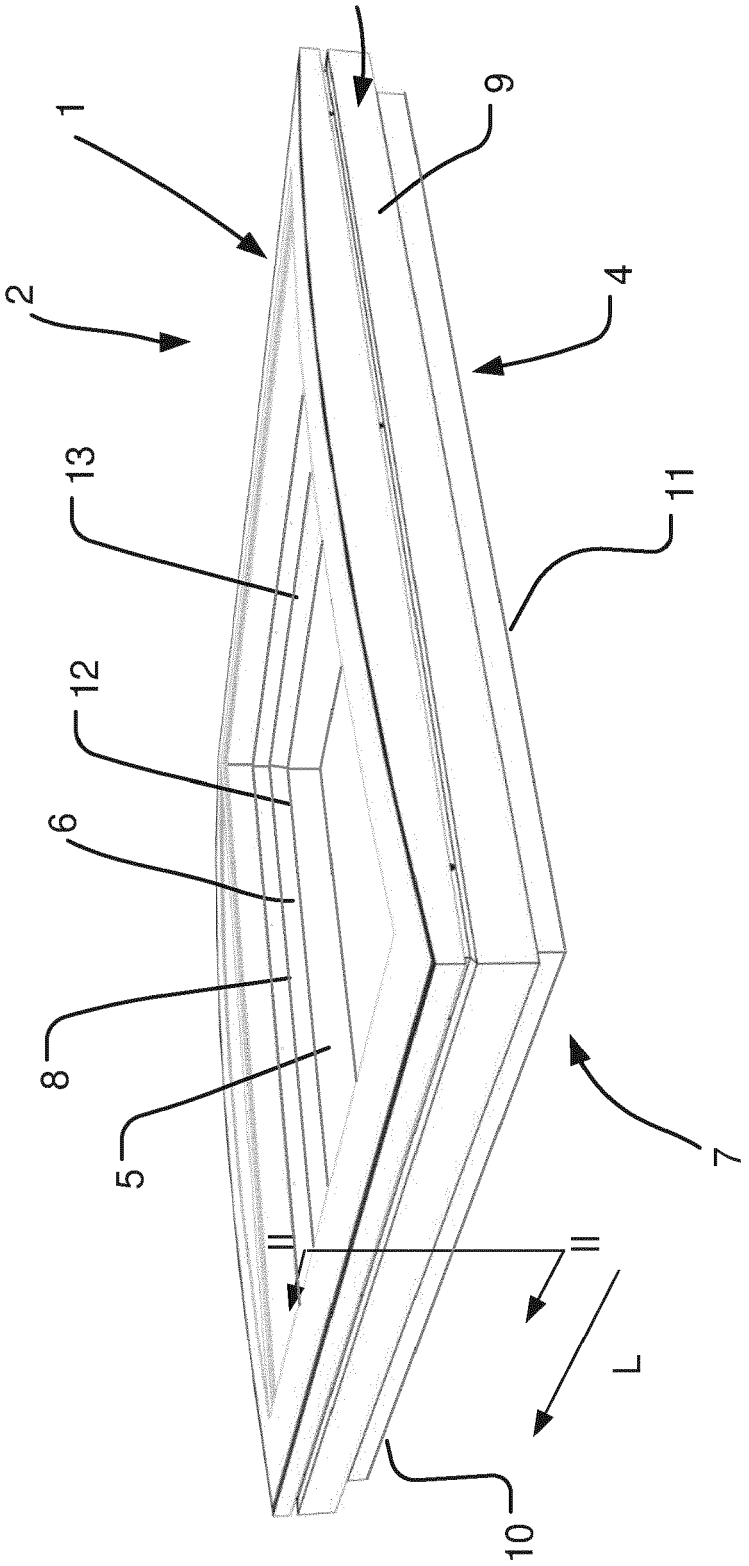

Fig. 1

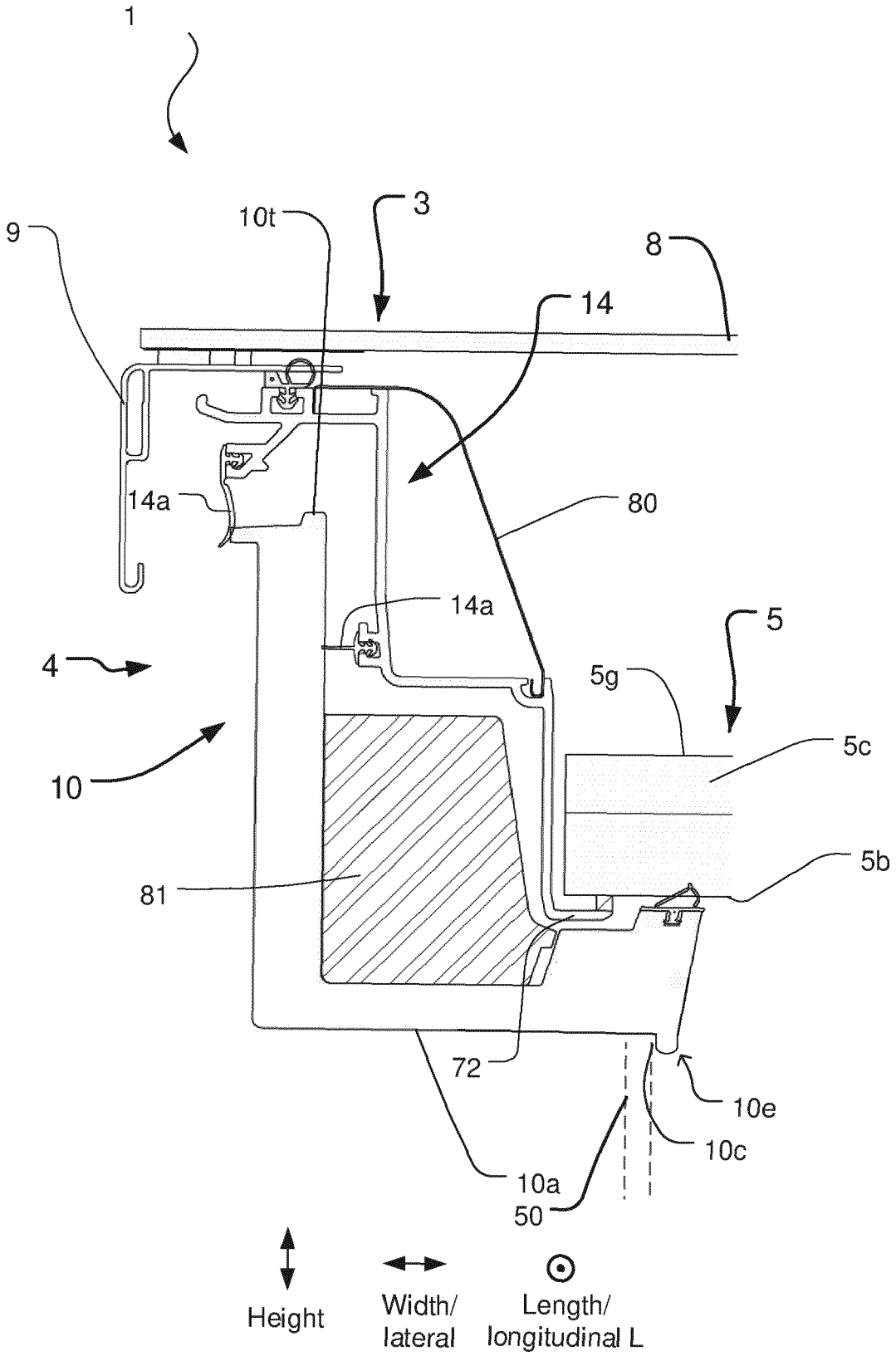
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Fig. 2

