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(54) **A ROOF WINDOW INSTALLATION SYSTEM, AND A METHOD OF INSTALLING A ROOF WINDOW**

(57) The window installation system comprises a kit of parts for protecting a window frame in a window installation process. The window frame (2) has a top frame member, a bottom frame member, and side frame members. The protection kit (10) comprises at least a bottom protection member (10), and possibly also side protection members (12, 13). Reinforcement sections (115, 116) are provided, and interior and exterior engagement flanges (1111, 1112) extend from the base portion (110) to engage the window frame (2).

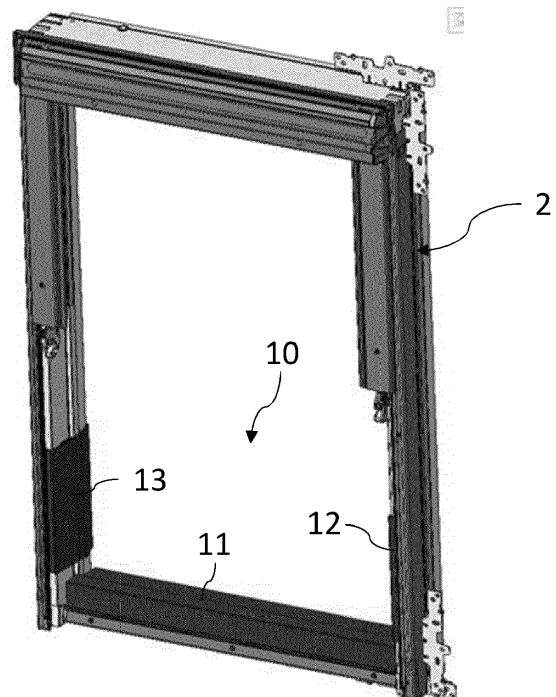


Fig. 15

Description

Technical Field

[0001] The present invention relates to a window installation system comprising a kit of parts, and a roof window having a window frame and a sash. The invention furthermore relates to a method of installing a roof window.

Background Art

[0002] When installing windows, in particular roof windows in an inclined roof, the typical installation process involves mounting the stationary window frame in a first step to allow easy access to the exterior without necessarily exiting to the roof surface. During this procedure, mounting brackets and auxiliary equipment such as under-roofing etc. are installed, but the frame opening is sometimes also used for climbing through, either from the outside and in or vice versa. Also during the installation process, the sash needs to be fitted temporarily to ensure that the frame forms a proper rectangle, without skewness, which can be observed when closing and opening the sash. Following this, the sash is again dismounted and possible adaptation of the position of the frame is carried out. This procedural step is repeated until a satisfying fit has been reached. It is known that the most sensitive times for a window are when the installer is taking the sash in and out and that is when damage is most likely to occur. The step of fitting the sash into the frame typically involves engaging sash hinge parts with frame hinge parts. Since the sash carries the pane is relatively heavy and may be cumbersome to handle, in particular for broad and/or tall windows, the engagement process is challenging and typically involves two persons. There are several critical points when an installer works around the window; s/he can damage parts of the frame or sash, even though the procedure is carried out with great care: when it is removed from the frame, while reassembling sash and frame, when passing the sash to the outside, when working inside from hanging tools, with shoes while climbing in and out of the roof, when reaching parts through the frame to the outside, when roof is dirty and wet, etc.

[0003] Traditionally, experienced installers use cardboard or towels for protecting the frame, but this solution can become wet or fly away and do not offer a high standard protection for the frame.

[0004] After the damage has happened one can use a touch-up kit but there is no definitive solution to the problem. Hence, there exists a need for a window installation system including kit of parts for providing increased assistance to the installer in a window installation process.

[0005] Attempts have been made to meet these challenges, including prior art document DE 20 2018 100 566 U1, which describes a protective profile for a window frame or door, in which a U-shaped profile of a resiliently

yielding material is provided to be able to protect door steps or window frames of a more or less arbitrary cross-section. However, while this profile may be useful in some fields of application, the versatile feature also renders it less useful in others, due to its inherent one-size-fits-all function. Prior art documents addressing more shape-stable profile elements include FR 1 516 259 A and DE 299 19 774 U1. While these two latter documents describe form-fitting profiles that to some extent provide protection of the door or window at least during transportation, there is still room for improvement in providing protection at the installation site.

Summary of Invention

[0006] With this background, it is therefore an object of the invention to provide a window installation system, in which the above-mentioned disadvantages are mitigated or even overcome.

[0007] In a first aspect, this and further objects are achieved with a window installation system of the kind mentioned in the introduction, which is furthermore characterised by the features of claim 1.

[0008] In this way, it is possible to provide a protection kit substantially preventing direct contact between objects, such as a sash, tools, body parts etc., and at least the covered interior portions of the window frame, thereby protecting the window frame in the window installation process. Additionally, the protection kit acts as a support for the sash before engagement of the hinges to fit the sash into the window frame and as guidance during the engagement of the parts of the hinges, thereby assisting the installer in the installation process. Finally, the protection kit is easy and cost-efficient to manufacture, store, transport and handle.

[0009] The wording "protection" should, within the context of this application, be construed as an action of guarding, shielding and/or covering in order to prevent a damage of the window frame or the window sash. The window frame may be unmounted in a package, mounted of unmounted in free state or may be mounted in a stationary window frame. The advantage of this solution of protecting the window frame includes i.e.: preventing direct contact between a sash to be installed in the window frame and the interior portions of the window frame, more specifically preventing the damage of the windows frame when the sash is removed from the frame, while reassembling sash and frame, and when passing the sash to the outside, when working inside from hanging tools, with shoes while climbing in and out of the roof, when reaching parts through the frame to the outside, when roof is dirty and wet.

[0010] In a presently preferred embodiment, at least one of said interior engagement flange and said exterior engagement flange is provided with an inwards inclination relative to a general direction of the base portion of the bottom protection member. In this way, easy mounting and improved retention of the protection member rel-

ative to the frame is achieved since the flanges are so to say clamped against the frame member. Once the installation has been completed, the bottom protection member is easily demounted.

[0011] Each reinforcement section preferably comprises a plurality of ribs extending from a respective part of the base portion of the bottom protection member. Ribs provide for a simple, yet reliable strengthening of the protection member.

[0012] In one development of this embodiment, each reinforcement section is provided with a base rib, said plurality of ribs extending between the base rib and the respective part of base portion of the bottom protection member, preferably also with an end rib. In this way, a geometrically closed configuration is achieved which has proven to provide excellent strength properties.

[0013] In one embodiment, the bottom protection member is provided with two reinforcement sections in connection with the base portion, namely an interior reinforcement section at an interior part of the base portion and an exterior reinforcement section at an exterior part of the base portion, preferably including a joining rib and a shoulder at the transition between the interior reinforcement section and the exterior reinforcement section. This provides for improved protection and distribution of any load following an impact, scraping or even stepping on the bottom protection member.

[0014] In a development of this embodiment, a central reinforcement section is provided between the interior reinforcement section and the exterior reinforcement section, said central reinforcement section preferably having a larger extension in a direction transverse to a general direction of the base portion of the bottom protection member. By this design, optimum protection and assistance during installation are achieved.

[0015] Preferably, the base portion of the bottom protection member is provided with at least one opening near the exterior longitudinal edge. Such opening or openings may provide access to elements present on the bottom frame member, including striking plate(s) for a locking mechanism present in windows having a handle at the bottom sash member.

[0016] In one presently preferred embodiment, said kit of parts comprises at least one side protection member, each having a base portion with an interior longitudinal edge and an opposed exterior longitudinal edge, each extending between one end edge and another end edge and defining a pre-defined length, and wherein the base portion of each side protection member has a pre-defined outer width between the interior longitudinal edge and the exterior longitudinal edge, and a pre-defined inner width, said pre-defined inner width being smaller than the pre-defined outer width and smaller than or substantially equal to the pre-defined width of the side frame member, the pre-defined inner width being defined as a distance between at least one interior engagement flange extending from the base portion at the interior longitudinal edge and at least one exterior engagement flange ex-

tending from the base portion at the exterior longitudinal edge. This provides for protection also of the side members of the frame during installation.

[0017] In a further development of this presently preferred embodiment, at least one of said interior engagement flange and said exterior engagement flange is provided with an inwards inclination relative to a general direction of the base portion of the side protection member. In this way, the side protection member or members may be mounted easily and ensures a safe retention and easy de-mount.

[0018] In another embodiment, each side protection member is provided with at least one reinforcement section in connection with the base portion, and wherein each reinforcement section comprises a plurality of ribs extending from a respective part of the base portion of the side protection member. While this provides for improved protection also of the side members of the frame, the reinforcement section(s) of the side protection member or members need(s) not be as elaborate as in the bottom protection member. It is also conceivable to have side protection member(s) without reinforcement sections.

[0019] In a further development of this embodiment, the base portion part is inclined relative to a general direction of the base portion of the side protection member and the ribs have varying length so that the free ends of at least the majority of the ribs are substantially parallel with the general direction of the base portion, preferably one rib being inclined. The provision of ribs provides for a mechanically reliable structure.

[0020] In a presently preferred embodiment, the protection kit comprises a first side protection member and a second side protection member of substantially identical profiling as the first side protection member. In addition to providing a harmonic appearance, this also has advantages during manufacture.

[0021] Preferably, the bottom protection member is configured to cover substantially an entirety of the bottom frame member facing the central opening such that the pre-defined length of the bottom protection member is substantially equal to the inner width of the window. In this way, maximum protection of the exposed surface of the bottom frame member is achieved.

[0022] Advantageously, the protection kit is adapted to be stored and reused one or more times, preferably in a storage container such as for instance a box, a bag, a net, a strap device. While it is increasingly possible to manufacture parts of any material with due regard to sustainability and recycling, it is still meaningful to provide the protection kit of the window installation system sufficiently robust to allow for repeated use. By "storage container" is to be understood any type of assembly that holds the parts of the kit together.

[0023] In one presently preferred embodiment, the bottom protection member and the two side protection members each comprises an aperture, and wherein the bottom protection member and the two side protection mem-

bers are placed on top of each other such that the apertures are brought into alignment with each other to receive a lock ring in a supply condition of the protection kit, the bottom protection member and the two side protection members being preferably being held together by a rubber band in the supply condition of the protection kit. This provides for a well-functioning supply and storage condition of the protection kit, while at the same time allowing for easy disassembly in preparation of the installation process.

[0024] While in principle any suitable material is conceivable, the material of the bottom protection member and the at least one side protection member preferably comprises hard plastic materials and/or metal, preferably a thermoplastic elastomer (TPE), more preferably made by extrusion or injection moulding. This is light-weight, yet strong and durable and may thus be reused several times, while at the same time, responsible disposal is possible.

[0025] The window installation system with the protection kit may be used for any window; however, the invention is particularly advantageous when the window is a roof window installed in an inclined roof structure of a building, in which the installation is particularly challenging.

[0026] According to a second aspect, a method of installing a roof window is provided as stated in claim 18.

[0027] A further scope of applicability of the present disclosure will become apparent from the detailed description given below. However, it should be understood that the detailed description and specific examples, while indicating preferred variants of the present inventive concept, are given by way of illustration only, since various changes and modifications within the scope of the inventive concept will become apparent to those skilled in the art from this detailed description.

[0028] Hence, it is to be understood that this inventive concept is not limited to the particular steps of the methods described or component parts of the systems described as such method and system may vary. It is also to be understood that the terminology used herein is for purpose of describing particular embodiments only, and is not intended to be limiting. It must be noted that, as used in the specification and the appended claim, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements unless the context clearly dictates otherwise. Thus, for example, reference to "a kit" or "the kit" may include several devices, and the like. Furthermore, the words "comprising", "including", "containing" and similar wordings do not exclude other elements or steps.

