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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 screening device is mounted in a spacing delimited laterally by first and second sash side members and in the height direction by a weather shield pane and by the sash and/or the exterior major surface of the IGU towards the interior, where the screening device is located below the exterior side of the first sash side member when seen in the height direction.

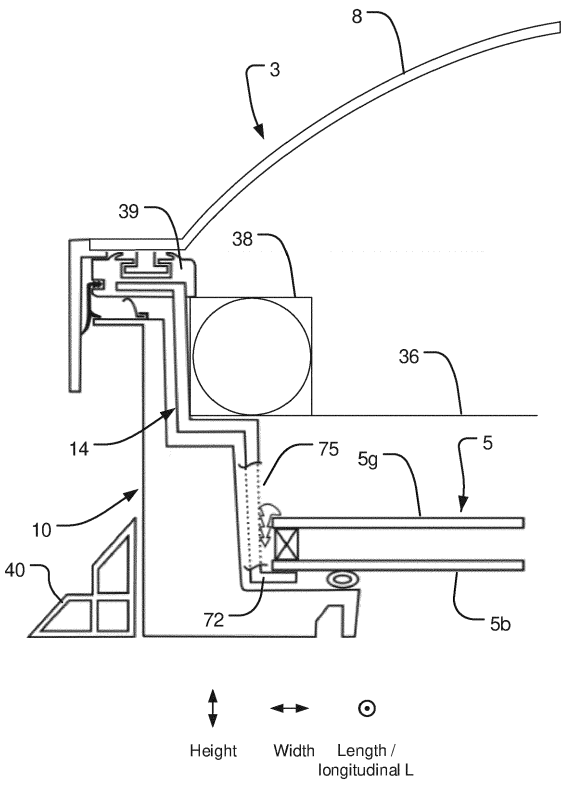

Fig. 8

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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 portion comprising a window sash and an insulating glazing unit (IGU), said IGU being attached to the window sash and having multiple layers of glazing, said IGU having an exposed interior major surface for facing an interior of the building in an installed position of the skylight window and an exterior major surface facing in a direction opposite to the interior of the building towards the exterior, the sash having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a first sash side member and a second sash side member, which is substantially parallel to the first sash side member, said first sash side member extending in a longitudinal direction along a first peripheral side of the IGU and said second sash side member extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface towards the exposed exterior major surface, and a lateral direction extending from the first sash side member towards the second sash side member,

a weather shield positioned over the exterior major surface of the IGU when seen in the height direction so as to cover the sash and the IGU for protecting the window portion from the weather in the installed position of the skylight window, the weather shield comprising a weather shield pane, and

a screening device including a screening body, the screening body being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member and a second, screening end position in which, for the screening of the IGU, it is extended between the first and second sash side members.

[0002] The invention further relates to a roof structure with such a skylight window and to a method for retrofitting a screening device on a skylight wind ow.

Background

[0003] 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.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] 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.

[0008] In the art it is also known to mount a screening device of varying forms on a skylight window. Such screening devices may take the form of roller curtains and/or awning blinds, the screening body being a flexible covering cloth which in one end is connected to a roller constituting a reception means for the screening body and being mounted rotatably in a casing positioned at for example a top sash side member constituting the first sash side member. A collection roller, motor, actuator and/or other parts of the screening device may be accommodated at least partly in a casing together with the covering cloth. Movement of the screening body between its two end positions is often obtained by a cord guidance system, typically with two cords guided in respective side guide rails.

[0009] The screening device is typically positioned below the exposed interior major surface of the IGU facing the interior of the building in the mounted position of the window so that the screening body may be accessed

from the inside of the building as is known for example from US7624547B1.

[0010] In the art it has been suggested to position especially a venetian blind between two layers of glazing in an IGU as is known for example from JP63-27659. This protects the screening body from dust and moisture from the interior of the building, but has the disadvantage that it may be difficult to access the screening device and especially the screening body, e.g. in case of repairs or replacement.

[0011] In the art it has also been suggested to position the collection roller inside a spacing or cavity of the window sash or frame. EP1870532A2 discloses positioning of a collection roller inside a frame of a skylight window.

[0012] Finally, it has been suggested in EP3396100A1 to provide the screening device on the exterior major side of the IGU, but this has necessitated a re-shaping of the weather shield pane so that it may reach over the screening device.

[0013] 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.

[0014] A further object of the invention and/or of the present disclosure may be to provide a skylight window with improved light entry and/or in which view through the window is improved.

[0015] According to the invention, this and further objects may be met by a skylight window according to the introduction, wherein the screening device is mounted in a spacing delimited in the lateral direction by the first and second sash side members and in the height direction by the weather shield pane towards the exterior and by the sash and/or the exterior major surface of the IGU towards the interior, and wherein the screening device is located below the exterior side of the first sash side member when seen in the height direction.

[0016] Hereby, the screening device may be positioned in a spacing that is both protected from the elements of the exterior, e.g. precipitation and wind, and is not or only to a limited extent exposed to moisture, dust etc. from the interior of the building. This spacing may be readily ventilated to further protect the screening device components. Furthermore, the screening device and especially the screening body may be at least partly hidden when seen from the interior of the building. Also, it is relatively easy to access the screening device from the outside in case of repairs or replacement, which may be achieved by removing the weather shield and reattaching afterwards.

[0017] The fact that the screening device is located below the exterior side of the first sash side member means that the weather shield pane can be provided relatively close to the IGU, hence making the path to be travelled by sunlight in order to reach the interior of the building relatively short and thereby improving light entry.

[0018] The exterior side of each sash side member may be an uppermost surface of each respective sash side member when seen in the height direction. The exterior side or uppermost surface may face in the same direction as the exterior major surface of the IGU.

[0019] The interior side of each sash side member be a lowermost surface of each respective sash side member when seen in the height direction. The interior side or lowermost surface may face in the same direction as the exposed interior major surface of the IGU.

[0020] In one embodiment, said exterior sides of the sash side members together define an exterior side of the sash, and the entire screening device is located below exterior side of the sash both in the first and in the second end position. This for example entails that a cord guidance system, side guide rails, a bottom roller, a bottom bar, and/or other parts of the screening device, which are not or not permanently located at the first sash side member will also be below the exterior side of the sash both in the first end position and in the second end position. Hence the presence of such items will not necessitate a particular shape of the weather shield pane. Moreover, this allows such items to be arranged on inner sides of the sash side members, where they may be at least partially protected from exposure to sunlight and thermal variations in addition to having a good supporting base.

[0021] In one embodiment, where said exterior sides of the sash side members together define an exte-rior side of the sash, and where the entire screening body 36 is located below said exterior side of the sash both in the first and in the second end position.

[0022] In one embodiment, a first leg of said first sash side member extends along said first peripheral side of the IGU and above the exposed interior major surface in the height direction, and a screening device support section extends from the first leg in the lateral direction. In this way the screening device can be arranged wholly or partially on the first sash side member and thus be wholly or partially hidden from view when seen from the interior side. The screening device support section may extend over the exterior major surface of the IGU, so that the IGU extends underneath the screening device, which may add to the insulating properties of the skylight window. In may, however, also be considered advantageous to let the screening device support section extend away from the first peripheral side of the IGU. This will allow the screening device to be wholly or partially hidden from view when in the first end position, and if the screening device support section is substantially in plane with the exterior major surface of the IGU the screening device may extend close to the exterior major surface of the IGU when in the second end position.

[0023] If wishing to keep a distance between the screening device and the IGU, for example in order to allow the formation of an insulating air space between the IGU and the screening device when in the second end position, the screening device support section may be provided at a distance above the exterior major surface of the IGU. In this embodiment, the first leg of the first sash side member includes an interior section ex-

tending between the exposed exterior major surface of the IGU and the screening device support section and an exterior section extending from the screening device support section towards the exterior, so that the screening device support section forms a ledge or step on the first leg of the first sash side member. The interior section does not need to end at the exposed interior major surface of the IGU. It may extend past the first peripheral side of the IGU and possibly be connected to other parts of the sash.

[0024] In one embodiment a first leg of said first sash side member extends along said first peripheral side of the IGU and above the exposed exterior major surface in the height direction, and a second leg of the first sash side member extends along said first peripheral side of the IGU and inwards in the lateral direction, said first and second legs being interconnected at the first peripheral side of the IGU, and said second leg forming an IGU supporting section supporting the IGU. In other words, the first sash side member may have an L-shaped cross-sectional shape, with one leg extending underneath the IGU and the other extending upwards along its outer side along the first peripheral side.

[0025] When the screening body is positioned in the non-screening, end position, the collapsed screening body may be at least partly hidden by the IGU supporting section when seen from the interior through the IGU.

[0026] Two or more sash side members may be provided with a screening device support section and/or an IGU supporting section as described with reference to the first sash side member above.

[0027] The first leg of the first sash side member and/or a possible screening supporting section and/or a possible IGU supporting section may be generally plate-shaped, consisting of one single section of substantially solid material. Such a section may have a thickness of less than 1 cm. It may be made from a single material or from composite, which may be laminated or otherwise layered.

[0028] In other embodiments, the first leg of the first sash side member and/or a possible screening supporting section and/or a possible IGU supporting section include(s) additional legs/sections so that a core spacing is formed within the first leg of the first sash side member and/or a possible screening supporting section and/or a possible IGU supporting section. Insulating, strengthening, and/or stiffening material may be provided within said core spacing.

[0029] In one embodiment, the IGU supporting section has a first width in the lateral direction, and, when the screening body is positioned in the first non-screening, end position, the collapsed screening body has second width in the lateral direction, which is less than 150 %, more preferred less than 140, 130, 120, 110, 100, 90, 80, 70, 60 or 50 %, of the first width.

[0030] This may ensure that the screening device is at least partly hidden when seen from inside the building, i.e. from the interior.

[0031] In case the screening device is a roller curtain and the screening body is rolled up in its collapsed end position, the second width is the maximum to which the rolled up screening body extends, i.e. a potential end section of the screening body which is not rolled up is not included in the second width.

[0032] In an embodiment of the skylight window according to the invention the window portion comprises a first lining recess for receiving an edge of an embrasure lining first panel to be positioned at the first sash side member, and, when the screening body is positioned in the first non-screening, end position, the screening body includes a point positioned closest to the first sash side member, the first lining recess being positioned closer to the second sash side member in the lateral direction than said point of the screening body, preferably the first lining recess is positioned substantially at a centre point in the lateral direction of the collapsed screening body or closer to the second sash side member than said centre point.

[0033] Hereby, the screening device is positioned far in the outward direction in relation to the lining panel, which ensures optimum light entry through the IGU. The position of the first lining recess may be defined as the position of a centre point in the lateral direction of the first lining recess or, alternatively, as a side surface of the first lining recess, including an innermost or an outermost side surface.

[0034] The first lining recess may form part of the first sash side member or, if a frame is included in the window portion, of a corresponding first frame side member.

[0035] An edge of an embrasure lining first panel of an embrasure lining may be received in the first lining recess. In this case the present embodiment can alternatively or supplementary be defined as an inner surface (i.e. a surface facing inwardly and/or towards the second sash side member in the lateral direction) of the embrasure lining first panel being positioned closer to the second sash side member in the lateral direction than said point of the screening body, this surface similarly preferably being positioned substantially at a centre point in the lateral direction, which will also be referred to as the width dimension, of the collapsed screening body or closer to the second sash side member than said centre point.

[0036] In an embodiment, the first frame side member comprises a lining panel protrusion located lower than the exposed interior major surface of the IGU in the height direction, wherein the interior pane comprises a side surface extending substantially along the first frame and sash side members, wherein the lining panel protrusion protrudes away from the IGU, the lining panel protrusion comprising a first surface for abutting a surface of reveal panel or lining panel so as to position the reveal panel or lining panel, and wherein, in the closed position of the skylight window, the first surface of the lining panel protrusion in a lateral direction extending along the exposed interior major surface of the IGU is positioned farther away from the side surface of the interior pane than the supporting leg.

[0037] Such protrusion can help an installer install a

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

[0038] 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. 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.

[0039] 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.

[0040] In one embodiment, the screening device is a roller curtain in which the screening body is a covering cloth, the screening device comprising a reception or collection device in the form of a collection roller, the covering cloth being at least partly collected on the collection roller in its collapsed end position. In this embodiment, at the collection roller will be positioned in the spacing, and the covering cloth may at least partly hide the collection roller in the collapsed end position thereof. If the skylight window includes an IGU supporting section, the collection roller may be at least partly or completely hidden by it when seen through the IGU, and the collection roller then preferably has a diameter less than 80 %, more preferred 70, 60, 50 or 40 % of the width of the supporting section in the lateral direction.

[0041] Alternatively, e.g. in the case of a Venetian blind or a roller shutter, the collection device may take the form of a top bar at or below which slats of the screening body are collected. The top bar may be wholly or partially hidden from view as described above.

[0042] In one embodiment, the screening device further comprises a bottom roller for guiding a bottom edge of the screening body between the end positions of the screening body.

[0043] When the skylight window includes an IGU supporting section and when the screening body is positioned in the non-screening, end position, the bottom roller may be at least partly or completely hidden by the IGU supporting section when seen through the IGU.

[0044] When the screening body is positioned in the non-screening, end position, the bottom roller may have width, which is less than 150 %, more preferred less than 140, 130, 120, 110, 100, 90, 80, 70, 60 or 50 %, of the first width of the IGU supporting section as describe above. This may ensure that the screening device including the bottom roller is at least partly hidden when seen from inside the building.

[0045] The bottom edge of the screening body may be the edge of the screening body closest to the second sash side member. The bottom roller may be attached to the bottom edge of the screening body and may extend and be oblong in the longitudinal direction, i.e. in the length dimension. The bottom roller may be substantially parallel with the above-described collection roller.

[0046] In one embodiment, in the collapsed end position of the screening body, the screening body is at least partly collapsed inside the bottom roller. Hereby, it may be possible to provide a screening device with reduced outside dimensions which may assist in hiding the screening device in the spacing. In case the screening device is a roller curtain, the screening body may be rolled up in the bottom roller.

[0047] In this embodiment it is preferred that at least 10 % of the covering cloth is collapsed in the bottom roller.