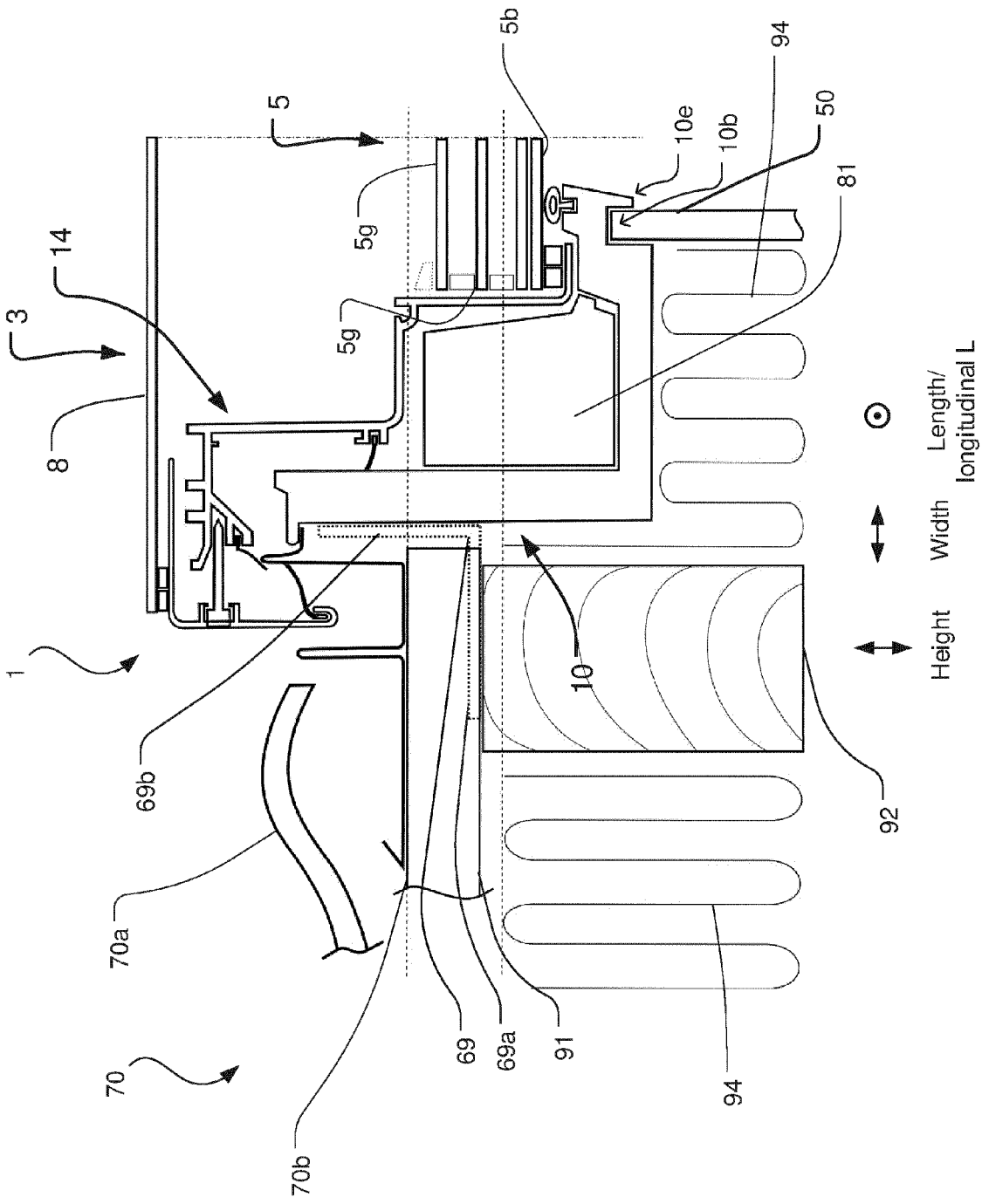
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Fig. 3