Brief Description of Drawings

[0029] In the following description embodiments of the invention will be described with reference to the schematic drawings, in which

Fig. 1 is a perspective view of a roof window comprising a frame and a sash;

Fig. 2a is a perspective view of the frame of the roof window in Fig. 1;

Fig. 2b is a partial perspective view, on a larger scale, of the lower left-hand corner of the frame of Fig. 2a;

Fig. 3 is a perspective view of the sash of the roof window in Fig. 1;

Fig. 4 is a perspective view of a bottom protection member of a protection kit in a first embodiment of the present invention;

Fig. 5 is a perspective view of a side protection member of a protection kit in a first embodiment of the present invention;

Figs 6 and 7 are end views, on larger scales, of the bottom protection member of Fig. 4;

Figs 8 and 9 are end views, on larger scales, of the side protection member of Fig. 5;

Fig. 10 is an end view corresponding to Fig. 6, of a bottom protection member of a protection kit in a second embodiment of the invention;

Fig. 11 is a plan view of the bottom protection member of Fig. 10;

Fig. 12 is an end view corresponding to Fig. 8, of a side protection member of the protection kit in the second embodiment of the invention;

Fig. 13 is a perspective view of the protection kit of the second embodiment in a supply condition;

Fig. 14 is a schematic perspective view showing an initial step in an example of an inventive method of installing a roof window;

Figs 15 to 17 are perspective views of the first embodiment of the protection kit mounted on a roof window during a step of an inventive method of installing a roof window; and

Fig. 18 is a schematic perspective view showing a further step in an example of an inventive method of installing a roof window.

Description of Embodiments

[0030] The present inventive concept will now be described more fully hereinafter with reference to the accompanying drawings, in which currently preferred variants of the inventive concept are shown. This inventive concept may, however, be implemented in many different forms and should not be construed as limited to the variants set forth herein; rather, these variants are provided for thoroughness and completeness, and fully convey the scope of the present inventive concept to the skilled person.

Figs 1 to 3

[0031] Referring initially to Fig. 1, a roof window 1 is shown, with a window frame 2, having a top frame member 300, a bottom frame member 200, and two side frame members 100, defining a central opening. The window

will be referred to as "roof window" and only as "window" on equal footing. The invention is in particular intended for use in a roof window, to be installed in an inclined roof surface. Directional terms such as "upper", "lower" etc. relate to the position shown in the drawings. "Top", "bottom", "side" denote the position in the mounted condition of the window and are used for convenience and not to be considered limiting. The invention is in principle applicable to all types of windows for installation in all types of roofs, including flat roofs, and facades, however.

[0032] Fig. 1 shows the roof window 1 seen from the side of the roof window which faces the interior side of a building structure in which the roof window 1 is installed. The frame 2 is stationary when the roof window 1 is in a mounted condition. A sash 3 carrying a pane 4 is connected to the frame 2 by means of a set of hinges 5, such that the sash 3 is pivotable about a substantially centrally located axis between an open and closed position relative to the stationary frame 2. Corresponding to the members of the window frame 2, the sash 3 has a top sash member 600, a bottom sash member 500, and two side sash members 400.

[0033] A covering assembly 6 comprising claddings 61, coverings 62 and a top box 63 is provided as well. These elements form part of a covering assembly to protect the exterior parts of the window from weathering.

[0034] The hinges 5 may also be located further upwards, towards the upper part of the stationary frame 2 and sash 3. In order to bring the sash 3 to a ventilation and a number of open positions, an operating member 7 is provided at the top sash member 600, such that a lock mechanism 8, also at the top sash member 600 is disengaged from a striking plate (not shown) on the top member 300 of the frame 2 in a manner known per se. Examples of so-called pivot hinges are shown in Figs 2a and 3 and a detailed description of such a hinge is present in for instance Applicant's EP1612352A1, WO 85/02646, WO 99/28581 and EP3486413A1. The invention is also applicable to so-called pantograph hinges, as described in Applicant's WO2017076416A1 and EP3252255A1. The invention is also applicable to windows having a different position of the hinge axis, and to roof windows which are top-hung during normal operation and which pivot for cleaning, the sash being journaled in an intermediate frame. In addition to or alternative to the operating member 7 at the top, a handle may be located at any position, for instance at the bottom member of the sash.

[0035] In Fig. 2a, the sash 3 has been disassembled from the frame 2, and in Fig. 3, the sash 3 is shown separately. The sash 3 is typically connected to the frame 2 in a supply condition of a window installation system of the invention, in that a sash hinge part 53 of each hinge 5 is in engagement with a frame hinge part 52 of the corresponding hinge 5 by respective engagement means. In the specific example in which the hinge 5 is a pivot hinge, disengagement is carried out in that the engagement means of the sash hinge part 53, in the form

of a slide bar (not shown in detail), is withdrawn from the engagement means of the frame hinge part 52, in the form of a guide (not shown in detail) of the frame hinge part 52.

[0036] By the terms "exterior" and "interior", mutually opposite sides of components of the roof window 1 are indicated, in a direction substantially perpendicular to the plane of the pane 4. The terms "outer" and "inner" are used to indicate for instance mutually opposite sides of the frame members 100, 200, 300, substantially in a direction parallel to the plane of the pane 4.

[0037] Each of the frame members 100, 200, 300 has an inner side facing the central opening. The inner sides of the respective frame members 100, 200, 300 each comprises an exterior portion 102, 202 (exterior portion of top frame member 300 not visible), which, when the window is in the closed position, is covered by the sash 3 and therefore not visible from the interior of the building structure, and an interior portion of which the interior portion 101 of the side member 100 shown to the right in Fig. 1 and the interior portion 201 of the bottom frame member 200 are visible. The interior portions 101, 201 are not covered by the sash 3, when the window is in the closed position. Reference numeral 101 will be used to denote the interior portion of each of the side members 100, since these members are generally mirror-inverted to each other. Hence, the interior portion 101, 201 of each frame member 100, 200, 300 is visible from the interior side of the building structure in both in the open and closed positions of the sash. Eventually, each of the stationary frame members 100, 200, 300 also has a bottom surface 103, 203, 303 which here, in a manner known per se, includes a groove adapted to accommodate a lining forming a transition between the roof window 1 and an inner wall of the building in which the roof window 1 is installed.

[0038] As shown in Fig. 2a, the bottom frame member 200 of the window frame 2 defines an inner width w_i . In the specific embodiment of the kit of parts and window installation system according to the invention, in which the frame members 300, 200, 100 are stepped to provide stepped exterior portions, the inner width w_i is the distance between the mutually facing interior portions 101 of the first and second side frame members 100, which is substantially uniform over the height of the frame 2. However, other configurations of the frame are conceivable and the respective dimensions of a protection kit 10 of the kit of parts to be described in further detail below are relative as will be readily appreciated by the person skilled in the art.

[0039] In the following, reference will be made also to the enlarged view of Fig. 2b, showing the lower left-hand corner as seen from the inside. In the shown embodiment, the exterior portions 102, 202 of the inner sides of each of the frame members 100, 200, 300 are offset relative to the interior portions 101, 101, 201 to form a space in which the sash 3 is accommodated when the window is in a closed position.

Figs 4 to 9

[0040] Referring now to Figs 4 to 9, a first embodiment of a kit of parts for protecting at least the bottom parts of the stationary frame 2 in a window installation process will be described in further detail.

[0041] Fig. 4 and 5 illustrate the kit of parts for protecting a window frame in a window installation process, comprising a bottom protection member 11; and at least one side protection member, here two side protection members 12 and 13. In the following, the side protection members 12, 13 will be referred to jointly or individually; the side protection members 12, 13 may be formed in an identical cross-section, which is mirror-inverted manner in a condition of use, but variations are also conceivable. In principle, the invention is applicable to a protection kit comprising only a bottom protection member 11.

[0042] The bottom protection member 11 is formed with a pre-defined length l_b and each side protection member 12, 13 with a pre-defined length l_s .

[0043] In the embodiment shown, the bottom protection member 11 is configured to cover substantially an entirety of the interior portion 201 of the bottom frame member 200 facing the central opening such that the pre-defined length l_b of the bottom protection member 11 is substantially equal to the inner width w_i of the window. However, for a typical range of window sizes, which is customary within the field of roof windows, the kit of parts may for instance be manufactured in two different sizes of the bottom protection member 11 and the side protection members 12, 13, respectively, such that the length l_b of the bottom protection member 11 fits a particular size of roof window and is used for one, two or more larger sizes, until the larger size protection kit is chosen.

[0044] In embodiments of the roof window 1, in which the window frame 2 is formed such that the exterior portion 202 of the inner side of the bottom frame members 200 is offset relative to the interior portion 201 to form a stepped portion, the bottom protection member 11 has a profiling to be described in further detail below. The bottom protection member 11 comprises a base portion 110 with an interior longitudinal edge 111 and an opposed exterior longitudinal edge 112, each extending between one end edge 113 and another end edge 114 and defining the length l_b of the bottom protection member 11.

[0045] Referring now also to Figs 6 and 7, showing details of the bottom protection member 11, and Figs 8 and 9, showing details of one of the side protection members 13, the base portion 110 of the bottom protection member 11 has a pre-defined outer width w_{b2} between the interior longitudinal edge 111 and the exterior longitudinal edge 112, and a pre-defined inner width w_{b1} . The pre-defined inner width w_{b1} is smaller than the pre-defined outer width w_{b2} and smaller than or substantially equal to the pre-defined width w_{bf} of the bottom frame member 200. In this regard, the pre-defined inner width w_{b1} is defined as a distance between an interior engagement flange 1111 extending from the base portion 110

at the interior longitudinal edge 111 and an exterior engagement flange 1121 extending from the base portion 110 at the exterior longitudinal edge 112. Finally, the bottom protection member 11 is provided with at least one reinforcement section 115, 116 in connection with the base portion 110.

[0046] It is noted while only one coherent flange 1111, 1121 is provided at either side, the provision of a number of intermittent flange portions is conceivable as well.

[0047] In the embodiment shown, the interior engagement flange 1111 and the exterior engagement flange 1121 is each provided with an inwards inclination relative to a general direction of the base portion 110 of the bottom protection member 11. In the configuration shown in Fig. 6, the general direction of the base portion 110 is substantially horizontal. The inclination between the interior engagement flange 1111 and the general, horizontal direction is about 62° and between the exterior engagement flange 1121 and the general direction about 75° .

[0048] The choice of suitable dimensions of the components of the protection kit, including the pre-defined inner width w_{b1} and pre-defined outer width w_{b2} , the inclination of the interior and exterior engagement flanges 1111, 1121, choice of material, and thickness etc. depends on the desired engagement and retention forces. That is, for instance a large inclination of the flanges, in combination with a relatively large material thickness will typically require more force to engage the protection kit, but will also typically result in a more secure retention. Conversely, providing the flanges substantially perpendicular to a general plane of the respective protection members, and of a thin material thickness, will typically result in easy installation, but the retention force will be lower as well. It lies within the knowledge of the skilled person to provide suitable dimensions and choices of material properties.

[0049] Each reinforcement section 115, 116 comprises a plurality of ribs 1151, 1152, 1153, 1154, 1161, 1162, 1163 extending from a respective part 1101, 1102 of the base portion 110 of the bottom protection member 11.

