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(54) **A SKYLIGHT WINDOW**

(57) A skylight window comprising a window frame, a window sash, a weather shield, and an IGU, wherein a primary leg of the sash extends as far as or farther in an upward direction than the location of an exterior major surface of the IGU.

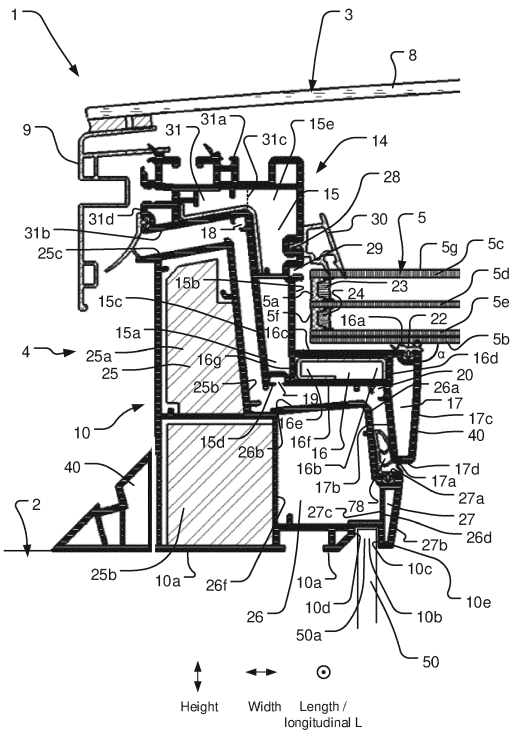

Fig. 3

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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, said window sash being movable in relation to the window frame between an open and a closed position of the skylight window, and
a weather shield attached to the sash so as to protect a window portion of the skylight window, the window portion comprising the sash, frame and IGU,
a first of the frame side members being associated with a first of the sash side members, said first frame and sash side members extending in a longitudinal direction along a first peripheral side of the IGU,
said IGU having an exposed interior major surface for facing an interior of said building in an installed position of the skylight window, said interior major surface extending in an outward direction away from a center of the IGU, an inward direction extending in a direction opposite to said outward direction,
said IGU further having an exposed exterior major surface for facing in an exterior direction which is opposite of said interior of said building in said installed position of the skylight window, said exterior major surface extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface of the IGU,
said first frame side member having a primary leg, which in said closed position is positioned next to and extends along an outwardly facing surface of said first peripheral side of the IGU, and a secondary leg, which in said closed position extends next to and along a part of said interior major surface of the IGU,
a height direction extending from the exposed interior major surface towards the exposed exterior major surface.

Background

[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 of the roof. 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 this 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 a skylight window in flat roofs and potentially cover the window portion with a dome-shaped weather shield. One example of this type of skylight window is disclosed in WO 2009/080026 A1. This roof window comprises a standard VELUX ® outwardly hung 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 and/or limited entry 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 as well as limited compatibility with different roof angles. This may be attributed to the manner, in which flat-roof skylight windows are installed on a roof structure of a building which generally results in a larger proportion of the window portion structure being exposed to the surrounding environment. 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.

[0007] On this background it may be an object of the present invention to provide a skylight window according to the introduction in which the insulation properties are improved.

[0008] A further object of the invention may be to provide a skylight window with improved light entry and/or in which view through the window is improved.

[0009] According to the invention, these and further objects are met by a skylight window according to the introduction, where said primary leg extends as far as or farther in said upward direction than a location of said exterior major surface of the IGU.

[0010] This allows for positioning the IGU deeper or lower in the window structure i.e. closer to an interior of the building in an installed position of the skylight window. This reduces the area of the sash and frame through which heat energy escapes (or enters) from the interior of the building. Furthermore, improved light inflow and view through the skylight window are achieved.

[0011] Said primary leg may be plate-shaped and/or may extend substantially in an up-down or vertical direction.

[0012] In an embodiment of the present invention, said first sash and/or frame side member(s) provide an inwardly facing interior surface located below the interior

major surface of the IGU, an angle formed between said inwardly facing interior surface and said interior major surface of the IGU at an interior corner formed between said surfaces being equal to or less than 110 degrees, preferably equal to or less than 105, 100, 95, 90, 85 or 80 degrees.

[0013] This may provide improved inflow of light as the angling of the inwardly facing interior surface may reduce the amount of light blocked

[0014] In an embodiment said frame and sash side members comprise or are made substantially of one or more plastic polymer materials, preferably said frame side members comprise or are made substantially of polyurethane, and/or preferably said sash side members comprise or are made from a thermoset plastic polymer material comprising fibers.

[0015] This may provide a skylight window that is more cost effective to manufacture.

[0016] Preferably said sash side members comprise or are made from HELO, a thermoset plastic polymer material comprising fibers.

[0017] In an embodiment, said primary leg extends at least 5, 10, 15, 20, 30, 40, 50, 70, 90, or 100 percent of a distance between said exterior and interior major surface of the IGUs in said upward direction from said exterior major surface of the IGU.

[0018] This has the effect of facilitating the IGU being positioned deeper or lower in the skylight window structure, that is closer to an interior of the building in an installed position of the skylight window. This reduces the area of sash and/or frame through which thermal energy may transfer between the interior and the exterior of the building thus improving the insulation properties.

[0019] In an embodiment, said first leg extends at least 50, 60, 70, 80, 90 or 100 % of a distance between said exterior and interior major surface of the IGUs in said upward direction from said exterior major surface of the IGU.

[0020] In an embodiment said first sash side member has a first leg, which extends substantially in the upward direction.

[0021] This may facilitate a deeper or lower mounting of the IGU supported by the first sash side member.

[0022] It may also protect the IGU and provide potential surface for sealing elements to be placed and seal between the first sash and frame side member.

[0023] In an embodiment, said first leg extends next to said outwardly facing surface of said first peripheral side of the IGU, and wherein the primary leg in said closed position extends next to and along an outwardly facing surface of said first leg. Hereby, the first leg is positioned between the outwardly facing surface of said first peripheral side of the IGU and the primary leg.

[0024] This provides a spacing in an upward/downward direction which allows the IGU to be placed deeper or lower in the skylight window structure.

[0025] It may also have the effect of guiding the sash side member when closing the skylight window. It may further provide a surface for placing an abutment element for aiding in the positioning of the sash and IGU in the closed position to ensure they are properly positioned in said window in the closed position to ensure optimal sealing. It may also be possible to place sealing elements between the first and primary legs.

[0026] Said outwardly facing surface of said first peripheral side of the IGU may extend substantially in the upward direction.

[0027] In an embodiment, said first leg does not extend to cover any part of said exterior major surface of said IGU.

[0028] This has the advantage of not blocking light from entering through the exterior major surface of the IGU and into the interior of the building. It may thus improve the inflow of light into the interior of the building.

[0029] In an embodiment, the first sash side member further comprises a second leg, which may potentially project from a lower end of said first leg so as to extend along part of said interior major surface of the IGU to support the IGU, said second leg potentially resting on an upper abutment surface of said secondary leg in said closed position of said window.

[0030] The secondary leg may in said closed position extend next to, on an inward side of, and along said second leg of said first sash side member.

[0031] This may also facilitate a more stable support of the IGU. It may also have the effect of ensuring correct positioning of the sash and IGU in the closed position of the window. The second leg may further protect the IGU. It may also allow further placement of sealing elements to improve sealing and insulation properties.

[0032] In an embodiment, said first sash side member further has a third leg projecting from an upper end of said first leg and extending in said outward direction and, optionally, a fourth leg projecting from said third leg and extending substantially in said upward direction and, optionally, a fifth leg projecting from said fourth leg substantially in said outward direction.

[0033] The provision of additional legs may allow the physical properties of the different legs to be tailored to their specific purpose, which may be to support the IGU, provide an abutment surface, provide a mounting surface, support a weather shield etc. For example, if a leg is supporting the IGU it may be provided with a higher strength and/or stiffness and/or smaller or larger size compared to other legs. A leg provided to aid the sealing and/or positioning of the sash and IGU may be provided with grooves or the like adapted to accommodate sealing and/or abutment elements.

[0034] The weather shield may be attached to said fifth leg.

[0035] In an embodiment, said exterior major surface of the IGU is positioned at a distance of less than 80 % of a total height of the first leg from a lower end of said first leg.

[0036] This may allow the IGU to be positioned closer to one of the main areas of thermal energy transfer be-

tween the exterior and interior of the building i.e. the interface between the exterior and interior of the building. As the IGU is typically the best insulating component of a window, this may improve the insulation properties of the skylight window. By the IGU being positioned at the lower end of the first leg, it may also provide a more compact skylight window.

[0037] In an embodiment, said primary leg at a lower end thereof is connected to an outer end of said secondary leg.

[0038] This has the effect of providing a frame side member that may be provided in a shaped profile, such as a stepped profile.

[0039] In an embodiment, a lower end of said primary leg is positioned below said interior major surface of the IGU.

[0040] This may have the effect of providing an abutment surface for the IGU. The abutment surface may be in the form of an abutment element. The primary leg positioned below said interior major surface of the IGU may also provide a surface for the IGU and/or sash to seal against. To this end the primary leg may comprise one or more sealing elements.

[0041] In an embodiment, an insulating member, such as a block of insulating foam, is positioned between said first leg and said primary leg.

[0042] The insulating member may be positioned in a corner of e.g. approximately 90 degrees formed between the primary and secondary legs.

[0043] Said primary leg of the sash member may be positioned right beside the insulating member, i.e. with no further elements between them. Similarly, the above-mentioned potential third leg of the sash member may be positioned right above the insulating member.

[0044] The insulating member may extend upwardly from the secondary leg to more than half a height of the primary leg.

[0045] In this way insualtion properties may be futher improved.

[0046] In an embodiment the skylight window is installed potentially in or on a flat or inclined roof of a building to cover a roof opening of the roof, said interior major surface of the IGU facing an interior of the building.

[0047] This may improve the light inflow and/or insulation properties of the building.

[0048] Said first sash and frame side members may form a first pair of side members, and the remaining three said sash and frame side members similarly may form respective pairs of side members, one or more of which being provided in a manner similar or identical to said first pair of side members as defined in any one of the embodiments disclosed herein. Hereby, the IGU may similarly be extended in one or more of the other three outward directions, which may further add to the above advantages of the invention.

[0049] It is preferred that all four sash side members have the structure as described for the first sash side member and that the corresponding or associated four frame side members are also adapted accordingly.

[0050] In general in this specification, in relation to the first sash side member, a length dimension may be defined as a dimension in which said longitudinal direction extends, a height dimension may be defined as a direction perpendicular to the length dimension and to major surfaces of the IGU, and a width dimension may be defined as a dimension perpendicular to the height and length dimensions. The width and length dimensions are thus parallel to the major surfaces of the IGU. Whereas the longitudinal direction extends in the length dimension, the width and height dimensions can be said to extend in transverse or lateral directions. The length dimension may also be denoted longitudinal direction. The width dimension may also be denoted width direction. The height dimension may also be denoted height direction.

[0051] Throughout this text the term "interior" is used to indicate that something is intended to face the interior of the building in which the skylight window is installed, in an installed position of the skylight window. The term "exterior" is used to indicate that something is intended to face in a direction opposite to the interior of the building in which the skylight window is installed, in an installed position of the skylight window. The terms "inner" and "outer" are used to indicate that something is intended for facing towards or away, respectively, from the opening in the frame of an assembled skylight window.

[0052] The terms "insulation", "insulating", "insulation properties" and "insulating properties" are to be understood in the sense of thermal insulation and thermal insulation properties and thermally insulating and insulating properties. However, other insulation may also be provided such as for example acoustic insulation.

[0053] As mentioned above, skylight windows for inclined roofs are typically built into the roof structure. This means that the frame and sash, i.e. most of the frame and sash structures, are embedded in the roof so that much, most or all of an outer surface of the frame facing away from the opening in the frame is positioned within the roof structure. The inventors of the present invention have realized that in inclined skylight windows installed in this way the insulation properties of the frame and sash are to a large extent not decisive for the total heat loss through the window. However, in skylight windows where the frame and sash are positioned higher than the level of the roof i.e. above the exterior surface of the roof, the typically inferior insulation properties of the frame and sash structures compared to those of the IGU are to a much lesser degree alleviated by the insulation properties of the roof structure. In prior art skylight windows of the above described type the IGU is typically the best insulated part of the window, i.e. having the lowest thermal conductivity or "U-factor", unit W/(m2K), especially compared to the thermal conductivity of the frame and sash. Thus, the inventors have realized that it is important to minimize the area of the sash and frame through which heat energy will escape.

[0054] The IGU (Insulated Glazing Unit) may have mul-

tiple layers of 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.The sash may be made movable in relation to the window frame by the sash being outwardly hung, i.e. being rotatable about an axis extending along one of the sash side members. Generally by outwardly hung it is to be understood that the sash moves outwards from the frame during opening. This is contrary to pivot hung skylights which move both outwards and inwards during opening and employ a different design. The sash being outwardly hung may be achieved by using a rotary hinge positioned at this sash side member and connecting this sash side member with an associated, adjacent frame side member. Alternatively or additionally, the sash may be parallel-displaceable so that all four sash side members shift upwardly or downwardly between the open and closed positions of the window in which case further or other hinges or the like connect the sash with the frame. 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.

[0055] 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.

[0056] The exposed interior major surface of the IGU may be a lower surface of the IGU and/or may face in a downwards direction towards an interior of the building in an installed position of the skylight window. The exposed interior major surface faces in a direction away from the weather shield.

[0057] The IGU comprises an exposed exterior major surface positioned oppositely from the exposed interior major surface and facing towards the outside, in an installed position of the skylight window. The exterior major surface may be substantially parallel with and/or may have substantially the same or the same shape and size as the interior major surface of the IGU. A distance between the two major surfaces defines a thickness of the IGU, which distance may be measured in the height dimension.

[0058] The IGU may have a rectangular shape and may have further second to fourth peripheral sides that each extends linearly along, potentially along substantially a total extent of, a corresponding respective sash member. The peripheral sides may define a shape of the IGU.

[0059] 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.

[0060] 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 installation 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.

[0061] The weather shield may be mounted on the window portion to protect it from the elements and preventing rain and other downfall from entering into gaps or slots in the roof or the window portion.

[0062] The weather shield may comprise a weather shield pane positioned on an exterior side of the IGU.

[0063] 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. 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.

[0064] A weather shield may comprise a transparent or translucent weather shield pane or cover member, e.g. a dome of glass or a clear polymer

[0065] The weather shield may be provided without a sealed gas-filled spacing between the weather shield pane and the IGU.

[0066] The frame may enclose the sash in the closed position of the skylight window.

[0067] Respectively associated frame and sash side members may be positioned to be substantially parallel to each other in both the open and closed positions of the skylight window.

[0068] The first sash and/or frame side member may

extend substantially along an entire length of said first peripheral side or side surface of the IGU.

[0069] The first leg may have a height in the height dimension of at least 1.5, 1.8, 2 or 2.2 times a height or thickness of the IGU, where the height of the IGU as mentioned may be defined as a distance between its exposed exterior major surface and its exposed interior major surface. Additionally or alternatively, the first leg may have an inner side surface facing a side surface of the first peripheral side of the IGU, this inner side surface extending 1.3, 1.5, 1.8 or 2 times the height or thickness of the IGU.

[0070] The first sash side member may in general in all embodiments have a substantially uniform cross section along a length of the first sash side member in said longitudinal direction. Alternatively or additionally, the first frame side member may have a substantially uniform cross section along a length of the first frame side member in said longitudinal direction. One or more of the remaining sash and frame side members may similarly have substantially uniform cross sections in the same manner.

[0071] Generally, 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), PUR (polyurethane), fibre reinforced PUR such as glass fibre 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 or PVC, specifically fiber-reinforced PVC, which plates may extend in the longitudinal direction and may be connected to each other at corners 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, 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 third leg of the first sash side member, see further 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.