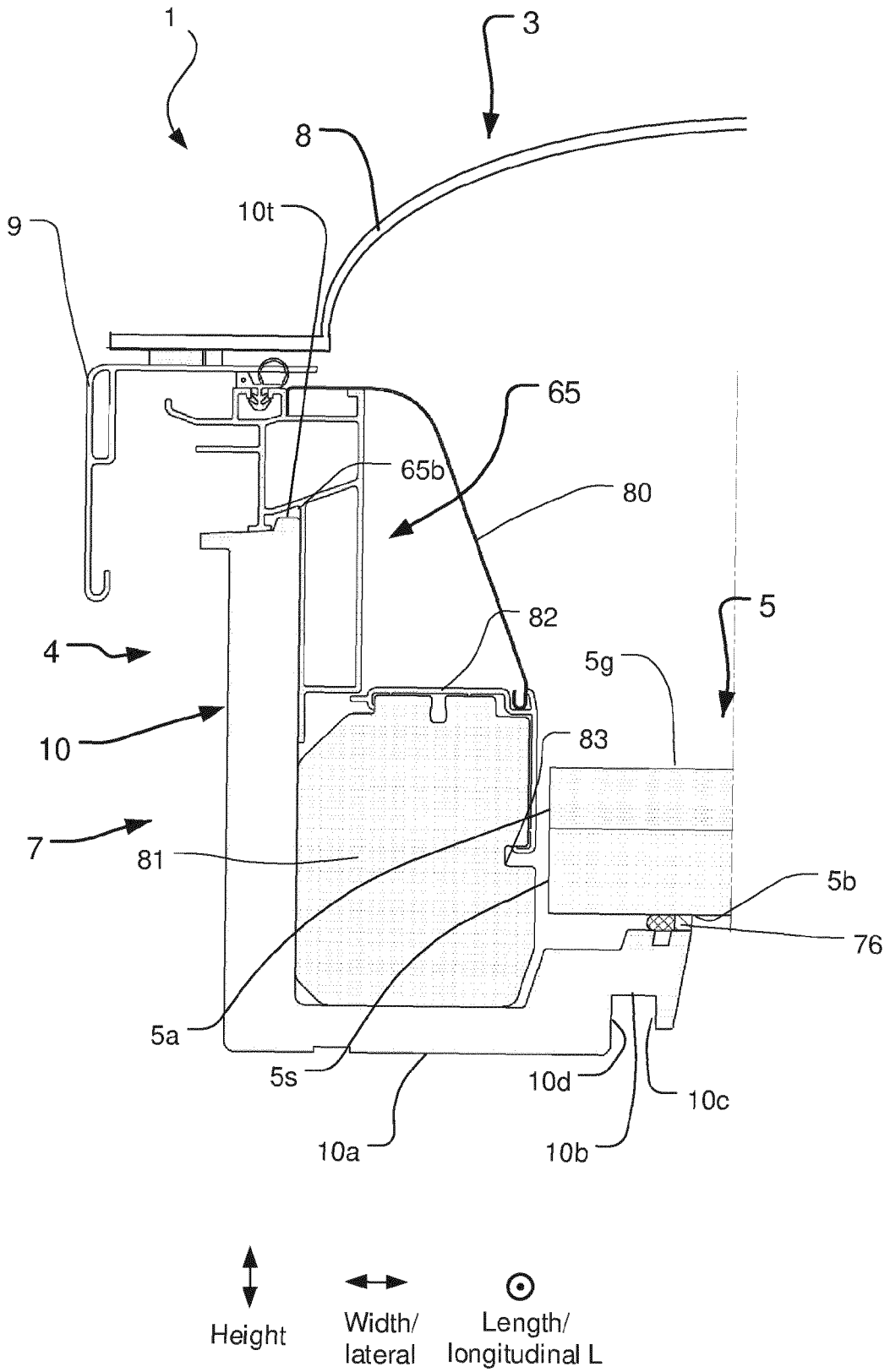
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Fig. 4

