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(54) **SKYLIGHT WINDOW**

(57) A skylight window for being installed in a roof of a building, the skylight window comprising: a window frame having four frame side members, a window sash having four sash side members supporting an Insulating Glazing Unit, IGU, the IGU having an interior pane layer, the interior pane layer having a first peripheral side, a height direction being defined as extending perpendicularly to the interior major pane layer of the IGU, the first frame member comprising a primary leg and a secondary leg, the first frame side member comprising a lining panel reception groove located interior to the interior pane layer of the IGU, wherein there is a distance D1, in the height direction, between a most interior surface of the first frame side member and the interior pane layer of the IGU, wherein a distance D2 between a bottom of the lining panel reception groove and the most interior surface of the first frame side member is at least 1/3 of D1 in the height direction.

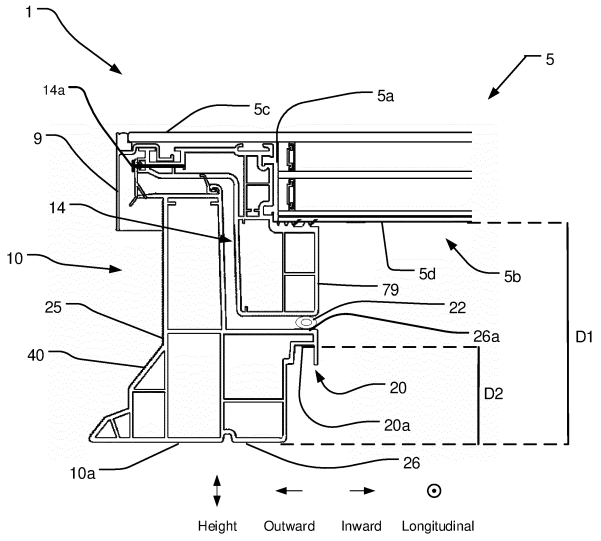

Fig. 2

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Description

[0001] The present invention relates to a skylight window for being installed in a roof of a building, the skylight window comprising:

a window frame having four frame side members,
a window sash having four sash side members supporting an Insulating Glazing Unit, IGU, having multiple layers of glazing,
the IGU having an exposed interior major surface for facing an interior of the building, the exposed interior major surface being of an interior pane layer of the IGU, the interior pane layer having a periphery and a first peripheral side,
a first of the frame side members being associated with a first of the sash side members, the first frame and sash side members extending in a respective longitudinal direction in parallel with the first peripheral side of the interior pane,
a height direction being defined as extending perpendicularly to the interior major surface of the IGU of the skylight window, an outward direction and an inward direction extending from the first peripheral side in opposite directions, the outward direction extending away from the IGU perpendicularly to both the longitudinal direction and the height direction and, and the inward direction being opposite to the outward direction,
the first frame member comprising a primary leg and a secondary leg, where the primary leg is outwards in relation to the first peripheral side of the interior pane layer and extends in the height direction, and where the secondary leg extends in the inward direction on an interior side of said interior major surface of the IGU,
the first frame side member comprising a lining panel reception groove located interior to the interior major surface of the IGU,
wherein there is a distance D1, in the height direction, between a most interior surface of the first frame side member and the interior pane layer of the IGU.

Background

[0002] There is often a desire from architects, contractors and home owners to position one or more skylight windows in a roof of private homes, office buildings, etc. in order to allow daylight to reach the interior of the building. This, however, may give rise to a variety of challenges.

[0003] The use of skylight windows originates from industry buildings, where more light, in particular daylight, was desired in a cost-efficient way. Many industry buildings are made with substantially flat roofs and the most cost-efficient way to provide more daylight in such a building was to cut a hole in the roof and install a traditional facade window substantially horizontally, thereby creating a skylight window. Over the years there has been a focus on how to improve the exterior integration of skylight windows by improving the integration with roofing to avoid water accumulation and by improving insulation of the skylight window.

[0004] In general, skylight windows of the prior art have suffered from a lack of attention to the interior integration with ceilings etc. and to the fact that a limited amount of light reaches into the building as well as limited visibility through the window from the interior of the building.

[0005] On this background it may be an object of the invention to provide an alternative skylight window according to the introduction which integrates better with interior adjacent surfaces of the building.

[0006] According to the invention, these and further objects are met by a skylight window according to the introduction, where a distance D2 between a bottom of the lining panel reception groove and the most interior surface of the first frame side member is at least 1/3 of D1 in the height direction.

[0007] As a result, a lining panel to be installed will extend past the most interior surface of the window frame and hide an interior part of the frame side member. Since the lining panel to be installed, in general, is provided with flat surfaces, this may provide a flush continuous inwardly facing surface at a roof opening in the roof covered by the skylight window compared to prior art skylight windows where the lining panel reception groove is provided in the most interior surface of the frame side member. This may in turn improve the integration with adjacent surfaces, such as a ceiling, as the surface colour or texture given to the ceiling may continue almost up to the interior side of the IGU, thus potentially making the skylight window appear less bulky. Moreover, the lining panel extending far towards the IGU may protect the inwards facing side of the window frame from UV radiation, and make it easier to keep the area surrounding the skylight window clean. Furthermore, the high position of the lining panel reception groove may entail an improved guidance for installation of a lining panel and support for the lining panel in the mounted state, as a section thereof will be located adjacent to a section of the second leg of the window frame.

[0008] Further, the high position of the lining panel reception groove may serve the purpose of providing improved insulation, as a lining panel provided in the lining panel reception groove will work as an extra layer of insulating material in the skylight.

[0009] The width of the lining panel reception groove in the inward diretion may correspond or be larger than the width of the lining panel to be installed in the lining panel reception groove. The lining panel reception groove width may be between 1-15mm, between 10-14 mm, or be 12.5mm.

[0010] The lining panel may alternatively be denoted a reveal panel, an aperture panel or a window opening panel.

[0011] The term IGU is an abbreviation of "Insulating

Glazing Unit" and is a concept well-known to the skilled person.

[0012] The IGU has multiple layers of glass or glazing, which layers may define a potentially sealed volume or spacing between them, the spacing potentially comprising an inert gas, an aerogel, or a vacuum. The IGU may in a conventional manner comprise two, three or more layers of glazing, i.e. layers of glass, polycarbonate or the like, or glass panels. Sealing and/or supporting members or spacers may be provided at one or more of four peripheral sides of the IGU between the layers of glazing and may form a so-called spacer frame. The sealing and/or supporting members may distance adjacent layers of glazing from each other and may together with lateral edges of the layers of glazing form respective side or lateral surfaces of the IGU. These side surfaces may be substantially plane and/or extend substantially in the height direction.

[0013] The IGU comprises an exposed exterior pane layer positioned oppositely from the interior pane layer and facing towards the outside, in an installed position of the skylight window. The exterior pane layer may be substantially parallel with and/or may have substantially the same shape and size as the interior pane layer.

[0014] The IGU may have a rectangular shape and may have further second to fourth peripheral sides that each extends linearly along a corresponding respective sash member. The peripheral sides may define a shape of the IGU, but the IGU may also comprise layers of glazing being larger than the interior pane layer and thus defining an overall size and shape of the window. IGUs where one layer of glazing is larger than the other(s) are also known as stepped panes..

[0015] The four frame side members may together form a substantially rectangular shape. Additionally or alternatively, the four sash side members may together form a substantially rectangular shape. A rectangular shape of the four sash side members may be smaller than a rectangular shape of the four frame sash side members, which may allow the sash to be embedded within the frame.

[0016] In an embodiment, at least one of the sash side members or frame side members comprises a thermal break.

[0017] The thermal break may be made from a material of a lower thermal conductivity than other parts of the first sash or frame side member. The thermal break may be a joint joining parts of the sash or frame side member. This may have the advantage of improving the insulation properties of the skylight as a lower thermal conductivity through the sash or frame side 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.