[0048] In one embodiment, the screening device comprises a top casing, the screening body being at least partly accommodated in the top casing in its collapsed end position.

[0049] When the screening body is positioned in the non-screening, end position, the top casing may be at least partly or completely hidden by an IGU supporting section when seen through the IGU.

[0050] In this embodiment too, the top casing may have a maximum, second width, which is less than 150 %, more preferred less than 140, 130, 120, 110, 100, 90, 80, 70, 60 or 50 %, of the first width. This may ensure that the screening device including the top casing is at least partly hidden when seen from inside the building.

[0051] In an embodiment the screening device further comprises a bottom bar for guiding a bottom edge of the screening body between the end positions of the screening body. The bottom bar may be attached to the bottom edge of the screening body and may extend in the longitudinal direction, i.e. in the length dimension.

[0052] When the skylight window includes an IGU supporting section and when the screening body is positioned in the non-screening, end position, the bottom bar may be at least partly or completely hidden by the IGU supporting section when seen through the IGU.

[0053] The bottom bar may be connected to a cord guidance system which is connected to an actuator or motor by which the screening body is moved between its first, non-screening and second, screening end positions.

[0054] The screening device may further comprise a receiving structure, adapted to receive at least part of the bottom bar or bottom roller in the second, screening end position of the screening body. The receiving may be attached to the second sash side member, and the receiving structure extends along the second sash side member in the longitudinal direction. The receiving structure may comprise a recess for receiving the bottom bar or bottom roller in second, screening end position of the screening body. The recess of the receiving structure

extends in the longitudinal direction at an inward facing surface of the receiving structure. When in the second, screening end position of the screening body, the bottom bar or bottom roller at least partly extends into said recess. This may have the effect of preventing light from entering at an interface of the bottom bar or roller and the receiving structure.

[0055] In one embodiment, the skylight window further comprises a fixation member attached to the first sash side member and extending towards the second sash side member, the screening device being attached to the fixation member.

[0056] If the screening device comprises a top casing, the top casing may be attached to the fixation member.

[0057] The fixation member may extend substantially along an entire length (in the length dimension) of the first sash side member and the first peripheral side of the IGU. Similar fixation members may be attached to one, two or three of the other sash side members at the other three peripheral sides of the IGU, possibly in grooves therein.

[0058] The fixation member may include a curved outer surface that corresponds to a curved outer surface of the covering cloth in its collapsed position, especially in case the screening device is a roller curtain.

[0059] The first sash side member may comprise one or more grooves adapted for receiving the fixation member. If there are two or more grooves, the position of the fixation member in the height direction can be changed by attaching it to another groove. By choosing an appropriate height the fixation member may be arranged so that it abuts the exterior major surface of the IGU, thereby potentially contributing so as to holding the IGU.

[0060] In one embodiment, the screening device comprises a further, separate screening body, this further screening body being moveable between a first, non-screening, end position in which it occupies a collapsed, such as a rolled-up, pleated or folded, position at the second sash side member and a second, screening, end position in which, for the screening of the window, it is extended between the first and second sash side members.

[0061] The further screening body may thus be positioned oppositely from the screening body described above.

[0062] The previously defined screening body may be denoted the first screening body and the further screening body the second screening body.

[0063] The collapsed second screening body may be associated with a second sash side member in a manner identical to the manner the first screening body is associated with the first sash side member. The second sash side member may therefore in this and any other of the embodiments described herein be of identical form and/or shape as the first sash side member, but reversed or mirrored so that the second screening body may similarly be at least partly hidden in a similar spacing.

[0064] The second screening body may thus be provided in a manner identical to any of the above embodiments associated with the first screening body; however, in relation to the second sash side member in case of the second screening body.

[0065] The second screening body may thus similarly be associated with a collection member or roller (that is different from that of the first screening body), a bottom roller (that may be the same as that used for the first screening body), side rails (that may be the same side rails as used for the first screening body), cord guidance system (that may be the same cord guidance system as used for the first screening body) etc. similar to the first screening body. All of these elements may be provided in embodiments similar to those described above in relation to the first screening body.

[0066] The first and second screening bodies may be of different forms and shapes. For instance, the first screening body may be a covering or awning cloth, whereas the second screening body may be an insect or mosquito net, or vice versa.

[0067] The first and second screening bodies may alternatively be of substantially the same form and/or shape.

[0068] Potentially, the first and second screening bodies cover substantially the entire IGU when both are in their respective screening, end positions.

[0069] In any case, the first and/or second screening body may be provided so that in their respective screening, end positions they only extend to cover part of the IGU.

[0070] This embodiment may have the advantage of it being possible, in the respective collapsed end positions of the first and second screening devices, to hide each screening device in the respective spacing. If each screening device has a shorter extent than the entire extent of the IGU, each collapsed screening body may have a smaller volume than if only one screening body were used to cover the entire IGU. This may thus further assist in hiding the screening device from the inside in the collapsed end positions of the screening devices by respective, associated IGU supporting sections of the first and second sash side members.

[0071] The second sash side member may comprise a second lining recess for receiving an edge of an embrasure lining second panel to be positioned at the second sash side member. The above embodiments relating to the geometry, dimensions, positioning etc. of different members of the screening device at the first sash side member in relation to the first lining recess can be directly transferred to the different members of the screening device at the second sash side member, including the second screening body, in relation to the second lining recess.

[0072] According to a second aspect of the invention, the object of the invention is achieved with a flat-roof structure including a skylight window as described above, wherein the skylight window is installed in or on a flat 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.

[0073] According to a third aspect of the invention, the object is achieved with a method for retrofitting a screening device on a skylight window for being or being positioned in roof of a building, the skylight window comprising:

a window portion comprising a window sash and an insulating glazing unit (IGU), said IGU being attached to the window sash and having multiple layers of glazing, said IGU having an exposed interior major surface for facing an interior of the building in a installed position of the skylight window and an exterior major surface facing in a direction opposite to the interior of the building towards the exterior, the sash having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a first sash side member and a second sash side member, which is substantially parallel to the first sash side member, said first sash side member extending in a longitudinal direction along a first peripheral side of the IGU and said second sash side member extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface towards the exposed exterior major surface, and a lateral direction extending from the first sash side member towards the second sash side member,
a weather shield positioned over the exterior major surface of the IGU when seen in the height direction so as to cover the sash and the IGU for protecting the window portion from the weather in the installed position of the skylight window, the weather shield comprising a weather shield pane, and
a screening device including a screening body, the screening body being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member and a second, screening end position in which, for the screening of the IGU, it is extended between the first and second sash side members,
said method comprising the steps of:

- removing or detaching the weather shield from the window portion,
- mounting the screening device by attaching it to the window portion, specifically the sash, more specifically the first sash side member, so that the screening device is positioned in a spacing delimited in the lateral direction by the first and second sash side members, and in the height direction by the weather shield pane towards the exterior and by the sash and/or the exterior major surface of the IGU towards the interior, and in that the screening device is located below the exterior side of the first sash side member when seen in the height direction,
- reattaching the weather shield to the window portion.

[0074] According to a third aspect, the invention concerns 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,
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.

[0075] 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.

[0076] Said primary leg may be plate-shaped and/or may extend substantially in an up-down or vertical direction.

[0077] 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.

[0078] This may provide improved inflow of light as the angling of the inwardly facing interior surface may reduce the amount of light blocked

[0079] 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.

[0080] This may provide a skylight window that is more cost effective to manufacture.

[0081] Preferably said sash side members comprise or are made from HELO, a thermoset plastic polymer material comprising fibers.

[0082] 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.

[0083] 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.

[0084] 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.

[0085] In an embodiment said first sash side member has a first leg, which extends substantially in the upward direction.

[0086] This may facilitate a deeper or lower mounting of the IGU supported by the first sash side member.

[0087] 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.

[0088] 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.

[0089] This provides a spacing in an upward/downward direction which allows the IGU to be placed deeper or lower in the skylight window structure.

[0090] 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.

[0091] Said outwardly facing surface of said first peripheral side of the IGU may extend substantially in the upward direction.

[0092] In an embodiment, said first leg does not extend to cover any part of said exterior major surface of said IGU.

[0093] 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.

[0094] 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.

[0095] 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.

[0096] 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.

[0097] 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.

[0098] 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.

[0099] The weather shield may be attached to said fifth leg.

[0100] 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.

[0101] This may allow the IGU to be positioned closer to one of the main areas of thermal energy transfer between 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.

[0102] In an embodiment, said primary leg at a lower end thereof is connected to an outer end of said secondary leg.

[0103] This has the effect of providing a frame side member that may be provided in a shaped profile, such as a stepped profile.

[0104] In an embodiment, a lower end of said primary leg is positioned below said interior major surface of the IGU.

[0105] 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.

[0106] In an embodiment, an insulating member, such as a block of insulating foam, is positioned between said first leg and said primary leg.

[0107] The insulating member may be positioned in a corner of e.g. approximately 90 degrees formed between the primary and secondary legs.

[0108] 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.

[0109] The insulating member may extend upwardly from the secondary leg to more than half a height of the primary leg.

[0110] In this way insualtion properties may be futher improved.

[0111] 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.

[0112] This may improve the light inflow and/or insulation properties of the building.

[0113] Acccording to a fourth aspect of the invention, 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 said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said recess.

[0114] 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.

[0115] 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.

[0116] 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.

[0117] 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,

[0118] 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.

[0119] The first and/or second surface of the recess may extend substantially in the height dimension and may be substantially linear.

[0120] 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.

[0121] In an embodiment, a transparent central area of the IGU extends, in said outward direction, beyond said first surface of said recess.

[0122] 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.

[0123] 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.

[0124] 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.

[0125] 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.

[0126] 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.

[0127] In some embodiments, the first leg of the sash may have a height to thickness ratio of at least 4:1. That means that the leg's height is substantially larger than the leg's width, which can also be perceived as a particularly thin oblong element. The height to thickness ratio may also be 5:1, 6:1, 7:1 etc. If the first leg extends between the interior major surface of the IGU and the exterior major surface of the IGU, i.e. along the outer side of the IGU at the peripheral side, having a thin first leg means that the IGU can come closer to the frame. This is turn means that the excellent insulating properties of the IGU can be exploited and potentially also that the light admitting area of the IGU, i.e. the area not covered by other parts of the skylight window, can become relatively bigger. In an embodiment the distance between a peripheral side of the IGU and an inner side of a frame side member extending substantially in parallel with said peripheral side of the IGU and facing towards the IGU is less than 20 mm, preferably less than 15 mm.

[0128] Reducing the thickness of the material extending along and/or on top of the peripheral sides of the IGU may also lead to significant cost savings with regards to the manufacturing of the window sash and the associated material costs.

[0129] In an embodiment the sash side members are connected to the exterior major surface of the IGU and extending away from the interior major surface of the IGU, i.e. not extending below the exterior major surface of the IGU in the mounted state. In this way the IGU will be positioned as deep as possible in relation to the roof structure, thereby potentially improving the insulating properties of the window.

[0130] The sash side member may further comprise a second leg and possibly further legs in order to allow a more complex structure. The second and/or possible further legs may also be substantially plate-shaped.

[0131] In an embodiment, the legs form a stepped profile, when the cross-section perpendicular to the longitudinal direction. An upper surface of the second leg may be denoted a step surface. A step profile may be achieved by making the sash side member with two, three or more legs where each leg is substantially perpendicular to an immediately preceding leg and/or an immediately following leg.

[0132] 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 of a potential 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. The sealing between the stepped profile of the sash and frame side member may further be aided by the load transfer of the load exerted by the IGU through the sash. 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 increased.

[0133] Such a step may also be used for supporting a screening device, such as a roller blind.

[0134] In an 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.

[0135] The skylight window may comprise one or more thermal breaks being located in the sash side member. 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 window 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. The thermal breaks may be located on the sash side member, so that possible thermal bridges are avoided. In an embodiment a thermal break is provided at an exterior edge of the first leg located above the exterior major surface of the IGU when seen in the height direction, i.e. on the exterior side of the IGU.

[0136] In an embodiment, at least some of the legs are

attachable/detachable to/from each other. This would for example allow the first leg to be replaced with one of another height, so that the window sash has an adjustable height that could be used for different installation depth. In particular, the window sash will be able to adjust its height also based on the number of layers of glazing included in the IGU. For example, an IGU comprising two layers of glazing may require a shorter sash height than an IGU with three layers of glazing. In addition, the sash may also be adjusted for different frame sizes.

[0137] In an embodiment, the sash side member may comprise one or more recesses that may be adapted for securing one or more sealing elements (e.g. gaskets), said recesses may lead to a larger thickness of the sash side member in some limited areas, but the thickness should preferably not exceed 3 cm. The recesses may be in the form of a groove or an indentation on any of the legs of the first sash side member. Apart from securing the sealing elements, the recesses may also secure centering blocks that may be attached to the sash in order to carry load so that the sealing elements are not too heavily deformed and thus, damaged. The recesses may also be formed between projections, such as feathers extending in the longitudinal direction, and may include barbs or like elements designed to prevent the sealing elements from coming loose unintentionally.

[0138] In an embodiment, the first leg may comprise or substantially consists of metal, such as steel or aluminium and/or polymer. The metal structure may make the sash extremely resistant to high temperatures, which may arise due to high solar gains. Alternatively, the first leg may comprise or substantially consist of a polymer, which may be fibre reinforced, one example being a thermoset plastic polymer material comprising glass fibres. A thermal break may be comprised on the sash side member along with a metal discontinuity, having a different thermal conductivity, which will eventually lead to lower thermal losses through the sash.

[0139] The frame side members may have 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.

[0140] The sash side members may be separate members or may be formed as one continuous member.

[0141] 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.

[0142] 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.

[0143] 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.

[0144] 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.

[0145] The IGU (Insulated Glazing Unit) may have multiple 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.

[0146] 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.

[0147] 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.

[0148] 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.

[0149] 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.

[0150] 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.

[0151] 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.

[0152] 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.

[0153] 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.

[0154] 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.

[0155] The weather shield may comprise a weather shield pane positioned on an exterior side of the IGU.

[0156] 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.

[0157] 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

[0158] The weather shield may be provided without a sealed gas-filled spacing between the weather shield pane and the IGU.