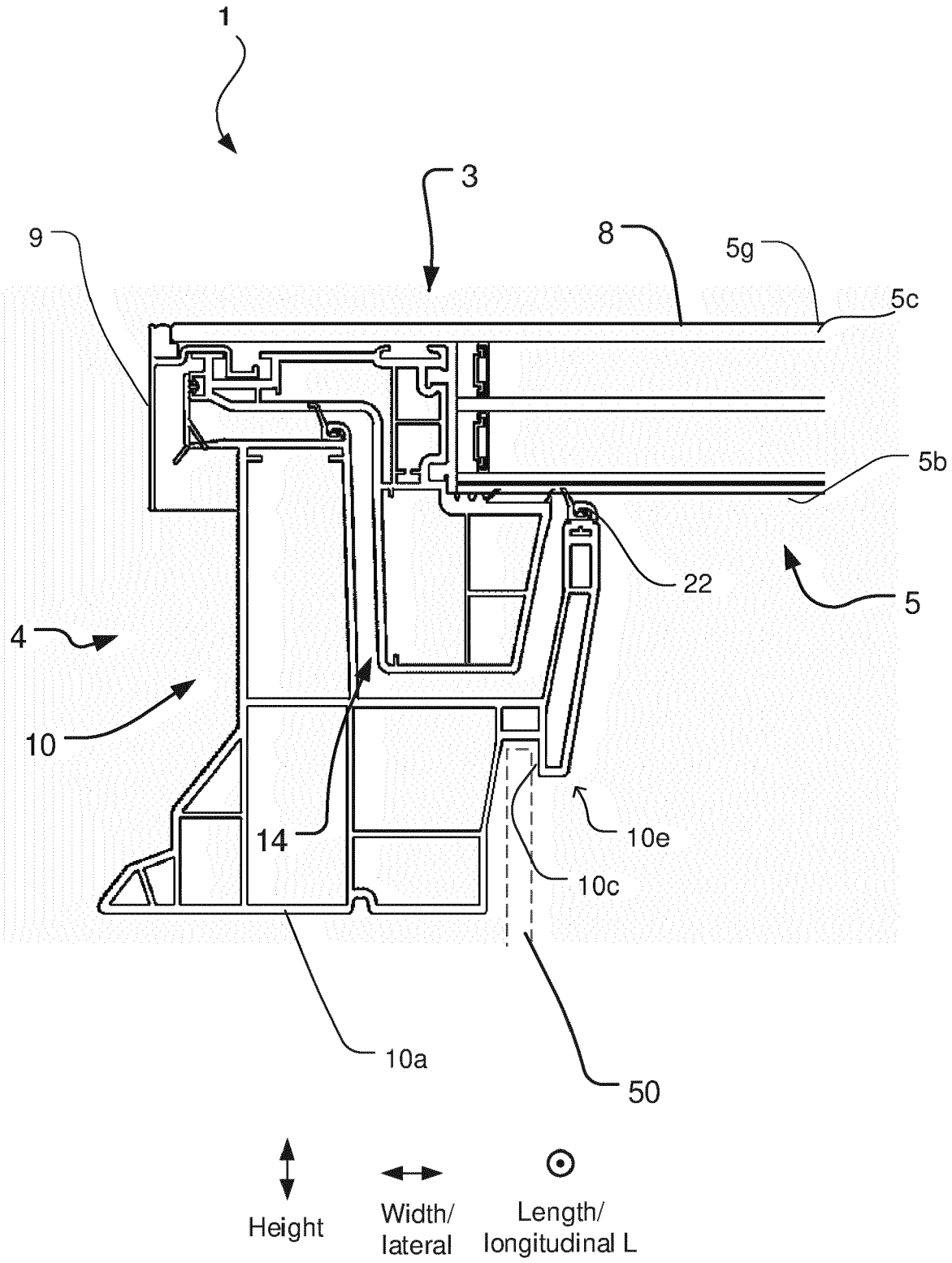
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Fig. 5