[0018] In an embodiment, the secondary leg extends in the inward direction, relative to the primary leg.

[0019] In an embodiment, D2 is at least 2/5, 1/2, 3/5, 2/3, 4/5, 5/6, 6/7, 8/9, or 9/10 of D1 in the height direction. D2 may be equal to or more than 25 mm, 30 mm, 40 mm, 50 mm, 60 mm, 70 mm, 80 mm or 85 mm.

[0020] This may provide the ability to position the lining panel high in the frame and close to the IGU. This may have the advantage of improving insulation properties by providing another barrier of material. It may further provide a more aesthetically pleasing transition between the interior of the roof structure and the skylight window.

[0021] In an embodiment, the secondary leg of the first frame side member is on an interior side of the first sash side member. The secondary leg may be partly below the interior side of the first sash side member in the height direction. The secondary leg may not overlap with the first sash side member in the height direction.

[0022] Providing the secondary leg on an interior side of the first sash side member may provide a better integration with the ceiling and potentially walls in a building where the skylight is to be installed, as the second leg may cover the sash side member, when looking out the window from the interior side, in an installed position.

[0023] In an embodiment, the lining panel reception groove has one uninterrupted surface comprising a first face for abutting an inwardly facing face of the lining panel, an opposite second face, and a third face, constituting the bottom of the groove and extending between the first face and the second face.

[0024] This provides for a simple manufacturing of the lining panel reception groove, as it e.g. can form part of the first frame side member and may be an integrated part of the first frame side member.

[0025] In an embodiment, the lining panel reception groove is made up of at least two different parts e.g. the first frame side member and a frame profile. This provides for a groove that can be assemblied and adjusted on site.

[0026] In an embodiment, the first face is of a length, different from the length of the second face, in the height direction. Alternatively, is the length of the first face the same length as the second face, in the height direction.

[0027] In an embodiment, the lining panel reception groove is a groove in the secondary leg and may be positioned on a side of the secondary leg facing the interior of the building to be installed in. The panel reception groove may be in a most interior side of the secondary leg. The liningpanel reception groove may be in a side having a distance to the most interior side of the secondary leg.

[0028] This may provide that the lining panel reception groove can be in an inward position relative to the entirety of the first frame side member, whereby a lining panel can be installed in the inward position, such that most of the window frame is hidden in an installed position. Further, it may enable that most of the window frame comprising the secondary leg can be positioned on the roof, not overlapping the roof opening..

[0029] In an embodiment, the lining panel reception groove is positioned further inwards than the sash side member associated with the frame side members in which it is provided. The lining panel reception groove

may be positioned interior to the sash or overlap the sash, in the inwards direction.

[0030] This may provide that the lining panel reception groove and a lining panel to be installed can hide the sash, when observing the skylight, in an installed position, from the interior towards the exterior. By hiding the sash, the insulation properties of the skylight may be improved, and it may form a uniform surface on the inwards side of the first frame side member.

[0031] In an embodiment, the lining panel reception groove is located further towards the exterior than a curb flange of the first frame side member. The curb flange member may form part of the first frame side member or be a separate part attached to the first frame side member. The curb flange member may have an incline on at least one surface, where the incline can be the same across the surface or may not be the same across the surface.

[0032] The curb flange may provide better means for installing the window frame on a roof, as fasteners can be fastened through it, it may help water flow around the skylight and it may function as a surface for mounting roofing.

[0033] The term slanted curb flange member is a concept well known to the skilled person and refers to apart on an outwards side of the first frame side member with an incline.

[0034] In an embodiment, the first frame side member has a substantially flat most outwards surface extending from an interior end to an exterior end of the of first frame side member. This may provide for a smaller window frame and thus a more compact window during transportation and installation.

[0035] In an embodiment, the lining panel reception groove is positioned below a most exterior surface of the secondary leg of the frame side member, and D2 is at least 75 %, 80 %, 85 % 90 % of a distance, D3, extending between the most interior surface of the first frame side member and the most exterior surface of the sash side member.

[0036] This may provide for a lining panel reception groove high in the frame for providing improved insulation of the window and an uninterrupted flush surface on most of an inward side of the skylight window in an installed position.

[0037] In an embodiment, the lining panel reception groove is positioned below a part of the first sash side member when seen in the height direction. The lining panel reception groove may further be positioned within a most inward side of the first sash side member and a most outward side of the first sash side member.

[0038] The entirety of the lining panel reception groove may overlap 80 %, 90 %, 95 % or 100 % with the first sash side member, when seen in the height direction. A most inward surface of the lining panel reception groove may be flush with a most inward surface of the first sash side member.

[0039] In an embodiment, the lining panel reception groove is below a part of the first sash side member being interior to the interior pane layer of the IGU and inwards of the peripheral side of the IGU.

[0040] This may provide a small width of the secondary leg, where the first sash side member may be inwardly exposed to the surroundings and/or the first sash side member may be in line with the lining panel reception groove in the height direction. This may further provide for a simple construction, where the first sash side member is positioned exterior to the lining panel reception groove and there are no obstacles for accessing the sash side member e.g. when cleaning of for after installation purposes.

[0041] In an embodiment, the window sash is movable, in relation to the window frame, between an open and a closed position of the skylight window.

[0042] The window sash may be made movable in relation to the window frame by the sash being rotatable about an axis extending along one of the sash side members. The skylight window may be hinged to open in the exterior direction i.e. away from the interior of the building. The skylight window may be openable by a combination of a rotary movement and a shifting movement or other movement paths of the sash in relation to the frame.

[0043] In an embodiment, at least one fastener fastens the first sash side member to the first frame side member. The skylight may comprise a plurality of fasteners respectively fastening the sash side members to the corresponding frame side members. The fastener may be fastened in the inward direction, in a slanted direction to the outward surface of the first frame side member, and/or in the height direction. The fastener may be used in a skylight comprising a hinge. The fastener may be a screw, a nail, a pin, a bolt or a similar type of fastener.

[0044] This provides for a fixed window, which can be fixated onsite during installation.

[0045] Alternatively the sash may be permanently fixated to the frame, for example by means of an adhesive or by welding.

[0046] In an embodiment, the first frame side member and/or the first sash side member comprise(s) a hollow box structure. One or more of the frame and/or sash side members may comprise or be made substantially of polymer materials, such as plastic, specifically PVC (polyvinyl chloride), chlorinated PVC, polyurethane (PUR), fiber reinforced PUR such as glass fiber reinforced PUR, and/or wood and/or metal such as aluminium or composites or combinations thereof. The frame and/or sash may have a general hollow core structure with one or more hollows inside spacings or cavities surrounded by thin layers or plates of material, such as plastic, specifically PVC, specifically fiber-reinforced PVC, which plates may extend in the longitudinal direction and may be connected to each other at edges thereof such as to form a shell structure surrounding the spacings. One or more spacings may comprise a filler and/or an insulating and/or stiffening material or member, which may for example comprise or consist of wood and/or a foamed polymer

material. The plates of material may be extruded or pultruded, and may optionally be extruded as one or more separate elements for each frame or sash side member, which are subsequently attached to each other, and a filler material potentially being positioned in the core spacings afterwards. As an alternative, the surrounding material may be moulded around a core of filler material. These structures may provide good strength and insulation properties and may be low-cost in manufacture. Alternatively, the surrounding material or plates may comprise or substantially consist of metal, such as steel and/or aluminium. It is noted that the skylight window according to the invention can be made stronger due to the secondary leg of the first frame side member below, which may have the advantage that the sash and frame may be made of a less strong, but better insulating material, e.g. PVC instead of steel.

[0047] In an embodiment, the primary leg extends above the interior pane layer of the IGU in the height direction. The primary leg may extend above the exterior pane layer of the IGU.