[0072] The first leg of the first sash side member may on a surface facing the IGU, which surface may substantially extend in the height dimension, comprise two or more grooves, the first groove being positioned at a first distance from the interior major surface of the IGU, the second groove being positioned at a second distance from the interior major surface of the IGU, which is different from distance between the first groove and the interior major surface of the IGU, the first and second grooves being adapted for receiving a fixation member which can be attached to or snap-locked to either one of the two grooves, the fixation member abutting the exterior major surface of the IGU so as to hold the IGU along said first peripheral side thereof, especially in the upward direction. Hereby the IGU may be exchanged with an IGU of different thickness by switching the fixation member to the other of the two grooves. In the present invention the IGU can be positioned lower in the window structure, which means that more room may be available for including larger thicknesses of the IGU and more grooves and thus options for IGU thicknesses. The fixation member may be manufactured of or comprise a plastic and/or sealing material and may comprise one or more projections that are adapted to be in abutment with the upper or exterior major surface of the IGU such as to hold this in place against the upper resting surface of the second or third leg. The fixation member may extend substantially along an entire length (in the longitudinal direction) of the first sash side member and/or the first peripheral side of the IGU. Similar fixation members may be attached to similar grooves of the one, two or three of the other sash side members along the other three peripheral sides of the IGU.

[0073] The sash side members may be interconnected at the corners of the respective sash by corner keys. The corner keys may be attached to respective sash side members in hollows thereof. The corner keys may be made substantially of of a rigid and hard material such as metals like aluminium, steel or wood. The corner keys act to prevent sash members from moving out of alignment with interconnected sash members respectively.

[0074] chain drive, hinge or the like may be provided connecting the sash and frame for assisting in opening and closing the skylight window.

[0075] In this specification, generally one or more or all individual ones of the legs mentioned herein of the sash and frame members may be provided separately from each other, each leg potentially being attached to adjacent legs. Alternatively, where a leg is described as being attached to another leg, these two legs may be provided integrally or in one piece with each other.

[0076] In an embodiment of the present invention, said second leg extends as far as or farther than said secondary leg in said inward direction.

[0077] This may improve or further contribute to hiding parts of or the entire window when seen through the IGU from an interior of a building in the installed position of the window.

[0078] In an embodiment, said primary leg of said first frame side member extends as far as or farther in said upward direction than the location of said exterior major

surface of the IGU.

[0079] This allows for positioning the IGU deeper or lower in the window structure. This reduces the area of the sash and frame through which heat energy escapes (or enters) from the interior of the building. Furthermore, improved light inflow and view through the skylight window are achieved.

[0080] In an embodiment, said first sash side member further has a third leg projecting from an inner end of said second leg in a direction away from said interior major surface of the IGU to provide a lower supporting surface which in the closed position of the window rests on a corresponding upper resting surface of the first frame side member. The direction away from said interior major surface of the IGU, in which direction the third leg projects, may extend substantially in the height dimension and/or may extend downwards, i.e. towards an interior the building in an installed position of the skylight window.

[0081] Said inner end of the second leg may be positioned opposite from an outer end of the second leg, said outer end preferably being connected to the first leg at a position from which the second leg projects. Said inner end may be denoted a proximal end and said outer end a distal end with relation to the first leg.

[0082] The third leg of the first sash side member may provide additional support to the IGU, which is a typically relatively heavy component of the window. This means that it is possible to substantially reduce the strength and/or stiffness of the first and second legs of the first sash side member without compromising structural integrity of the first sash side member. As a consequence, the first and second legs may be made of smaller size, which again allows for positioning the IGU lower in the window structure as well as to use an IGU with a larger planar area, i.e. it extends further to the sides and so increase the relative area of IGU compared to the skylight window. This reduces the area of the sash and frame through which heat energy escapes from (or enters) the interior of the building.

[0083] The third leg may be provided in the form of a stiffening and/or strengthening leg, which substantially improves stiffness, strength, structural integrity and/or the like of the first sash side member. Accordingly, the third leg may affect stiffness, strength, moment of inertia and/or like structural properties of the first sash side member, including providing greater resistance to bending. Improved structural properties mean that the sash can hold a larger IGU or an IGU having a plurality of glazing layers.

[0084] Thus, by improving the structural properties of the sash in this manner, it has been found that when holding IGUs of substantially the same size and weight as in the prior art, it is possible to decrease the size of other legs of the sash, specifically the first and second legs. The IGU can be placed lower in the skylight window construction, and as such will improve the insulating properties of the skylight window.

[0085] Furthermore, due to the improved structural properties of the first sash side member the inventors have realized that inclusion of the third leg need not obstruct entry of light or the view through the IGU. On the contrary, since it is possible to position the IGU lower in the window structure, entry of light and view through the IGU may, in fact, be improved.

[0086] The third leg may comprise the only or substantially the only supporting surface or supporting point of the first sash side member resting on the frame in the closed position of the skylight window. Similarly, in one or more of the remaining three sash side members a corresponding third leg may comprise the only or substantially the only supporting surface or supporting point of the respective sash side member resting on the frame in the closed position of the skylight window. This may provide an improved ability to position and center the skylight window during closing thereof. Other contact points or contact surfaces between the sash and frame in the closed position of the skylight window, which contact surfaces are not carrying any substantial amount of the weight of the sash in the closed position of the skylight window, may include sealing members between associated sash and frame side members. An insignificant amount of a weight of the sash in the closed position of the window can be defined as less than 20, 10, 5, 3, 2 or 1 percent of a total weight of the sash the sash imposed by the first sash side member on the first frame side member. It is preferable that the only contact points between one, two, three or four of the sash side members to the associated frame side member are established by the abutment element(s) and potential sealing members, potentially a hinge and/or a chain drive for moving the sash. The abutment element (s) may be of or comprise an elastic material and/or a plastic material and/or a sealing material. The abutment element may be deformed in the closed position of the skylight window.

[0087] In case a rotary hinge and/or a chain drive is included in the skylight window, the rotary hinge and/or chain drive may also establish an indirect contact point between sash and frame, which may also carry part of the weight of the sash in both the closed and especially in the open position of the skylight window.

[0088] Alternatively, a lower supporting surface of the second leg may in the closed position of the window rest on a corresponding upper resting surface of the first frame side member. The first leg or the potential fourth leg mentioned further below may also or alternatively comprise a lower supporting surface that rests on a corresponding upper resting surface of the first frame side member in the closed position of the skylight window. An upper resting surface of the second or third leg on which the IGU rests may be provided as an upper resting surface in the form of one or more sealing members, which sealing members may be manufactured from a polymer material, may include glue and/or a sealing material and may extend in the longitudinal direction, potentially in substantially an entire length in the longitudinal direction

of the first peripheral side of the IGU and/or of the second leg. The lower supporting surface of the first leg and/or of the second leg and/or of the third leg may be provided by one or more abutment elements attached to or forming part of one or both of the sash and frame. This abutment element(s) may be provided at a corner (corners) of the first sash and/or frame side member.

[0089] Said side surface extending along said first peripheral side may potentially have an angle to the interior major surface of the IGU of approximately 90 degrees. Generally, each of the first, second and/or third legs may be substantially plate-shaped and/or oblong and/or have a flat shape, potentially so that they together form a step where an upper surface of the second leg may be denoted a step surface.

[0090] Generally, the first leg may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the height dimension than in the width dimension. Similarly, the second leg may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the width dimension than in the height dimension. Similarly, the third leg may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the height dimension than in the width dimension. Alternatively or additionally, the second leg may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the width dimension than the first leg and/or than the third leg. As explained above, it is possible to increase these ratios of the first and second leg due to the improved structural properties gained by the provision of the third leg, which makes it possible to position the IGU lower in the window structure and to extend further sidewards than would otherwise be the case. The distance the legs extend in a dimension may in this context by an overall and/or total and/or largest extent of the relevant leg.

[0091] Alternatively or additionally, generally, the extent in the length dimension of the first, second and third legs may be substantially equal to or 1 to 1.3 times the extent of the first peripheral side of the IGU in the length dimension. The extents measured also in this context and in general throughout the present specification may be an overall and/or total and/or largest extent of the leg in question in the relevant direction. Alternatively or additionally, the second leg may be defined as projecting from a surface of the first leg, which surface extends substantially in the height dimension and faces the IGU, and/or the third leg may be defined as projecting from a surface of the second leg, which surface extends substantially in the height dimension and is substantially perpendicular to the IGU. These latter surfaces may be imaginary, i.e. the relevant portions may be integral with each other at said imaginary surfaces. If these surfaces are imaginary, the surfaces may be denoted planes.

[0092] Generally, an angle between the first and second legs and/or between the second and third legs may be 70 to 110 degrees or 80 to 100 degrees or substantially 90 degrees. This angle may be measured between a surface of one leg adjacent or contiguous to a surface of the other leg and/or between a overall directions in which the respective legs extend.

[0093] Generally, the first leg may be attached to or formed integrally with the second leg, and/or the second leg may be attached to or formed integrally with the third leg.

[0094] Generally, the first and third legs may project in substantially opposite directions from the second leg, these opposite directions both preferably being substantially in the height dimension. The first leg may extend in an upwards direction, and/or the third leg may extend in a downwards direction.

[0095] The third leg may be positioned with a major part thereof being located beneath the first leg.

[0096] The lower supporting surface of the third leg may form part of the third leg and/or may be a lower surface of the third leg and/or may extend substantially in the width dimension.

[0097] The direction away from said exposed interior major surface of the IGU, in which direction the third leg projects, may extend substantially in the height dimension and/or may extend downwards, i.e. towards an interior the building in an installed position of the skylight window.

[0098] In general, in a cross section perpendicular to the length dimension or to the longitudinal direction the first leg and/or second leg and/or third leg may be substantually shaped as a rectangle, e.g. outer surfaces of the individual leg form an overall rectangular shape. However, the first leg may be substantially shaped as a trapezoid or a trapezium, an outer surface of the first leg extending substantially along a surface of the first frame side member (e.g. along a surface of the primary leg of the first frame member, which may be similarly inclined, see further below) being inclined, e.g. with 1 to 10 or 2 to 5 degrees, with respect to the height dimension. This inclination may be towards the second leg and/or may be in an outward and upward direction. An inward direction may generally in this specification be defined as a direction towards a centre of the IGU, and the outward direction may be a direction opposite to the inward direction, which directions extend in the width dimension. The first frame side member may comprise a side surface extending substantially in parallel with the the latter side surface of the first leg in the closed position of the window. A surface of the first leg extending along another surface of the first frame side member (e.g. along an upper surface or the step surface of the secondary leg of the first frame side member, see further below) may extend substantially in the width dimension. A surface positioned opposite from the latter surface of the first leg may be substantially parallel to the latter surface of the first leg in the closed position of the window. Another surface of the first leg, specifically a surface extending next to the side surface of the first peripheral side of the IGU, may connect the two latter surfaces of the first leg and/or may extend substantially in the height dimension. Similarly, the third leg may comprise a side surface facing a surface of the first frame side member and extending substan-

tially in the height dimension, but may extend at an angle of 1 to 10 or 2 to 5 degrees with relation to the height dimension. The first frame side member may comprise a side surface extending substantially in parallel with the latter side surface of the third leg in the closed position of the window. The inclination in this context may be in a direction away from the second leg and/or may be in an outward and upward direction.

[0099] Said lower supporting surface of said third leg of the first sash side member and/or the corresponding upper resting surface of the first frame side member may extend substantially in the width dimension.

[0100] One or more sealing members may be provided at acorner formed between the second and third legs, this sealing member abutting the first frame side member in the closed position of the skylight window.

[0101] In an embodiment of the invention said first sash side member further has a fourth leg projecting from an upper end of said first leg in a direction away from from the IGU. Said direction away from the IGU may be in said width dimension and/or be said outward direction.

[0102] The fourth leg may provide a further lower supporting surface which in the closed position of the window rests on a corresponding further upper resting surface of the first frame side member, specifically of the primary leg thereof mentioned further below.

[0103] Alternatively or additionally, the fourth leg may in the closed position of the window be positioned above the below mentioned primary leg of the first frame side member. A width of the fourth leg may substantially correspond to a width of this primary leg.

[0104] As is the case for the first, second and third legs, the fourth leg may be substantially plate-shaped or have a flat shape so that an upper surface thereof forms a further step surface similar to and potentially extending substantially in parallel with the step surface of the second leg.

[0105] Alternatively or additionally, the fourth leg may have an oblong shape in the width dimension and/or may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the width dimension than in the height dimension. Alternatively or additionally, the extent in the length dimension of the fourth leg may be substantially equal to or 1 to 1.3 times the extent of the first peripheral side of the IGU in the length dimension. Alternatively or additionally, the fourth leg may be defined as projecting from a surface of the first leg extending in the height dimension and facing away from the IGU. This surface may be imaginary in the manner described above.

[0106] An angle between the first and fourth legs may be 70 to 110 degrees or 80 to 100 degrees or substantially 90 degrees.

[0107] The fourth leg is preferably attached to or formed integrally with the first leg.

[0108] The fourth leg may extend along, preferably along a substantially entire length of, the first peripheral side of the IGU.

[0109] The fourth and second legs may extend substantially in parallel.

[0110] In a cross section perpendicular to the length dimension or to the longitudinal direction the fourth leg may be substantually shaped as a rectangle. However, the fourth leg may be substantially shaped as a trapezoid or a trapezium, a surface of the fourth leg extending substantially along an upper surface of the first frame side member (e.g. along an upper surface of the primary leg of the first frame member, which may be similarly inclined, see further below) being inclined, e.g. with 1 to 10 or 2 to 5 degrees, with respect to the width dimension. This inclination may be in the inward and/or downward direction. The fourth leg may further comprise a first lateral side surface facing and/or attached to the first leg and potentially extending substantially in the height dimension and an opposite, substantially parallel side surface that may face in the outward direction. An upper surface of the fourth leg may extend substantially in the width dimension and may connect the two parallel surfaces thereof.

[0111] The fourth leg may have a height in the height dimension less than the thickness of the IGU and/or substantially equal to the height of the second leg.

[0112] One or more sealing members may be provided at a corner formed between the fourth and first legs, these sealing members abutting the first frame side member in the closed position of the skylight window. Alternatively or additionally, a sealing element may be attached to the fourth leg or to the first frame side member, the sealing element preferably covering an outwardly facing potential gap or a slot between the fourth leg and the first frame side member in the closed position of the skylight window.

[0113] In a development of the embodiment comprising a third leg, the IGU extends from an inner edge of the third leg towards the first leg in the width dimension to farther than half of an accumulated width of the first, second and third legs.

[0114] Hereby the IGU extends relatively far in the width dimension, which reduces heat transmission through the frame and sash and thus through the window as explained in the above. As explained, this is made possible due to the provision of the third leg, which allows for thinner first and second (and fourth) legs.

[0115] More preferred, the IGU extends from an inner edge of the third leg in the width dimension to farther than 0.6, most preferred farther than 0.7, of said accumulated width of the first, second and third legs.

[0116] In another embodiment the interior major surface of the IGU is positioned at a distance of less than 45 % of a total height of the first leg from said lower end of said first leg.

[0117] Hereby the IGU is positioned relatively deep in the window structure, i.e. in the downward direction, which similarly reduces heat transmission through the frame and sash and thus through the window as explained in the above. Again, this is made possible due to the provision of the third leg, which allows for thinner first and second legs.

[0118] The lower end of the first leg may be defined as the lowest position of the first leg in the height dimension and/or the end of the first leg from which the second leg projects.

[0119] More preferred the interior major surface of the IGU is positioned at a distance of less than 40, 35, 32 or 30 % of the total height of the first leg from said lower end of said first leg.

[0120] In another development of the embodiment comprising a third leg, the third leg has an oblong shape in the height dimension.

[0121] The oblong shape of the third leg may be defined as the height of the third leg being at least 1.5, 2, 2.5 or 3 times longer than the width thereof. Additionally or alternatively, the third leg may extend in the height dimension 1, 1.5, 2 or 2.5 times a height of the second leg. Additionally or alternatively, the third leg may have a height of 0.3 to 1, 0.3 to 0.8, 0.4 to 0.7 or 0.4 to 0.6 times a height of the first leg. Additionally or alternatively, a height of the third leg may be 0.5 to 1.5, 0.7 to 1.3 or 0.8 to 1.2 times a width of the second leg.

[0122] In another embodiment the first frame side member comprises a primary leg with a surface extending next to and along a side surface of said first leg of the first sash side member, said side surface of said first leg facing substantially away from said first peripheral side of the IGU, and a secondary leg extending along a surface of said second leg of said first sash side member, which surface faces substantially away from said interior major surface of the IGU.