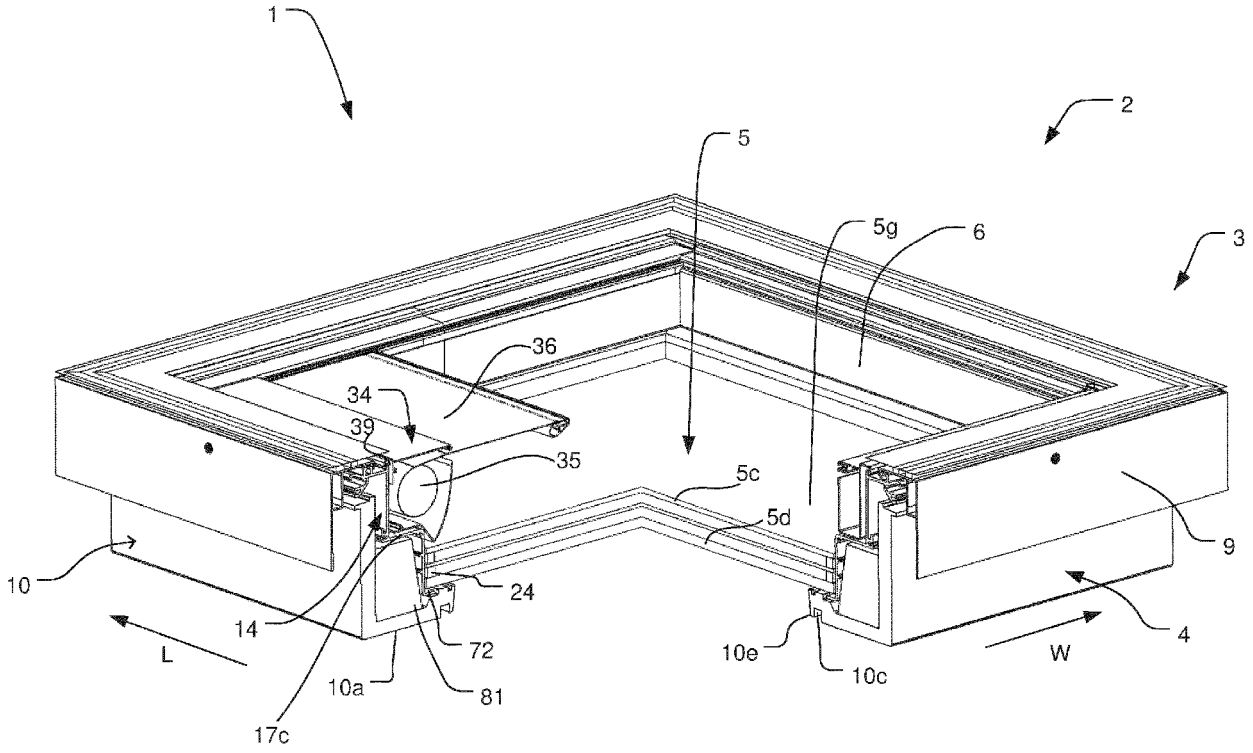

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 5252

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 July 2020	Tran, Kim Lien

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