[0048] In an embodiment, the secondary leg comprises a cover leg, where the cover leg is positioned inwards in relation to the first peripheral side of the interior pane layer opposite to the primary leg, and the cover leg extends from the secondary leg in the height direction towards the interior major surface of the IGU.

[0049] Providing the cover leg of the first frame side member may cover the peripheral side of the IGU and the first sash side member when seen from an interior of a building in the installed position of the skylight window. Covering the peripheral side of the IGU and first sash side member results in an inward side of the skylight window which may provide a flush surface that is easy to clean. Covering or hiding parts of the IGU or sash may allow a wider range of materials to be used for these parts as they will not be exposed, which may in turn lead to simpler manufacturing and/or reduced costs of manufacturing. Furthermore, providing the cover leg and the primary leg of the first frame side member on opposite sides of the first peripheral side of the interior pane layer, may contribute to the thermal insulation properties of the skylight window, at least by provding a futher layer of material providing resistance to heat transport and by impeding air flow in the space between the IGU and the first frame side member.

[0050] In an embodiment, the cover leg comprises a lining panel reception groove.

[0051] The lining panel reception groove may be provided at a distal end of the of the cover leg, whereby the lining panel in the mounted position will extend high in the frame, i.e. close to the IGU. Alternatively, the lining panel reception groove may be provided at the proximal end of the cover leg.

[0052] In an embodiment, the skylight window comprises a weather shield pane covering the IGU, the sash and the frame to protect them from the elements and preventing rain and other downfall from entering into the skylight window. The weather shield may be provided as a unitary structure. 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 sash or when attaching roofing felt to cover a joint between the frame and the roof structure.

[0053] The weather shield pane 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.

[0054] 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. Alternatively or additionally, the weather shield pane may be a transparent window pane that may be of glass or hardened glass. The weather shield pane may comprise only one single layer of glazing. Alternatively, or additionally, the weather shield pane may be substantially flat.

[0055] In a development of the previous embodiments, the weather shield is without a sealed gas-filled spacing between the weather shield pane and the IGU.

[0056] In some embodiments, the exterior pane layer extends further in the outward direction than the interior pane of the IGU. Such an IGU may be denoted a "Stepped IGU". The exterior pane layer may extend as far or further than the first sash side member in the outward direction, whereby the exterior pane layer covers the first sash side member.

[0057] The exterior pane layer may extend as far as or further than a frame top edge of the first frame side member in the outward direction, the frame top edge being an outward edge of an exterior end of the primary leg.

[0058] The second leg of the first sash side member may extend immediately beneath this further part of the exterior pane layer. In such embodiments, the primary leg suitably extends above the interior major surface of the IGU, while the exterior pane layer extends above the primary leg.

[0059] A peripheral area of the exterior pane layer may be masked e.g. with enamel so as to protect part of the window frame and/or window sash and/or a spacer of the IGU from sunlight. The peripheral area may be the part of the exterior pane layer, which covers the window frame and/or window sash, in particular the part of the exterior pane layer which is immediately adjacent to the sash. Such masking may also be applied to peripheral areas of the other pane layers, e.g. the peripheral area of the interior pane layer, which is immediately adjacent to the supporting leg of the first sash side member.

[0060] In some embodiments, wherein the exterior pane layer extends further in the outward direction than the interior pane layer of the IGU, the weather shield pane is the exterior pane layer of the IGU. The weather shield thus forms part of the IGU, and the exterior pane layer of the IGU protects the window portion of the skylight

window. The exterior pane layer of the IGU is the most exterior pane layer of the IGU and thus has an exposed exterior major surface. In these embodiments the exterior pane layer covers the sash. The exterior pane layer thus covers and protects the entire window portion and allows rain water or the like to drain off the skylight window, whereby the exterior pane layer serves as a weather shield pane.

[0061] The exterior pane layer may be attached to the window sash by a structural adhesive bond or structural tape. In particular this may be advantageous when the exterior pane layer is the also the weather shield pane. Suitably such adhesive means are applied in between the interior facing surface of the exterior pane layer and the first sash side member, preferably the second leg of the first sash side member.

[0062] In some embodiments, the weather shield pane is provided separately from the IGU. In such an embodiment the weather shield may be provided as a unitary structure, which may be detachably attached to the sash as described above. The separate weather shield may be used in both skylight windows with a stepped IGU and those with an IGU with similarly sized pane layers.

[0063] In some embodiments, the skylight window further comprises a weather shield skirt extending along a peripheral side of the weather shield pane, wherein the weather shield skirt extends toward the interior down to or past the top surface of the primary leg of first frame side member. The first peripheral side of the weather shield pane may be denoted the first peripheral weather shield side. The weather shield skirt preferably surrounds the window frame on an outward 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.

[0064] The weather shield skirt may comprise and L-shape, wherein one leg of the L-shape is attached to the exterior pane of the IGU, such as to the exterior major surface of the IGU or to an interior facing surface of the exterior pane of the IGU. In configurations where the IGU is a stepped IGU, the one leg of the L-shape may be positioned in between the exterior pane layer of the IGU and the first sash side member.

[0065] The top surface of the primary leg may be the most exterior surface of the primary leg which is typically also the most exterior surface of the first frame side member. The top surface may in some configurations be a major, most exterior surface of the primary leg, in case minor protrusions are provided on the primary leg for e.g. locking in sealing elements.

[0066] A sealing element may be provided between the first sash side member and the first frame side member for sealing a gap between the first frame side member and the first sash side member. Additionally, or alternatively a sealing element may be provided in between the weather shield skirt and the first frame side member. Additionally, or alternatively a sealing element may be provided between a surface of the secondary leg and the interior pane layer of the IGU.

[0067] The primary, secondary and cover legs of the first frame side member may be integrally formed. Similarly, the first, second and supporting legs of the first sash side member may be integrally formed.

[0068] The height of the first frame side member is denoted the "total frame height", which is defined the total height in the height direction of the first frame side member from a lowermost point of the frame to an uppermost point of the frame. This typically corresponds to the distance between the top surface of the primary leg and a bottom surface first frame side member. The bottom surface of the first frame side member is the surface on which the first frame side member rests on the roof in the installed position of the skylight window.

[0069] The height of the supporting leg of the first sash side member is denoted the "supporting leg height", which is defined herein as a total height in the height direction of the supporting leg from a most interior surface of the supporting leg to a most exterior surface of the supporting leg. Typically, both these surfaces are located within the periphery of the interior pane layer of the IGU.

[0070] The height of the cover leg of the first frame side member is denoted the "cover leg height", which is defined herein as a total height in the height direction of the cover leg from the most exterior surface of the cover leg to an exterior facing surface of the secondary leg of the frame side member. As such the cover leg height is typically equivalent to the height of an outwardly facing surface of the cover leg, which outwardly facing surface delimits the frame spacing toward in the inwards direction as previously described. In case of the exterior surface of the secondary leg being irregular, the cover leg height is defined in relation to exterior surface of secondary leg which is adjacent to the cover leg.

[0071] The cover leg height may be greater than the supporting leg height. In this way the cover leg can cover the supporting leg of the first sash side member.

[0072] The total frame height is typically about 15 cm.

[0073] The supporting leg height may be may be at least 15 % of the total frame height, preferably at least 30 % or 35 % of the total frame height.

[0074] The cover leg height may be at least 15 % of the total frame height, preferably at least 30 % or 35 % of the total frame height. The cover leg height is preferably greater than the supporting leg height.

Detailed Description

[0075] 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 installed in a roof,

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 view similar to that of Fig. 2 showing an alternative embodiment of a first frame side member of the skylight window according to Fig. 1,

Fig. 4 is a cross-sectional view similar to that of Fig. 2 showing an alternative embodiment of a first frame side member of the skylight window according to Fig. 1,

Fig. 5 is a cross-sectional view similar to that of Fig. 2 showing an alternative embodiment of a first frame side member of the skylight window according to Fig. 1, and

FIG. 6 shows a cross-sectional view of a skylight window according to the present invention with a weather shield which is separate from the IGU.