[0159] The frame may enclose the sash in the closed position of the skylight window.

[0160] 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.

[0161] 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.

[0162] 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.

[0163] 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 side members and frame side members may similarly have substantially uniform cross sections in the same manner.

[0164] Generally, one or more of the frame side members and/or sash side members may comprise or be made substantially of polymer materials, such as plastic, specifically PVC (polyvinyl chloride), chlorinated PVC, PUR (polyurethane), fiber reinforced PUR such as glass-fiber reinforced PUR, and/or wood and/or metal such as aluminum or composites or combinations thereof.

[0165] 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.

[0166] 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.

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

[0167] 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.

[0168] In an embodiment of the present invention, said second leg extends as far as or farther than said secondary leg in said inward direction.

[0169] 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.

[0170] 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.

[0171] 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.

[0172] 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.

[0173] 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.

[0174] 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.

[0175] 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.

[0176] 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.

[0177] 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.

[0178] 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.

[0179] 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.

[0180] 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.

[0181] 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.

[0182] 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.

[0183] 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.

[0184] 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.

[0185] 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.

[0186] 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.

[0187] 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.

[0188] The third leg may be positioned with a major part thereof being located beneath the first leg.

[0189] 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.

[0190] 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.

[0191] 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 substantially 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.

[0192] 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.

[0193] 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.

[0194] 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.

[0195] 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.

[0196] 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.

[0197] 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.

[0198] 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.

[0199] An angle between the first and fourth legs may be 70 to 110 degrees or 80 to 100 degrees or substantially 90 degrees.

[0200] The fourth leg is preferably attached to or formed integrally with the first leg.

[0201] The fourth leg may extend along, preferably along a substantially entire length of, the first peripheral side of the IGU.

[0202] The fourth and second legs may extend substantially in parallel.

[0203] 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.

[0204] 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.

[0205] 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.

[0206] 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.

[0207] 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.

[0208] 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.

[0209] 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.

[0210] 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.

[0211] 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.

[0212] 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.

[0213] In another development of the embodiment comprising a third leg, the third leg has an oblong shape in the height dimension.

[0214] 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.

[0215] 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.

[0216] 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.

[0217] 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.

[0218] 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.

[0219] 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.

[0220] 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.

[0221] 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.

[0222] 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.

[0223] 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.

[0224] An angle between the secondary and tertiary legs may be 70 to 110 degrees or 80 to 100 degrees or substantially 90 degrees.

[0225] The tertiary leg is preferably attached to or formed integrally with the secondary leg.

[0226] The tertiary leg may extend along, preferably along a substantially entire length of, the first peripheral side of the IGU.

[0227] The tertiary and third legs may extend substantially in parallel in the closed position of the window.

[0228] The tertiary leg may project from the secondary leg substantially inwardly and/or in the width dimension.

[0229] 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.

[0230] 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.

[0231] 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.

[0232] 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.

[0233] 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.

[0234] 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.

[0235] 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.

[0236] 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.

[0237] 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.

[0238] 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.

[0239] 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.

[0240] 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.

[0241] In the latter two embodiments, all frame and/or side members, respectively, may have substantially identical cross sectional shapes in a cross section per-

pendicular 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.

[0242] 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.

[0243] 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.

[0244] 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.

[0245] 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.

[0246] 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.

[0247] 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.

[0248] 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.

[0249] In an embodiment, the screening device may further comprise an actuator for moving the screening body between the first, non-screening end position and the second, screening end position, wherein the actuator is located in a spacing delimited by the sash and the frame in the height direction and by the frame and the sash or the IGU in the lateral direction.

[0250] 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.

[0251] 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.

[0252] 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.

[0253] 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.

[0254] 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.

[0255] 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.

[0256] 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.

[0257] 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.

[0258] 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.

[0259] 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

[0260] In the enclosed drawings, which show non-binding examples of embodiments of the present invention,

Fig. 1 is a perspective view from above of an embodiment of a skylight window according to the present invention installed in a roof,
Fig. 2 is a cross-sectional 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, and
Fig. 8 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. 9 is a perspective view from above of an embodiment of a skylight window according to the invention installed on a roof,
Fig. 10 is a cross-sectional view of a first side of the skylight shown in Fig. 9,
Fig. 11 is a cross-sectional view of a second side of the skylight window shown in Fig. 9, the second side being opposite the first side shown in Fig. 10, and
Fig. 12 is a cross-sectional view of a third side of the skylight window shown in Fig. 9, the third side extending between the first and second sides of Figs 10-11.

[0261] 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.

[0262] 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.

[0263] 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.

[0264] The IGU 5 has an exposed interior major surface 5b facing downwards towards an interior of the building in the shown installed position of the skylight window 1 and exposed exterior major surface 5g facing in a direction opposite to the interior of the building 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.

[0265] 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.

[0266] 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.

[0267] 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.

[0268] Fig. 3 shows the same cross-sectional view as Fig. 2, but in a two-dimensional side view.

[0269] 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.

[0270] 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 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.

[0271] 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.

[0272] 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.

[0273] 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.

[0274] The slightly curved weather shield pane 8 extends over the entire roof opening O, which opening the skylight window 1 is positioned to cover.

[0275] 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 positioned 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..

[0276] 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 7a 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.

[0277] 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.

[0278] 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.

[0279] The lower supporting surface 17a of the third leg 17 abuts a sealing element 78 in the closed position of the window 1, which sealing 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 sealing element 78 is provided at or in an inner corner of the frame side member 10.

[0280] 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.

[0281] 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.

[0282] 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.

[0283] 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.

[0284] 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.

[0285] An angle between the first 15 and second 16 legs and between the second and third legs 17 is substantially 90 degrees, respectively.

[0286] The first leg 15 is formed integrally with the second leg 16, and the second leg is formed integrally with the third leg 17.

[0287] 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.

[0288] 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.

[0289] 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.

[0290] 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.

[0291] 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.

[0292] 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.

[0293] 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.

[0294] 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.

[0295] 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.

[0296] 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.

[0297] 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.

[0298] 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.

[0299] 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.

[0300] 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.

[0301] 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.

[0302] An angle between the first 15 and fourth 31 is substantially 90 degrees.

[0303] The fourth leg 31 is formed integrally with the first leg 15.

[0304] The fourth and second legs 31, 16 extend or project substantially in parallel.

[0305] 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 31 b 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 31 d, 31 c. 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.

[0306] The fourth leg has an overall or total height in the height dimension less than the thickness of the IGU 5.

[0307] The skirt 9 of the weather shield 3 is attached to each of the fourth legs of the four sash side members.

[0308] 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.

[0309] 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.

[0310] 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.

[0311] 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.

[0312] The frame side member 10 comprises a tertiary leg 27, which comprises the sealing element 78 with the corresponding upper resting surface 7a 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.

[0313] 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.

[0314] The tertiary leg 27 is also substantially plate-shaped and has a flat shape, an upper surface thereof on which the abutment sealing 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.

[0315] 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.

[0316] An angle between the secondary leg 26 and the inward direction in which the tertiary leg 27 extends is substantially 90 degrees.

[0317] The part of the tertiary leg 27 that does not include the sealing element 78 is formed integrally with the secondary leg 26.

[0318] The tertiary leg 27 and third leg 17 extend substantially in parallel in the closed position of the window.

[0319] 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.

[0320] 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.

[0321] 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.

[0322] The sealing element 78 is provided as part of the tertiary leg 27 so that the sealing element 78 provides the upper resting surface 7a 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.

[0323] The sealing 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.

[0324] The sealing element 78 is a separate part attached to the remaining parts of the tertiary leg 27. The sealing element 78 comprises the resting surface 7a in the form of an abutment surface 7a, on which the supporting surface 17a of the third leg 17 rests in the closed position of the skylight window 1. The abutment surface 7a 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 sealing element 78, the sealing 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 7a 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 sealing 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.

[0325] The sealing 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.

[0326] The sealing element 78 is of an elastic, plastic and sealing material.

[0327] 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.

[0328] 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.

[0329] 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.

[0330] 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

[0331] 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.

[0332] 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 function even if not they are not structurally identical.

[0333] 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.

[0334] 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.

[0335] 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.

[0336] 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.

[0337] 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.

[0338] 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.

[0339] 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 he 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.

[0340] 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.

[0341] In this embodiment, the first leg 15 of the first sash side member is generally plate-shaped, consists of one single layer of substantially solid material such that no other surrounding legs/sections form a core spacing with said first leg, and at least a portion of the first leg has a said thickness less than 1 cm. The thickness of the material extending along the peripheral side of the IGU has thus been significantly reduced in comparison the embodiments in Figs 1-5.

[0342] An insulating member (not shown), such as a block of insulating foam may be positioned between the first leg 15 and the primary leg 25. The insulating member may be positioned in a corner formed between the primary 25 and secondary 26 legs of the first frame side member 10 and such that the first leg 15 is positioned right beside the insulating member i.e. with no further elements between them. The above-mentioned potential third leg 17 of the sash member 14 may be positioned right above the insulating member. The insulating member may extend upwardly from the secondary leg 26 to more than half a height of the primary leg 25.

[0343] Figs 6 and 7 both show a screening device 34, which is mounted in a spacing delimited in the lateral direction by the first and second sash side members. Here only the first sash side member 14 is shown, but it is to be understood that the second sash member is substantially identical to the first sash side member so that the exterior sides of the sash side members together define an exterior side of the sash which extends substantially in parallel to the exterior major surface 5g of the IGU 5.

[0344] Towards the interior the spacing is delimited in Fig. 6 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. In this embodiment, the first leg 15 of the first sash side member 14 may be said to include an interior section extending between the exposed exterior major surface 5g of the IGU 5 and the screening device support section 17 and an exterior section extending from the screening device support section 17 towards the exterior, so that the screening device support section forms a ledge or step on the first leg of the first sash side member.

[0345] In Fig. 7 the spacing is delimited by the exterior major surface 5g of the IGU 5 and this embodiment thus does not include a screening device support section.

[0346] 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 second sash side members for covering the IGU 5. A top casing 38 accommodates the collection device 35 and the screening body 36 when in its collapsed end position. The screening device 34 might, however, also be another type of blind or a shutter.

[0347] In the embodiment in Fig. 6 the screening device 34 could also have been arranged at the step surface 16c provided by the upper surface of the second leg 16. This, however, would have resulted in the screening device 34 coming closer to the centre of the IGU and thus becoming more visible from when seen from the interior of the building. If wishing to arrange the screening device on the second leg 16 could preferably be made wider than shown in Fig. 6 so that, when the screening body is positioned in the non-screening, end position, the collapsed screening body and preferably the entire screening device 34 is hidden by the second leg. Similar considerations apply to the embodiment in Fig. 7, where the width of the second leg 16 serving as an IGU supporting section and/or the width of the secondary leg 26 of the frame side member 10 can advantageously be designed so that the screening device is it least partially hidden when seen from the interior through the IGU. In the embodiment shown in Fig. 7 the screening device would have been less visible from the interior side if arranged closer to the IGU 5, possibly even resting on the exterior major surface 5g of the IGU.

[0348] In both figures the screening device 34 is located below the exterior side of the first sash side member 14 when seen in the height direction. In Fig. 6 the exterior side of the first sash side member 14 is defined by the upper surface 31a of the fourth leg 31 and in Fig. 7 it is defined by the upper end 31e of a flange projecting in continuation of the first leg 15. In Fig. 6 the upper surface 31a is the uppermost surface of the first sash side member 14 seen in the height direction. The upper sruface 31a faces in the same direction as the exterior major surface 5g.

[0349] In Fig. 7 the upper end 31 e is the uppermost surface of the first sash side member 14 seen in the height direction. The upper sruface 31a faces in the same direction as the exterior major surface 5g.

[0350] In the embodiment in Fig. 6 the first sash side member 10 includes a top lining recess 10b for receiving an edge of an embrasure lining top panel 50 as described above, and, when the screening body is positioned in the first non-screening, end position, the entire screening device is located on the outer side of the recess. In other words, the recess is positioned closer to the second sash side member than a centre point in the lateral direction of the collapsed screening body.

[0351] In Fig. 7, the first leg has a thickness in a width direction extending perpendicularly to said length and height directions which is denoted with T. The first leg 15 of the first sash side member is generally plate-shaped, consists of one single section of substantially solid material and at least a portion of the first leg has a said thickness less than 1 cm. The legs comprising the first sash side member 14 may be attachable or detachable from each other. The first leg 15 may comprise metal. The sash is made from a thermoset plastic polymer material comprising fibers, but could also comprise metal such as aluminium. This provides a siginficantly thinner sash which allows the IGU to be placed lower in the window structure and extend closer to the frame side member. The first leg having a thickness of less than 1 cm allows the distance between the peripheral side 5f of the IGU and the inner side surface 25b of the first frame side member 10 facing towards the IGU, is less than 20 mm. This provides a significantly thinner sash which is particulaly advantagous when the sash extends along the exposed interior major surface of the IGU 5b and/or along a peripheral side of the IGU 5 as the reduction in material thickness allows the IGU to be positioned lower in the window structure and extend closer to the frame side member as seen in Figs 6-8.

[0352] As seen in Fig. 7, the first leg 15 comprises on the surface 15b three grooves 28, 29, 80 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, while the third groove 80 being positioned at a third, smaller distance from the interior major surface of the IGU. The first, second and third grooves 28, 29, 80 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, 80 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 80 in the shown embodiment. Hereby the IGU 5 may be exchanged with an IGU of larger thickness by switching the fixation member 30 to the other groove 29 or 28. 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.

[0353] Fig. 8 shows a further embodiment, where a fixation member 39 is attached to the first sash side member 14 and extending towards the second sash side member (not shown). The fixation member 39 contributes to retaining the top casing 38 of the screening device 34 by preventing it from moving upwards, away from the exterior major surface 5g of the IGU. In this embodiment the fixation member 39 is also used for the fixation of the weather shielding pane 8, but that need not be the case.

[0354] The screening devices 34 in Figs 6-8 are shown with only one screening body, but it is to be understood that they might include two or more screening bodies, and that additional components such as a bottom roller, side rails, motors etc. might also be present even if not shown in the drawing.