[0050] Here, each reinforcement section 115, 116 is provided with a base rib 1150, 1160, said plurality of ribs 1151, 1152, 1153, 1154, 1161, 1162, 1163 extending between the base rib 1150, 1160 and the respective part 1101, 1102 of base portion 110 of the bottom protection member 11. At the interior and exterior, a respective end rib 1155, 1165 is provided to close off the cross-section of the bottom protection member 11.

[0051] The bottom protection member 11 is, in the embodiment shown, provided with two reinforcement sections in connection with the base portion 110, namely an interior reinforcement section 115 at an interior part 1101 of the base portion 110 and an exterior reinforcement section 116 at an exterior part 1102 of the base portion 110. A joining rib 1164 and a shoulder 117 are provided at the transition between the interior reinforcement section 115 and the exterior reinforcement section 116.

[0052] As mentioned in the above, the kit of parts com-

prises at least one, here two side protection members 12, 13. Correspondingly to the bottom protection member 11, each side protection member 12, 13 comprises a base portion 130 with an interior longitudinal edge 131 and an opposed exterior longitudinal edge 132, each extending between one end edge 133 and another end edge 134. The base portion 130 of the side protection member 13 has a pre-defined outer width ws_2 between the interior longitudinal edge 131 and the exterior longitudinal edge 132, and a pre-defined inner width ws_1 , said pre-defined inner width ws_1 being smaller than the pre-defined outer width ws_2 and smaller than or substantially equal to the pre-defined width ws_f of the side frame member 100, the pre-defined inner width ws_1 being defined as a distance between at least one interior engagement flange 1311 extending from the base portion 130 at the interior longitudinal edge 131 and at least one exterior engagement flange 1321 extending from the base portion 130 at the exterior longitudinal edge 132, and wherein each side protection member 12, 13 is provided with at least one reinforcement section 136 in connection with the base portion 130.

[0053] The interior engagement flange 1311 and the exterior engagement flange 1312 is provided with an inwards inclination relative to a general direction of the base portion 130 of the side protection member 12, 13.

[0054] Each reinforcement section 136 comprises a plurality of ribs 1361, 1362, 1363, 1364, 1365 extending from a respective part of the base portion 130 of the side protection member 12, 13. In the embodiment shown, only an exterior base portion part 1302 is provided with a reinforcement section 136, whereas an interior base portion part 1301 has no reinforcement section, unlike thus the bottom protection member 11. The exterior base portion part 1302 is adjoined by a central base portion part 1303. The base portion part 1302 is inclined relative to a general direction of the base portion 130 of the side protection member 12, 13 and the ribs 1361, 1362, 1363, 1364, 1365 have varying length so that the free ends of at least the majority of the ribs are substantially parallel with the general direction of the base portion 130. As shown, the right-most rib 1365 is inclined. The position of the side protection member 13 on the side frame member 100 is shown in more detail in Fig. 13.

[0055] In the configuration shown in Fig. 8, the general direction of the base portion 130 is substantially horizontal. The inclination between the interior base portion part 1301 and the general direction is about 9° and between the exterior base portion part 1302 and the general direction is about 8° . The inclination between the interior engagement flange 1311 and the general, horizontal direction is about 70° and between the exterior engagement flange 1321 and the general direction about 77° .

[0056] In this way, the profiling of the outer side of the protection kit 10 is made to fit the profiling of the inner sides of the window frame at the bottom frame member 200 and at the side frame members 100.

Figs 10 to 13

[0057] A second embodiment of the protection kit of the window installation system will now be described with particular reference to Figs 10 to 13. Only differences relative to the first embodiment will be described in detail. Elements having the same or analogous function are denoted by the same reference numerals. In the bottom protection member 11 shown in Fig. 10, a central reinforcement section 118 is provided between the interior reinforcement section 115 and the exterior reinforcement section 116. The central reinforcement section 118 has a larger extension in a direction transverse to the general direction of the base portion 110 of the bottom protection member 11. The central reinforcement section 118 comprises a number of ribs of which an interior joining rib 1181 extends from a central part 1103 of the base portion 110 to a base rib 1180 and the adjoining base rib 1150 of the interior reinforcement section 115. Correspondingly, an exterior joining rib 1182 extends from the central part 1103 to the shoulder 117 and the adjoining base rib 1160 of the exterior reinforcement section 116. A rib 1183 extends centrally, between the central part 1103 and the base rib 1180. The number of ribs in the interior and exterior reinforcement sections 115, 116 is reduced.

[0058] Further details visible in Fig. 11 are openings 1166, 1167 in the base portion 110 of the bottom protection member 11, here in the exterior part 1102 of the base portion 110, near the exterior longitudinal edge 112. The openings 1166, 1167 allow access to striking plates (not shown) cooperating with a handle (not shown) at the bottom member 500 of the sash 3 in windows provided with a locking mechanism at the bottom. Embodiments are also conceivable where the bottom protection member 11 has such a length that it is located between the striking plate, if any, in larger window sizes.

[0059] Finally, an aperture 1156 is provided in the interior part 1101 of the base portion of the bottom protection member, the function of which will be described in the following.

[0060] In a supply condition, the bottom protection member 11 and the side protection member or members 12 and 13 are delivered separately, but may for instance be interconnected by a set of carabiners, cords etc. The protection kit 10 may constitute one element of a kit of parts in a window installation system comprising a larger number of components for assisting the installer during the entire installation process. For instance, the parts of the protection kits may be adapted to be stored and re-used one or more times, for instance in a storage container such as for instance a box, a bag, a net, a strap device.

[0061] In the second embodiment, shown in a supply condition in Fig. 14, the bottom protection member 11 comprising the aperture 1156 and the two side protection members 12, 13, each comprising an aperture 1204, 1304, are placed on top of each other such that the apertures 1156, 1204, 1304 are brought into alignment with

each other to receive a lock ring 14. The bottom protection member 11 and the two side protection members 12, 13 are held together by a rubber band 15 in the supply condition of the protection kit. It is understood that a corresponding configuration for providing the protection kit in a supply condition may apply to the first embodiment as well.

[0062] The material, or combination of materials, of the parts of the protection kit may be chosen in any suitable manner. One suitable example could be forming the bottom protection member 11 and the side protection members 12, 13 of hard plastic materials and/or metal, preferably a thermoplastic elastomer (TPE), more preferably made by extrusion or injection moulding. The incorporation of any hard plastic and/or metal is also conceivable.

Figs 14 to 18

[0063] Referring now to Figs 14 to 18, installation of the roof window 1 by means of the kit of parts forming the protection kit 10 of the first embodiment will be described in further detail.

[0064] The roof window 1 is provided as in the above. A protection kit 10 is formed by a kit of parts as in the above, including bottom protection member 11 and at least one side protection member 12, 13.

[0065] Referring first to Fig. 14, the window frame 2 is mounted in the inclined roof structure (not shown as such). The protection kit 10 is placed to cover at least the bottom frame member 200. Any side protection members 12, 13 are placed on the side frame members 100 during this step.

[0066] The mounted condition of a protection kit in an embodiment of the window installation system is illustrated in Figs 15 to 17. Here, the position of the reinforcement sections relative to the components of the roof window is shown in clear detail. As mentioned in the above, the length of the bottom protection member 11 does not necessarily cover the full inner width of the window frame 2, even though it does in the shown embodiment. The position of the side protection members 12, 13 on the side members of the sash may in principle be chosen freely; however, the position shown, i.e. at some distance from the bottom frame member and hence from the bottom protection member 11, is representative of desired positions.

[0067] Referring now to Fig. 18, the sash 3 is placed on the protection kit 10, with at least the top sash member 600 in contact with the protection kit 10 such that the protection kit 10 supports the sash 3. Although not shown in detail, the upper part of the sash 3 is supported by the protection kit 10. It is noted that the sash 3 is placed upside-down and inside-out so to say, in preparation of the subsequent rotation of the sash 3 relative to the window frame 2.

[0068] The placing of the sash 3 may take place either from the inside, i.e. from the room in which the roof window 1 is to be installed, or from the roof, i.e. from the

exterior. In case the sash 3 is mounted from the exterior side, lifting the sash 3 into position may take place by a crane.

[0069] Once the sash 3 is securely placed in contact with the protection kit, the sash hinge parts 53 are engaged with the corresponding frame hinge parts 52. The engagement takes place by allowing the protection kit 10 to guide the sash 3, in a way so the sash hinge parts 53 are positioned in a height corresponding to that of the frame hinge parts 52 such that the engagement and final connection becomes easy.

[0070] Subsequently, the protection kit 10 is removed, and the sash 3 is rotated into its closed position relative to the window frame 2.

[0071] The person skilled in the art realizes that the present inventive concept by no means is limited to the preferred variants described above. On the contrary, many modifications and variations are possible within the scope of the appended claims.

[0072] Additionally, variations to the disclosed variants can be understood and effected by the skilled person in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims.

25 List of reference numerals

[0073]

- | | | |
|----|-----|------------------------------------|
| | 1 | roof window |
| 30 | 2 | Frame |
| | | 100 side frame member |
| | | 101 interior portion |
| | | 102 exterior portion |
| | | 103 bottom surface |
| 35 | 200 | bottom frame member |
| | 201 | interior portion |
| | 202 | exterior portion |
| | 203 | bottom surface |
| | 300 | top frame member |
| 40 | 3 | Sash |
| | 400 | side sash member |
| | 500 | bottom sash member |
| | 600 | top sash member |
| | 4 | Pane |
| 45 | 5 | Hinge |
| | 52 | frame hinge part |
| | 53 | sash hinge part |
| | 6 | covering assembly |
| | 61 | claddings |
| 50 | 62 | coverings |
| | 63 | top box |
| | 7 | operating member |
| | 8 | lock mechanism |
| 55 | 10 | protection kit |
| | 11 | bottom protection member |
| | | 110 base portion |
| | | 1101 interior part of base portion |

1102	exterior part of base portion
1103	central part of base portion
111	interior longitudinal edge
112	exterior longitudinal edge
113	one end edge
114	other end edge
115	interior reinforcement section
1150	base rib
1151	rib
1152	rib
1153	rib
1154	rib
1155	end rib
1156	aperture
116	exterior reinforcement section
1160	base rib
1161	rib
1162	rib
1163	rib
1164	joining rib
1165	end rib
1166	opening
1167	opening
117	shoulder
118	central reinforcement section
1180	base rib
1181	interior joining rib
1182	exterior joining rib
1183	rib
12	side protection member
13	side protection member
130	base portion
1301	interior part of base portion
1302	exterior part of base portion
1303	central part of base portion
1304	aperture
131	interior longitudinal edge
132	exterior longitudinal edge
133	one end edge
134	other end edge
136	exterior reinforcement section
1361	rib
1362	rib
1363	rib
1364	rib
1365	rib
14	lock ring
15	rubber band
wi	inner width of window frame
lb	length of bottom protection member
ls	length of side protection member
wbf	width of bottom frame member
wsf	width of side frame member