[0076] Fig. 1 shows an embodiment of a skylight window 1 according to the present invention installed or positioned substantially horizontally in a flat roof 2 of a building (of which only the roof 2 is shown). The skylight window 1 comprises a window frame 3, a transparent IGU 5 and a window sash 6 visible through the IGU 5. The IGU 5 comprises a substantially flat transparent exterior pane layer 5c covering a top of the skylight window 1. The frame comprises four frame side members of which a first frame side member 10 and a second frame side member 11 is visible in Fig. 1 Each frame side member is respectively associated with one of four corresponding sash side members of which two 15, 16 are visible in Fig. 1. The first and second frame side member is connected in an edge joint forming a right angle. On an outwards side, at an interior end, each of the frame side members comprises a slanted curb flange 40 for leading water away from the skylight 1, a roofing material (not shown) typically being arranged to extend over the curb flange to seal the joint between the roof 2 and the window frame 7. On an outwards side, at an interior end of each frame side member a skirt 9 is arranged, said skirt surrounding the exterior pane layer 5c of the IGU.

[0077] The flat roof 2 has a roof inclination of less than 1 % in relation to horizontal. The skylight window 1 is positioned so that a major part of or the entire frame 7 and the entire sash 6 are positioned above an upper roof surface level, also denoted an exterior roof surface level. The skylight window may however also be installed embedded in an inclined roof.

[0078] Fig. 2-5 shows a cross-sectional side view of embodiments showing a detail of the skylight window according to Fig. 1 taken along the line II-II of Fig. 1, the cross-sectional plane being perpendicular to a longitudinal direction of the frame side member 10, the longitudinal direction being the direction in which the frame side member 10 extends along a first peripheral side 5a of the IGU 5. Fig. 2-5 specifically shows a cross-section of the frame side member 10 and of a sash side member 14 as well as part of the IGU 5. The first frame side member 10 being associated with the first sash side member 14 and extending in the respective longitudinal direction in parallel with the first peripheral side 5a. A height direction extends perpendicularly to the interior major surface 5b of the IGU 5, and an outward direction and an inward direction extend from the first peripheral side 5a in opposite directions. The outward direction extends away from the IGU 5 perpendicularly to both the longitudinal direction and the height direction, and the inward direction is opposite to the outward direction,

[0079] Still referring to Fig. 2-5, the IGU 5 has an exposed interior major surface for facing an interior of the building in which the skylight is installed, the exposed interior major surface 5b being of an interior pane layer 5d of the IGU 5, the interior pane layer 5d having a periphery and the first peripheral side 5a. Opposite of the interior pane layer, and facing the exterior the IGU comprises the exterior pane layer 5c. The exterior pane layer 5c extends further in the outward direction than the other pane layers of the IGU 5, and hence the IGU 5 may be denoted a stepped IGU. Additionally, the exterior pane layer 5c extends slightly further than the frame top edge 10g of the first frame side member as seen in Fig. 5 and is provided with a skirt 9, which extends along a first peripheral side 8a of the exterior pane layer 8. In these embodiments, the exterior pane layer 5c may also function as a weather shield, which protects the window frame 7 and window sash 6 of the skylight window 1 as well as the other pane layers.

[0080] The first frame side member comprises a primary leg 25 extending in the height direction, where the primary leg 25 is outwards in relation to the first peripheral side 5a of the interior pane layer 5d.

[0081] In Fig. 2-4, an outward side of the first frame side member comprises the slanted curb flange 40. The curb flange of these embodiments comprises three curb flange surfaces of different inclination. All of the three curb flange surfaces have a downwards inclination relative to the height direction being configured for the mounting of roofing felt and for installing a fastener through the curb flange 40.

[0082] The outward side of the first frame side member 10 further comprises a planar vertical surface above the slanted curb flange 40. The vertical surface is understood to extends substantially in the height direction.

[0083] In this embodiment the skirt 9 on the outward side of the primary leg 25 overlap with the curb flange in the outward direction and protects the first sash side member 14.

[0084] The first frame member 10 further comprises a secondary leg 26, that extends in the inward direction, relative to the primary leg on an interior side of the interior major surface 5b of the IGU 5.

[0085] Again referring to Figs 2-5, both the first frame side member 10 and first sash side member 14 have a hollow box structure and some or part of the internal cavities thereof may be provided with an insulation material (not shown).

[0086] The first sash side member 14 is positioned between the first frame side member 10 and the IGU 5 and

has a supporting leg 79. The supporting leg 79 extends in the inward direction below part of the interior pane layer 5d of the IGU 5. The IGU 5 rests on the supporting leg 79 whereby at least part of the weight of the IGU 5 is carried by the supporting leg 79. A sealing element may be provided in between the supporting leg 79 and the interior pane layer 5c and/or they may be interconnected by an adhesive.

[0087] The first sash side member 14 extends in the height direction along and above part of the primary leg 25 of the frame side member 10. A part of the first sash side member 14 being exterior to the first frame side member 10 extending in an outward direction above part of the first frame side member 10.

[0088] In Fig. 3, the sash comprises an elongated supporting leg 79a extending in the inwards direction for supporting the sash. The elongated supporting leg supports the interior pane layer on the interior side at the edge.

[0089] In Fig. 2 and Fig. 3, the first sash side member 14 finds support on a gasket 22 positioned on an exterior side of the secondary leg 26 of the frame side member. A most inward side of the first sash side member is exposed to the surrounding, and is substantially flush with a most inward side of the secondary leg 26 of the frame side member.

[0090] In Fig. 4 and Fig. 5, there is a space between a most interior surface 79a of the supporting leg 79 of the first sash side member 14 and a surface of the secondary leg 26 of the frame side member 10 facing the most interior surface of the supporting leg.

[0091] The secondary leg 26 also has a cover leg 73, which is positioned inwards in relation to the first peripheral side 5a of the interior pane layer 5d, i.e. to right of the first peripheral side 5a in the drawing. The cover leg 73 is thus opposite the primary leg 25 of the frame side member in relation to the first peripheral edge 5a. The cover leg 73 extends from the secondary leg 26 toward the interior major surface 5b of the IGU, whereby the most exterior surface 73a of the cover leg is adjacent to the interior major surface 5b. This means that when the skylight window is seen from the interior side, at least the supporting leg 79 of the sash side member 14 will be entirely hidden behind the cover leg 73.

[0092] The cover leg 73 extends from the secondary leg 26 in the sense that it extends higher than the secondary leg 26 in the height direction.

[0093] In Fig. 3 and Fig. 5, the first frame side member 10 and the first sash side member 14 are connected with each other to enable a rotary movement of the sash 6. The sash 6 is thus movable in relation to the window frame 7, so that the skylight window may be opened. This may be accomplished by the sash being top-hung, i.e. being rotatable about a rotary axis extending along a sash side member.

[0094] In Fig. 2 and Fig. 4, a screw 14a fastens the first sash side member 14 to the first frame side member 10, by extending through both. Thus, it is made certain that the sash 7 will not move in relation to the window frame. In Fig. 2, the screw is fastened in the inwards direction and protected by the skirt 9. In Fig. 4, the screw is fastened in a downwards direction being protected by the exterior pane layer of the IGU.

[0095] Fig. 2 to Fig. 5 show a lining panel reception groove 20 located interior to the interior major surface 5b of the IGU 5. There is a distance D1, in the height direction, between a most interior surface 10a of the first frame side member 10 and the interior pane layer 5d of the IGU 5 and a distance D2 between a bottom 20a of the lining panel reception groove 20 and the most interior surface 10a of the first frame side member 10.