[0355] In Fig. 8, the weather shield 3 is dome-shaped. The supporting section 72 of the first sash side member may extend further than shown in Fig. 4. It may also comprise a thermal break 75. The thermal break 75 may be made from a material of a lower thermal conductivity than other parts of the first sash side member 14 and is used to reduce any potential thermal bridges from the sash. The supporting section 72 may also comprise a material discontinuity to reduce the heat transfer at this point, hence the thermal break may be used to insulate the specific part of the sash side member. The supporting section may also comprise a fixation element, which fixation element acts as support between the IGU and the first sash side member and/or may be made of a material that has insulating properties.

[0356] Fig. 9 shows a perspective view from above of a skylight window 1 according to the present invention installed on a roof 2 of a building. The skylight window 1 covers an opening in the roof (not shown). The skylight window 1 has a window portion 4, the window portion comprising the window sash 6 and the IGU 5.

[0357] The IGU 5 is attached to the sash 6 and has multiple layers of glazing 5c-5e. The most interior pane of the IGU 5d has an exposed major interior surface 5b which faces an interior of the bulding in the closed posi-

tion of the skylight window 1 show in Fig. 9. The most exterior pane of the IGU 5c has an exterior major surface 5g which faces an exterior of the building in the closed position of the skylight window 1 show in Fig. 9. The layers og glazing 5c-5e are separated by supporting members 23, 24. The sealing members distances the layers of glazing and seal in the spacings between the layers og glazing 5c-5e. A height direction H extends from the exposed interior major surface 5b towards the exposed exterior major surface 5g.

[0358] The skylight window 1 has a weather shield 3 which comprises a weather shield pane 8 which is not shown in Fig. 9 to provide an unobstructed view of the skylight window. The weather shield 3 is provided above the exterior major surface 5g and covers the sash 6 and the IGU 5. The weather shield 3 further has a weather shield skirt 9, which is arranged to surround the weather shield pane 8.

[0359] The skylight window has four frame side members 10, 11 arranged at respective sides of the skylight window. The first frame side member 10 extends in the longutudinal direction L and another frame side member 11 extends the lateral direction W.

[0360] The sash 6 has four sash side members 12, 13, 14 each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior. A first sash side member 14 extends along a first peripheral side 5a of the IGU in the longutidnal direction L. The first sash side member 14 also extends along the first frame side member 10. A second sash side member 13 is parralel to the first sash side member 14 and extends along a second peripheral side of the IGU (not shown). A third sash side member 12 extends between the first 14 and second sash side members 13 in the lateral direction W. The first sash side member 14 is located at a first side of the skylight window, which is shown in more detail in Fig. 10, the second sash side member 13 is located at a second side of the skylight window, which is shown in more detail in Fig. 11, and the third sash side member 12 is located at a third side of the skylight window, which is shown in more detail in Fig. 12.

[0361] Referring to Fig. 9 the skylight window 1 has a screening device 34 which is mounted in a spacing delimited in the lateral direction by the first 14 and second 23 sash side members and in the height direction by the direction by the weather shield pane (8) towards the exterior and by the sash and/or the exterior major surface of the IGU towards the interior.

[0362] The screening device 34 shown in Fig. 9 includes a screening body 36 which is moveable between a first, non-screening end position and a second, screening end position. In the first, non-screening end position the screening body is rolled up on a collection roller 35 at the first sash side member 14, and in the second, screening end position, the screening body 36 is extended between the first 14 and second 13 sash side members. In Fig. 9 the screening body 36 shown in a screening position in which the screening body partly extends between the first 14 and second 13 sash side members, the screening body 36 being partly rolled up on collection roller 35. The collection roller 35 is placed in a casing 38.

[0363] Figs. 10-12 shows cross-sectional views of the first, second and third sides of the skylight window 1 shown in Fig. 9 respectively. If not otherwise stated below parts or features of the skylight window shown in Figs. 10-12 may be similar or identical to those of previous embodiments.

[0364] Fig. 10 shows the first frame side member 10 and the first sash side member 14 in the closed position of the skylight window 1. The exterior side of the first sash side member is defined by the upper end 31 e of a flange, the flange projecting upwardly in the height direction. The upper end 31e faces in the same direction as the exterior major surface 5g of the IGU. There is provided a first insulation member 81 between the first peripheral side 5a of the IGU and the primary leg 25 of the first frame side member.

[0365] In Fig. 10 the screening device 34 is mounted in the space delimited by lateral direction W by the first sash side member 14, and in the height direction by the first sash side member 14 toward the interior and by the weather shield pane 8 toward the exterior. The collection roller 35 is provided within a casing 38 and the casing is attached to the first sash side member 14 by the fixation member 39. The fixation attachment is in this embodiment a hook or cleat type fixation member. The screening body 36 is shown in a partly rolled-up state wherein the screening body 36 is partly extended toward the second sash side member (not shown) in the lateral direction W. The screening body 36 is provided with a bottom bar 36a, the bottom bar is attached to the screening body 36 at a bottom edge of the screening body, and it extends in the longitudinal direction. The bottom edge of the screening body is the edge closest to the second sash side member. The bottom bar 36a prevents the screening body 36a from completely entering the casing 38, as an opening in the casing 38 for the screening body hinders the bottom bar 36a from entering the casing 38.

[0366] The screening device 34 is located below the exterior side of the first sash side member defined by the upper end 31 when seen in the height direction. The entire screening body 36 is located below said exterior side.

[0367] Fig. 11 shows a cross-sectional view of the second side of the skylight window 1, the second side being opposite the first side of the skylight shown in Fig. 10. As can be seen the frame side member and second sash side member 14 in Fig. 11 is identical or similar to those shown in Fig. 10.

[0368] At this second side of the skylight window 1 there is provided a receiving structure 63 of the screening device 34. The receiving structure 63 is mounted on the second sash side member 13 by a fixation member 39 similar to the fixation member of Fig. 10. The receiving structure 63 extends along the second sash side member 13 in the longitudinal direction L and covers an inward

facing surface of the second sash side member. The receiving structure 63 has a recess 63a which is adapted to receive part of the bottom bar 36a in the second, screening end position of the screening body 36. In the second, screening end position of the screening body, the engagement of the recess 63 of the receiving structure and the bottom bar 36a prevents light from entering through the skylight window, i.e. prevents a sliver of light from entering at an interface of the screening body 36 and the receiving structure 63.

[0369] An insulation member 81 is provided between the primary leg 25 and the IGU 5 in the lateral W direction. The insulation member 81 is further provided between the second sash side member 13 and an actuator 37. The actuator 37 is located in a space delimited in the second sash side member 14 and the secondary leg 26 in the height direction and by the primary leg 25 and the second sash side member 14 or by a peripheral side of the IGU in the lateral direction W, in the closed position of the skylight window 1. The actuator 37 is connected (not shown) to the screening device 34 whereby it may move the screening body 36 between its first and second end positions. The actuator may be connector to the screening body 36 by a cord guidance system (not shown).

[0370] Fig. 12 shows a cross-sectional view of the third side of the skylight window 1 of Fig. 9, the third side extending between the first and second sides of the skylight window 1. As can be seen the frame side member and third sash side member 12 in Fig. 12 is identical or similar to those shown in Figs. 10-11.

[0371] At this third side of the skylight window 1 there is provided a side rail of the screening device 34. The side rail 64 is mounted to the third sash side member 12 by a fixation member 39 similar to the fixation member of Figs. 10-11. The side rail 64 extends along the third sash side member 12 in the lateral direction and covers an inward facing surface of the third sash side member. The side rail 64 hollow and comprises a rail cavity 64b and a rail opening 64b in an inward facing surface of the s rail 64. In the cavity 64a and through the rail opening 64b a peripheral side (not shown) of the screening body 36, may be mounted, possibly by an end of the bottom bar 36a. A similar side rail may be provided at a fourth sash side member (not shown), the fourth sash side member being parallel to and located opposite to the third sash side member 12, an opposite peripheral side of the screening body 36 being mounted within said side rail at the fourth sash side member (not shown). This situation is shown in Fig. 10, where the screening body is extended in the longitudinal direction L by the side rails.

[0372] The side rail 64 provides a guidance track for the movement between the first, non-screening end position and the second, screening end position of the screening body 36. The cavity 64b may further accommodate connecting means, such as cords, wires or chains (not shown), connecting the actuator 37 (not shown) to the screening body 36, possibly to the bottom bar 36a, through which connecting means the actuator 37 may move the screening body 37. Such connecting means may be part of a cord guidance system (not shown)

Claims

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

a window portion (4) comprising a window sash (6) and an insulating glazing unit (IGU), said IGU being attached to the window sash and having multiple layers of glazing, said IGU having an exposed interior major surface (5b) for facing an interior of the building in an installed position of the skylight window and an exterior major surface (5g) facing in a direction opposite to the interior of the building towards the exterior, the sash (6) having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a first sash side member and a second sash side member, which is substantially parallel to the first sash side member, said first sash side member extending in a longitudinal direction along a first peripheral side of the IGU and said second sash side member extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface towards the exposed exterior major surface, and a lateral direction extending from the first sash side member towards the second sash side member,

a weather shield (3) positioned over the exterior major surface (5g) of the IGU when seen in the height direction so as to cover the sash and the IGU for protecting the window portion (4) from the weather in the installed position of the skylight window, the weather shield comprising a weather shield pane (8), and

a screening device (34) including a screening body, the screening body being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member and a second, screening end position in which, for the screening of the IGU, it is extended between the first and second sash side members,

characterized in that

the screening device (34) is mounted in a spacing delimited in the lateral direction by the first and second sash side members and in the height direction by the weather shield pane (8)

towards the exterior and by the sash and/or the exterior major surface of the IGU towards the interior, and **in that** the screening device is located below the exterior side of the first sash side member when seen in the height direction.

2. A skylight window according to claim 1, where said exterior sides of the sash side members together define an exterior side of the sash, and where the entire screening device is located below said exterior side of the sash both in the first and in the second end position.

3. A skylight window according to claim 1 or 2, where a first leg of said first sash side member extends along said first peripheral side of the IGU and above the exposed interior major surface in the height direction, and where a screening device support section extends from the first leg in the lateral direction.

4. A skylight window according to claim 3, where the first leg of the first sash side member includes an interior section extending between the exposed exterior major surface of the IGU and the screening device support section and an exterior section extending from the screening device support section towards the exterior, so that the screening device support section forms a ledge or step on the first leg of the first sash side member.

5. A skylight window according to one or more of the preceding claims, where a first leg of said first sash side member extends along said first peripheral side of the IGU and above the exposed exterior major surface in the height direction, and a second leg of the first sash side member extends along said first peripheral side of the IGU and inwards in the lateral direction, said first and second legs being interconnected at the first peripheral side of the IGU, and said second leg forming an IGU supporting section supporting the IGU.

6. A skylight window according to claim 5, wherein, when the screening body is positioned in the non-screening, end position, the collapsed screening body is at least partly hidden by the IGU supporting section when seen from the interior through the IGU.

7. A skylight window (1) according to any one of the previous claims, where said exterior sides of the sash side members together define an exterior side of the sash, and where the entire screening body (36) is located below said exterior side of the sash both in the first and in the second end position.

8. A method for retrofitting a screening device on a skylight window for being or being positioned in roof of a building, the skylight window comprising:

a window portion comprising a window sash and an insulating glazing unit (IGU), said IGU being attached to the window sash and having multiple layers of glazing, said IGU having an exposed interior major surface for facing an interior of the building in a installed position of the skylight window and an exterior major surface facing in a direction opposite to the interior of the building towards the exterior, the sash having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a first sash side member and a second sash side member, which is substantially parallel to the first sash side member, said first sash side member extending in a longitudinal direction along a first peripheral side of the IGU and said second sash side member extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface towards the exposed exterior major surface, and a lateral direction extending from the first sash side member towards the second sash side member,
a weather shield positioned over the exterior major surface of the IGU when seen in the height direction so as to cover the sash and the IGU for protecting the window portion from the weather in the installed position of the skylight window, the weather shield comprising a weather shield pane, and
a screening device including a screening body, the screening body being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member and a second, screening end position in which, for the screening of the IGU, it is extended between the first and second sash side members,
said method comprising the steps of:

- removing or detaching the weather shield from the window portion,
- mounting the screening device by attaching it to the window portion, specifically the sash, more specifically the first sash side member, so that the screening device is positioned in a spacing delimited in the lateral direction by the first and second sash side members, and in the height direction by the weather shield pane towards the exterior and by the sash and/or the exterior major surface of the IGU towards the interior, and in that the screening device is located below the exterior side of the first sash side member when seen in the height direction,
- reattaching the weather shield to the win-

dow portion.

9. A skylight window according to any one of the preceding claims 1 to 7, 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, each of said first frame and sash side members extending in a respective longitudinal direction substantially in parallel with 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,
said secondary leg having a bottom surface facing in a direction away from the interior major surface of the IGU, which bottom surface comprises a lining panel protrsuion (10e) configured to receive an upper part of a reveal panel or lining panel in said installed position of the skylight window, said lining panel protrusion comprising a first surface for abutting an inwardly facing interior surface of said reveal panel or lining panel when received by said protrusion
wherein said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said protrusion.

10. A skylight window according to any one of the preceding claims 1 to 7, 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, each of said first frame and sash side members extending in a respective longitudinal direction substantially in parallel with 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,
said secondary leg having a bottom surface facing in a direction away from the interior major surface of the IGU, which bottom surface comprises a recess configured to receive 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,
wherein said first peripheral side of the IGU is located, in said outward direction, beyond said first surface of said recess.

11. A skylight window according to any one of claims 1

to 7 and 9 to 10 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, each of said first frame and sash side members extending in a respective longitudinal direction substantially in parallel with 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,
wherein said primary leg extends as far as or farther in said upward direction than a location of said exterior major surface of the IGU.