Claims

1. A window installation system, comprising:

5	a roof window (1) including a window frame (2) having a top frame member (300), a bottom frame member (200) defining an inner width (wi) of the window frame (2), and opposing first and second side frame members (100), defining a central opening, each of the frame members (300, 200, 100) having an inner face including an interior portion (301, 201, 101) and an exterior portion (202, 102) facing the central opening, and a sash (3) having a top sash member (600), a bottom sash member (500) and opposing first and second side sash members (400), together encasing a pane (4) and connected to the window frame (2) in a mounted condition by means of a set of hinges (5), the bottom frame member (200) having a pre-defined width (wbf) and the side frame member (100) a pre-defined width (wsf), and
10	a kit of parts for protecting the window frame (2) in a window installation process bringing the roof window (1) to the mounted condition, in which the kit of parts comprises at least one protection member adapted to be positioned on the bottom frame member (200) to cover the pre-defined width (wbf) of the bottom frame member (200),
15	characterised in that
20	the kit of parts comprises a bottom protection member (11) having a base portion (110) with an interior longitudinal edge (111) and an opposed exterior longitudinal edge (112), each extending between one end edge (113) and another end edge (114) and defining a pre-defined length (lb), the base portion (110) of the bottom protection member (11) having a pre-defined outer width (wb2) between the interior longitudinal edge (111) and the exterior longitudinal edge (112), and a pre-defined inner width (wb1), said pre-defined inner width (wb1) being smaller than the pre-defined outer width (wb2) and smaller than or substantially equal to the pre-defined width (wbf) of the bottom frame member (200),
25	that the pre-defined inner width (wb1) is defined as a distance between at least one interior engagement flange (1111) extending from the base portion (110) at the interior longitudinal edge (111) and at least one exterior engagement flange (1121) extending from the base portion (110) at the exterior longitudinal edge (112), and that the bottom protection member (11) is provided with at least one reinforcement section (115, 116; 118) in connection with the base portion (110).
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2. A window installation system according to claim 1, wherein at least one of said interior engagement flange (1111) and said exterior engagement flange (1112) is provided with an inwards inclination relative to a general direction of the base portion (110) of the bottom protection member (11). 5
3. A window installation system according to claim 1 or 2, wherein each reinforcement section (115, 116; 118) comprises a plurality of ribs (1151, 1152, 1153, 1154, 1161, 1162, 1163; 1181, 1182, 1183) extending from a respective part (1101, 1102; 1103) of the base portion (110) of the bottom protection member (10). 10
4. A window installation system according to claim 3, wherein each reinforcement section (115, 116; 118) is provided with a base rib (1150, 1160; 1180), said plurality of ribs (1151, 1152, 1153, 1154, 1161, 1162, 1163; 1181, 1182, 1183) extending between the base rib (1150, 1160; 1180) and the respective part (1101, 1102; 1103) of base portion (110) of the bottom protection member (10), preferably also with an end rib (1155, 1165). 15
5. A window installation system according to any one of the preceding claims, wherein the bottom protection member (11) is provided with two reinforcement sections in connection with the base portion (110), namely an interior reinforcement section (115) at an interior part (1101) of the base portion (110) and an exterior reinforcement section (116) at an exterior part (1102) of the base portion (110), preferably including a joining rib (1164) and a shoulder (117) at the transition between the interior reinforcement section (115) and the exterior reinforcement section (116). 20
6. A window installation system according to claim 5, wherein a central reinforcement section (118) is provided between the interior reinforcement section (115) and the exterior reinforcement section (116), said central reinforcement section (118) preferably having a larger extension in a direction transverse to a general direction of the base portion (110) of the bottom protection member (11). 25
7. A window installation system according to any one of the preceding claims, wherein the base portion (110) of the bottom protection member (11) is provided with at least one opening (1166, 1167) near the exterior longitudinal edge (112). 30
8. A window installation system according to any one of the preceding claims, wherein said kit of parts comprises at least one side protection member (12, 13), each having a base portion (130) with an interior longitudinal edge (131) and an opposed exterior longitudinal edge (132), each extending between one end edge (133) and another end edge (134) and defining a pre-defined length (ls), and wherein the base portion (130) of each side protection member (12, 13) has a pre-defined outer width (ws2) between the interior longitudinal edge (131) and the exterior longitudinal edge (132), and a pre-defined inner width (ws1), said pre-defined inner width (ws1) being smaller than the pre-defined outer width (ws2) and smaller than or substantially equal to the pre-defined width (wsf) of the side frame member (100), the pre-defined inner width (ws1) being defined as a distance between at least one interior engagement flange (1311) extending from the base portion (130) at the interior longitudinal edge (131) and at least one exterior engagement flange (1321) extending from the base portion (130) at the exterior longitudinal edge (132). 35
9. A window installation system according to claim 8, wherein at least one of said interior engagement flange (1311) and said exterior engagement flange (1312) is provided with an inwards inclination relative to a general direction of the base portion (130) of the side protection member (12, 13). 40
10. A window installation system according to claim 8 or 9, wherein each side protection member (12, 13) is provided with at least one reinforcement section (136) in connection with the base portion (130), and wherein each reinforcement section (136) comprises a plurality of ribs (1361, 1362, 1363, 1364, 1365) extending from a respective part (1302) of the base portion (130) of the side protection member (12, 13). 45
11. A window installation system according to claim 10, wherein the base portion part (1302) is inclined relative to a general direction of the base portion (130) of the side protection member (12, 13) and the ribs (1361, 1362, 1363, 1364, 1365) have varying length so that the free ends of at least the majority of the ribs are substantially parallel with the general direction of the base portion (130), preferably one rib (1365) being inclined. 50
12. A window installation system according to any one of claims 8 to 11, wherein the protection kit (10) comprises a first side protection member (12) and a second side protection member (13) of substantially identical profiling as the first side protection member (12). 55
13. A window installation system according to any one of the preceding claims, wherein the bottom protection member (11) is configured to cover substantially an entirety of the bottom frame member (200) facing the central opening such that the pre-defined length (lb) of the bottom protection member (11) is substan-

tially equal to the inner width (wi) of the window.

14. A window installation system according to any one of the preceding claims, wherein the kit of parts is adapted to be stored and reused one or more times, preferably in a storage container such as for instance a box, a bag, a net, a strap device. 5
15. A window installation system according to claims 12 and 14, wherein the bottom protection member (11) and the two side protection members (12, 13) each comprises an aperture (1156, 1204, 1304), and wherein the bottom protection member (11) and the two side protection members (12, 13) are placed on top of each other such that the apertures (1156, 1204, 1304) are brought into alignment with each other to receive a lock ring (14) in a supply condition of the protection kit, the bottom protection member (11) and the two side protection members (12, 13) being preferably being held together by a rubber band (15) in the supply condition of the protection kit. 10 15 20
16. A window installation system according to any one of the preceding claims, wherein the material of the bottom protection member (11) and the at least one side protection member (12, 13) comprises hard plastic materials and/or metal, preferably a thermoplastic elastomer (TPE), more preferably made by extrusion or injection moulding. 25 30
17. A window installation system according to any one of the preceding claims, wherein the window is a roof window (1) installed in an inclined roof structure of a building. 35
18. A method of installing a roof window (1) with a window frame (2) and a sash (3) in an inclined roof structure of a building, the window frame (2) having a top frame member (300), a bottom frame member (200), and opposing first and second side frame members (100), defining a central opening, each of the frame members (300, 200, 100) having an inner face including an interior portion (301, 201, 101) and an exterior portion (202, 102) facing the central opening, and a set of frame hinge parts (52) located at the opposing side frame members (100), and the sash (3) having a top sash member (600), a bottom sash member (500) and opposing first and second side sash members (400), together encasing a pane (4), and a set of sash hinge parts (53) located at the opposing side sash members (500), in which each pair of sash hinge part (53) and frame hinge part (52) constitute one hinge (5) of a set of hinges (5), said method comprising the steps of: 40 45 50 55
 - providing a protection kit (10) formed by a kit of parts including at least one bottom protection member (11) and preferably at least one side

protection member (12, 13);

- mounting the window frame (2) in the inclined roof structure;
- placing the protection kit (10) to cover at least partly the inner face of the bottom frame member (200);
- placing the sash (3) on the protection kit (10), with at least the top sash member (600) in contact with the protection kit (10) such that the protection kit (10) supports the sash (3);
- engaging the sash hinge parts (53) with the corresponding frame hinge parts (52) by allowing the protection kit (10) to guide the sash (3);
- removing the protection kit (10); and
- rotating the sash (3) relative to the window frame (2).