[0123] In an embodiment, the cross-sectional shape of the first frame side member and the first sash side member may have a stepped profile, where the frame side member may comprise primary, secondary, tertiary or more legs where each leg may be substantially perpendicular to an immediately preceding leg and the immediately following leg, such that a step like structure is formed. Similarly, the first sash side member may comprise a first, second, third or more legs, where each leg may be substantially perpendicular to an immediately preceding leg and the immediately following leg, such that a step like structure is formed. Generally, each of the primary, secondary and/or tertiary legs may be substantially plate-shaped and/or oblong and/or have a flat shape, potentially so that they together form a step where an upper surface of the second leg may be denoted a step surface. Similarly the the first, second and/or third legs may be substantially plate-shaped and/or oblong and/or have a flat shape, potentially so that they together form a step where an upper surface of the second leg may be denoted a step surface.

[0124] A stepped configuration of adjacent surfaces of the first sash and frame side members may thus be achieved by means of the stepped profile of the first sash side member as described and an associated stepped profile of the first frame side member according to the present embodiment. This stepped configuration may provide a labyrinth like structure between the sash and frame side member, resulting in a less direct path for air, precipitation or dirt to pass between the interior and exterior of the building. The stepped profile also provides the possibility of placing sealing elements along the profile such that sealing is facilitated between two parallel surfaces i.e. a surface of the frame side member and a parallel sash side member. Furthermore, insulating sealing members may conveniently be positioned between the first sash and frame side members at respective corners of the stepped configurations, e.g. as described in the above. Hereby, insulating and sealing properties of the skylight window may be further improved. This allows the force exerted through the sash corresponding to the weight of the IGU and sash to be utilized in compressing the sealing elements place between the frame side member and sash, to ensure optimal sealing.

[0125] In the embodiment comprising a third leg, the secondary leg of the first frame side member may further comprise a side surface, which may extend substantially in the height dimension, and which faces, is placed next to and/or extends along a side surface of the third leg of the first sash side member. Said side surface of the third leg of the first sash side member may similarly extend substantially in the height dimension and/or may face in the outwards direction. Said two side surfaces may be substantially parallel to each other in the closed position of the window and/or be inclined with 2-10 or 2-5 degrees in relation to the height dimension and/or they may extend in the length dimension and/or along substantially a total extent of the first sash and frame side members in the longitudinal direction.

[0126] In the embodiment comprising a third leg, the third leg may have an extent in the height dimension of at least 0.2, 0.3, 0.4 or 0.5 times an extent of the secondary leg in the height dimension.

[0127] In a development of the embodiment comprising a third leg, the first frame side member comprises a tertiary leg, which comprises said corresponding upper resting surface of the first frame side member on which said lower supporting surface of said third leg of the first sash side member rests in the closed position of the window.

[0128] The tertiary leg may in the closed position of the window be positioned below or immediately below the third leg of the first sash side member. A width of the tertiary leg may be 0.3 to 1 of a width of the third leg.

[0129] The tertiary leg may be substantially plate-shaped or have a flat shape so that an upper surface thereof forms a further step surface similar to and potentially extending substantially in parallel with the step surfaces of the primary and secondary legs. This step surface may be positioned beneath the abutment element explained further below.

[0130] The tertiary leg may have an oblong shape in the height dimension and/or may extend longer, e.g. at least 1.5, 2, 2.5 or 3 times longer, in the height dimension than in the width dimension. Alternatively or additionally, the extent in the length dimension of the tertiary leg may

be substantially equal to or 1 to 1.3 times the extent of the first peripheral side of the IGU in the length dimension. Alternatively or additionally, the tertiary leg may be defined as projecting from a surface of the secondary leg extending in the width dimension and facing inwardly. This surface may be imaginary in the manner as mentioned above.

[0131] An angle between the secondary and tertiary legs may be 70 to 110 degrees or 80 to 100 degrees or substantially 90 degrees.

[0132] The tertiary leg is preferably attached to or formed integrally with the secondary leg.

[0133] The tertiary leg may extend along, preferably along a substantially entire length of, the first peripheral side of the IGU.

[0134] The tertiary and third legs may extend substantially in parallel in the closed position of the window.

[0135] The tertiary leg may project from the secondary leg substantially inwardly and/or in the width dimension.

[0136] The tertiary leg may form a third step surface, corresponding to the first and second step surfaces of the primary and secondary legs, respectively, which may be substantially parallel to the first and second step surfaces.

[0137] In a cross section perpendicular to the length dimension or to the longitudinal direction the tertiary leg may be substantually shaped as a rectangle. However, the tertiary leg may be substantially shaped as a trapezoid or a trapezium, an inwardly facing surface of the tertiary leg being inclined, e.g. with 1 to 10 or 2 to 5 degrees, with respect to the height dimension. This inclination may be in the inward and/or the upward direction. The tertiary leg may further comprise a first lateral side surface facing and/or being attached to the secondary leg and potentially extend substantially in the height dimension and an opposite side surface that may face in the inward direction, the latter being the surface that may be inclined in relation to the height dimension. The resting surface or an upper surface of the tertiary leg may extend substantially in the width dimension and may connect the two lateral side surfaces thereof.

[0138] The tertiary leg may have a height in the height dimension less than the thickness of the IGU and/or less than that of the first, third, primary and/or secondary leg.

[0139] In the development of the embodiment comprising a third leg, an abutment element may be provided as part of said third leg of the first sash side member so that said abutment element provides said lower supporting surface of said third leg, and/or is provided as part of the first frame member so that said abutment element provides said corresponding upper resting surface of the first frame side member on which said lower supporting surface of said third leg rests in the closed position of the skylight window.

[0140] The abutment element may extend along substantially a total length of the first frame and/or sash frame side members and/or substantially along a total length of the third leg and or said lower surface of the third leg, these lengths being in the length dimension.

[0141] The abutment element is preferably a separate part attached to remaining parts of the tertiary leg. Furthermore, the abutment element may comprise an abutment surface, which includes or forms the resting surface on which the supporting surface of the third leg rests in the closed position of the skylight window. The abutment surface may in a position in which the third leg does not rest on it be inclined with an angle of 5 to 25 or 10 to 20 degrees with respect to the height dimension and/or may extend substantially linearly. Such an inclined abutment surface may help positioning or centering the sash in the frame during a closing movement. Accordingly or alternatively, the supporting surface of the third leg of the sash side member, which supporting surface is in abutment with the resting surface of the abutment element in the closed position of the skylight window, may comprise part of an outer side surface of the third leg as well as part of a lower surface of the third leg, these outer and lower surfaces of the third leg forming a lower, outer corner of the third leg. Hereby the third leg and thus the first sash side member are held by the abutment element both in the width dimension (outwardly) and in the height dimension (downwardly). Holding the sash in the width dimension helps centering and embedding the sash in the frame in the closed position of the skylight window, especially if all sash and frame side members are provided with a similar configuration.

[0142] In embodiments where the secondary and tertiary legs of the frame side member are provided, the abutment element may form part of the secondary and/or of the tertiary leg of the first frame side member, and/or the abutment element may be attached to and/or abut one side the secondary leg and/or be attached to another part of the tertiary leg.

[0143] The abutment element may form a seal covering an opening or slot that would otherwise be provided between the third leg of the first sash side member and the tertiary leg of the first sash frame side member in the closed position of the skylight window.

[0144] A similar abutment element may be provided in a similar manner on or forming part of one, two or three of the remaining frame and/or sash side members. In this case, abutment elements with inclined surfaces in the manner described will help positioning and centering of the sash within the frame during closing of the skylight window.

[0145] The abutment element(s) may form the only or substantially the only resting point or resting surface of the sash or of one or more of the sash side members on the frame in the closed position of the skylight window. This provides a superior ability to position and center the skylight window during closing thereof. Other contact points between sash and frame in the closed position of the skylight window may include sealing members between associated sash and frame side members, but these sealing members preferably only carry an insignificant amount of the sash in the closed position of the

window, i.e. less than 10, 5, 3, 2 or 1 percent. It is preferable that the only direct contact points between one, two, three or four of the sash side members to the associated frame side member are established by the abutment element(s) and potential sealing members. Generally, a sash side member is "associated" with a frame side member if they lie adjacent to each other in the closed position of the skylight window. In case a rotary hinge and/or a chain drive is/are included in the skylight window, the rotary hinge and/or chain drive may establish one or more indirect contact points or contact areas between sash and frame, which may also carry part of the weight of the sash in both the closed and especially in the open position of the skylight window.

[0146] In another embodiment a second, third and/or fourth sash side member is/are substantially similar and/or identical in shape and/or form and/or size and/or structure to the first sash side member.

[0147] In another embodiment a second, third and/or fourth frame side member is/are substantially similar and/or identical in shape and/or form and/or size and/or structure to the first frame side member.

[0148] In the latter two embodiments, all frame and/or side members, respectively, may have substantially identical cross sectional shapes in a cross section perpendicular to the length dimension associated with the first sash side member. Alternatively or additionally, all frame and/or sash side members, respectively, may be substantially identical to each other.

[0149] Thus, two or more of the four respective frame and sash side members may be similar or substantially identical to each other. This makes it cheaper to produce and may allow for optimal movement and positioning of the sash during opening and closing of the skylight window. Also, safe sealing may be provided between the sash and frame, simple mounting may be achieved and the structural properties of the frame and/or sash are the same on all sides of the skylight window.

[0150] In case the first sash side member comprises the above described fourth leg, the weather shield may be attached to the fourth leg. In case all four sash side members comprise the above described fourth leg, the weather shield may be attached to each of the fourth legs.

[0151] In alternative embodiments, the weather shield may be replaced by a flat window pane, which may be positioned to be substantially parallel to the window portion.

[0152] In another development of the embodiment comprising a third leg, the first frame side member further comprises a cover leg that covers the third leg in the closed position of the skylight window so as to at least partly or substantially hide the third leg when seen from below the interior major surface of the IGU.

[0153] Hereby the third leg, which is typically the only or the most visible element of the first sash side member when seen from inside the building, may be at least partly or completely hidden when seen from inside the building in an installed position of the window.

[0154] The cover leg may extend in the longitudinal direction along substantially an entire length of the first leg and/or the first sash side member.

[0155] In the embodiment where the first frame side member comprises a tertiary leg, the cover leg may form part of the tertiary leg or extend from an inward surface of the tertiary leg. The cover leg and the secondary and tertiary legs of the first frame side member may establish a longitudinally extending groove, potentially with the secondary leg and the cover leg defining sides thereof and the tertiary leg defining a bottom thereof, and into which the third leg of the first sash side member is inserted or embedded when the sash moves to the closed position of the skylight window.

[0156] In an embodiment the skylight window is installed in or on a flat roof of a building to cover a roof opening of the roof, said exposed interior major surface of the IGU facing an interior of the building.

[0157] In an embodiment the skylight window is installed in or on an inclined roof of a building to cover a roof opening of the roof, said exposed interior major surface of the IGU facing an interior of the building.

[0158] A flat roof may be defined as a roof with a roof inclination, i.e. an inclination of a roof surface, of less than 5 degrees in relation to horizontal.

[0159] An inclined roof may be defined as a roof with a roof inclination. i.e. an inclination of a roof surface, of more than 5 degrees inclination in relation to horizontal.

[0160] The skylight window may be positioned so that a major part of or the entire frame and/or the entire sash are positioned above an upper roof surface level.

[0161] First and second major surfaces of the IGU may be substantially parallel in the closed position of the window with a plane defined by the roof surface or may have an inclination of less than 1, 2, 3, 4 or 5 degrees to said roof surface plane.

[0162] In an embodiment, said secondary leg having an bottom surface facing in a direction away from the interior major surface of the IGU, which bottom surface comprises a lining panel protrusion located lower than the exposed interior major surface of the IGU in the height direction, wherein the lining panel protrusion protrudes away from the IGU, the lining panel protrusion comprising a first surface for abutting an inwardly facing surface of said reveal panel or lining panel when received by said protrusion.

where said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said lining panel protrusion.

[0163] In an embodiment the skylight window comprises a second protrusion next to the lining panel protrusion such that a recess for receiving a reveal panel or lining panel to be installed, is formed between the protrusions.

[0164] In an embodiment the first surface of the lining panel protrusion and an inward facing surface of the secodary leg delimit a recess for receiving a reveal panel or lining panel to be installed. In an embodiment, said secondary leg has a bottom surface facing in a direction

away from the interior major surface of the IGU, which bottom surface comprises a recess for receiving an upper part of a reveal panel or lining panel in said installed position of the skylight window, said recess comprising a first surface for abutting an inwardly facing interior surface of said reveal panel or lining panel when received in said recess, where

[0165] said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said recess.

[0166] As a result, the major surfaces of the IGU may be bigger in a skylight window according to the invention compared to prior art skylight windows of similar size, fitting a similarly sized skylight window aperture in the roof in which the skylight window is to be installed. Since the IGU more often than not insulates better than the sash and frame, this may provide improved overall insulation properties of the skylight window. Furthermore, the visible area of the total area of the skylight window, which can be seen through, may be increased, which provides improved view through the skylight window as well as increased inflow of daylight.

[0167] Furthermore, the positioning of the IGU may contribute to hiding parts of the window when seen through the IGU from an interior of a building in the installed position of the skylight window. E.g. positioning the IGU such that it is the only component extending into the opening in the roof structure visible from the interior of the buidling.

[0168] Said recess may comprise a second surface positioned opposite from said first surface for abutting an outwardly facing exterior surface of said reveal panel or lining panel when received in said recess. A distance between these first and second surfaces defines a width of the recess, which width usually corresponds to a width of an upper part of said lining panel in order to accommodate the lining panel upper part suitably in the recess. Said first peripheral side of the IGU may extend a distance of at least 0.5, 1, 1.5, 2, 2.5 or 3 times said width of said recess beyond said first surface of said recess.

[0169] The width of the recess may correspond to the width of said lining panel width. The width may be between 1-15mm. Preferably the width is 12.5mm,

[0170] A slanted portion extending away from the inside of the bottom surface of the second leg may form part of said recess. The slanted portion facilitates use of tilted (45 degree) lining panels and easier panel insertion.

[0171] The first and/or second surface of the recess may extend substantially in the height dimension and may be substantially linear.

[0172] The reveal panel or lining panel may alternatively be denoted an aperture panel or a window opening panel. It may serve the purpose of providing improved sealing and insulation towards the interior of the building. It may act as a barrier. It may provide a aesthetically pleasing transition between the skylight window and the roof structure as well as the interior of the building.

[0173] In an embodiment, at least one of the sash side members or frame side members comprises a thermal break.

[0174] In an embodiment according to the present invention, the supporting section comprises or constitutes a thermal break.

[0175] 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.

[0176] In an emodiment, a height direction extends from the exposed interior major surface towards the exposed exterior major surface in the closed position of the skylight windown, the first sash side member has a total sash height, and said first frame side member has a total frame height, in the height direction, said first frame side member comprising an interior part, the interior part in the closed position of the skylight window extending below the ex-posed interior major surface of the IGU and being located within the periph-ery of the interior pane, said interior part of the first frame side member hav-ing a total height in the height direction, said first sash side member comprising a supporting section extending beneath and supporting the exposed interior major surface of the IGU, the supporting section having a total height in the height direction. The total height of the supporting section may be 40% or less of the total sash height. Alternatively or addtionally, the total height of the supporting leg may be 20% or less of the total sash height.

[0177] A total height of the supporting leg of the first sash side member in the height direction may be less than 35%, less than 30%, less than 25%, less than 20%, less than 15%, less than 10%, less than 5%, less than 4%, less than 3.5%, less than 3.16%, less than 2.5%, less than 2%, less than 1.5%, less than 1% less than 1%, less than 0.5%, less than 0.1%, or less than 0.05% of the total sash height.

[0178] The total height of the interior part may be 25% or less of the total frame height. Alternatively or addtionally the total height of the interior part is 15% or less of the total frame height.