[0096] The lining panel reception groove 20 has one uninterrupted surface comprising a first face for abutting an inwardly facing face of the lining panel 50 (shown in Figs 4 and 5), an opposite second face, and a third face 20a, constituting the bottom of the groove and extending between the first face and the second face.

[0097] In Fig. 2, the lining panel reception groove 20 is positioned in the secondary leg 26 of the frame side member 10 at a most inwards side of the secondary leg 26. The most inwards surface of the secondary leg is substantially flush with the most inwards surface of the first sash side member 14. D2 is approximately 2:5 of D1 in Fig. 2. The lining panel reception groove 20 is beneath the gasket 22 and the first sash side member 14 in the height direction and is inwards in relation to the peripheral side 5a of the IGU 5.

[0098] In Fig. 3, the lining panel reception groove 20 is similary positioned in the secondary leg 26 of the frame side member 10 at a most inwards side of the secondary leg 26. The lining panel reception groove 20 is positioned high in the secondary leg 26 in this embodiment, which means that D2 is here about 4/5 of D1.

[0099] A distance D3 extends from the most interior surface 10a of the first frame side member 10 to a most exterior surface of the secondary leg 26. In Fig. 3, D2 is 5/6 of D3.

[0100] In Fig. 4, the lining panel reception groove 20 is positioned further inwards than the sash 14, above a part of the supporting leg 79 of the sash 14 and as part of the cover leg 73. In Fig. 4, D2 is 9:10 of D1, and 95 % of D3.

[0101] The lining panel 50 is to be installed in the lining panel reception groove 20 for creating a long uninterrupted flush surface on an inward side of the first frame side member 10, covering both most of the frame and the sash so that they are hidden from view from the interior side.

[0102] In Fig. 5, the lining panel reception groove 20 is positioned below the sash 14 and in the secondary leg 26 of the frame side member 10. The cover leg 73 extends from the secondary leg and upwards to cover the entirety of the sash 14 and connect to the IGU via the gasket 22a. An outwardly facing surface at an interior end of the cover leg 73 functions as a side surface of the lining panel reception groove 20, thus the lining panel 50 is installed in a position outward of the cover leg 73, but still inwards

of the peripheral side 5a. In Fig. 5 D2 is about 1:3 of D3.

[0103] Turning to FIG. 6, which shows another embodiment of the invention, wherein a weather shield 3 is provided separately from the IGU 5 . Parts of the embodiment of FIG. 6 are identical or similar to the previous embodiments unless otherwise stated in the following. The first frame side member 10 is mirrored compared to the previous embodiments, whereby the outwards direction is to the right and the inwards direction to the left. The first frame side member 10 is in this embodiment not a hollow box structure and is consequently less bulky than the in the previous embodiments. The cover leg 73 is substantially as tall in the height direction as the primary leg 25, i.e. the top surface 73a of the cover leg has substantially the same height position as the top surface 10t of the of the primary leg 25, the top surfaces being the most exterior surfaces of the respective legs. The first frame side member 10 is seen to form a substantially U-shaped structure. The weather shield 3 is here provided separately from the IGU 5, and the weather shield is attached to the first sash side member 14. The cover leg 73 here covers the peripheral side 5a of the skylight window 1 such that the IGU periphery, first sash side member 14 and weather shield periphery is hidden when viewing through the skylight window 1 from an interior of the building. The frame spacing provided in between the cover leg 73 and the primary leg 25 allows for the use of a bulkier sash such as a sash with a hollow box structure. The lining panel reception groove 20 is positioned high in the cover leg 73 in this embodiment, which means that D2 is here about 4/5 of D1, and D2 is about 6/7 of D3..

[0104] In Fig. 2 to Fig. 4, the lining panel reception groove 20 is exterior relative to the slanted curb flange 40 of the first frame side member.

Claims

1. The present invention relates to a skylight window (1) for being installed in a roof of a building, the skylight window (1) comprising:

a window frame having four frame side members,
a window sash having four sash side members supporting an Insulating Glazing Unit, IGU (5), having multiple layers of glazing,
the IGU (5) having an exposed interior major surface for facing an interior of the building, the exposed interior major surface (5b) being of an interior pane layer (5d) of the IGU (5), the interior pane layer (5d) having a periphery and a first peripheral side (5a),
a first of the frame side members (10) being associated with a first of the sash side members (24), the first frame member (10) and sash side member (14) extending in a respective longitudinal direction in parallel with the first peripheral side (5a) of the interior pane,
a height direction being defined as extending perpendicularly to the interior major surface (5b) of the IGU (5) of the skylight window (1), an outward direction and an inward direction extending from the first peripheral side (5a) in opposite directions, the outward direction extending away from the IGU (5) perpendicularly to both the longitudinal direction and the height direction and the inward direction being opposite to the outward direction,
the first frame member (10) comprising a primary leg (25) and a secondary leg (26), where the primary leg (25) is outwards in relation to the first peripheral side (5a) of the interior pane layer (5d) and extends in the height direction, and where the secondary leg (26) extends in the inward direction on an interior side of said interior major surface (5b) of the IGU (5),
the first frame side member comprising a lining panel reception groove located interior to the interior major surface (5b) of the IGU (5),
wherein there is a distance D1, in the height direction, between a most interior surface (10a) of the first frame side member and the interior pane layer (5d) of the IGU (5),
wherein a distance D2 between a bottom (20a) of the lining panel reception groove and the most interior surface (10a) of the first frame side member is at least 1/3 of D1 in the height direction.

2. A skylight window according claim 1, wherein D2 is at least 2/3 of D1 in the height direction.

3. A skylight window according to any of the previous claims, wherein the lining panel reception groove is a groove in the first frame side member,
wherein the groove has one uninterrupted surface comprising a first face for abutting an inwardly facing face of the lining panel, an opposite second face, and a third face, constituting the bottom of the groove and extending between the first face and the second face.

4. A skylight window according to claim 1 or claim 2, wherein the secondary leg comprises the lining panel reception groove.

5. A skylight window according to any of the previous claims, wherein the lining panel reception groove is positioned below a most exterior surface of the secondary leg, and
wherein D2 is at least 75 % of a distance, D3, extending between the most interior surface of the first frame side member and the most exterior leg of the sash side member.

6. A skylight window according to any of the previous

claims, wherein the lining panel reception groove is positioned further inwards than the sash.

7. A skylight window according to any of the previous claims, wherein the lining panel reception groove is positioned below a part of the first sash side member when seen in the height direction.

8. A skylight window according to any of the previous claims, wherein the lining panel reception groove is exterior relative to a slanted curb flange of the first frame side member.

9. A skylight window according to any of the previous claims, wherein the window sash is movable, in relation to the window frame, between an open and a closed position of the skylight window.

10. A skylight window according to claim 1-8, wherein at least one fastener (14a) fastens the first sash side member to the first frame side member.

11. A skylight window according to any of the previous claims, wherein the first frame side member (10) and/or the first sash side member (14) comprise(s) a hollow box structure.

12. A skylight window according to any of the previous claims, wherein the primary leg extends above the interior pane layer of the IGU in the height direction.

13. A skylight window according to any of the previous claims, wherein the second leg of the first frame side member is on an interior side of the first sash side member.

14. A skylight window according to any of the previous claims, wherein the secondary leg comprises a cover leg (73), where the cover leg (73) is positioned inwards in relation to the first peripheral side (5a) of the interior pane layer (5d) opposite to the primary leg (25), and the cover leg (73) extends from the secondary leg (26) in the height direction towards the interior major surface (5b) of the IGU.