12. A skylight window according to any one of claims 1 to 7 and 9 to 11 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,
a weather shield attached to the sash so as to protect a window portion of the skylight window, the window portion comprising the sash, the frame and the 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 respective longitudinal direction substantially in parallel with a respective 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 IGU further having an exposed exterior major surface facing in an opposite direction towards an exterior in said installed position of the skylight window,
where said weather shield extends across substantially the entire exposed exterior major surface, wherein, in a closed position of said skylight window,
said first sash side member having a first leg connected to a supporting section of the first sash side member supporting the IGU, the first leg extending in said longitudinal direction and extending substantially in a height direction substantially perpendicularly to at least one of said major surfaces of the IGU, said first leg having a thickness in a width direction extending perpendicularly to said length and height directions, wherein at least a portion of said first leg of the first sash side member is generally plate-shaped, consisting of one single section of substantially solid material having a said thickness less than 1 cm.

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

1. A skylight window (1) for being installed in a roof (2) of a building, the skylight window (1) comprising:

a window portion (4) comprising a window sash (6) and an insulating glazing unit (IGU), said IGU (5) being attached to the window sash (6) and having multiple layers of glazing, said IGU (5) having an exposed interior major surface (5b) for facing an interior of the building in an installed position of the skylight window and an exterior major surface (5g) facing in a direction opposite to the interior of the building towards the exterior, the sash (6) having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a

first sash side member (14) and a second sash side member (13), which is substantially parallel to the first sash side member (14), said first sash side member (14) extending in a longitudinal direction along a first peripheral side (5a) of the IGU and said second sash side member (13) extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface (5b) towards the exposed exterior major surface (5g), and a lateral direction extending from the first sash side member (14) towards the second sash side member (13),
a weather shield (3) positioned over the exterior major surface (5g) of the IGU when seen in the height direction so as to cover the sash (6) and the IGU (5) for protecting the window portion (4) from the weather in the installed position of the skylight window, the weather shield (3) comprising a weather shield pane (8), and
a screening device (34) including a screening body (36), the screening body (36) being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member (14) and a second, screening end position in which, for the screening of the IGU (5), it is extended between the first and second sash side members (14, 13),
characterized in that
the screening device (34) is mounted in a spacing delimited in the lateral direction by the first and second sash side members (14, 13) and in the height direction by the weather shield pane (8) towards the exterior and by the sash (6) and/or the exterior major surface (5g) of the IGU towards the interior, and **in that** the screening device (34) is located below the exterior side of the first sash side member when seen in the height direction.

2. A skylight window (1) according to claim 1, where said exterior sides of the sash side members together define an exterior side of the sash, and where the entire screening device (34) is located below said exterior side of the sash both in the first and in the second end position.

3. A skylight window (1) according to claim 1 or 2, where a first leg (15) of said first sash side member (14) extends along said first peripheral side (5a) of the IGU and above the exposed interior major surface (5b) in the height direction, and where a screening device support section (17) extends from the first leg (15) in the lateral direction.

4. A skylight window (1) according to claim 3, where the first leg (15) of the first sash side member (14) includes an interior section extending between the exposed exterior major surface (5g) of the IGU and the screening device support section (17) and an exterior section extending from the screening device support section (17) towards the exterior, so that the screening device support section (17) forms a ledge or step on the first leg (15) of the first sash side member (14).

5. A skylight window (11) according to one or more of the preceding claims, where a first leg (15) of said first sash side member (14) extends along said first peripheral side (5a) of the IGU and above the exposed exterior major surface (5g) in the height direction, and a second leg (16) of the first sash side member (14) extends along said first peripheral side (5a) of the IGU and inwards in the lateral direction, said first and second legs (15, 16) being interconnected at the first peripheral side (5a) of the IGU, and said second leg (16) forming an IGU supporting section (72) supporting the IGU (5).

6. A skylight window (1) according to claim 5, wherein, when the screening body (36) is positioned in the first, non-screening end position, the collapsed screening body is at least partly hidden by the IGU supporting section (72) when seen from the interior through the IGU (5).

7. A skylight window (1) according to any one of the previous claims, where said exterior sides of the sash side members together define an exterior side of the sash, and where the entire screening body (36) is located below said exterior side of the sash both in the first and in the second end position.

8. A method for retrofitting a screening device (34) on a skylight window (1) for being or being positioned in a roof (2) of a building, the skylight window (1) comprising:

a window portion (4) comprising a window sash (6) and an insulating glazing unit (IGU), said IGU (5) being attached to the window sash (6) and having multiple layers of glazing, said IGU (5) having an exposed interior major surface (5b) for facing an interior of the building in a installed position of the skylight window and an exterior major surface (5g) facing in a direction opposite to the interior of the building towards the exterior, the sash (6) having four sash side members each having an interior side facing the interior of the building in the installed position of the skylight window and an exterior side facing the exterior, said four sash side members including a first sash side member (14) and a second sash side member (13), which is substantially parallel to the first sash side member (14), said first sash

side member (14) extending in a longitudinal direction along a first peripheral side (5a) of the IGU and said second sash side member (13) extending in a longitudinal direction along a second peripheral side of the IGU, a height direction extending from the exposed interior major surface (5b) towards the exposed exterior major surface (5g), and a lateral direction extending from the first sash side member (14) towards the second sash side member (13),
a weather shield (3) positioned over the exterior major surface (5g) of the IGU when seen in the height direction so as to cover the sash (6) and the IGU (5) for protecting the window portion (4) from the weather in the installed position of the skylight window, the weather shield (3) comprising a weather shield pane (8), and
a screening device (34) including a screening body (36), the screening body (36) being moveable between a first, non-screening end position in which it is in a collapsed, such as a rolled-up, pleated or folded, state at the first sash side member (14) and a second, screening end position in which, for the screening of the IGU, it is extended between the first and second sash side members (14, 13),
said method comprising the steps of:

- removing or detaching the weather shield (3) from the window portion (4),
- mounting the screening device (34) by attaching it to the window portion (4), specifically the sash (6), more specifically the first sash side member (14), so that the screening device (34) is positioned in a spacing delimited in the lateral direction by the first and second sash side members (14, 13), and in the height direction by the weather shield pane (8) towards the exterior and by the sash (6) and/or the exterior major surface (5g) of the IGU towards the interior, and in that the screening device (34) is located below the exterior side of the first sash side member (14) when seen in the height direction,
- reattaching the weather shield (3) to the window portion (4).

9. A skylight window (1) according to any one of the preceding claims 1 to 7, comprising:

a window frame (7) having four frame side members,
the window sash (6) having four sash side members supporting the IGU, said window sash (6) being movable in relation to the window frame (7) between an open and a closed position of the skylight window, and
the weather shield (3) being attached to the sash (6) so as to protect a window portion (4) of the skylight window, the window portion (4) comprising the sash (6), frame (7) and IGU (5),
a first of the frame side members (10) being associated with the first of the sash side members (14), each of said first frame and sash side members (10, 14) extending in a respective longitudinal direction substantially in parallel with the first peripheral side (5a) of the IGU,
said interior major surface (5b) of the IGU 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 exterior major surface (5g) of the IGU extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface (5g) of the IGU,
said first frame side member (10) having a primary leg (25), which in said closed position is positioned next 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 next to and along a part of said interior major surface (5b) of the IGU,
said secondary leg (26) having a bottom surface (10a) facing in a direction away from the interior major surface (5b) of the IGU, which bottom surface (10a) comprises a lining panel protrsuion (10e) configured to receive an upper part (50a) of a reveal panel or lining panel (50) in said installed position of the skylight window, said lining panel protrusion (10e) comprising a first surface (10c) for abutting an inwardly facing interior surface of said reveal panel or lining panel (50) when received by said protrusion,
wherein said first peripheral side (5a) of the IGU is located, in said outward direction, beyond said first surface (10c) of said protrusion (10e).

10. A skylight window (1) according to any one of the preceding claims 1 to 7, comprising:

a window frame (7) having four frame side members,
the window sash (6) having four sash side members supporting the IGU (5), said window sash (6) being movable in relation to the window frame (7) between an open and a closed position of the skylight window, and
the weather shield (3) being attached to the sash (6) so as to protect a window portion (4) of the skylight window, the window portion (4) comprising the sash (6), frame (7) and IGU (5),
a first of the frame side members (10) being associated with the first of the sash side members

(14), each of said first frame and sash side members (10, 14) extending in a respective longitudinal direction substantially in parallel with the first peripheral side (5a) of the IGU,
said interior major surface (5b) of the IGU 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 exterior major surface (5g) of the IGU extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface (5g) of the IGU,
said first frame side member (10) having a primary leg (25), which in said closed position is positioned next 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 next to and along a part of said interior major surface (5b) of the IGU,
said secondary leg (25) having a bottom surface (10a) facing in a direction away from the interior major surface (5b) of the IGU, which bottom surface (10a) comprises a recess (10b) configured to receive an upper part (50a) of a reveal panel or lining panel (50) in said installed position of the skylight window, said recess (10b) comprising a first surface (10c) for abutting an inwardly facing interior surface of said reveal panel or lining panel (50) when received in said recess (10b),
wherein said first peripheral side (5a) of the IGU is located, in said outward direction, beyond said first surface (10c) of said recess (10b).

11. A skylight window (1) according to any one of claims 1 to 7 and 9 to 10 for being installed in a roof of a building, the skylight window (1) comprising:

a window frame (7) having four frame side members,
the window sash (6) having four sash side members supporting the IGU (5), said window sash (6) being movable in relation to the window frame (7) between an open and a closed position of the skylight window, and
the weather shield (3) being attached to the sash (6) so as to protect a window portion (4) of the skylight window, the window portion comprising the sash (6), frame (7) and IGU (5),
a first of the frame side members (10) being associated with the first of the sash side members (14), each of said first frame and sash side members (10, 14) extending in a respective longitudinal direction substantially in parallel with the first peripheral side (5a) of the IGU,
said interior major surface (5b) of the IGU 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 exterior major surface (5g) of the IGU extending in the outward direction, an upward direction being defined as extending away from at a right angle to said exterior major surface (5g) of the IGU,
said first frame side member (10) having a primary leg (25), which in said closed position is positioned next 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 next to and along a part of said interior major surface (5b) of the IGU,
wherein 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.

12. A skylight window (1) according to any one of claims 1 to 7 and 9 to 11 for being installed in a roof of a building, the skylight window (1) comprising:

a window frame having four frame side members,
the window sash (6) having four sash side members supporting the IGU (5), said window sash (6) being movable in relation to the window frame (7) between an open and a closed position of the skylight window (1),
the weather shield being attached to the sash (6) so as to protect a window portion (4) of the skylight window, the window portion (4) comprising the sash (6), the frame (7) and the IGU (5),
a first of the frame side members (10) being associated with the first of the sash side members (14), said first frame and sash side members (10, 14) extending in a respective longitudinal direction substantially in parallel with the first peripheral side (5a) of the IGU,
where said weather shield (3) extends across substantially the entire exposed exterior major surface (5g) of the IGU, wherein, in a closed position of said skylight window,
said first sash side member (14) having a first leg (15) connected to an IGU supporting section (72) of the first sash side member supporting the IGU, the first leg (15) extending in said longitudinal direction and extending substantially in the height direction substantially perpendicularly to at least one of said major surfaces (5b, 5g) of the IGU, said first leg (15) having a thickness in a width direction extending perpendicularly to said length and height directions,
wherein at least a portion of said first leg (15) of the first sash side member is generally plate-shaped, consisting of one single section of sub-

stantially solid material having a said thickness less than 1 cm.