[0179] The total height of the interior part may be less than 24%, less than 23%, less than 22%, less than 21%, less than 20%, less than 19%, less than 18%, less than 17%, less than 16%, less than 15%, less than 14%, less than 13%, less than 12%, less than 11%, less than 10%, less than 9%, less than 8%, less than 7%, less than 6%, less than 5%, less than 4%, less than 3%, less than 2%, less than 1 %, or less than 0.5% of the total frame height.

[0180] In an embodiment the frame side members each have a respective outer side surfaces facing outwardly and away from the IGU. The outer side surfaces of the frame side members may be planar or flat surfaces.

The outer side surfaces may be substantially parallel with the height direction. This may provide a surface suitable for mounting attachments to the window frame, such as a curb flange.

[0181] In an embodiment, the skylight window 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.

[0182] 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.

[0183] 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.

[0184] In an embodiment, the skylight window further comprises a motor-driven actuator comprising an elongated lifting element connecting between 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,

a height direction extending substantially perpendicularly to at least one of the major surfaces of the IGU in a closed position of the skylight window, and a lateral direction extending in parallel with the exposed interior major surface of the IGU in the closed position of the skylight window,

wherein at least the top end of the lifting element is at or above a height level of the interior major surface of the IGU in the height direction in the closed position of the skylight window.

[0185] 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.

[0186] The actuator may be mounted such that at least a part of the top end of the elongated lifting element is at or above a height level of the exposed exterior major surface of the IGU in the height direction.

[0187] In the closed position of the skylight window, at least a top element of the motor-driven actuator may be at or above a height level of the interior major surface of the IGU in the height direction.

[0188] In the closed position of the skylight window, a majority of the motor-driven actuator may be at or above a height level of the interior major surface of the IGU in the height direction.

[0189] In the closed position of the skylight window, at least a top element of the motor-driven actuator may be at or above a height level of the exterior major surface of the IGU in the height direction.

[0190] The motor-driven actuator further may comprise an actuator housing, wherein, in the closed position of the skylight window, at least a part of said actuator housing may be at or above a height level of the exterior major surface of the IGU in the height direction.

[0191] In the closed and installed position of the skylight window there may be a maximum frame distance in the height direction from a top of said actuator housing

to an interior surface of the frame of the skylight window, said maximum frame distance being 100 mm or less.

[0192] The sash may have a supporting leg extending beneath and supporting the exposed interior major surface of the IGU, and in the closed position of the skylight window at least a part of the motor-driven actuator may be at or above a height level of the supporting leg in the height direction.

[0193] The frame may comprise a first frame side member having an inner side facing towards the IGU in the lateral direction and an outer side facing in an opposite direction and away from the IGU in the lateral direction, and a lining panel protrusion protruding away from the IGU, the lining panel protrusion comprising a first surface for abutting a surface of a reveal panel or lining panel so as to position the reveal panel or lining panel, and the motor-driven actuator is positioned between the lining panel protrusion and the outer side of the first frame side member in the lateral direction.

[0194] In an embodiment, a transparent central area of the IGU extends, in said outward direction, beyond said first surface of said recess.

[0195] As is known to the skilled person, IGUs typically comprise a transparent central area surrounded with non-transparent areas at peripheries of the IGU where the glazing panels are attached to each other using sealing members and/or supporting members that typically extend along each peripheral side of the IGU.

[0196] In an embodiment, said first peripheral side of the IGU is located at, and a transparent central area of the IGU potentially extends, a distance in said outward direction from said first surface of said recess equal to or above 5, 10, 15, 20, or 25 percent of an extent in the outward direction of the secondary leg between said first surface of said recess and an outwardly outermost surface of said secondary leg.

[0197] This increases the relative area of IGU in regards to the skylight window. The IGU is typically the best insulating component of a skylight window, this improves the insulation properties of the skylight.

[0198] In an embodiment an upper part of a reveal panel or lining panel is received in said recess, said first surface of said recess abutting said inwardly facing interior surface of said reveal panel or lining panel.

[0199] 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 roof structure and the skylight window.

[0200] 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.

[0201] A person skilled in the art will appreciate that any one or more of the above embodiments and/or developments and/or options may be combined with each other to form further embodiments of the present invention.

Detailed description

[0202]

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 perspective 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 along the line II-II of Fig. 1, thus corresponding to Fig. 2,

Fig. 4 is a cross-sectional side view taken along the line IV-IV of Fig. 1 showing another detail of the 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,

Fig. 6 is a cross-sectional view similar to that of Fig. 2 showing an alternative embodiment of the first sash side member of the skylight window 1,

Fig. 7 is a cross-sectional view similar to that of Fig. 6 showing an alternative embodiment of a first sash side member of a skylight window 1,

Fig. 8 is a cross-sectional view similar to that of Fig. 3 showing an alternative embodiment of a first frame side member of the skylight window according to Fig. 1.

Fig. 9 is a perspective view from above of an embodiment of the skylight window 1 according to the invention installed on a roof, where a part of the skylight window has been removed for the purpose of illustration.

[0203] Figs. 1 and 2 show 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 and covering an opening O in the roof. The skylight window 1 comprises a weather shield 3 and a window portion 4, which includes a transparent insulting glazing unit 5, abbreviated IGU, a sash 6 supporting the IGU 5, and a frame 7. The weather shield 3 comprises a transparent weather shield pane 8 and a skirt 9, which cover the sash and the IGU.

[0204] In this embodiment, both the entire sash 6 and the entire frame 7 are positioned above an upper roof surface, also denoted the exterior roof surface. The skylight window 1 may, however, also be positioned so that a part of the frame 7 and the sash 6 are positioned below the exterior roof surface level.

[0205] The flat roof 2 shown here has a roof inclination of less than 5 % in relation to horizontal. The skylight window may however also be installed in an inclined roof.

[0206] The IGU 5 has an exposed interior major surface 5b facing downwards towards an interior of the build-

ing in the shown installed position of the skylight window 1 and exposed exterior major surface 5g facing in the opposite direction towards the weather shielding pane 8 and the exterior. The interior and exterior exposed major surfaces of the IGU 5 are substantially parallel with a plane defined by the roof surface, i.e. the exterior roof surface level.

[0207] The frame 7 comprises four frame side members of which two 10, 11 are visible in Fig. 1, and one 10 is visible in Fig. 2. Each frame side member is associated with one of four corresponding sash side members of which and one 14 is visible in Fig. 2. The frame side member 10 is associated with the sash side member 14 and both extend a longitudinal direction L along a first peripheral side 5a of the IGU 5. The four frame side members form a substantially rectangular shape and, similarly, the four sash side members form a substantially rectangular shape. In this embodiment each frame side member is positioned at an outer side of a respective associated one of the four sash side members, i.e. on the side facing away from the opening O and the IGU, so that the sash fits into the frame and the frame 7 encloses the sash 6 in the closed position of the skylight window 1.

[0208] The frame side member 10 is an embodiment of the first frame side member of the skylight window according to the invention. The sash side member 14 is an embodiment of the first sash side member according to the invention.

[0209] The window sash 6 supports the IGU 5 and is connected to the window frame 7 via hinges (not shown in Figs 1-3) so that it is movable in relation to the 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. It is, however, to be understood that the invention is not limited to openable windows or to windows including both a moveable sash and a stationary frame.

[0210] Fig. 3 shows the same cross-sectional view as Fig. 2, but in a two-dimensional side view.

[0211] In relation to the sash side member 14, a length dimension is defined as a dimension in which said longitudinal direction L extends, a height dimension is defined as a direction perpendicular to the length dimension and to the interior major surface of the IGU, and a width dimension is defined as a dimension perpendicular to the height and length dimensions. The width and length dimensions are parallel to the interior major surface of the IGU. The downward direction is the direction in the height dimension towards which the interior major surface 5b of the IGU 5 faces. The upward direction is a direction opposite to the downward direction. An inward direction is a direction in the width dimension towards a centre of the IGU 5 or towards the opposing sash side member 13, and the outward direction is a direction opposite to the inward direction.

[0212] As may be seen, the frame side member 10 in this embodiment comprises a bottom surface 10a, which is level with the exterior roof surface of the roof 2. This bottom surface 10a faces downwards and comprises a lining panel protrusion 10e, which together with a second protrusion next to the protrusion 10 forms a recess 10b, which is an empty spacing that accomodates an upper part or upper end 50a of a reveal panel or lining panel 50 in the installed position of the skylight window 1. 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 the roof 2 so as to cover side surfaces of the opening O in the roof, which allows daylight to reach the interior of the building.

[0213] The recess 10 comprises a first surface 10c that abuts an inwardly facing surface of the lining panel 50. The IGU extends beyond said first surface 10c of the recess 10 in the width direction so that the peripheral side 5a of the IGU 5 is located on the outer side of the recess in the width direction.

[0214] The recess 10b 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 10 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.

[0215] 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 towards the exterior, i.e. upwardly in Fig. 1, in relation to the window portion 4. In other embodiments, a flat pane may be used to for the weather shield 3. The weather shield pane 8 is transparent and here comprises only one single layer of glazing made for example of hardened glass.

[0216] The slightly curved weather shield pane 8 extends over the entire roof opening O, which opening the skylight window 1 is positioned to cover.

[0217] The shield pane 8 is surrounded by the weather shield skirt 9, which extends on an outer side of all four sides of the frame 7, i.e. of the respective frame side members, see Fig. 1. The weather shield 3 is provided as a unitary structure, which is separate from and detachably attached to the window portion 4, specifically to the sash 6 so as to move together with the sash 6 during the opening and closing movement thereof.As is seen in Figs 2 and 3, the sash side member 14 has a first leg 15 extending next to and along the first peripheral side 5a of the IGU 5, and a second leg 16 projecting from a lower end 15a of the first leg 15 in the lateral or width direction inwards underneath the IGU 5. As can also be seen, the exposed exterior major surface 5g of the IGU 5 is posi-

tioned at a distance from the lower end 15a of said first leg, which constitutes less than 80 % of the total height of the first leg 15..

[0218] The first sash side member 14 further has a third leg 17 projecting from an inner end 16b of the second leg 16 in a downwards direction away from the interior major surface 5b of the IGU 5 to provide a lower supporting surface 17a which in the closed position of the window 1 rests on a corresponding upper resting surface 27a of the frame side member 10. The direction away from the interior major surface 5b of the IGU 5, in which direction the third leg 17 projects, extends substantially in the height dimension and extends downwards, i.e. towards the interior the building in the installed position of the skylight window 1.

[0219] At an upper end the third leg 17 includes a resting surface 16a on which said interior major surface 5b of the IGU 5 rests. The upper resting surface 16a of the third leg 17 is provided as an upper resting surface 16a of a sealing member 22, which is manufactured from a resilient material and extends in the longitudinal direction L over substantially the entire length of the first peripheral side 5a of the IGU 5 or of the third leg 17. The sealing member 22 is a separate part attached in a slot of the third leg 17. Thus, not an entire upper surface of the third leg 17 constitutes the upper resting surface 16a of the third leg 17. The upper resting surface 16a and/or the sealing member may alternatively be moved further to the left in Fig. 3 and instead form part of the second leg 16.

[0220] In this embodiment, all four sash side members have the structure as described for the sash side member 14 and the corresponding or associated four frame side members have the same structure as the frame side member 10, but this need not always be the case.

[0221] The lower supporting surface 17a of the third leg 17 abuts an abutment element 78 in the closed position of the window 1, which abutment element 78 is a separately provided element forming part of the frame 7 and which is attached to the remaining parts of the frame 7. This abutment element 78 is provided at or in an inner corner of the frame side member 10.

[0222] In this embodiment, the third leg 17 comprises the only supporting point of the sash side member 14, which rests on the frame 7 in the closed position of the skylight window 1. Similarly, corresponding third legs of the remaining three sash side members each comprises only one supporting point for the respective sash side member on the frame 4 in the closed position of the skylight window 1, except for the contact provided by the hinges.

[0223] Other contact points or contact surfaces between the sash 6 and frame 7 in the closed position of the skylight window 1, which contact surfaces are not carrying any substantial amount of the weight of the sash 6 (and IGU and weather shield 3) in the closed position of the skylight window 1, may include not shown sealing members between associated sash and frame side members. These sealing members may be attached in holding members 18, 19, 20 of the sash side member 14 as shown in Fig. 3. As is best seen in Fig. 3, the IGU 5 in a conventional manner comprises three layers of glazing 5c, 5d, 5e positioned at a respective distance from each other to form respective spacings or cavities between them. These spacings are in a conventional manner filled with a gas to improve insulation. The lowermost surface 5b constituting the exposed interior major surface is a lower major surface of the lowermost glazing layer 5e. Sealing and supporting members 23, 24 are provided at the peripheral side 5a of the IGU 5 between the layers 5c, 5d, 5e of glazing so that outer sides of the layers 5c, 5d, 5e and the sealing and supporting members 23, 24 define a side or lateral surface 5f of the IGU 5 together with the end surfaces of the glazing layers. This side surface is substantially plane and extends substantially in the height dimension shown in Fig. 3.

[0224] The IGU 5 has a rectangular shape and has further second to fourth peripheral sides that each extends along a corresponding respective sash and frame side member in a similar manner as described above for the sash side member 14.

[0225] The first leg 15 is positioned adjacent to the side surface 5f of the first peripheral side 5a of the IGU 5. The second 16 and third 17 legs are positioned adjacent to the interior major surface 5b of the IGU 5. The first leg 15 extends along the side surface 5f, the latter having an angle to the interior major surface 5b of the IGU 5 of approximately 90 degrees.

[0226] As can be seen in Fig. 3, the first leg 15 extends more than 3 times longer in the height dimension than in the width dimension. The second leg 16 extends more than 3 times longer in the width dimension than in the height dimension. The third leg 17 extends more than 3 times longer in the height dimension than in the width dimension. The second leg 16 extends about 2 times longer in the width dimension than the first leg 15 and about 3 times longer in the width dimension than the third leg 17. The extent in the length dimension of the legs 15, 16, 17 is substantially equal to the extent of the first peripheral side 5a of the IGU 5 in the length dimension, but preferably slightly longer in order to allow them to be interconnected at the corners of the sash. The extents measured in this context are a total or largest extent of the leg 15, 16, 17 in question in the relevant dimension. The second leg 16 projects from a surface 15b of the first leg 15, which surface 15b extends substantially in the height dimension and faces the IGU 5, and the third leg 17 projects from a surface 16d of the second leg 16, which surface 16d extends substantially in the height dimension and is substantially perpendicular to the interior major surface of the IGU.

[0227] An angle between the first 15 and second 16 legs and between the second and third legs 17 is substantially 90 degrees, respectively.

[0228] The first leg 15 is formed integrally with the second leg 16, and the second leg is formed integrally with the third leg 17.

[0229] The inner or distal end 16b of the second leg 16 is positioned oppositely from an outer or proximal end 16e of the second leg 16, said outer end 16e being connected to the first leg 15 at a location from which the second leg 16 projects.

[0230] The first 15 and third 17 legs project in substantially opposite directions from the second leg 16, these opposite directions both being substantially in the height dimension.

[0231] The first leg 15 extends about 100 % of the distance between said exterior and interior major surface of the IGUs in the in the height direction from the exterior major surface of the IGU, i.e. having a height which is about twice the thickness of the IGU.

[0232] The first leg 15 does not extend to cover said exterior major surface of said IGU. No part of the sash 14 and frame 10 extends along the exterior major surface of the IGU 5. In the latter context, the fixation member 30 mentioned below is not considered part of the sash side member 14.

[0233] The first frame side member 10 comprises a primary leg 25 with a surface 25b extending next to and along a side surface 15c of the first leg of the sash side member 14, said side surface 15c facing substantially away from the first peripheral side 5a of the IGU 5. The primary leg at a lower end thereof is connected to an outer end of a secondary leg 26 extending along a surface 16f of the second leg 16 of the sash side member 14, which surface 16f faces substantially away from the interior major surface 5b of the IGU 5. The lower end of the primary leg is positioned below the interior major surface 5b of the IGU 5. The second leg 16 extends as far as or somewhat farther than the secondary leg 26 inward in the width direction. A stepped configuration of adjacent surfaces of the first sash side member 14 and first frame side member 10 is thus achieved by means of the stepped configuration of the first sash side member 14 as described and an associated stepped structure of the first frame side member 10. This stepped structure provides a labyrinth type structure acting to prevent dirt, water and contaminants from entering the interior of the building from an exterior of the building.