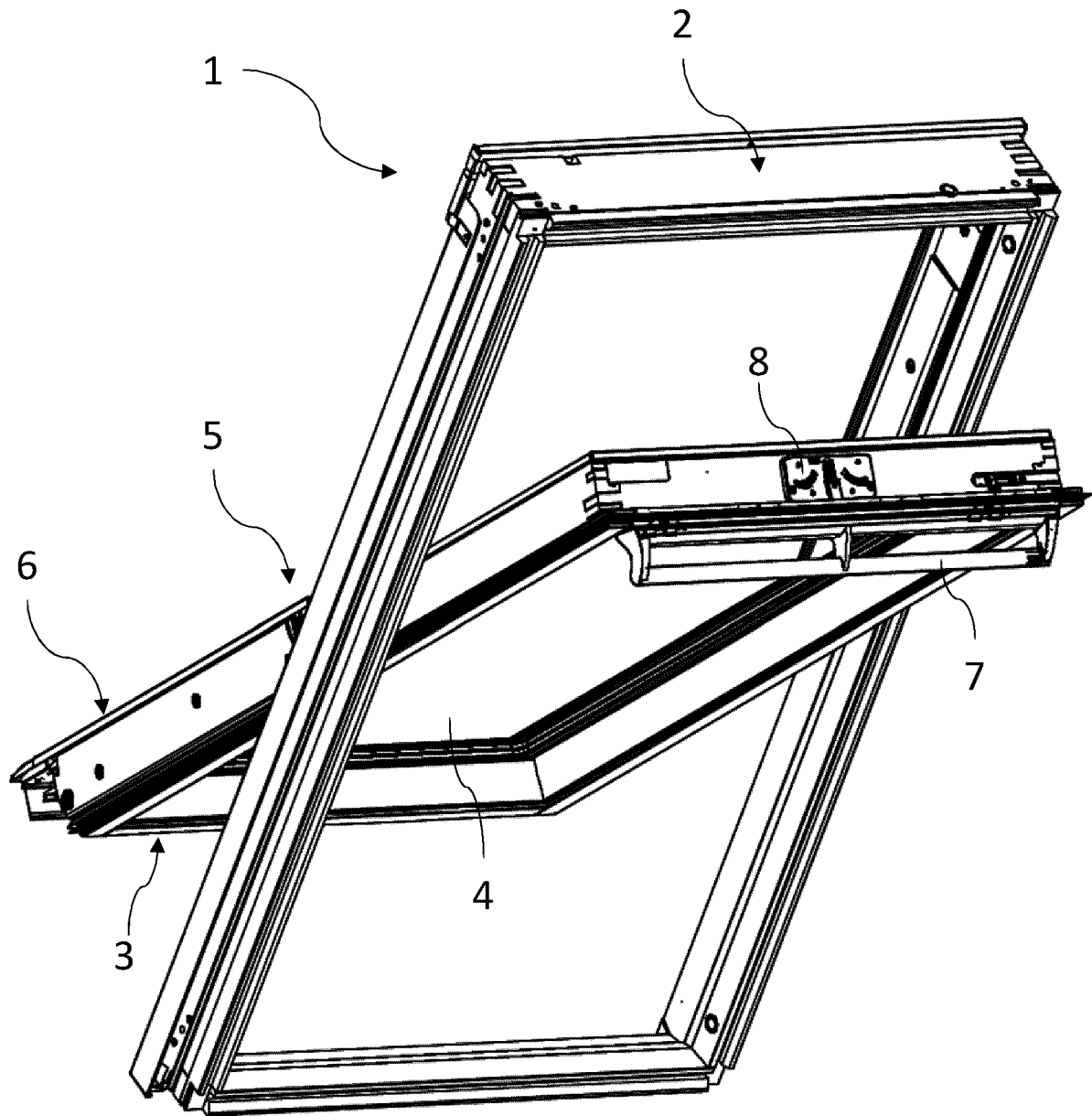


Fig. 1

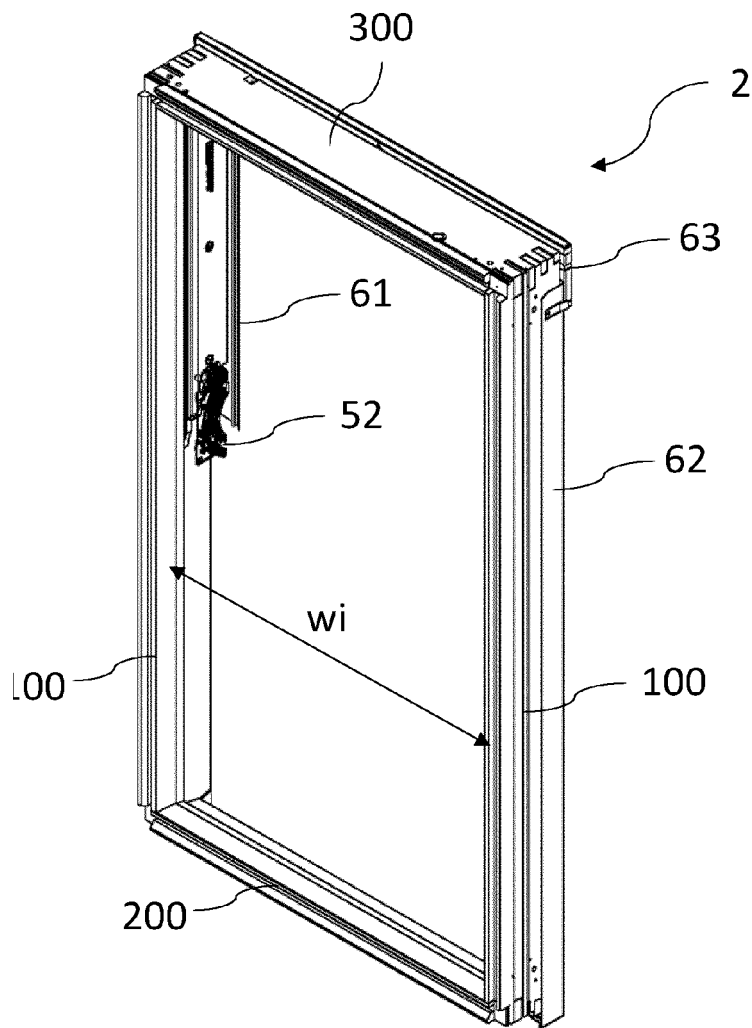


Fig. 2a

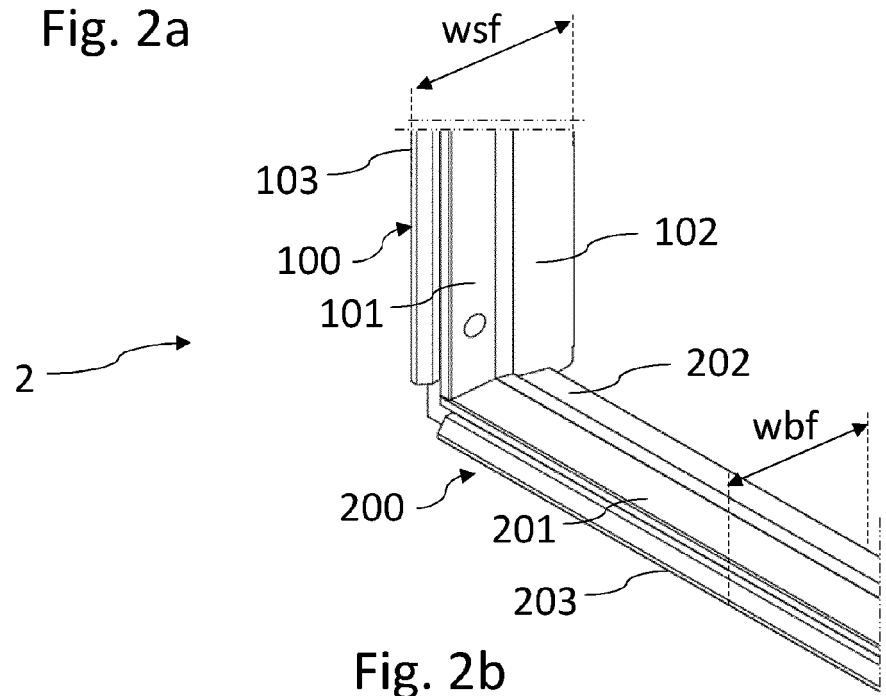


Fig. 2b

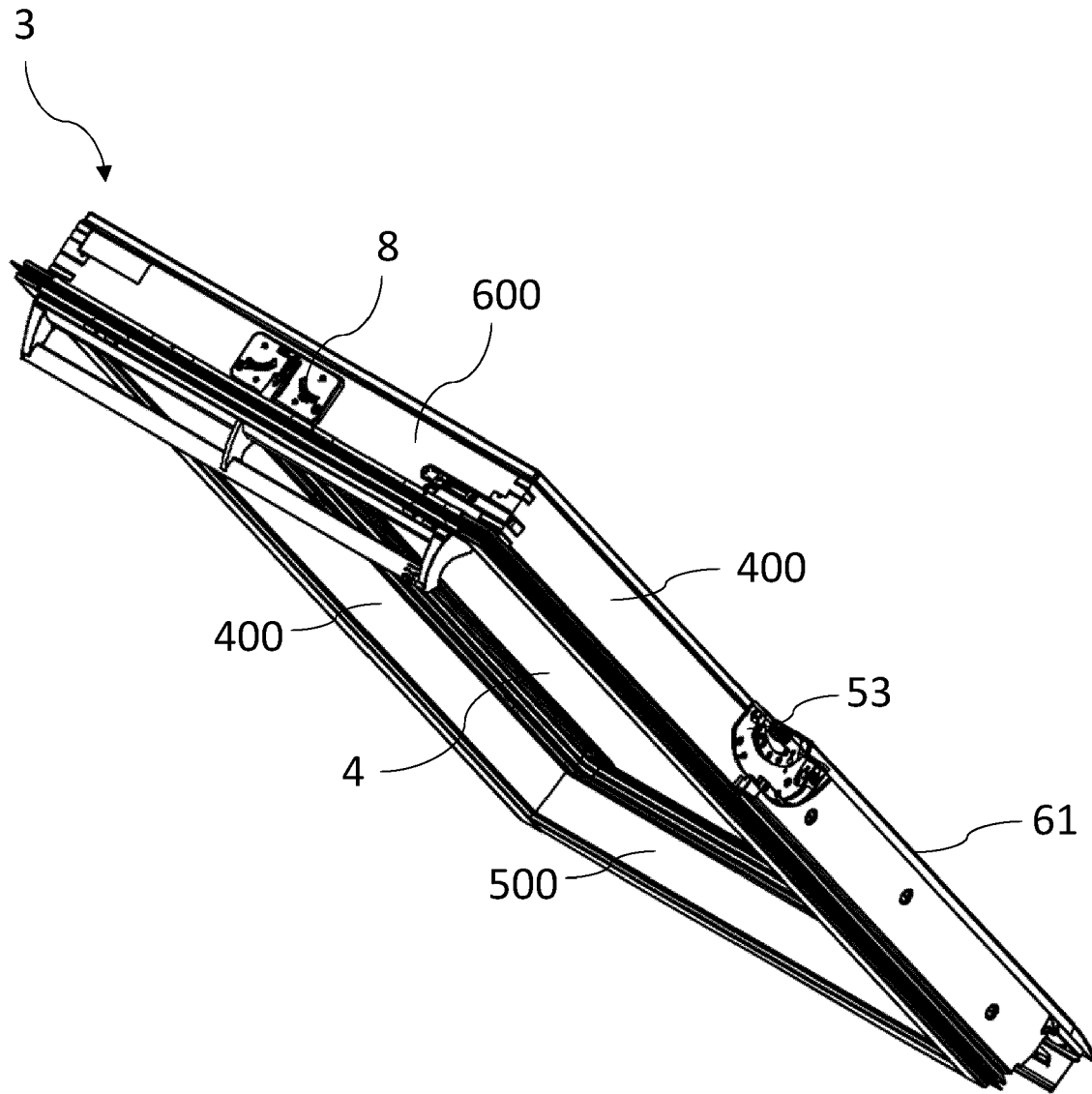
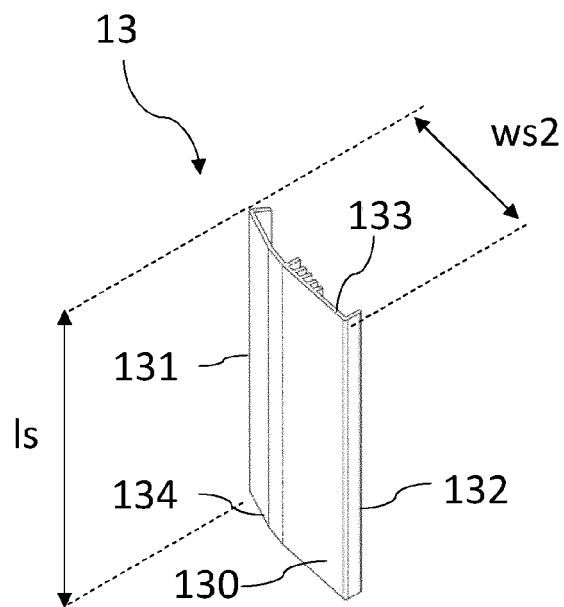
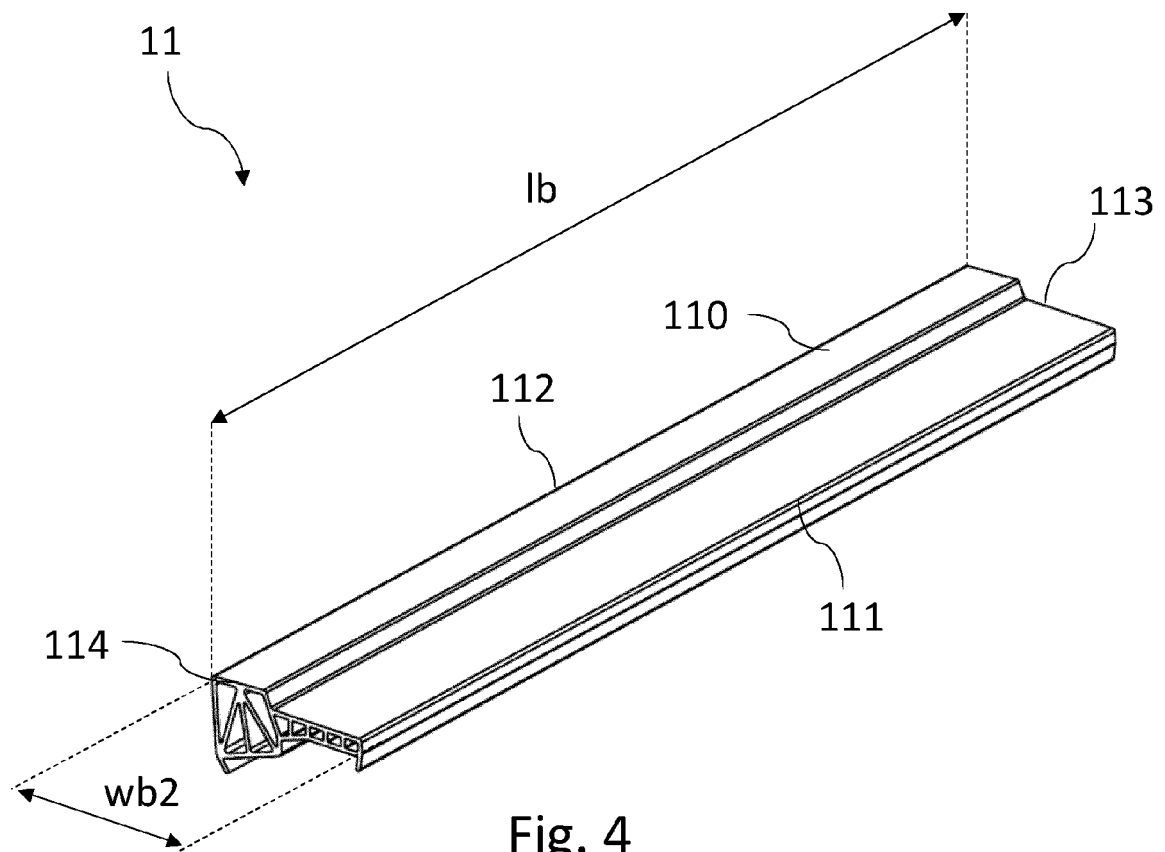