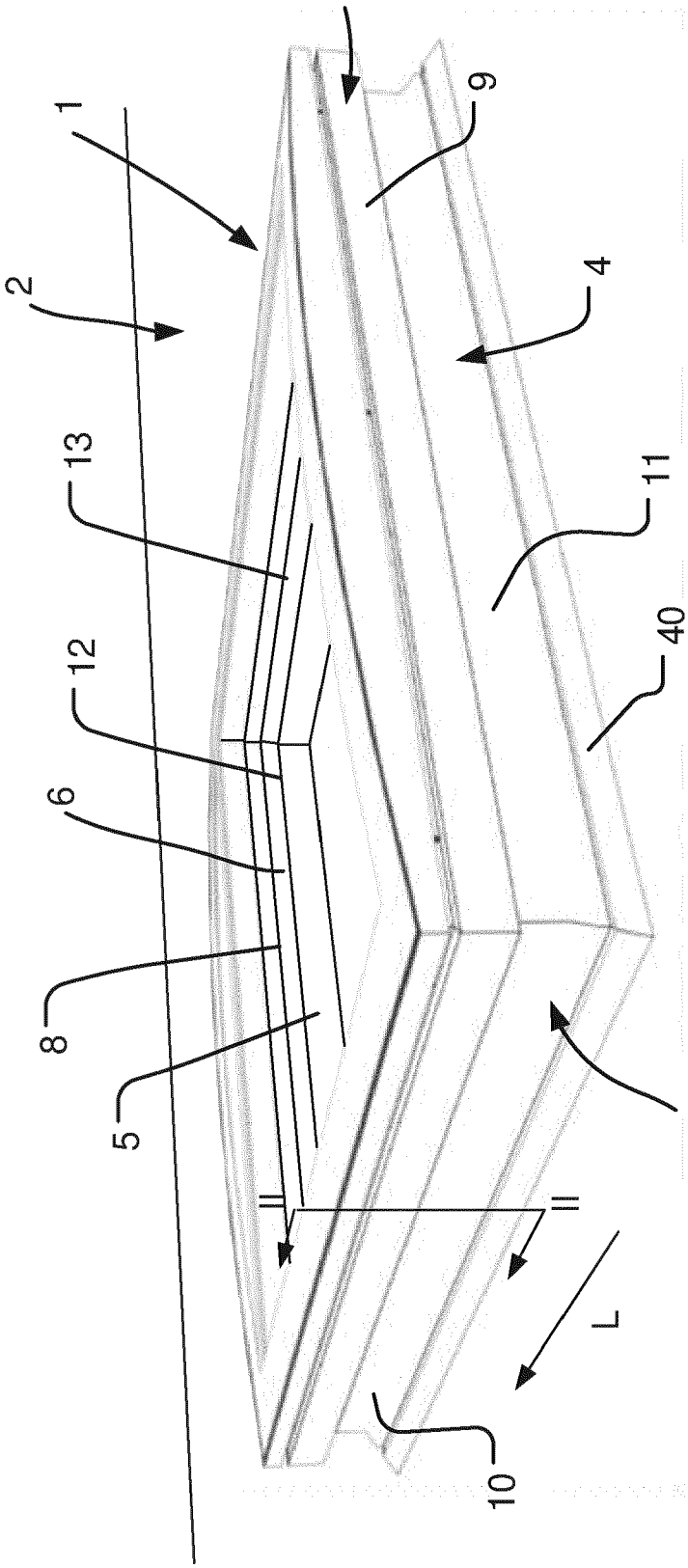


Fig. 1

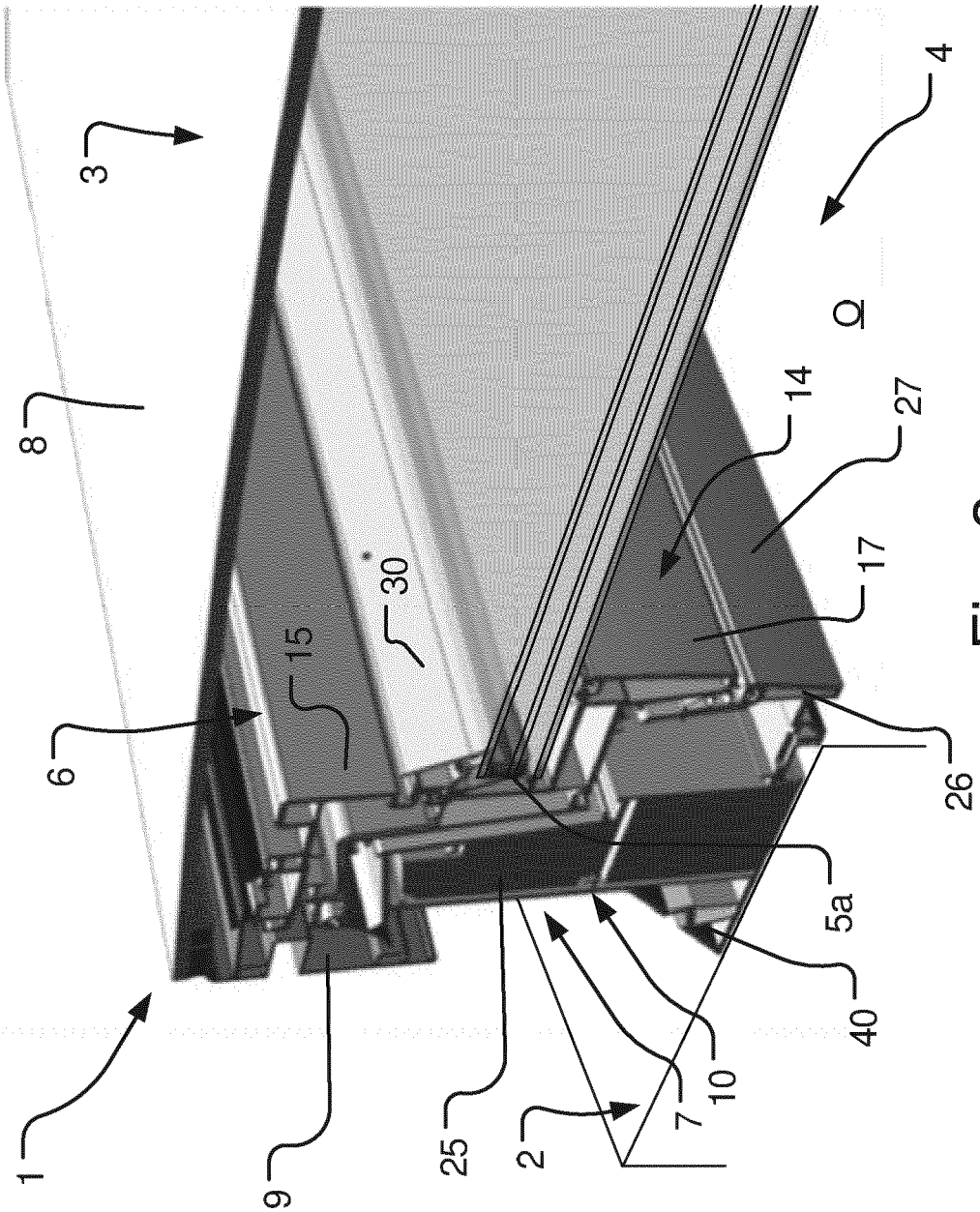
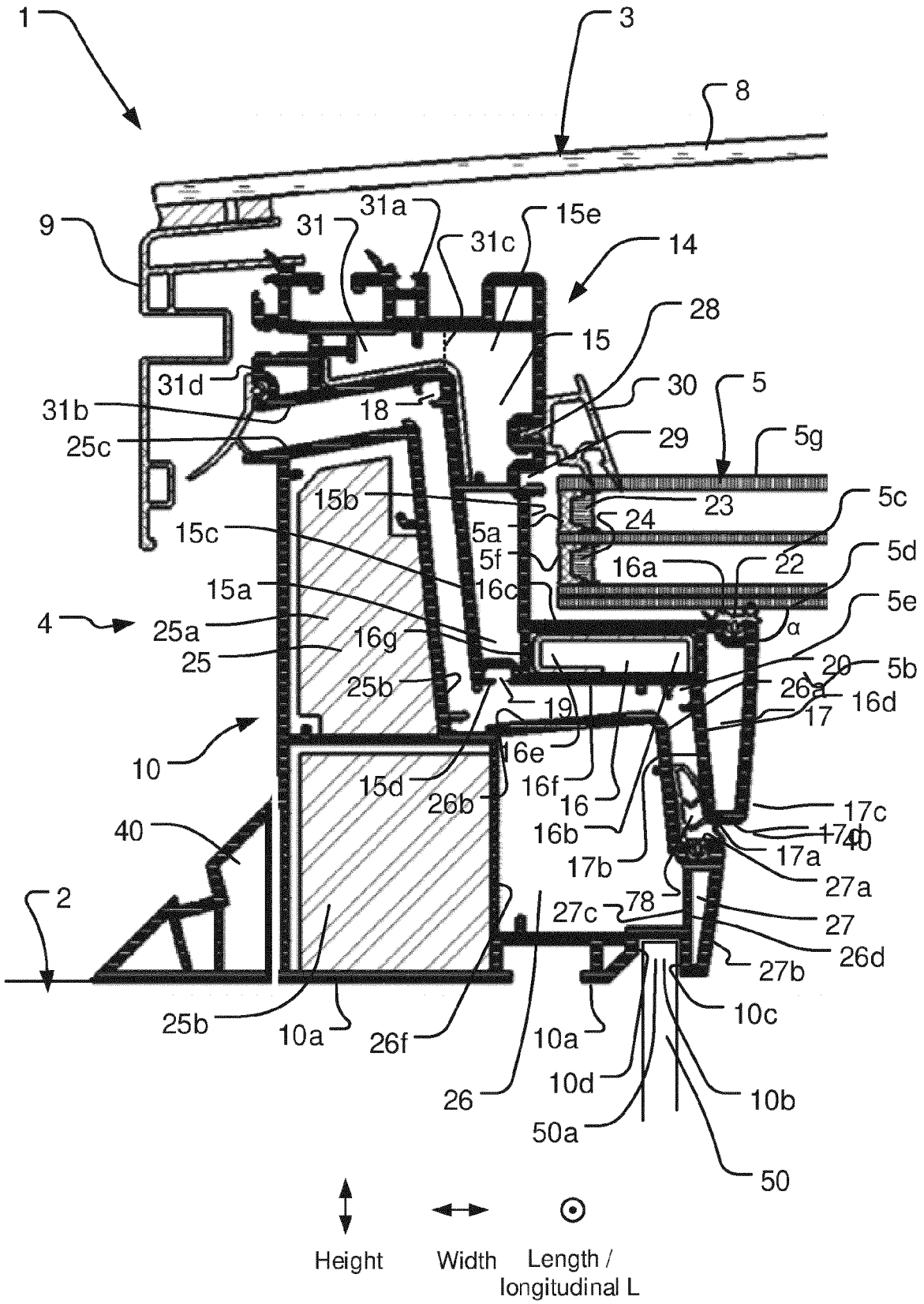


Fig. 2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Height
Width
Length / longitudinal L