[0234] In a cross section perpendicular to the length dimension or longitudinal direction L all legs 15, 16, 17, 25, 26, 27 may each be substantially shaped as a rectangle. However, in this embodiment the first leg 15 of the sash side member is substantially shaped as a trapezoid or a trapezium, a surface 15c of the first leg 15 in the closed position of the window 1 extending along the surface 25b of the primary leg 25, both surfaces being inclined with about 5 degrees with respect to the height dimension. This inclination is in an outward and upward direction in Fig. 3. A surface 15d of the first leg 15 extends along an upper surface 26b of the secondary leg 26 extends substantially in the width dimension. The surface 26b is substantially parallel to the surface 15d in the closed position of the window. The surface 15d of the first leg 15 connects the two surfaces 15b, 15c of the first leg 15. The third leg 17 comprises a side surface 17b facing a surface 26a of the secondary leg 26 and extends at an angle of about 5 degrees in relation to the height dimension. The surfaces 15c, 25b, 17b, 26a extend substantially in parallel in the closed position of the window 1.

[0235] The second leg 16 comprises a first lateral side surface 16g facing and attached to the first leg 15 and extending substantially in the height dimension. The opposite, substantially parallel side surface 16d faces and is attached to the third leg 17.

[0236] In this embodiment, all sash and frame side members each have a substantially uniform cross section along a length of these in the longitudinal direction L, except possibly for holes being provided for the attachment of a locking assembly, hinges or the like. Local recesses may also be provided for accommodating hinges and the like.

[0237] A base structure of the frame and sash side members is substantially of fiber-reinforced PVC. This base structure is a grid or hollow core structure with several hollow inside spacings or cavities surrounded by thin layers or plates of PVC, which plates are connected to each other at corners thereof such as to form a shell structure surrounding the spacings. Two of the core spacings of the first frame side member each comprise an insulating stiffening filler member 25a, 25b, see Fig. 3, which consist of a foamed polymer material. The plates of material of the sash side member 14 and the frame side member 10 are extruded each in one piece, these pieces subsequently respectively being attached to the other of the sash and frame side members, respectively, at ends thereof to form the sash 6 and frame 7.

[0238] The first leg 15 comprises on the surface 15b two grooves 28, 29, the first groove 28 being positioned at a first distance from the interior IGU plane, the second groove 29 being positioned at a second, smaller distance from the interior major surface of the IGU. The first and second grooves 28, 29 are adapted for receiving a fixation member 30, which can be attached to or snap-locked to either one of the two grooves 28, 29, abutting the exterior major surface of the IGU 5 so as to hold the IGU 5 along said first peripheral side 5a thereof, especially in the upward direction. The fixation member 30 is positioned in the groove 28 in the shown embodiment. Hereby the IGU 5 may be exchanged with an IGU of smaller thickness by switching the fixation member 30 to the other groove 29. The fixation member 30 is manufactured of a plastic and sealing material and comprises a projection adapted to be in abutment with the upper or exterior major surface 5g of the IGU 5 such as to hold this in place against the upper resting surface 16a. The fixation member 30 extends substantially along an entire length (in the longitudinal direction L) of the first peripheral side 5a of the IGU 5. Similar fixation members are attached to similar grooves of the one, two or three of the other sash side members at the other three peripheral sides of the IGU 5.

[0239] The primary leg 25 extends about 50 percent

of a distance between said exterior and interior major surface of the IGUs, i.e. the thickness of the IGU 5, in the upward direction from the exterior major surface 5g of the IGU 5.

[0240] A chain drive or the like (not shown) may be provided connecting the sash 6 and frame 7 for assisting in opening and closing the skylight window 1.

[0241] In this embodiment, the sash side member 14 has a fourth leg 31 projecting from an upper end 15e of the first leg 15 in the outward direction away from the IGU 5 in the width dimension. The fourth leg 31 is in the closed position of the window 1 positioned above the primary leg 25 of the frame side member 10 as shown in Figs 2 and 3. A width of the fourth leg 31 substantially corresponds to a width of the primary leg 25.

[0242] As is the case for the legs 15, 16, 17, the fourth leg 31 has a flat shape so that an upper surface thereof forms a further upper step surface similar to and potentially extending substantially in parallel with the step surface 16c of the second leg 16.

[0243] The fourth leg 31 has an oblong shape in the width dimension and extends more than 3 times longer in the width dimension than in the height dimension. The extent in the length dimension of the fourth leg 31 is substantially equal to about equal to or somewhat longer than the extent of the first peripheral side 5a of the window pane 5 in the length dimension.

[0244] An angle between the first 15 and fourth 31 is substantially 90 degrees.

[0245] The fourth leg 31 is formed integrally with the first leg 15.

[0246] The fourth and second legs 31, 16 extend or project substantially in parallel.

[0247] In the cross section shown the fourth leg 31 is substantually shaped as a rectangle or, more specifically, as a trapezoid or a trapezium, a surface 31b of the fourth leg 31 extending substantially along an upper surface 25c of the primary leg 25 being inclined with about 5 degrees with respect to the width dimension and being parallel to the upper surface 25c. This inclination is in the downward and outward direction in Fig. 3. The fourth leg 31 further comprises a first imaginary lateral side surface 31c facing and attached to (integral with) the first leg 15 and extending substantially in the height dimension, and an opposite, substantially parallel side surface 31d that faces in the outward direction. The upper surface 31a of the fourth leg 31 extends substantially in the width dimension and connects the two parallel surfaces 31d, 31c. Note that when the surfaces in question comprise slots, projections, indentations or the like, the dimension in which the surface is said to extend is an overall surface without taking such irregularities into account.

[0248] The fourth leg has an overall or total height in the height dimension less than the thickness of the IGU 5.

[0249] The skirt 9 of the weather shield 3 is attached to each of the fourth legs of the four sash side members.

[0250] As can be seen in Fig. 3, the IGU 5 extends in the width dimension from an inner surface 17c of the third leg 17 towards the first leg 15 to farther than half of an accumulated width of the first, second and third legs 15, 16, 17. This accumulated width is equal to a total extent of the legs 15, 16, 17 in the width dimension.

[0251] The interior major surface of the IGU is positioned at a distance of less than 40 % of the total height of the first leg 15 from said lower end 15a of said first leg 15, more specifically the lower surface 15d.

[0252] The third leg 17 has an oblong shape in the height dimension so that the height of the third leg 17 is more than 3 times longer than the width thereof. The third leg 17 extends in the height dimension more than 4 times a height of the second leg 16. The third leg 17 has a height of about 0.5 times a height of the first leg 15. The height of the third leg 17 is about equal to the width of the second leg 16.

[0253] The secondary leg 26 of the frame side member 10 comprises a side surface 26a, which extends substantially in the height dimension, but with a small inclination, and which faces, and is placed next to and extends along the side surface 17b of the third leg 17. The side surface 26a faces substantially in the outwards direction. The side surfaces 17b, 26a are substantially parallel to each other in the closed position of the window, are inclined with about 5 degrees in relation to the height dimension and extend in the length dimension along substantially a total extent of the sash and frame side members 10, 14 in the longitudinal direction L.

[0254] The frame side member 10 comprises a tertiary leg 27, which comprises the abutment element 78 with the corresponding upper resting surface 27a of the frame side member 10 on which the lower supporting surface 17a of the third leg 17 rests in the closed position of the window.

[0255] The tertiary leg 27 is in the closed position of the window 1 positioned below and partly to the outward side of the third leg 17. A width of the tertiary leg 27 is about half of a width of the third leg 17.

[0256] The tertiary leg 27 is also substantially plate-shaped and has a flat shape, an upper surface thereof on which the abutment element 78 is positioned forming a further step surface 27a similar to and potentially extending substantially in parallel with the step surfaces 25c, 26b of the primary 25 and secondary 26 legs.

[0257] The tertiary leg 27 has an oblong shape in the height dimension and extends more than 3 times longer in the height dimension than in the width dimension. The extent in the length dimension of the tertiary leg 27 is substantially equal to the extent of the first peripheral side 5a of the IGU 5 in the length dimension. The tertiary leg 27 projects from a surface of the secondary leg 26, said surface extending in the width dimension and facing inwardly.

[0258] An angle between the secondary leg 26 and the inward direction in which the tertiary leg 27 extends is substantially 90 degrees.

[0259] The part of the tertiary leg 27 that does not include the abutment element 78 is formed integrally with

the secondary leg 26.

[0260] The tertiary leg 27 and third leg 17 extend substantially in parallel in the closed position of the window.

[0261] In the cross section shown in Fig. 2 the tertiary leg is substantially shaped as a trapezoid or a trapezium, an inwardly facing surface 27b of the tertiary leg 27 being inclined about 5 degrees with respect to the height dimension. This inclination is in the inward and upward directions. The tertiary leg 27 further comprises a lateral side surface 27c facing and attached (integral with) a lower part of the side surface 26a of the secondary leg 26 and extending substantially in the height dimension. The upper surface 27a of the tertiary leg 27 extends substantially in the width dimension and connects the two lateral side surfaces 27b, 27c thereof.

[0262] An inwardly facing interior surface 50 located below the interior major surface 5b is provided in the form of the surfaces 17c, 27b. An angle α (Fig. 2) formed between said inwardly facing interior surface 50 and the interior major surface 5b or the interior major surface of the IGU at an interior corner formed between said surfaces is about 90 or 95 degrees.

[0263] The tertiary leg 27 has a height in the height dimension less than the thickness of the IGU and less than that of the first, third, primary and secondary legs 15, 17, 25, 26.

[0264] The abutment element 78 is provided as part of the tertiary leg 27 so that the abutment element 78 provides the upper resting surface 27a of the frame side member 10 on which the lower supporting surface 17a of the third leg 17 rests in the closed position of the skylight window 1.

[0265] The abutment element 78 extends along substantially a total length of the frame and sash frame side members 7, 6 and substantially along a total length of the third leg 17 and the lower supporting surface 17a of the third leg 17, these lengths being in the length dimension.

[0266] The abutment element 78 is a separate part attached to the remaining parts of the tertiary leg 27. The abutment element 78 comprises the resting surface 27a in the form of an abutment surface 27a, on which the supporting surface 17a of the third leg 17 rests in the closed position of the skylight window 1. The abutment surface 27a is in a position, in which the third leg 17 does not rest on it, inclined with an angle of about 15 degrees with respect to the height dimension and extends substantially linearly. When the sash side member 14 rests on the abutment element 78, the abutment element 78 is somewhat deformed since it to some extent gives in to the weight of the sash 6 as shown in Fig. 2. This inclined abutment surface 27a helps positioning and centering the sash 6 in the frame 7 during the closing movement. The supporting surface 17a of the third leg 17 comprises part of the outer side surface 17b of the third leg 17 as well as part of a lower surface 17d of the third leg 17, these outer and lower surfaces 17b, 17d of the third leg 17 forming a lower, outer corner of the third leg 17. Hereby the third leg 17 and thus the sash side member 14 are held by the abutment element 78 both in the width dimension (outwardly) and in the height dimension (downwardly). Holding the sash side member 14 in the width dimension helps centering the sash 6 in the frame 7 in the closed position of the skylight window 1, especially since all sash and frame side members are provided with a similar configuration.

[0267] The abutment element 78 forms a seal covering an opening or slot that would otherwise be provided between the third leg 17 and the tertiary leg 27 in the closed position of the skylight window 1.

[0268] The abutment element 78 is of an elastic, plastic and sealing material.

[0269] Similar abutment elements are provided in a similar manner on the remaining frame side members. The abutment elements form the only or substantially the only resting point or resting surface of the sash 6 (including the window pane 5 and the weather shield 3) on the frame 7 in the closed position of the skylight window 1.

[0270] Roofing felt (not shown) may in a conventional manner be positioned to seal between outer surfaces of the frame 7 and a roof opening in the roof 2, which opening the window 1 is positioned to cover. These outer surfaces of the frame 7 are here formed by a curb flange of the frame 7. In Fig. 3 a curb flange 40 is shown, which curb flange 40 has an overall triangular shape and forms part of the frame side member 10. Similar curb flanges are here provided at the remaining frame side members.

[0271] Fig. 4 is a cross-sectional side view showing a detail of the skylight window 1 according to Fig. 1 along the line IV-IV of Fig. 1, the cross sectional plane extending normal to the length dimension and being the same as in Fig. 2 except for showing the frame side member 18 opposed to the frame side member 10 and the sash side member 13 opposed to the sash side member 14. Note that the view of Fig. 2 only shows the elements of the window 1 which are visible or present in the cross-section, i.e. which are cut through, whereas in the view of Fig. 4 also elements behind the cross section are visible.

[0272] In Fig. 4 a conventional rotary hinge 21 of the window 1 is shown, which connects upper parts of the frame side member 18 and the sash side member 13 with each other so as to enable a rotary movement of the sash 6 (and IGU 5 and weather shield 3) in relation to the frame 7 along a rotary axis in a conventional manner. This rotary movement opens the window 1 in a conventional manner. If installed in an inclined roof the skylight window can be either top-hung, bottom-hung or side-hung

[0273] The rotary hinge 21 establishes a contact point between sash 6 and frame 7, which also carries part of the weight of the sash 6 in both the closed and especially in the open position of the skylight window 1.

[0274] Fig. 5 shows an alternative embodiment of the frame side member 10. In Fig. 5 as well as in the following figures the same reference numbers as in Figs 1-4 will be used for features having substantially the same func-

tion even if not they are not structurally identical.

[0275] This embodiment is different from the embodiment of Figs 1 to 4 only in that it includes a cover leg 32. The cover leg 32 covers the third leg 17 of the sash side member in the closed position of the skylight window 1 so as to hide the third leg 17 completely when seen from the interior of the building.

[0276] The cover leg 32 extends in the longitudinal direction along substantially the entire length of the first leg 17 and/or the sash side member 14.

[0277] The cover leg 32 extends from the inward surface 27b of the tertiary leg 27 of the frame side member. The cover leg 32 and the secondary 26 and tertiary 27 legs of the frame side member 14 establish a longitudinally extending groove 33 with the secondary leg 26 and the cover leg 32 defining sides thereof and the tertiary leg 27 defining a bottom thereof. The third leg 17 of the sash side member 14 is inserted in this groove 33 when the sash 6 moves to the closed position of the skylight window 1.

[0278] Fig. 6 shows an embodiment where the sash side member 14 comprises a first leg 15 extending in a substantially upwards direction with a second leg 16 projecting in an inwards direction from a lower end of the first leg 17. The second leg 16 comprises a supporting section 72 which is adhered to the exposed exterior major surface 5g of the IGU 5 by an adhesive 74. The adhesive may for example be a silane-terminated polyurethane (SPUR) adhesive, but may a silyl modified-polymer (SMP) adhesive or any other suitable adhesive may also be used. The adhesive may also be provided as an adhesive tape. A third leg 17 projects from an upper end of the first leg 15 in an outwardly direction where a fourth leg 31 projects from an outer end of the third leg 17 in an upwards direction.

[0279] As may be seen, the legs of the sash side member 14 are here plate-shaped with not internal spacings as in the embodiments in Figs 1-5, which makes the sash side member comparatively slim.

[0280] The window is here provided with a curb flange 40 that can be attached and detached to suit the given installation scenario, such as installation in a flat or inclined roof, or installation of two or more skylight windows 1 closely adjacent to each other in which case there may not be room for the curb flange.

[0281] The exposed interior major surface 5b of the IGU 5 abuts a sealing element 22 on the frame side member 10. That is, sealing between the IGU 5 and the frame side member 10 is achieved by a sealing element 22 sealing directly against the IGU 5 and not against the sash side member as in Figs. 1-5. This allows the skylight window 1 to be provided without a sash side member extending along the exposed interior major surface 5b of the IGU 5. Thus the IGU 5 is positioned lower in the window structure i.e. closer to the interior of the building in which the window 1 is installed.

[0282] The first surface 10c of the lining panel protrusion 10e together with a second surface 10d of the first frame side member form the sides of a lining panel recess 10b, which is an empty spacing that accommodates an upper part or upper end of a reveal panel or lining panel (not shown) in the installed position of the skylight window 1.