Fig. 3



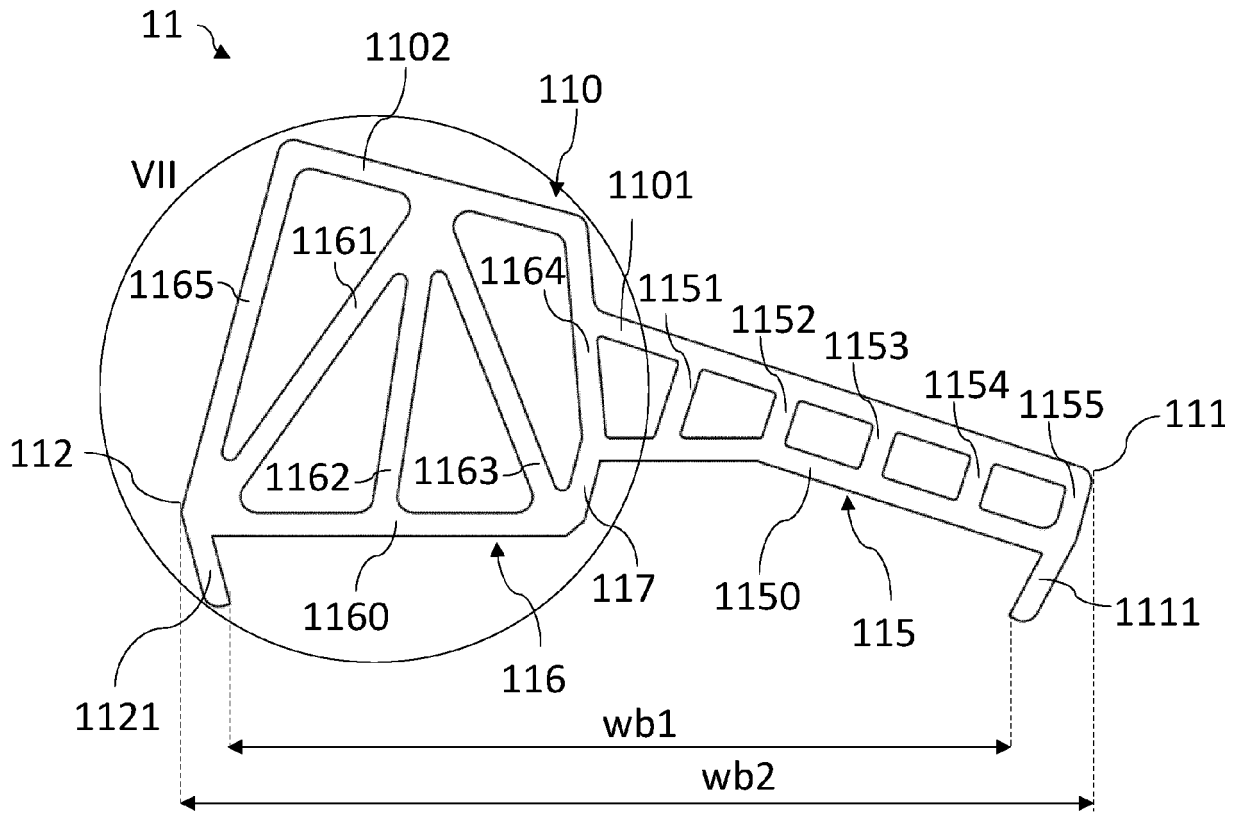


Fig. 6

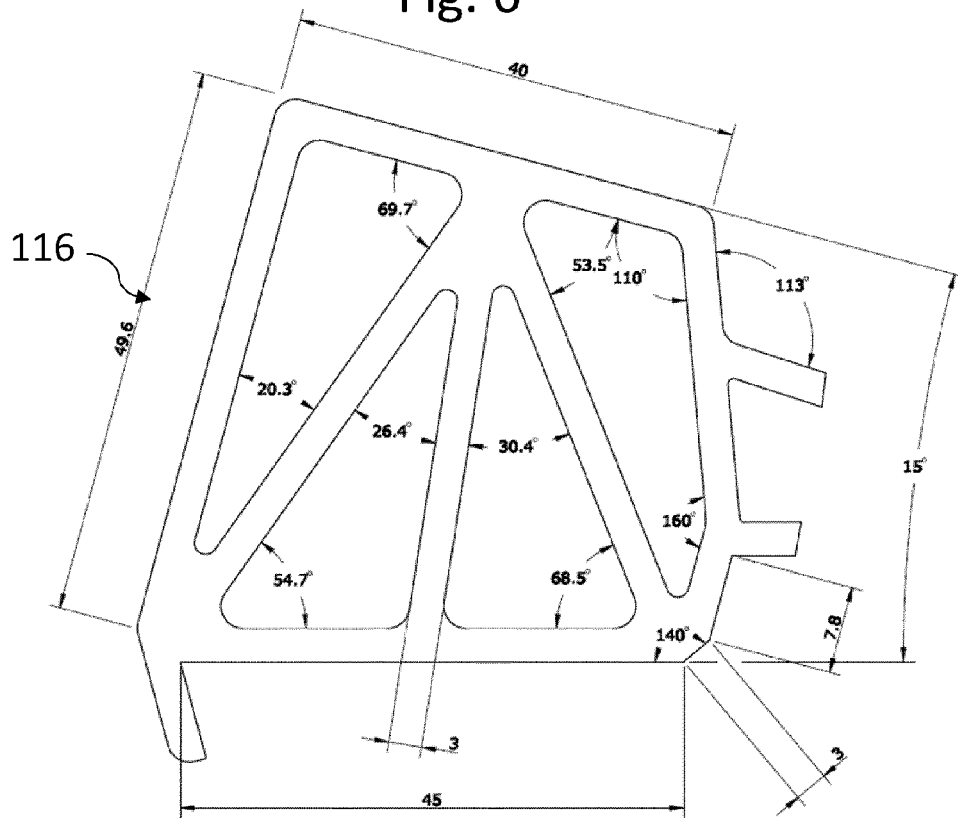


Fig. 7

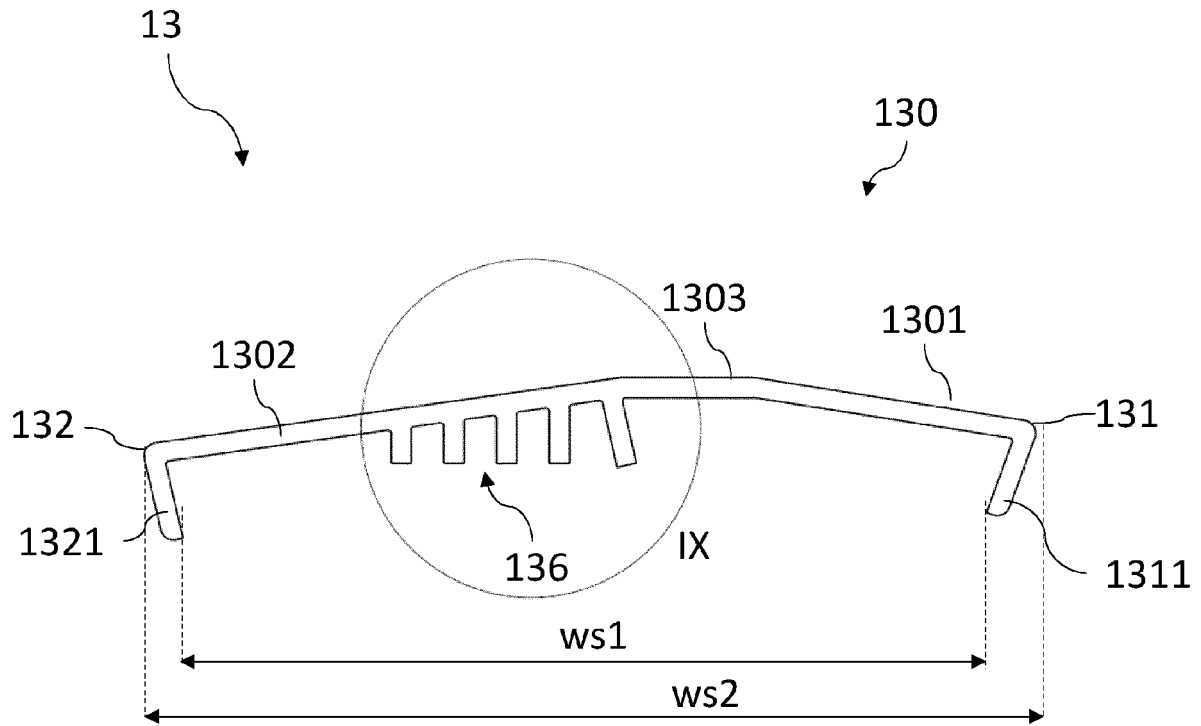


Fig. 8

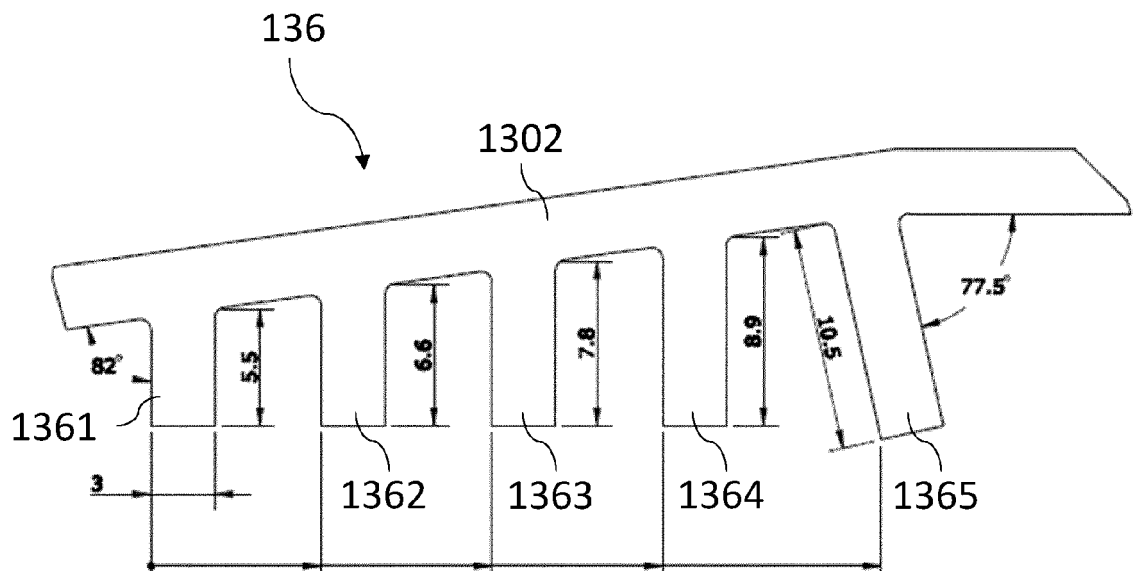


Fig. 9

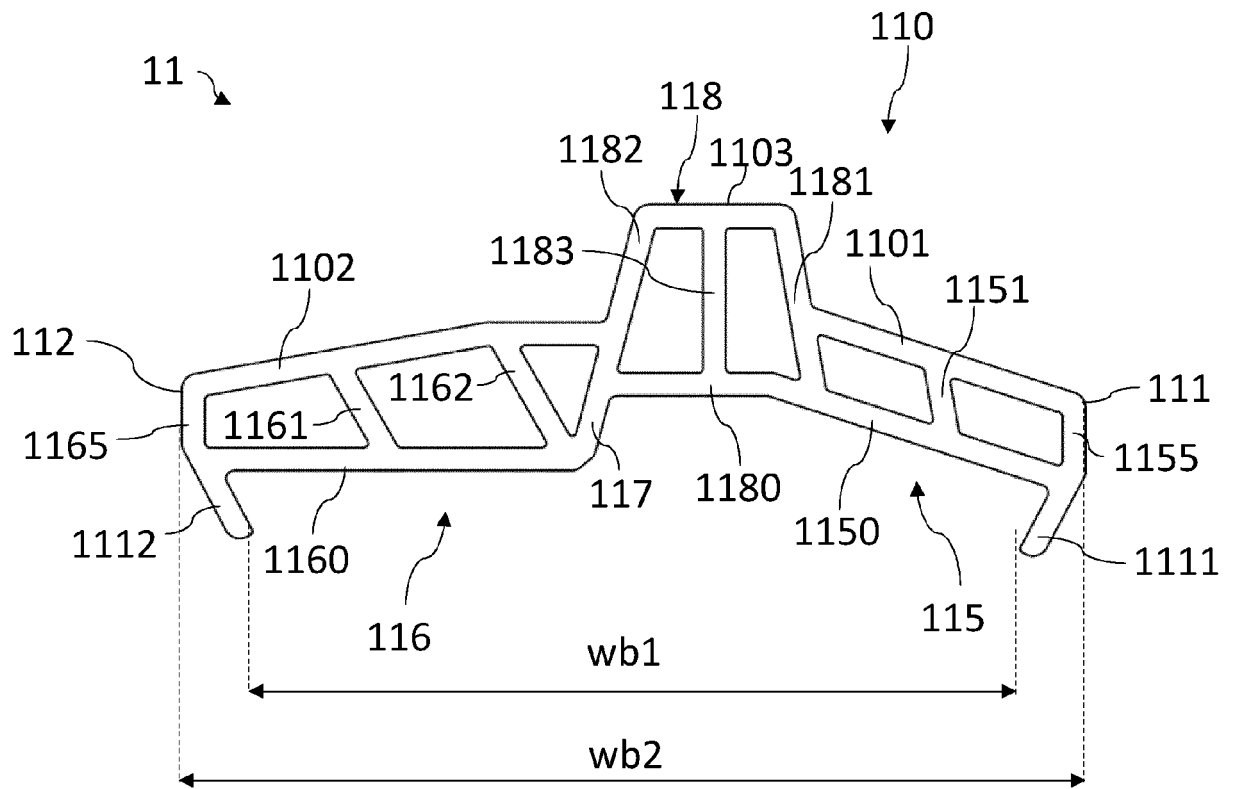


Fig. 10

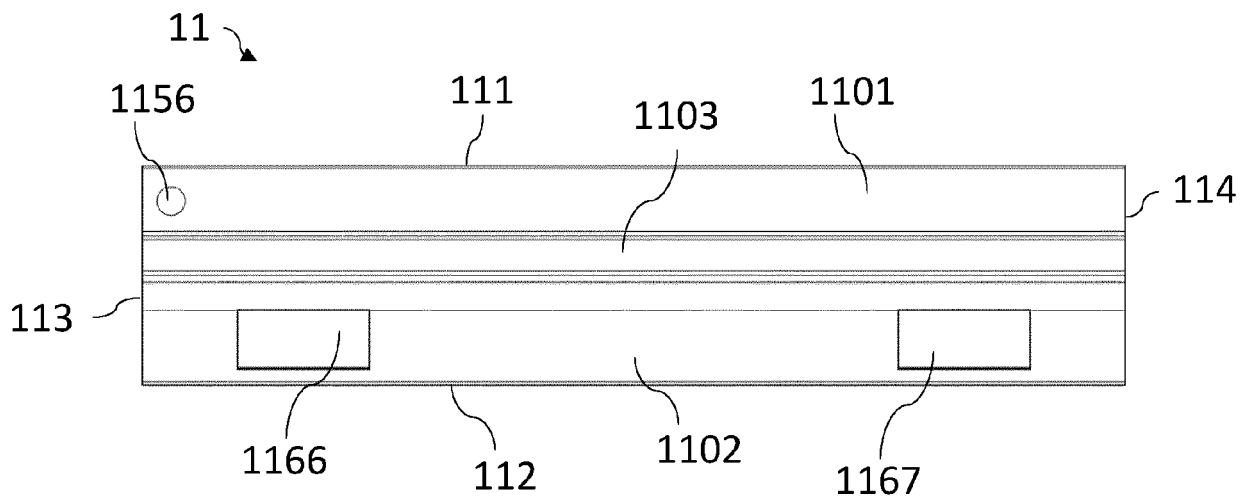


Fig. 11

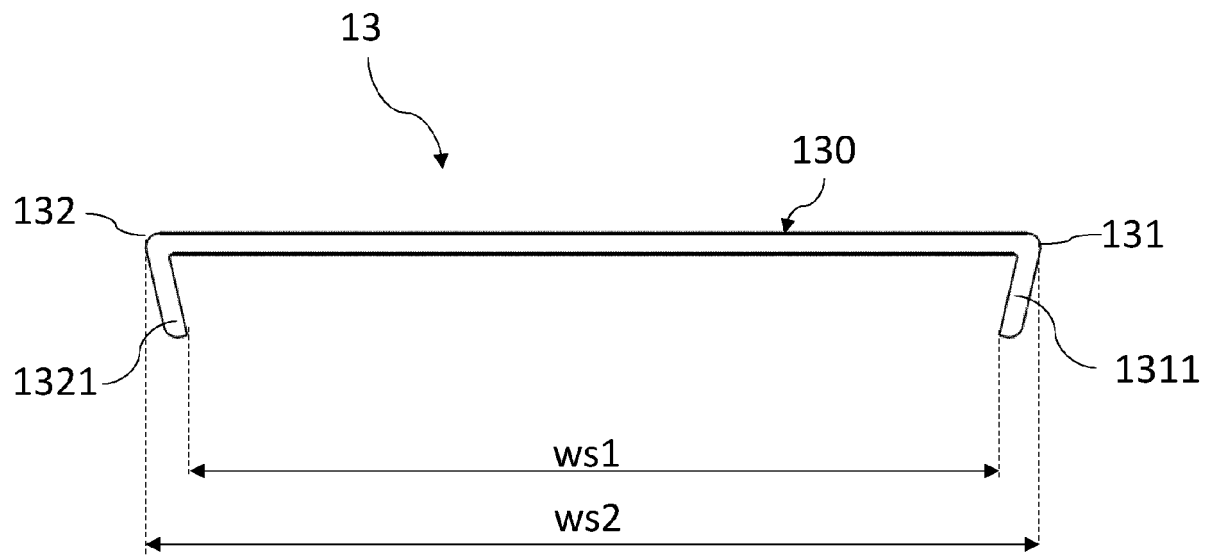


Fig. 12

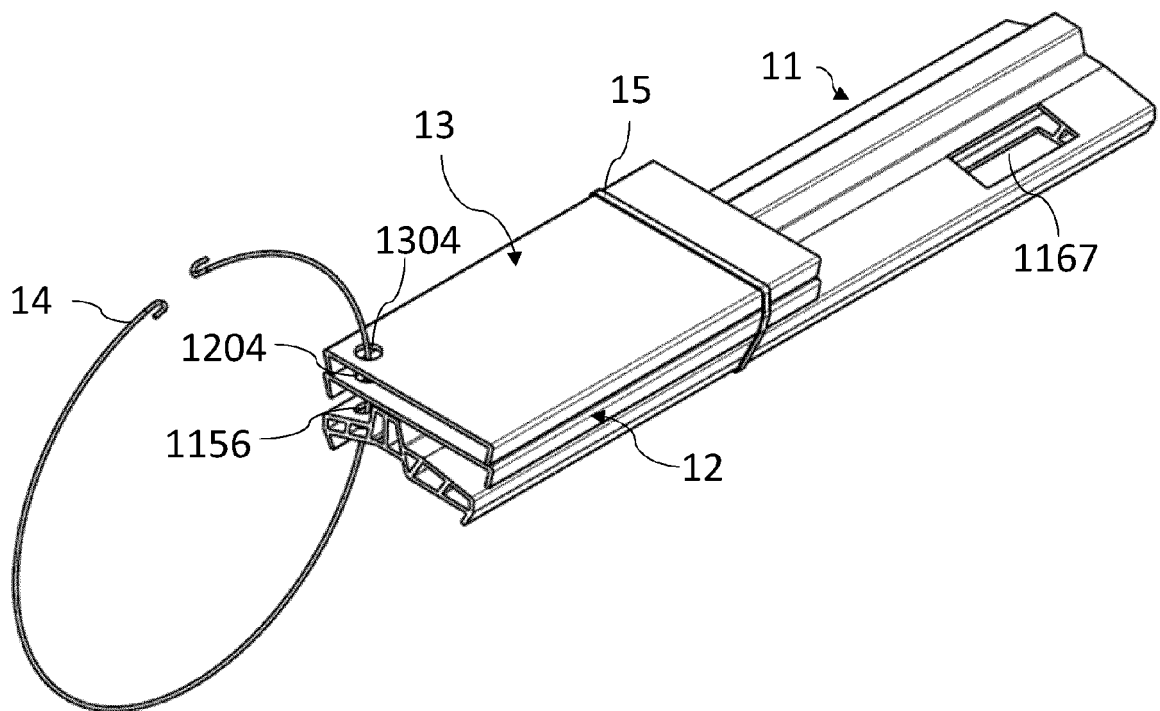


Fig. 13

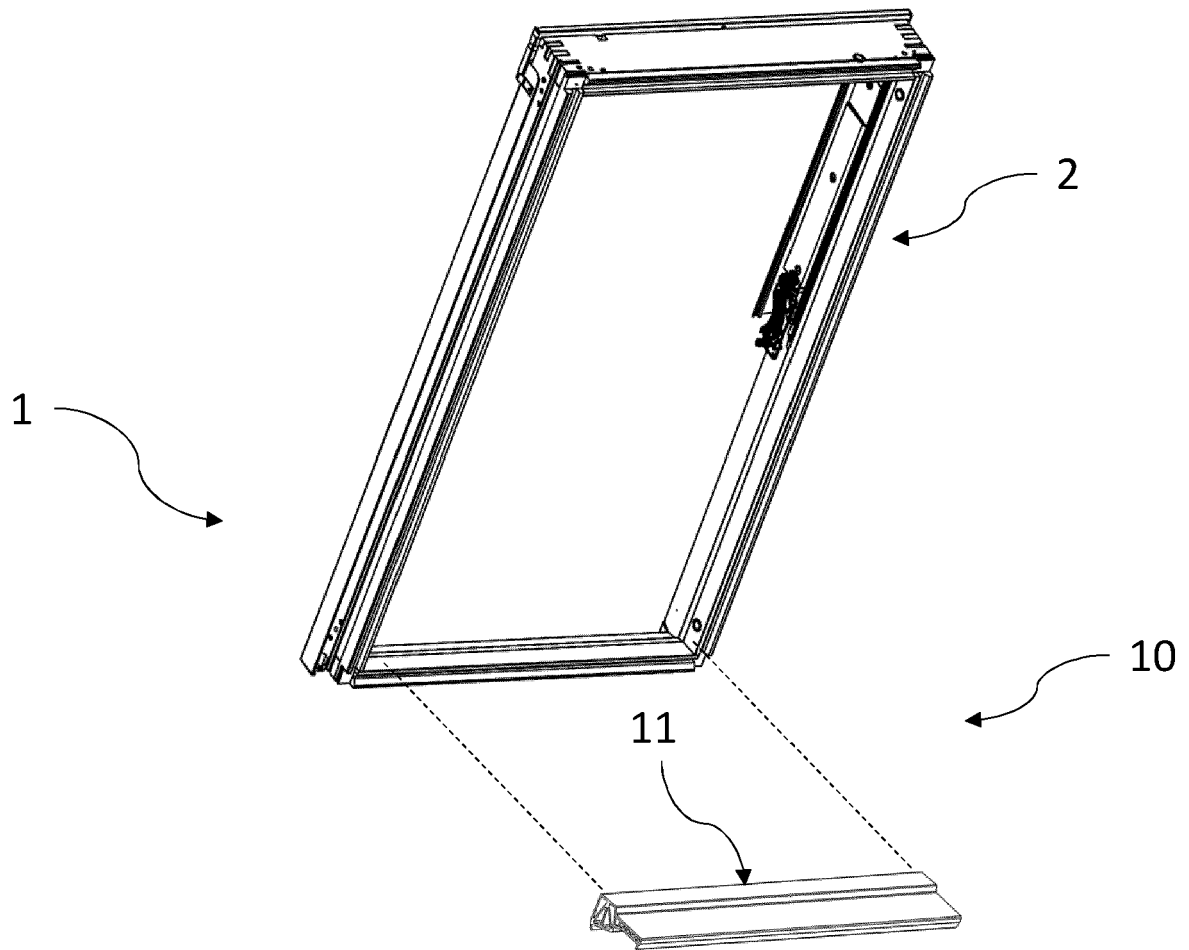