15. A skylight window according to claim 14, wherein the cover leg comprises a lining panel reception groove (20).

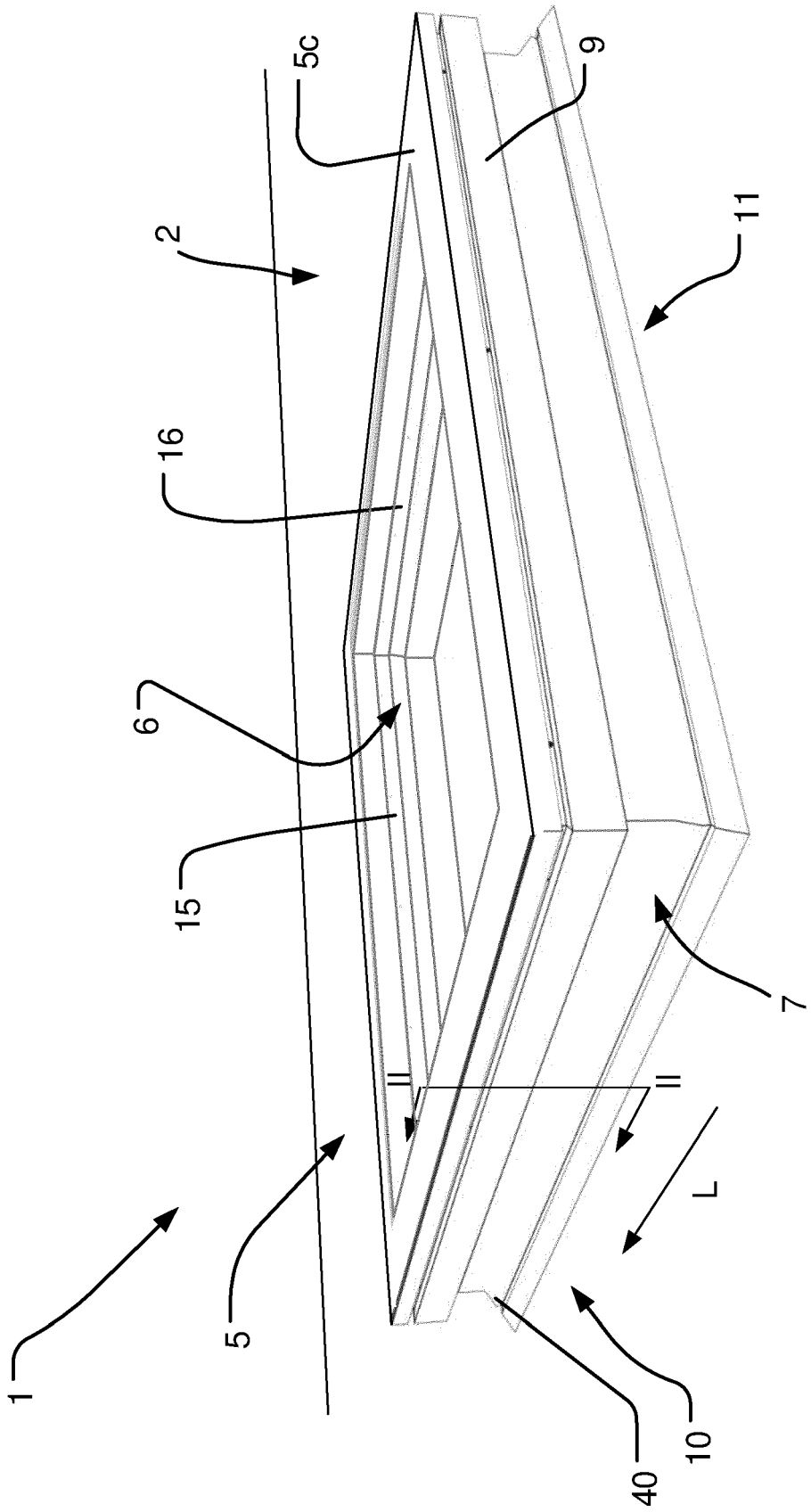
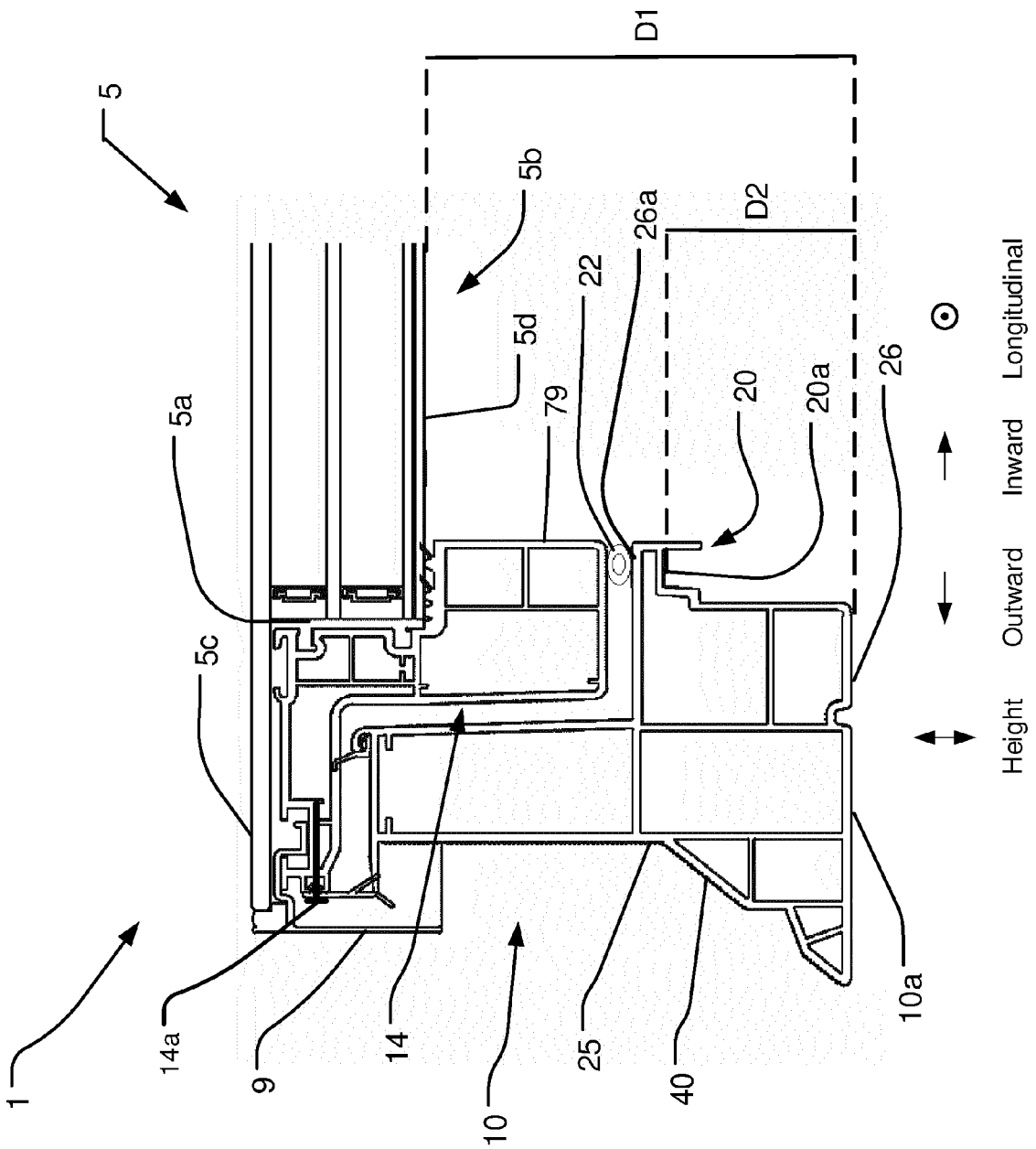


Fig. 1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D2
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Height
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Longitudinal