[0283] Fig. 7 shows another embodiment where a second leg 16 of the first sash side member 14 supports the IGU 5 at its exposed interior major surface 5b and the first leg 15 extends along the peripheral sides of the IGU.

[0284] Fig. 8 shows a cross-sectional view of an embodiment of a skylight window 1. Unless otherwise stated in the in the following parts or features of the embodiment shown in Fig. 8 are similar or identical to previous embodiments. In Fig. 8 the IGU 5 is depicted in a schematic manner, which may represent an IGU 5 as shown in any of the previous embodiments. In Fig. 5 the interior surface 10a has a lining panel protrusion 10e protruding away from the IGU 5, with a first surface 10c for abutting a lining or reveal panel (not shown). A first insulation member 81, potentially consisting substantially of extruded polystyrene (EPS), is provided between the primary leg 25 of the first frame side member and the first peripheral side 5a of the IGU 5, in the shown closed position of the skylight window. The first insulation member 81 is in contact with a first 10x and a second surface 10f of the frame side member 10 and is positioned between the first frame side member 10 and the first sash side member 14 in the height direction. Sealing members 14a fastened on the sash seals gaps between the first frame side member 10 and the first sash side member. A cover 80 on the sash creates a funnel like effect for the skylight window, directing light from the exterior towards the interior with an angled surface relative to the height direction. The weather shield 3 is substantially flat and the weather shield comprises a weather shield skirt 9 along the peripheral sides of the weather shield pane 8.

[0285] The first frame side member 10 has a total frame height HF extending in a height direction from the protrusion 1e of the first frame side member 10 to a top surface 10t of the first frame side member 10, the height direction being substantially perpendicular to at least one of the major surfaces 5b, 5g of the IGU 5 in the shown closed position of the skylight window 1. The first frame side member 10 further has an interior part 79 extending below the exposed interior major surface 5b of the IGU and being located within the periphery of the interior pane 5d, said interior part having a total height HI in the height direction. Similarly, the first sash side member 14 having a total sash height HS in the height direction. The first sash side member 14 further has a supporting leg 79 extending beneath and supporting the exposed interior major surface 5b of the IGU 5. The total height of the supporting leg 79 is denoted HL. The height HL of the supporting section 72 in the embodiment shown in Fig. 8 is about 3 % of a total height HS of the of the first sash side member. The height HI of the interior part 79 in the embodiment shown in Fig. 8 is about 28 % of a total height HF of the of the first frame side member.

[0286] Fig. 9 shows a perspective view from above of an embodiment of the skylight window 1 according to the present invention installed on a roof 2, where a part of the window has been removed for the purpose of illustration. The window frame 7 and the window sash 6 correspond to the ones shown in Fig. 5, unless otherwise stated in the following. The weather shield pane 8 has been removed to provide an unobstructued view. Fig. 9 also shows a screening device 34, which is mounted in a spacing delimited in the width direction W by the first 14 and second sash side members. It is to be understood that the second sash member is 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.

[0287] Towards the interior the spacing is delimited in the embodiment of Fig. 9 by the step surface 17c formed by the third leg 17 of the sash side member 14. The step surface 17c thus serves as a screening device support section extending from the first leg 15. 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 the second sash side member for covering the IGU 5. The screening device 34 might, however, also be another type of blind or a shutter. In Fig. 8, also 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.

[0288] The first frame side member comprises a lining panel recess 10b for receving a lining panel (not shown).

Claims

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

   a window frame (7) having four frame side members,
   a window sash (6) having four sash side members supporting an insulating glazing unit (IGU) having multiple layers of glazing, said window sash being movable in relation to the window frame between an open and a closed position of the skylight window, and
   a weather shield (3) attached to the sash so as to protect a window portion (4) of the skylight window, the window portion comprising the sash, frame and IGU,
   a first of the frame side members being associated with a first of the sash side members, said first frame and sash side members extending in a longitudinal direction along a first peripheral side of the IGU,
   said IGU having an exposed interior major surface (5b) for facing an interior of said building in an installed position of the skylight window, said interior major surface extending in an outward direction away from a center of the IGU, an inward direction extending in a direction opposite to said outward direction,
   said IGU further having an exposed exterior major surface (5g) for facing in an exterior direction which is opposite of said interior of said building in said installed position of the skylight window,
   said exterior major surface extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface of the IGU,
   said first frame side member having a primary leg (25), which in said closed position is positioned lateral to and extends along an outwardly facing surface of said first peripheral side of the IGU, and a secondary leg (26), which in said closed position extends lateral to and along a part of said interior major surface of the IGU,
   characterized in that
   said primary leg (25) extends as far as or farther in said upward direction than a location of said exterior major surface of the IGU.

2. A skylight window according to claim 1, wherein said first sash and/or frame side member(s) provide an inwardly facing interior surface (50, 17c, 27b) located below the interior major surface of the IGU, an angle formed between said inwardly facing interior surface and said interior major surface of the IGU at an interior corner formed between said surfaces being equal to or less than 110 degrees, preferably equal to or less than 105, 100, 95, 90, 85 or 80 degrees.

3. A skylight window according to claim 1 or 2, wherein said frame and sash side members comprise or are made substantially of one or more plastic polymer materials, preferably said frame side members comprise or are made substantially of polyurethane, and/or preferably said sash side members comprise or are made from a thermoset plastic polymer material comprising fibers.

4. A skylight window according to any one of the previous claims, wherein said primary leg extends at least 5, 10, 15, 20, 30, 40, 50, 70, 90, or 100 percent of a distance between said exterior and interior major surface of the IGUs in said upward direction from said exterior major surface of the IGU.

5. A skylight window according to any one of the previous claims, wherein said first sash side member

has a first leg (15), which extends substantially in the upward direction.

6. A skylight window according to claim 5, wherein said first leg (15) extends lateral to said outwardly facing surface of said first peripheral side of the IGU, and wherein the primary leg (25) in said closed position extends lateral to and along an outwardly facing surface of said first leg (15).

7. A skylight window according to any one of claims 5 to 6, wherein the first sash side member further comprises a second leg (16), which may potentially project from a lower end of said first leg (15) so as to extend along part of said interior major surface of the IGU to support the IGU, said second leg (16) potentially resting on an upper abutment surface of said secondary leg (26) in said closed position of said window.

8. A skylight window according to any one of claims 5 to 7, wherein said exterior major surface of the IGU is positioned at a distance of less than 80 % of a total height of the first leg from a lower end of said first leg.

9. A skylight window according to any one of the previous claims, wherein a lower end of said primary leg is positioned below said interior major surface of the IGU.

10. A skylight window according to any one of the preceding claims,said secondary leg having an bottom surface facing in a direction away from the interior major surface of the IGU, which bottom interior surface comprises a lining panel protrusion (10e) located lower than the exposed interior major surface of the IGU in the height direction,
wherein the lining panel protrusion protrudes away from the IGU, the lining panel protrusion comprising a first surface (10c) for abutting an inwardly facing surface of said reveal panel or lining panel when received in by said protrusion,
where said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said protrusion.

11. A skylight window according to any one of the preceding claims, wherein
a height direction extends from the exposed interior major surface towards the exposed exterior major surface in the closed position of the skylight window down,
the first sash side member has a total sash height, and said first frame side member has a total frame height, in the height direction,
said first frame side member comprising an interior part, the interior part in the closed position of the skylight window extending below the exposed interior major surface of the IGU and being located within the periphery of the interior pane, said interior part of the first frame side member having a total height in the height direction,
said first sash side member comprising a supporting section extending beneath and supporting the exposed interior major surface of the IGU, the supporting section having a total height in the height direction.

12. A skylight window according to claim 11, wherein the total height of the supporting section is 40% or less of the total sash height, preferably the total height of the supporting leg is 20% or less of the total sash height.

13. A skylight window according to any one of claims 11 to 12, wherein the total height of the interior part is 25% or less of the total frame height, prefarably the total height of the interior part is 15% or less of the total frame height.

14. A skylight window according to any one of the preceding claims, further comprising a motor-driven actuator comprising an elongated lifting element connecting between 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, a height direction extending substantially perpendicularly to at least one of the major surfaces of the IGU in a closed position of the skylight window, and a lateral direction extending in parallel with the exposed interior major surface of the IGU in the closed position of the skylight window,
wherein at least the top end of the lifting element is at or above a height level of the interior major surface of the IGU in the height direction in the closed position of the skylight window.

15. A skylight window according to any one of the preceding claims, wherein the weather shield comprises a transparent or translucent weather shield pane.

Amended claims in accordance with Rule 137(2) EPC.

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

a window frame (7) having four frame side members,
a window sash (6) having four sash side members supporting an insulating glazing unit (IGU) (5) having multiple layers of glazing, said win-

dow sash being movable in relation to the window frame between an open and a closed position of the skylight window, and
a weather shield (3) attached to the sash so as to protect a window portion (4) of the skylight window, the window portion comprising the sash, frame and IGU (5),
a first of the frame side members (10) being associated with a first of the sash side members (14), said first frame and sash side members extending in a longitudinal direction along a first peripheral side (5a) of the IGU,
said IGU (5) having an exposed interior major surface (5b) for facing an interior of said building in an installed position of the skylight window, said interior major surface extending in an outward direction away from a center of the IGU, an inward direction extending in a direction opposite to said outward direction,
said IGU (5) further having an exposed exterior major surface (5g) for facing in an exterior direction which is opposite of said interior of said building in said installed position of the skylight window, said exterior major surface extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface of the IGU,
said first frame side member (10) having a primary leg (25), which in said closed position is positioned lateral to and extends along an outwardly facing surface of said first peripheral side (5a) of the IGU, and a secondary leg (26), which in said closed position extends lateral to and along a part of said interior major surface (5b) of the IGU,
characterized in that
said primary leg (25) extends as far as or farther in said upward direction than a location of said exterior major surface (5g) of the IGU (5).

2. A skylight window according to claim 1, wherein said first sash (14) and/or frame (10) side member(s) provide an inwardly facing interior surface (50, 17c, 27b) located below the interior major surface (5b) of the IGU (5), an angle formed between said inwardly facing interior surface and said interior major surface of the IGU at an interior corner formed between said surfaces being equal to or less than 110 degrees, preferably equal to or less than 105, 100, 95, 90, 85 or 80 degrees.

3. A skylight window according to claim 1 or 2, wherein said frame and sash side members comprise or are made substantially of one or more plastic polymer materials, preferably said frame side members comprise or are made substantially of polyurethane, and/or preferably said sash side members comprise or are made from a thermoset plastic polymer material comprising fibers.

4. A skylight window according to any one of the previous claims, wherein said primary leg (25) extends at least 5, 10, 15, 20, 30, 40, 50, 70, 90, or 100 percent of a distance between said exterior (5g) and interior major surface (5b) of the IGUs in said upward direction from said exterior major surface of the IGU.

5. A skylight window according to any one of the previous claims, wherein said first sash side member (14) has a first leg (15), which extends substantially in the upward direction.

6. A skylight window according to claim 5, wherein said first leg (15) extends lateral to said outwardly facing surface of said first peripheral side (5a) of the IGU, and wherein the primary leg (25) in said closed position extends lateral to and along an outwardly facing surface of said first leg (15).

7. A skylight window according to any one of claims 5 to 6, wherein the first sash side member (14) further comprises a second leg (16), which may potentially project from a lower end of said first leg (15) so as to extend along part of said interior major surface (5b) of the IGU (5) to support the IGU, said second leg (16) potentially resting on an upper abutment surface of said secondary leg (26) in said closed position of said window.

8. A skylight window according to any one of claims 5 to 7, wherein said exterior major surface (5g) of the IGU is positioned at a distance of less than 80 % of a total height of the first leg (15) from a lower end (15a) of said first leg.

9. A skylight window according to any one of the previous claims, wherein a lower end of said primary leg (25) is positioned below said interior major surface (5b) of the IGU.

10. A skylight window according to any one of the preceding claims, said secondary leg (26) having a bottom surface (10a) facing in a direction away from the interior major surface of the IGU, which bottom interior surface (10a) comprises a lining panel protrusion (10e) located lower than the exposed interior major surface of the IGU in the height direction,
wherein the lining panel protrusion (10e) protrudes away from the IGU, the lining panel protrusion comprising a first surface (10c) for abutting an inwardly facing surface of said reveal panel or lining panel when received in by said protrusion,
where said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said protrusion.

11. A skylight window according to any one of the preceding claims, wherein
a height direction extends from the exposed interior major surface (5b) towards the exposed exterior major surface (5g) in the closed position of the skylight windown,
the first sash side member (14) has a total sash height (HS), and said first frame side member (10) has a total frame height (HF), in the height direction,
said first frame side member (10) comprising an interior part (79), the interior part in the closed position of the skylight window extending below the exposed interior major surface (5b) of the IGU and being located within the periphery of the interior pane (5d),
said interior part (79) of the first frame side member having a total height (HI) in the height direction,
said first sash side member (14) comprising a supporting section (72) extending beneath and supporting the exposed interior major surface (5b) of the IGU, the supporting section (72) having a total height (HL) in the height direction.

12. A skylight window according to claim 11, wherein the total height (HL) of the supporting section (72) is 40% or less of the total sash height, preferably the total height of the supporting section is 20% or less of the total sash height (HS).

13. A skylight window according to any one of claims 11 to 12, wherein the total height (HI) of the interior part is 25% or less of the total frame height, prefarably the total height of the interior part is 15% or less of the total frame height (HF).

14. A skylight window according to any one of the preceding claims, further comprising a motor-driven actuator comprising an elongated lifting element connecting between 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, a height direction extending substantially perpendicularly to at least one of the major surfaces of the IGU (5) in a closed position of the skylight window, and a lateral direction extending in parallel with the exposed interior major surface (5b) of the IGU in the closed position of the skylight window,
wherein at least the top end of the lifting element is at or above a height level of the interior major surface of the IGU in the height direction in the closed position of the skylight window.

15. A skylight window according to any one of the preceding claims, wherein the weather shield (3) comprises a transparent or translucent weather shield pane (8).