Fig. 3

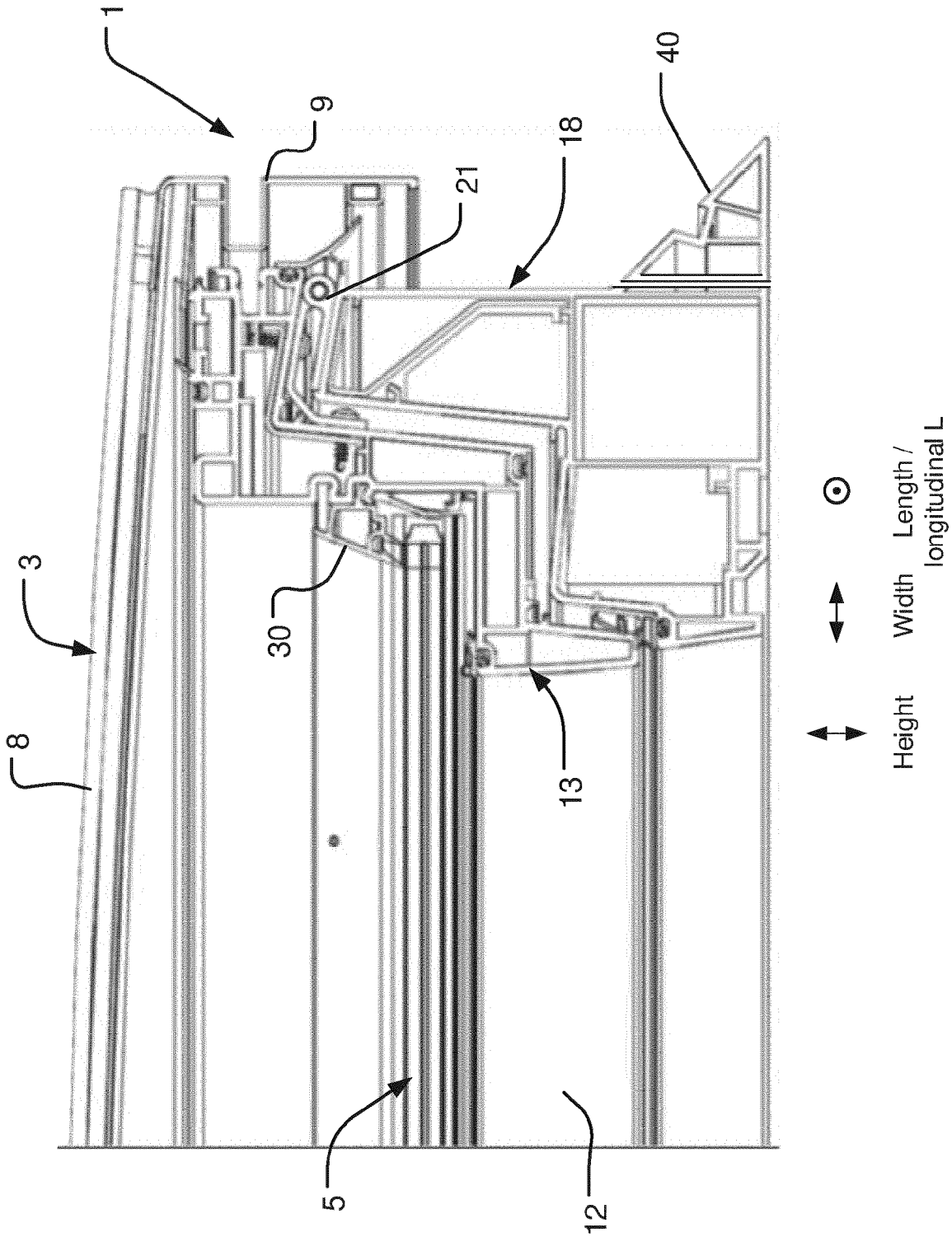


Fig. 4

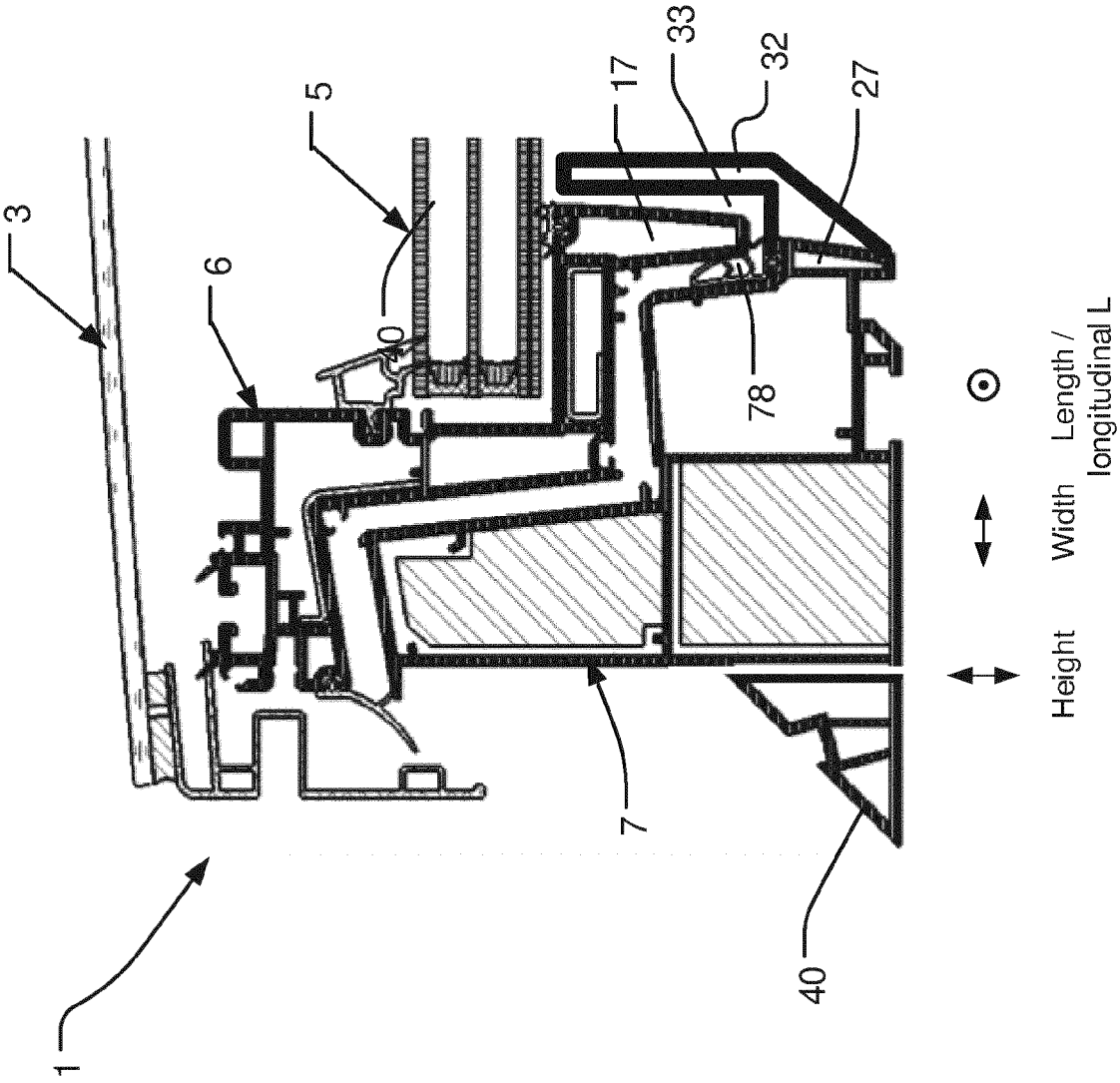
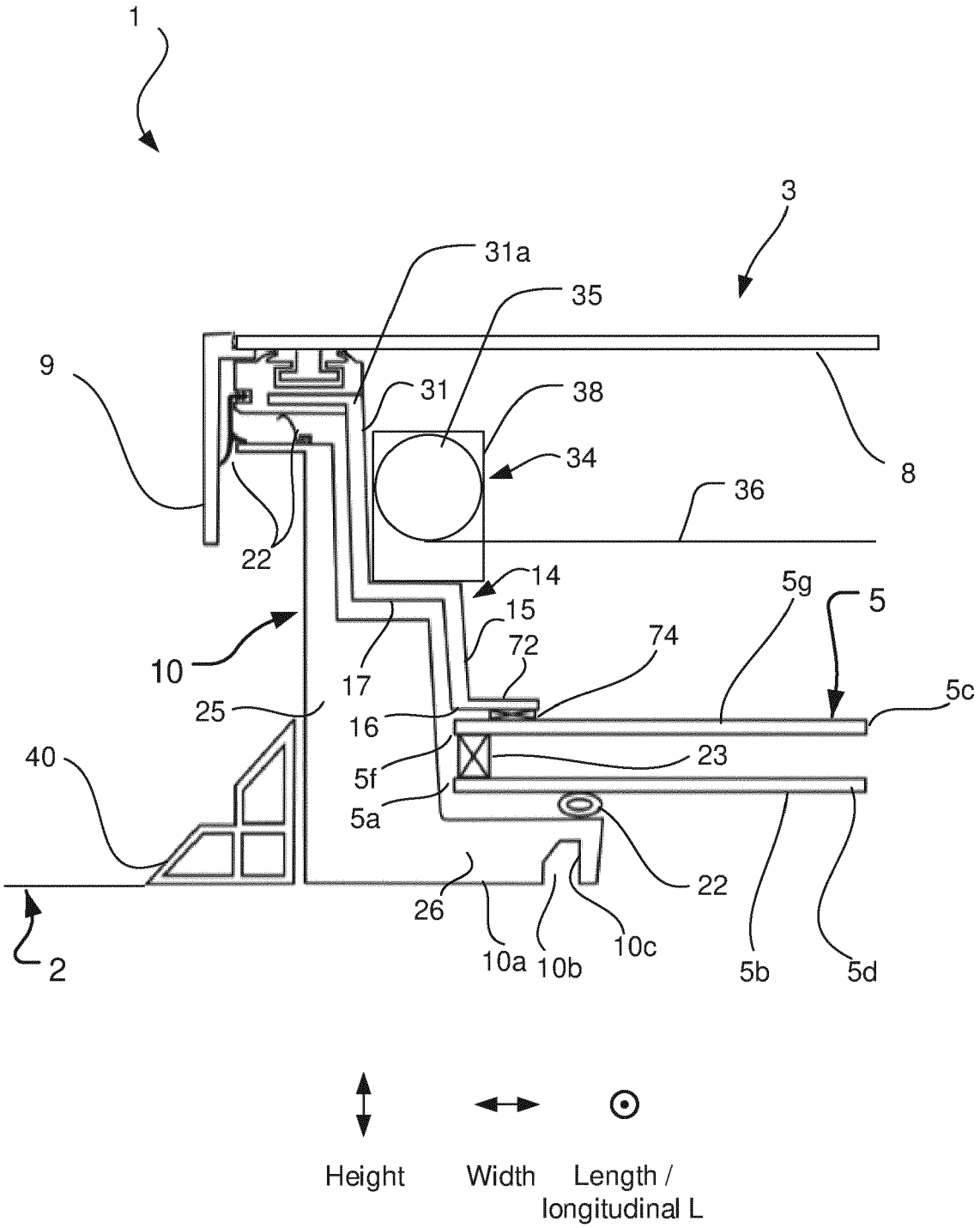


Fig. 5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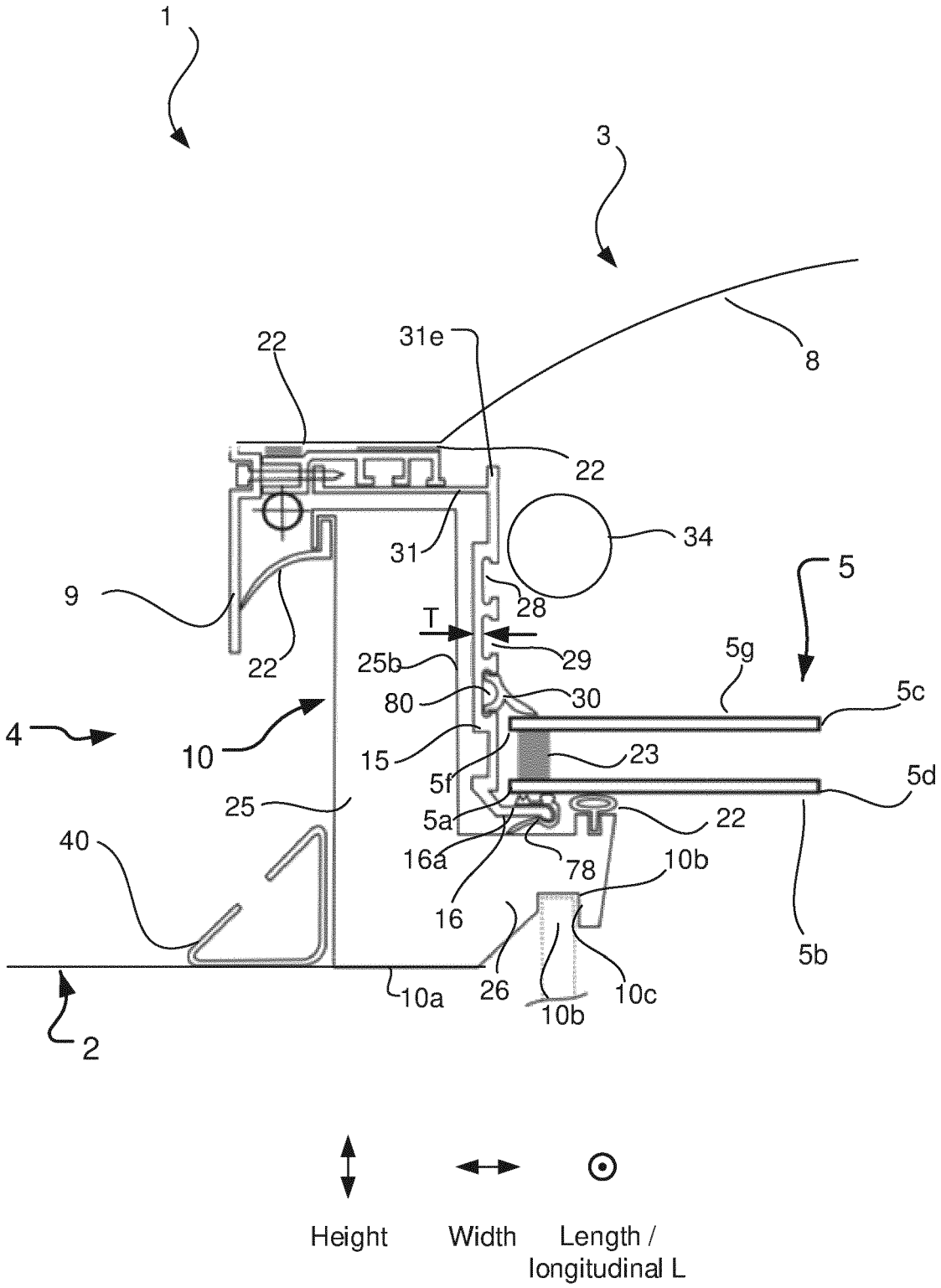
Height
Width
Length / longitudinal L

Fig. 6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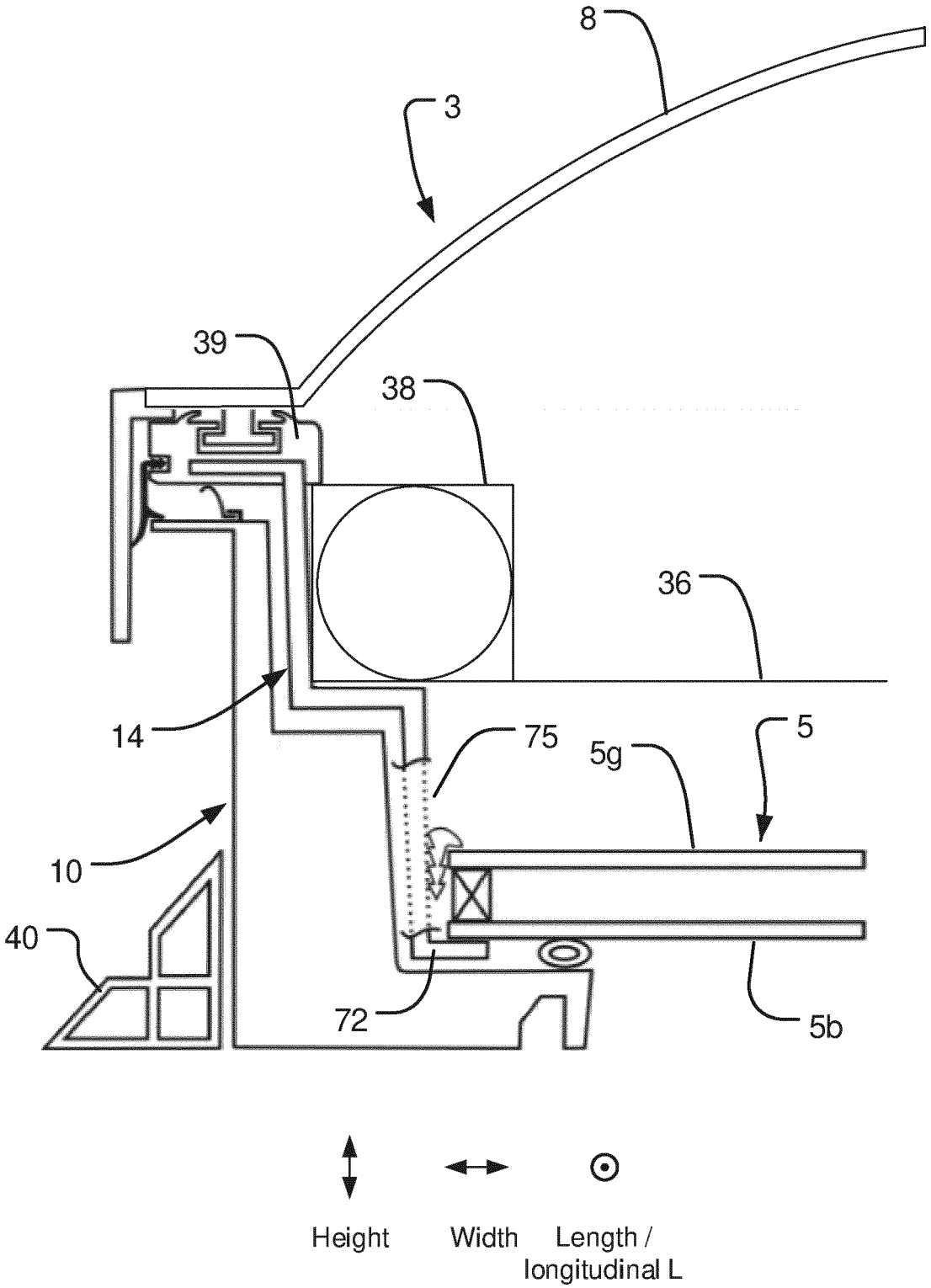
Length / longitudinal L

Fig. 7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5g
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10
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72
5b
Height
Width
Length / longitudinal L