Fig. 2

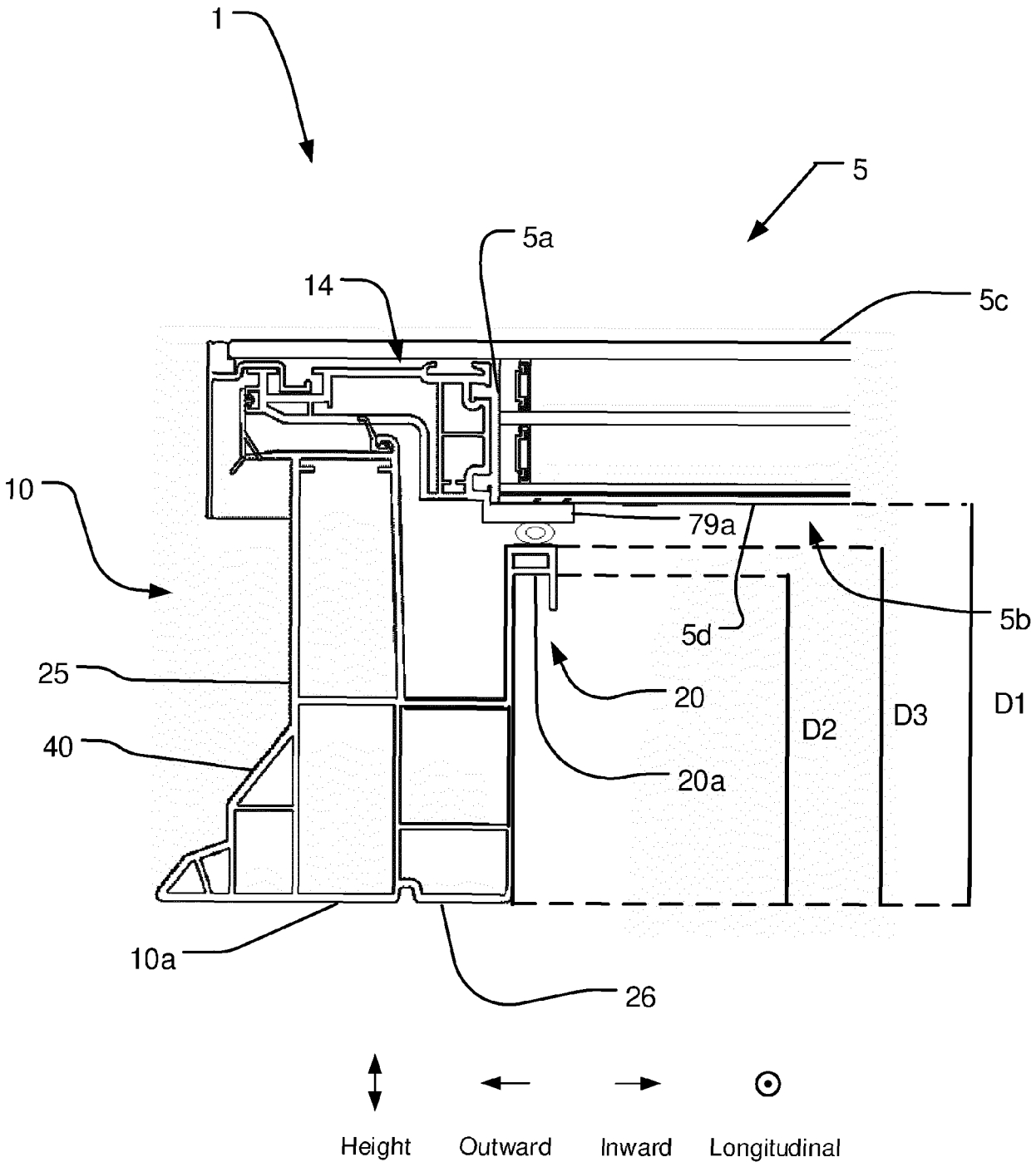
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Fig. 3

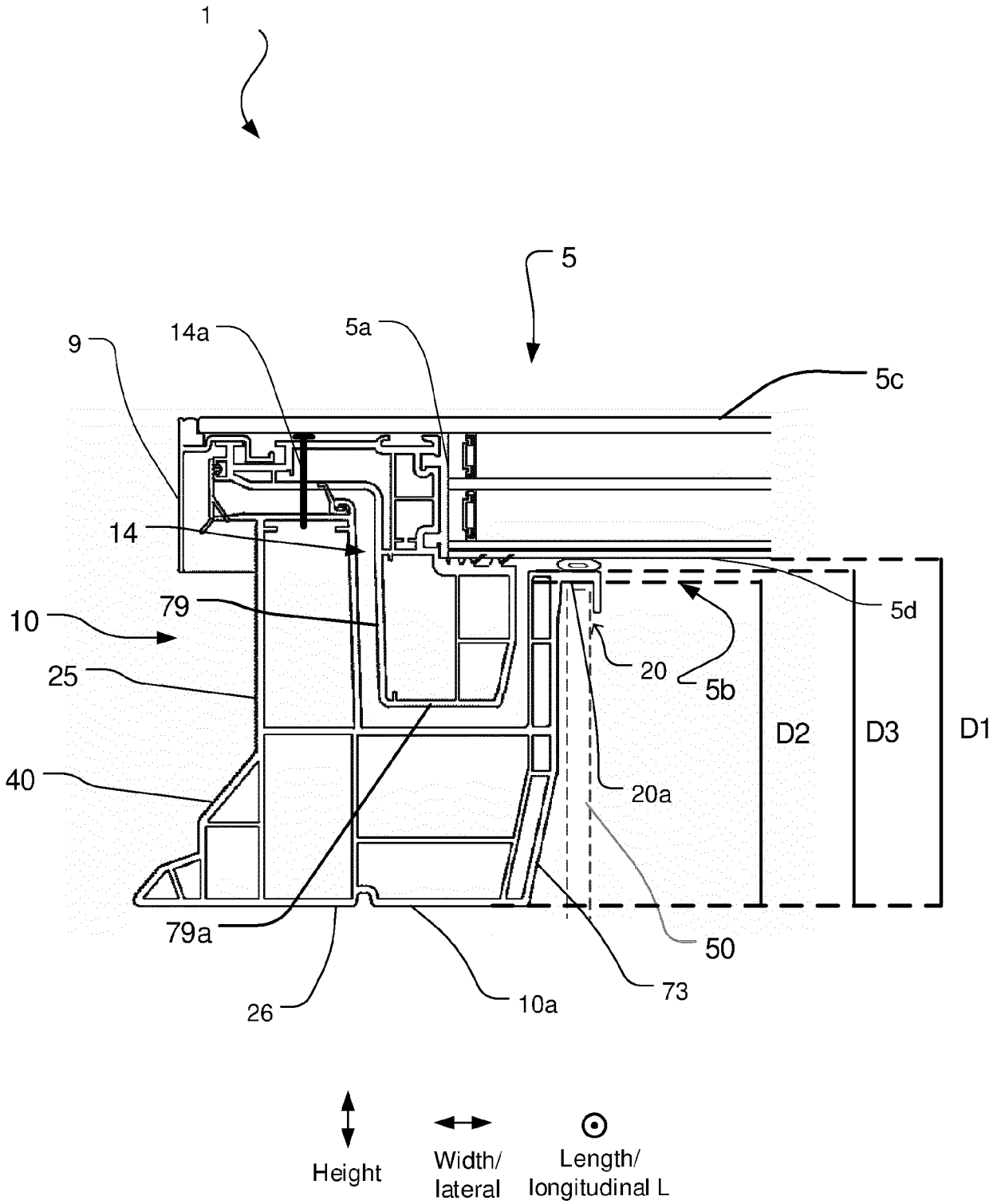
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Fig. 4