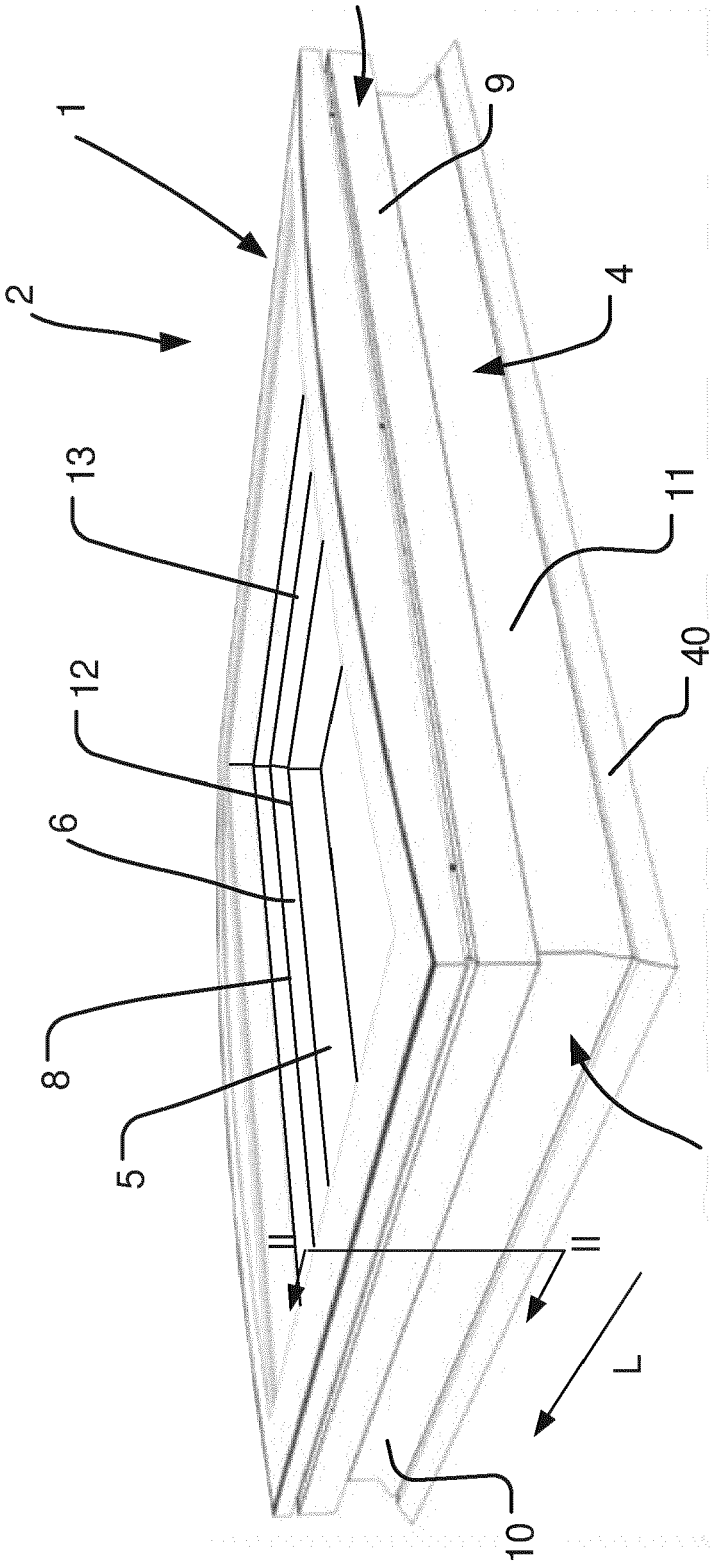


Fig. 1

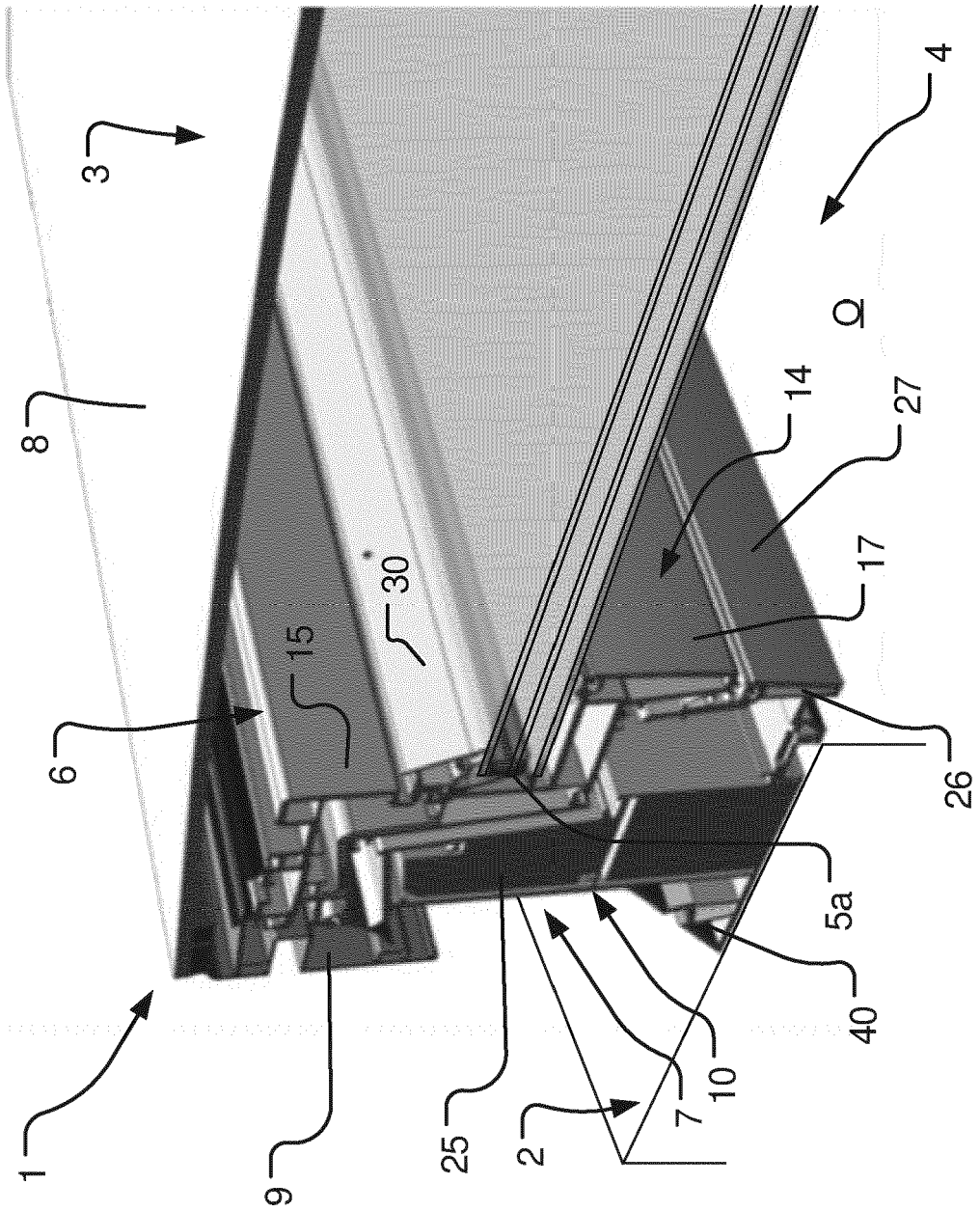
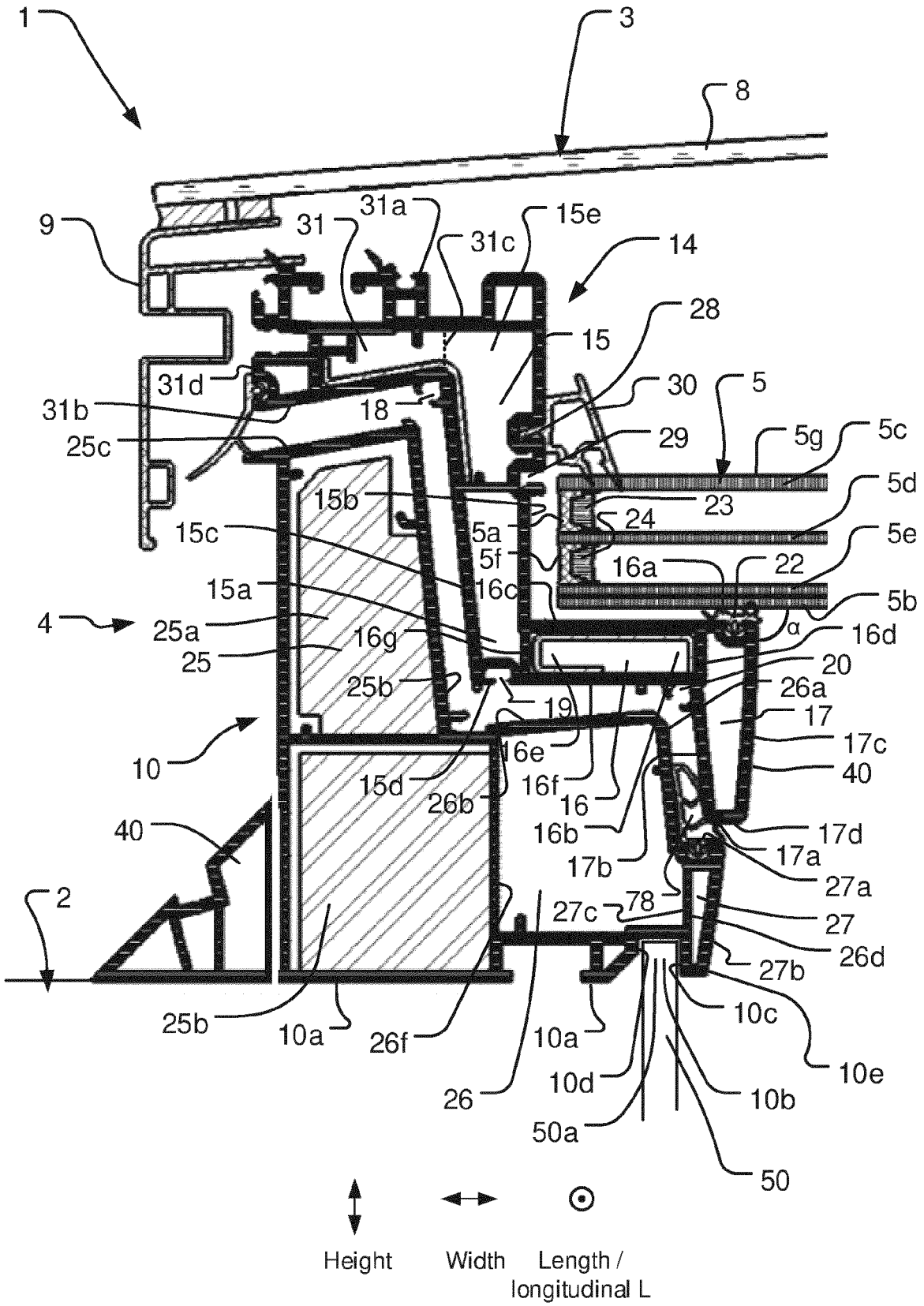


Fig. 2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50a
50
Height
Width
Length / longitudinal L