Fig. 8

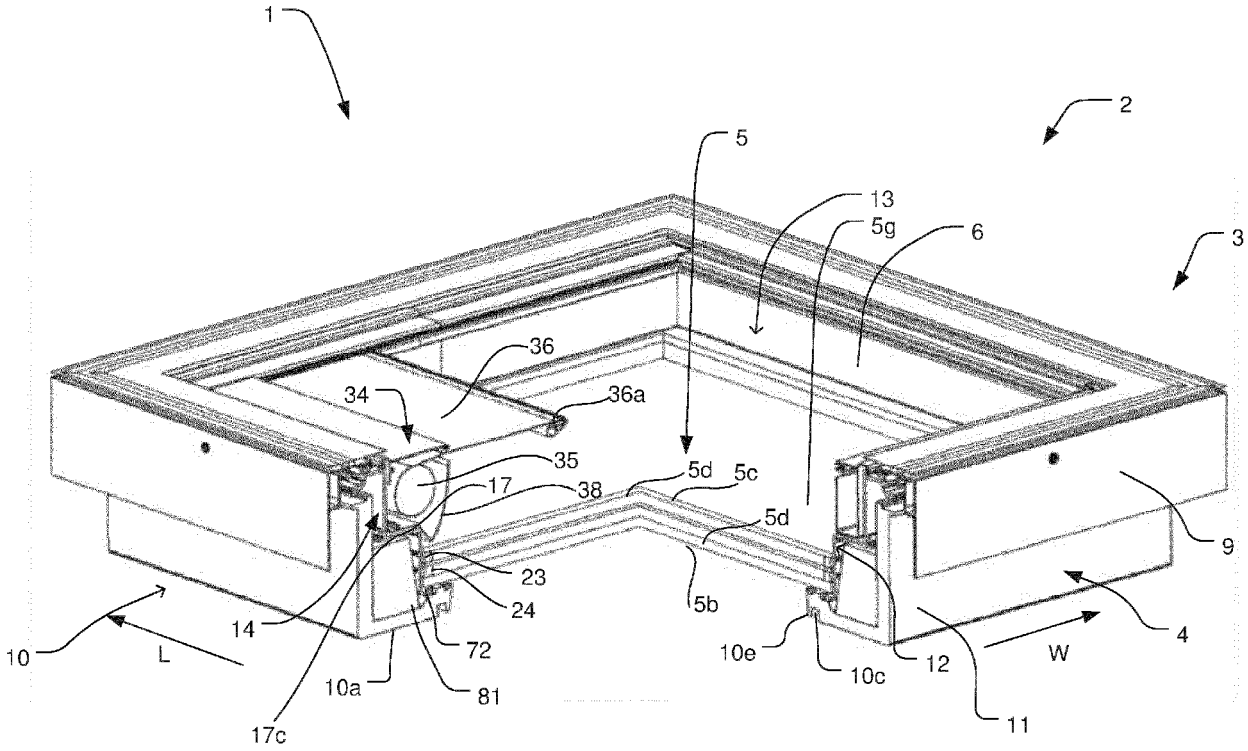
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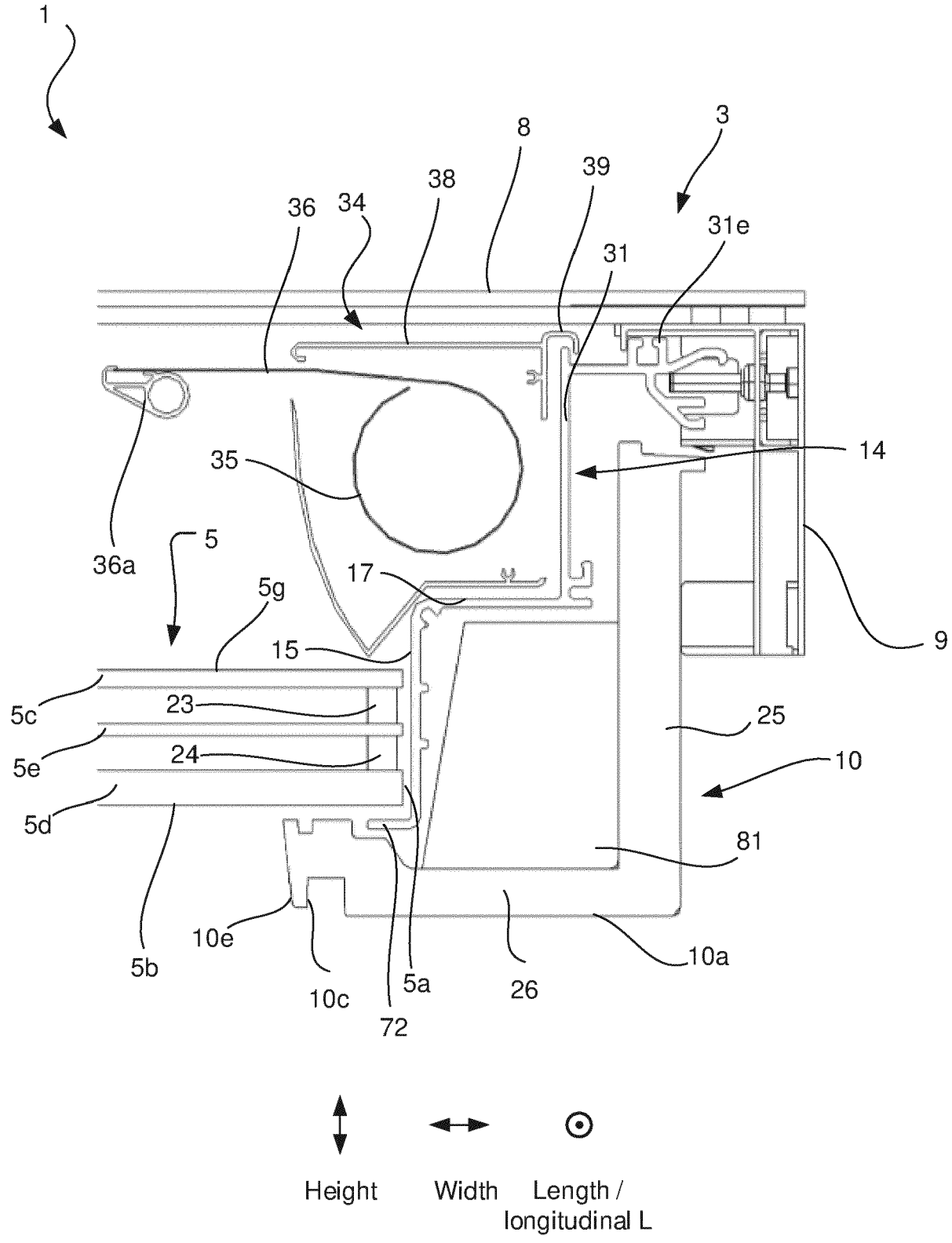
Fig. 9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10c
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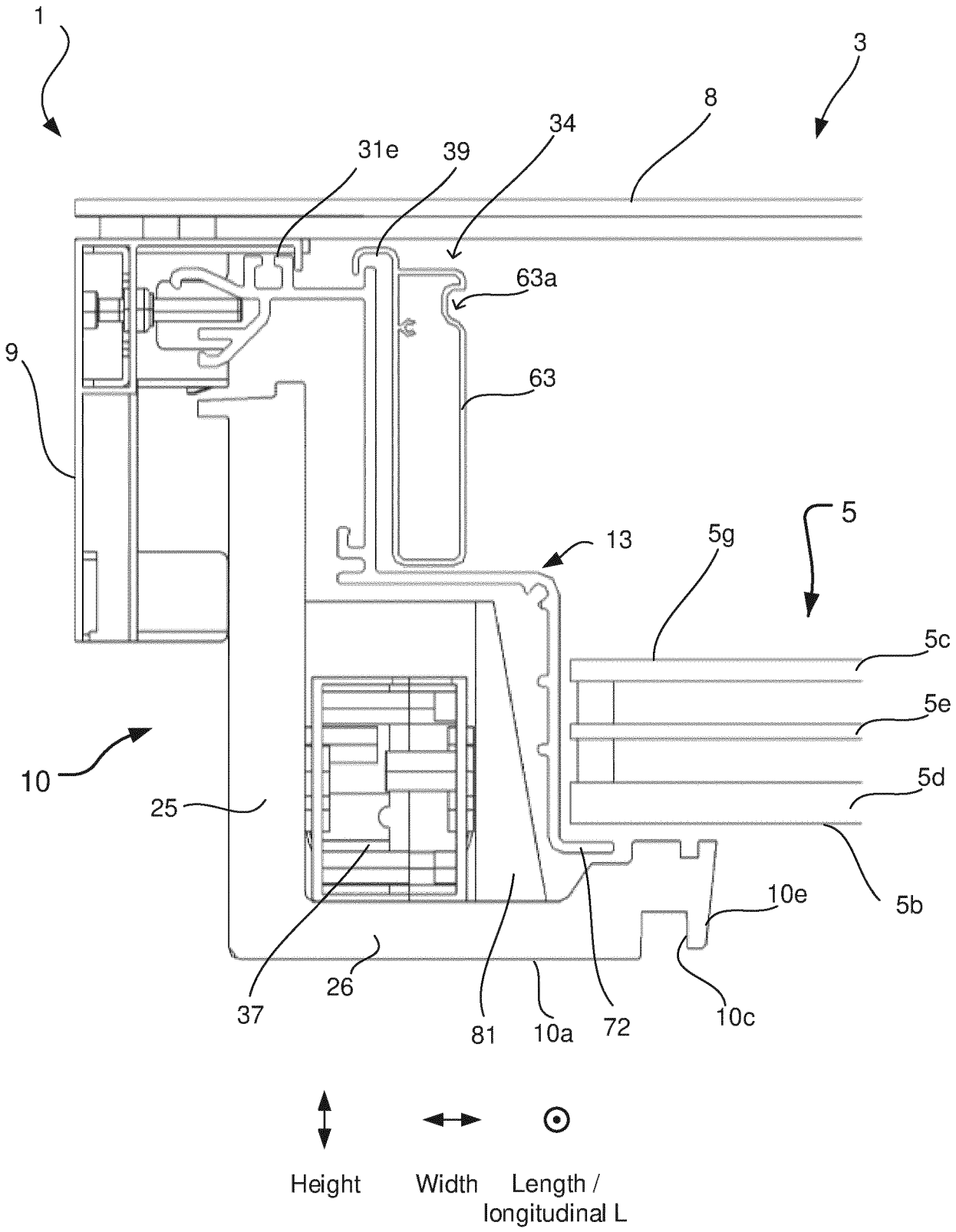
Height
Width
Length / longitudinal L

Fig. 10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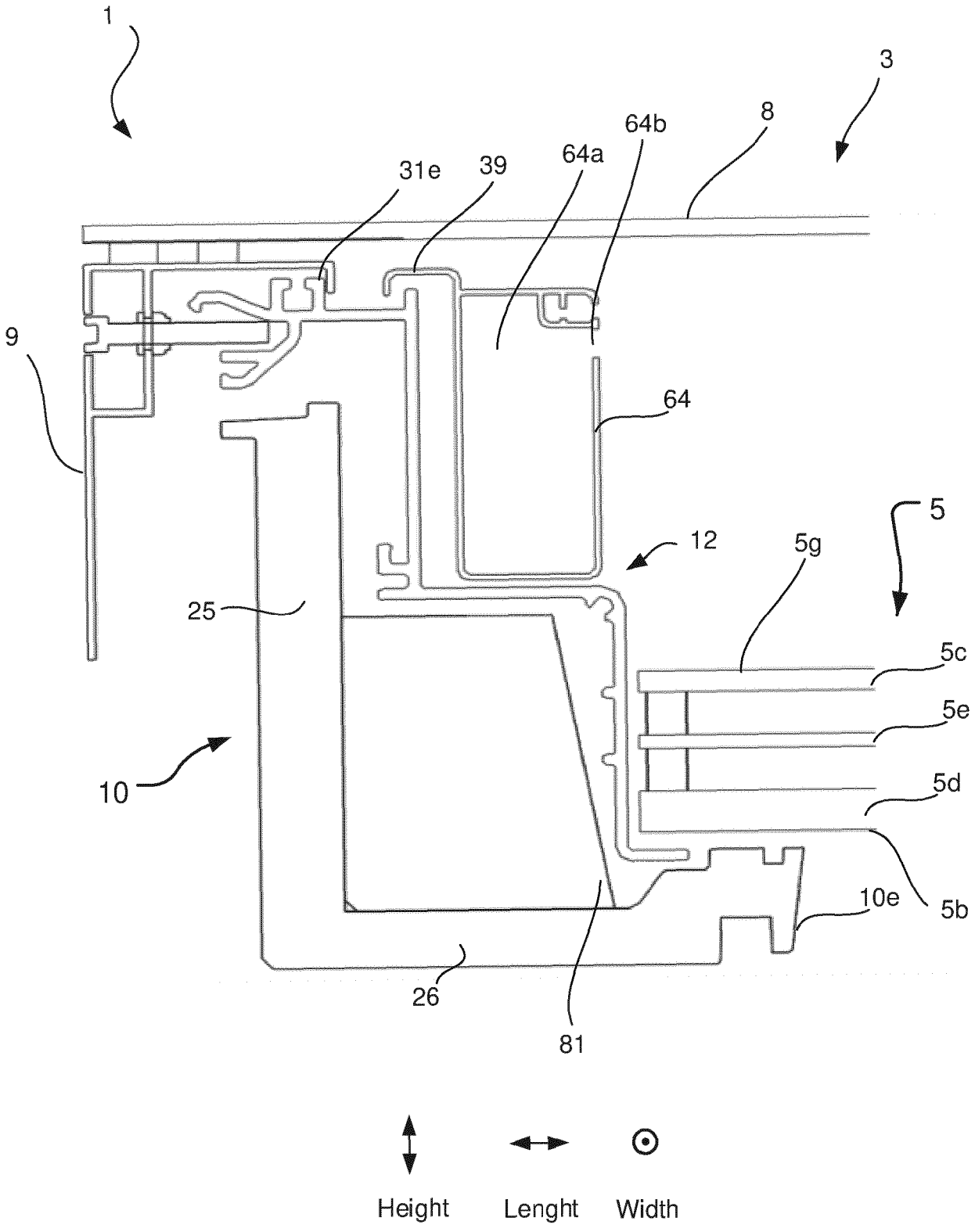
Height
Width
Length / longitudinal L

Fig. 11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81
Height
Lenght
Width

Fig. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 5239

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 3 396 100 A1 (FLOREK RYSZARD [PL]) 31 October 2018 (2018-10-31) * figures 1-3 *	1-12	INV. E04D13/03 E06B9/11
A,D	US 7 624 547 B1 (BRINTON JAMES ERIC [US] ET AL) 1 December 2009 (2009-12-01) * figure 9 *	1-12	
A	FR 2 216 416 A1 (ESSER KG KLAUS [DE]) 30 August 1974 (1974-08-30) * figures 1-2 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)
E04D
E06B

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

CATEGORY OF CITED DOCUMENTS

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03-07-2020

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REFERENCES CITED IN THE DESCRIPTION

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