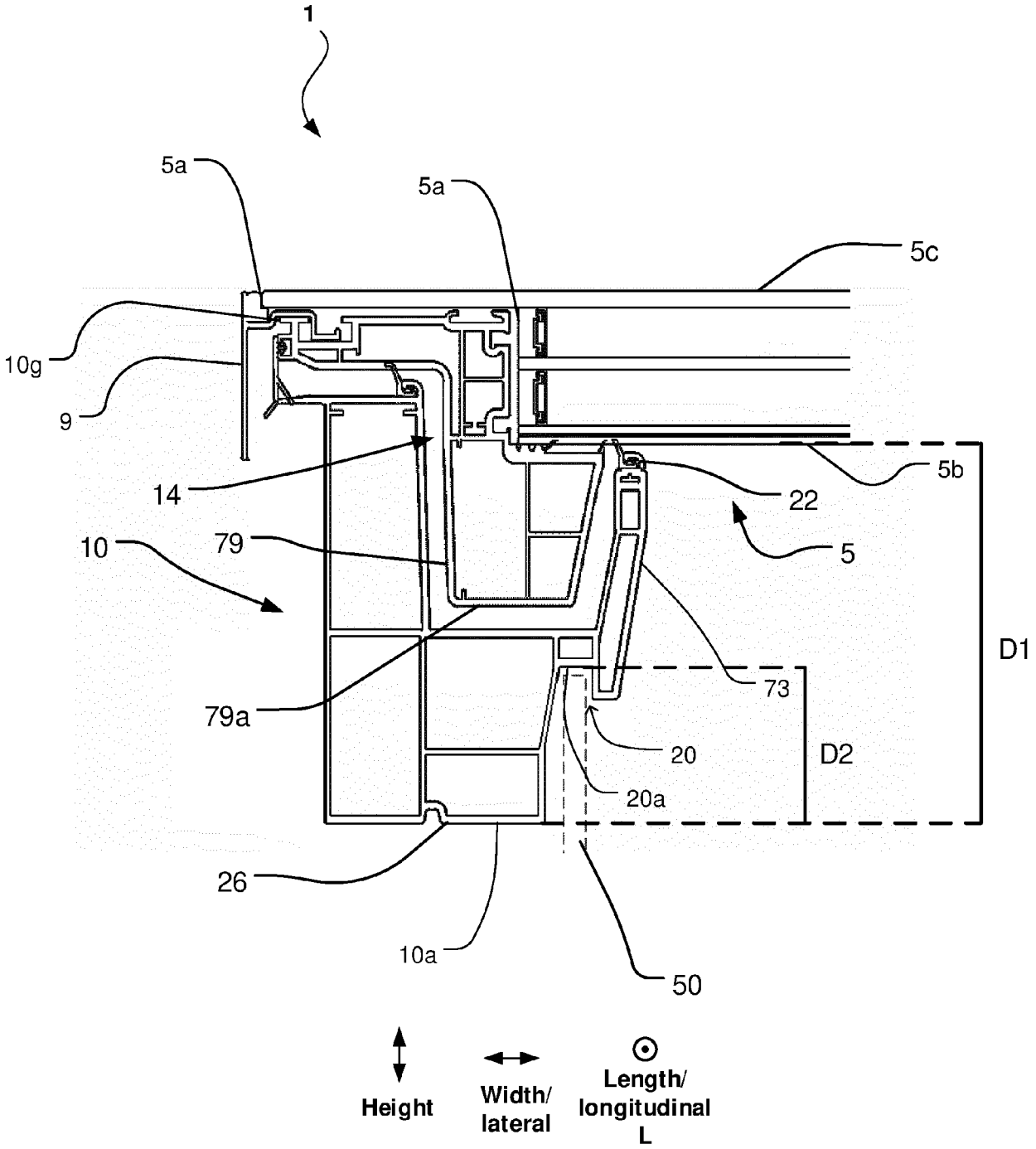
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Fig. 5

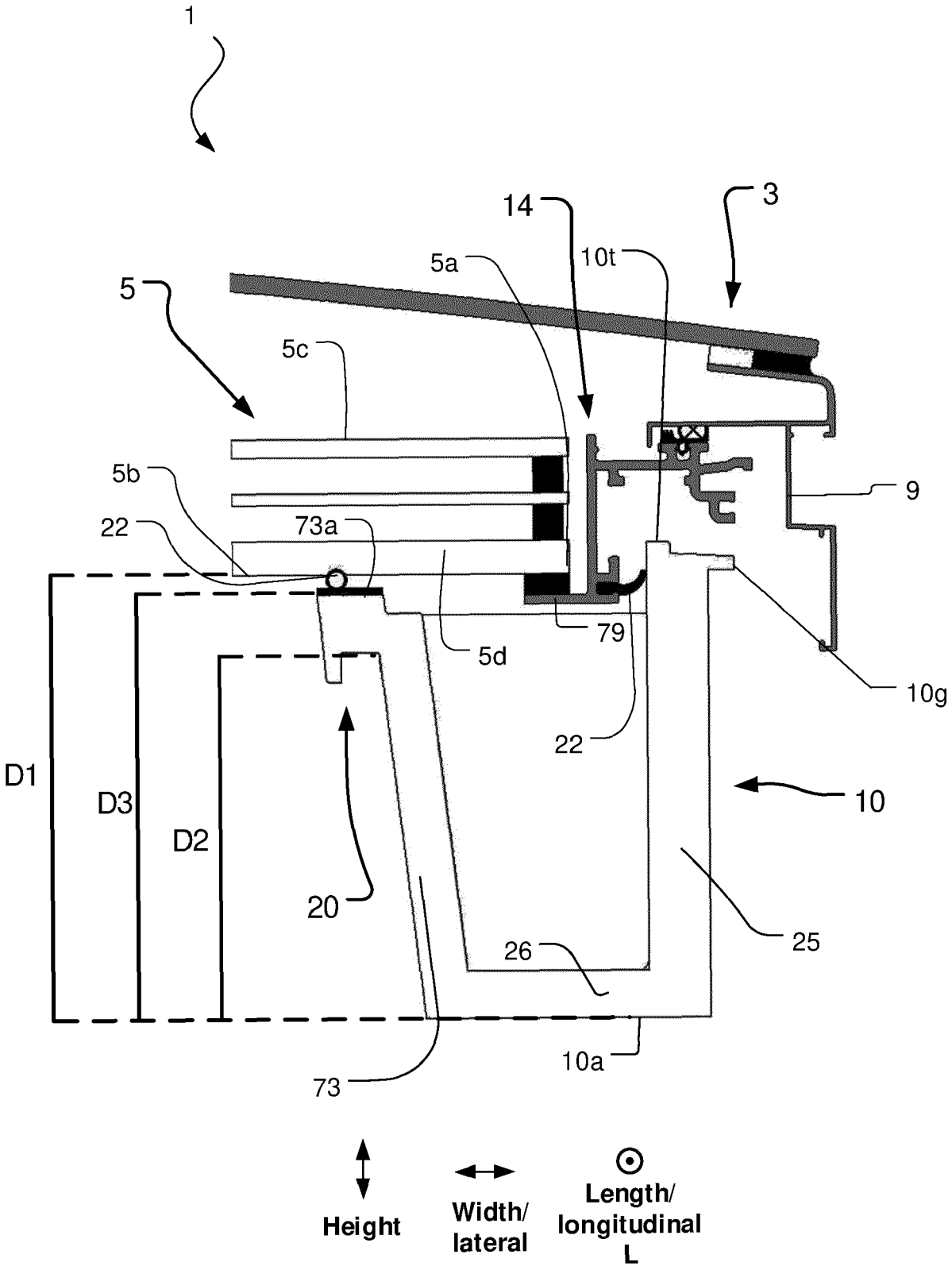
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Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 20 21 0447

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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E04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 February 2021	Leroux, Corentine

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12-02-2021

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