Fig. 3

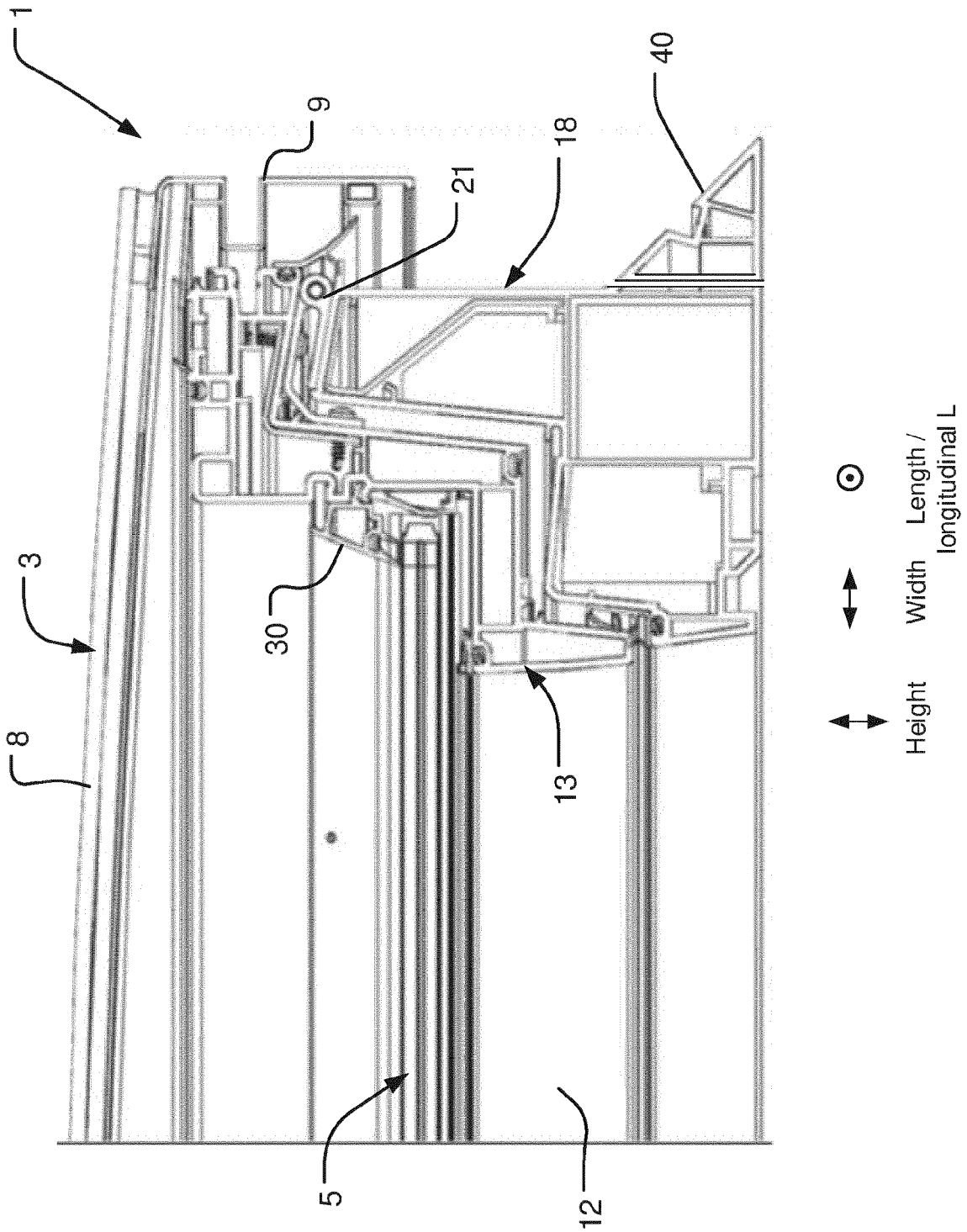


Fig. 4

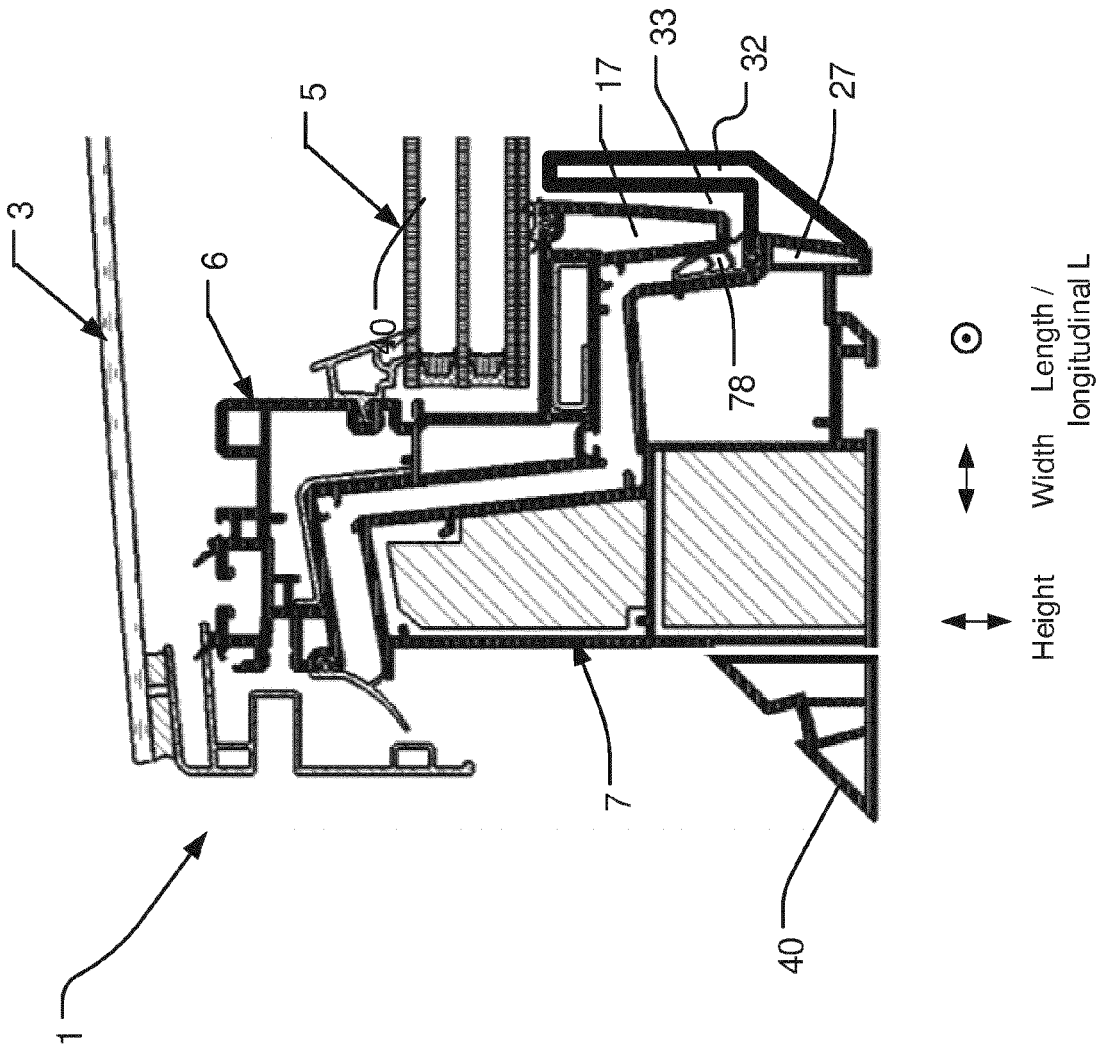
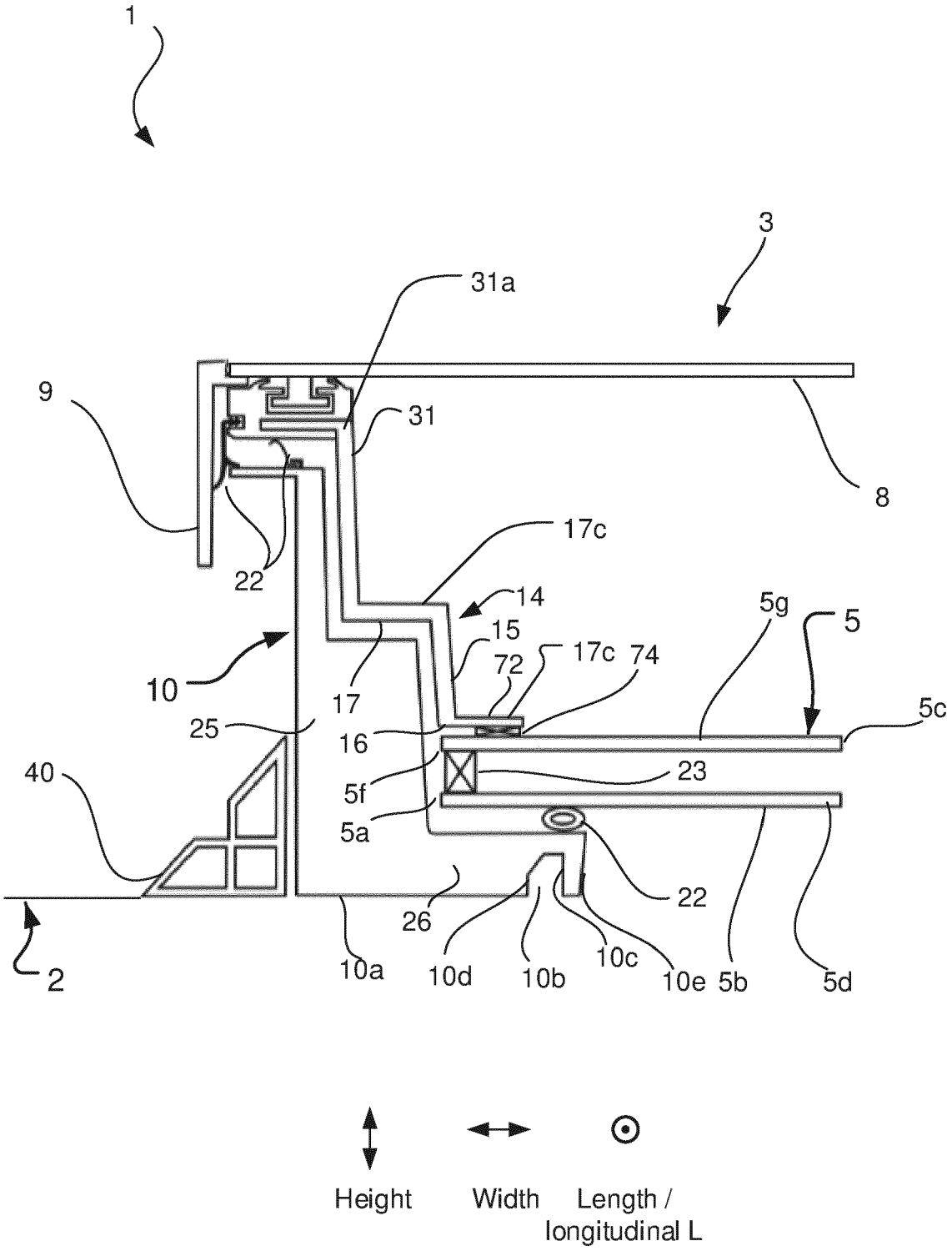


Fig. 5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3
31a
9
31
8
22
17c
14
15
72
17c
74
5g
5
10
17
25
16
5c
40
5f
23
5a
22
26
2
10a
10d
10b
10c
10e
5b
5d
Height
Width
Length / longitudinal L

Fig. 6

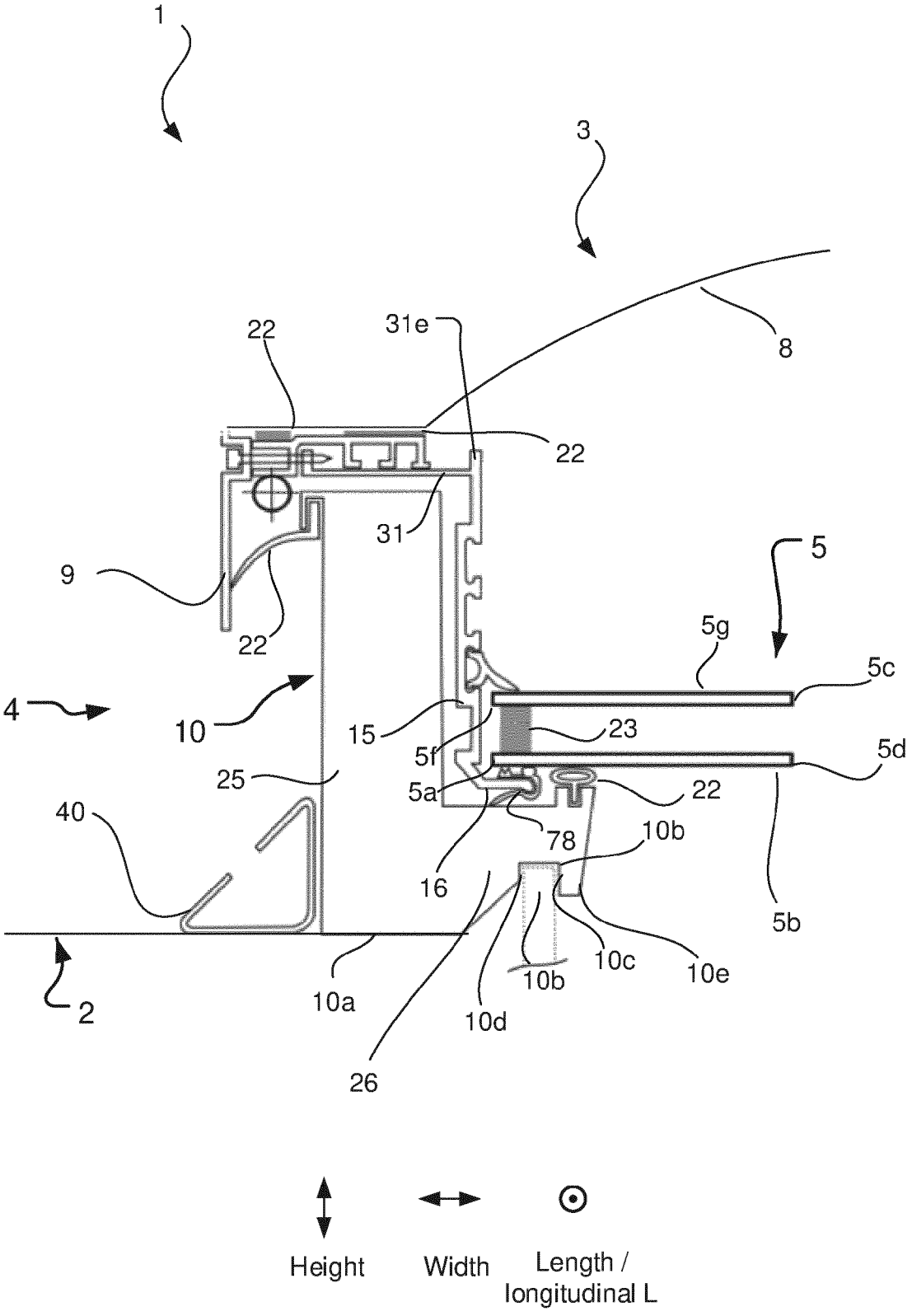
1
3
8
22
31e
22
31
9
22
5
5g
5c
4
10
15
23
5f
5d
25
5a
22
40
78
10b
16
5b
10a
10d
10b
10c
10e
2
26
Height
Width
Length / longitudinal L

Fig. 7

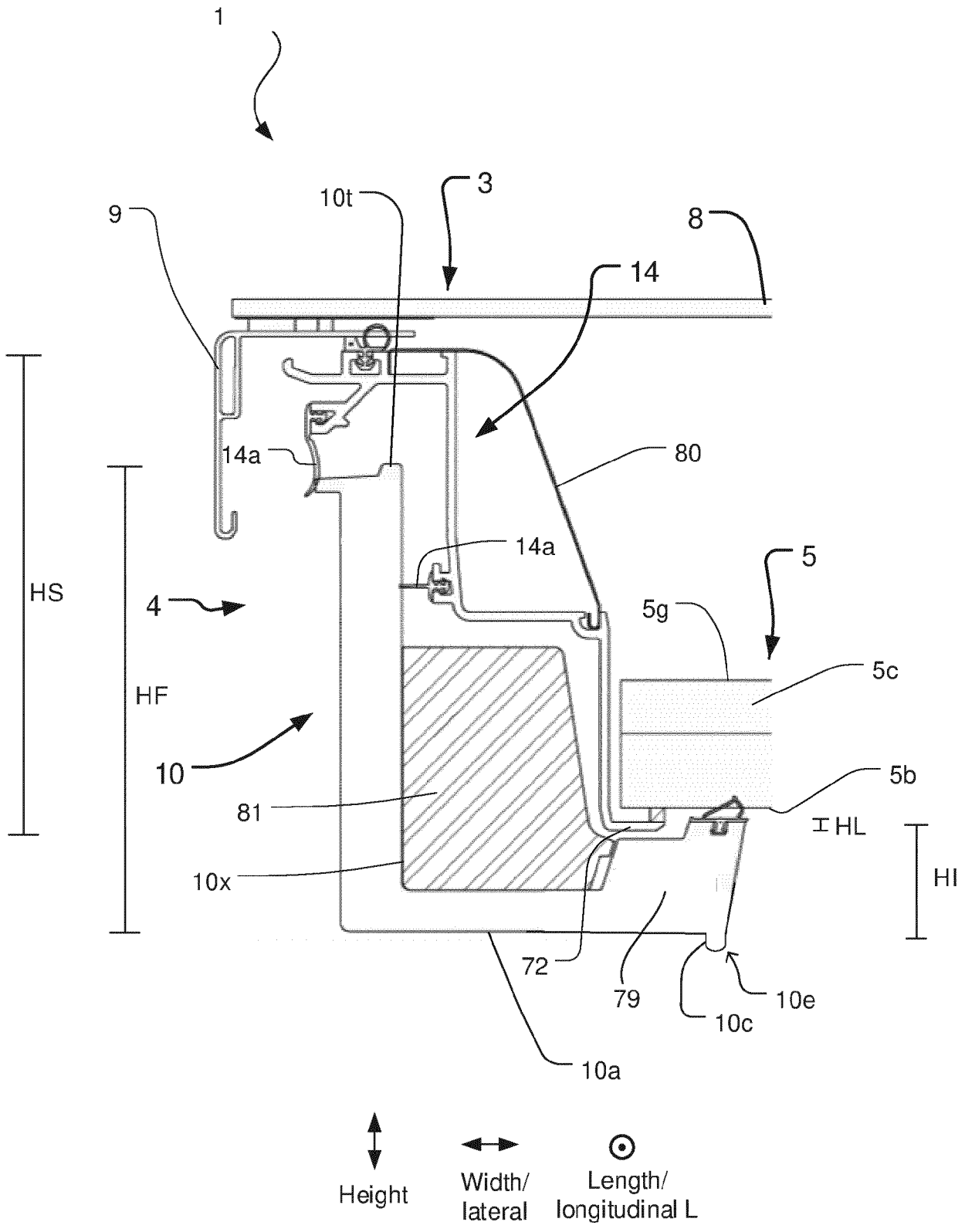
1
3
10t
9
8
14
14a
80
14a
5
HS
4
5g
5c
HF
10
5b
81
HL
HI
10x
72
79
10e
10c
10a
Height
Width/
lateral
Length/
longitudinal L

Fig. 8

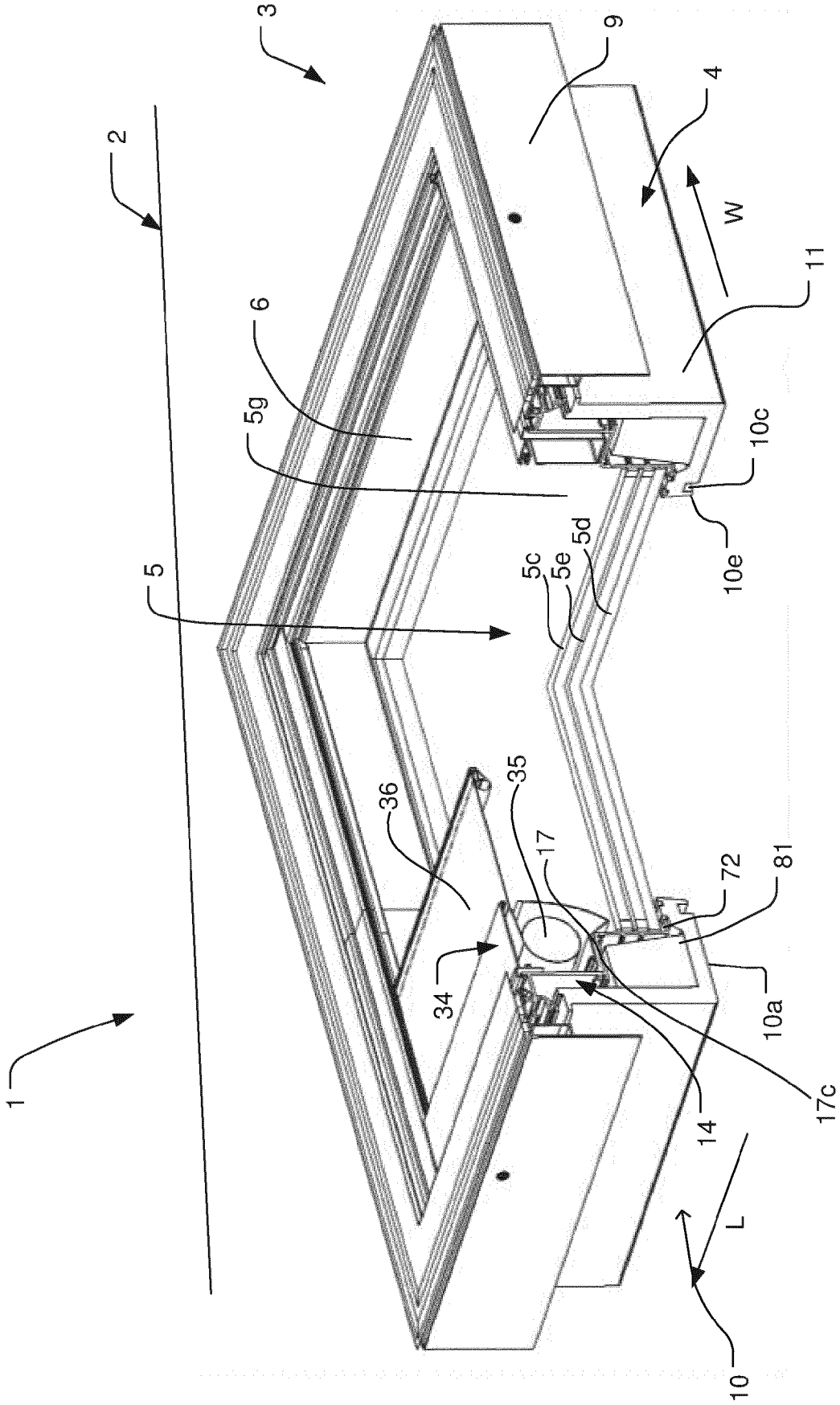

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 5237

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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	3 July 2020	Leroux, Corentine

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