Fig. 14

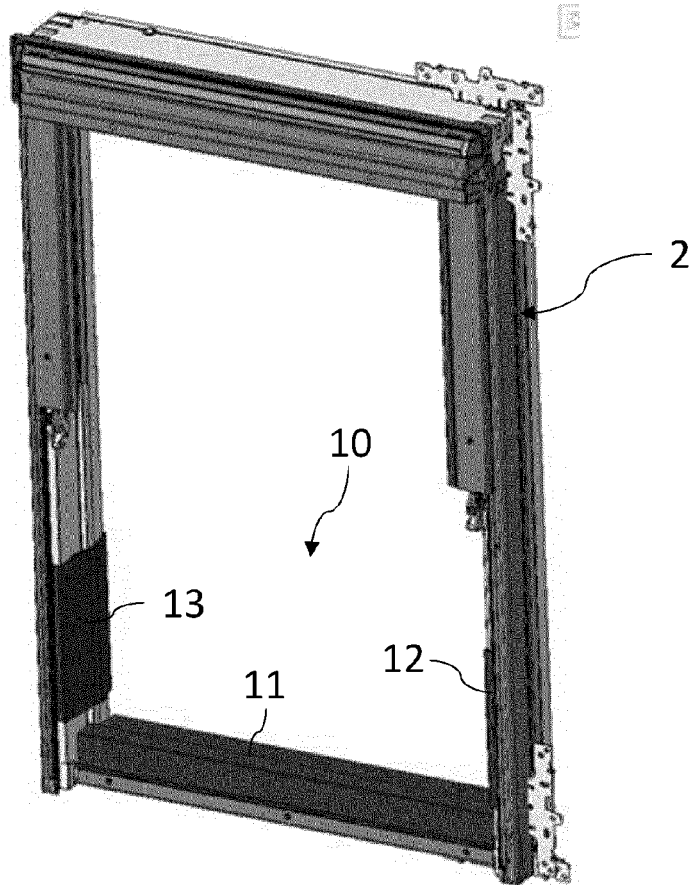


Fig. 15

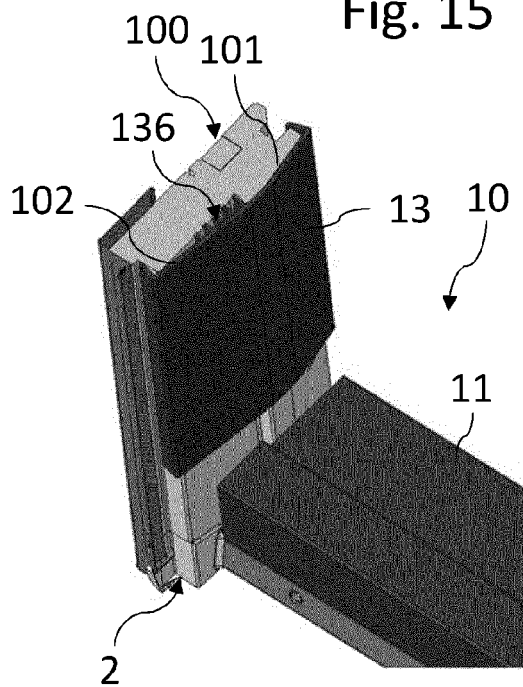


Fig. 17

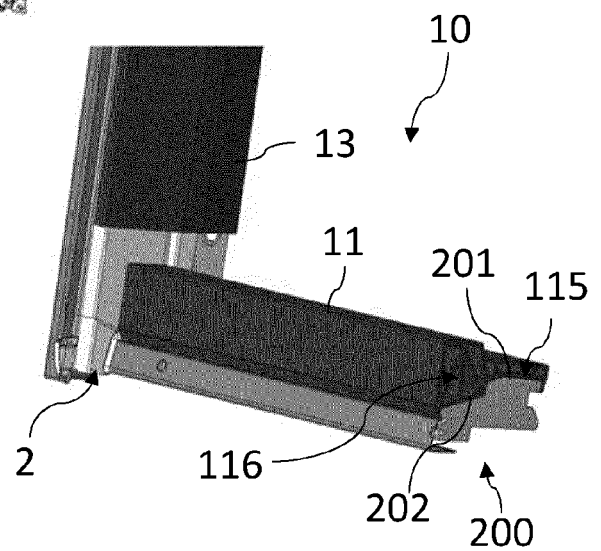


Fig. 16

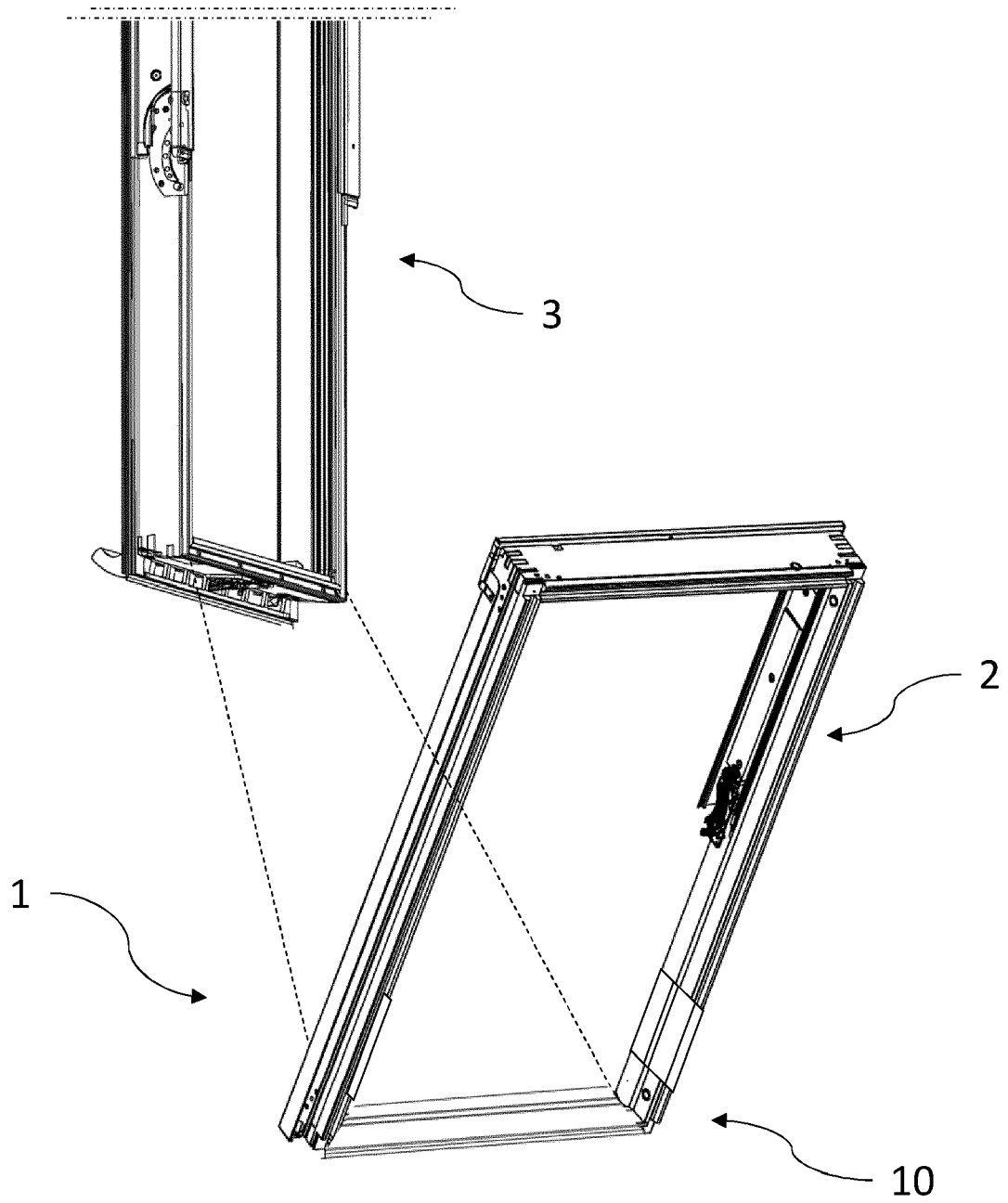


Fig. 18



EUROPEAN SEARCH REPORT

Application Number
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Y	* claim 1; figures *	18	E04D13/03
A	-----	11	E04G21/30
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Y	* figures *	18	
A	-----	11	
Y	EP 2 947 225 A1 (ROTO FRANK AG [DE]) 25 November 2015 (2015-11-25)	18	
A	* paragraphs [0016], [0023]; figures 1,2 *	11	

			TECHNICAL FIELDS SEARCHED (IPC)
			E06B E04G E04D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 July 2021	Examiner Tran, Kim Lien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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22-07-2021

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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