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(54) A ROOF WINDOW ARRANGEMENT COMPRISING A MANUAL OPERATING ASSEMBLY WITH AN APPLIANCE MEMBER

(57) The roof window arrangement comprises a roof window with a stationary frame and a sash (2). A manual operating assembly (4) is configured to assist in operation of the sash (2) between open and the closed positions, and includes a handle portion (41) located at the top member (21) of the sash (2) and having a longitudinal extension substantially in parallel with the top member (21) of the sash (2). The handle portion (41) of the manual operating assembly (4) is provided with receiving means configured to receive an exchangeable appliance member (10) in a releasable connection.

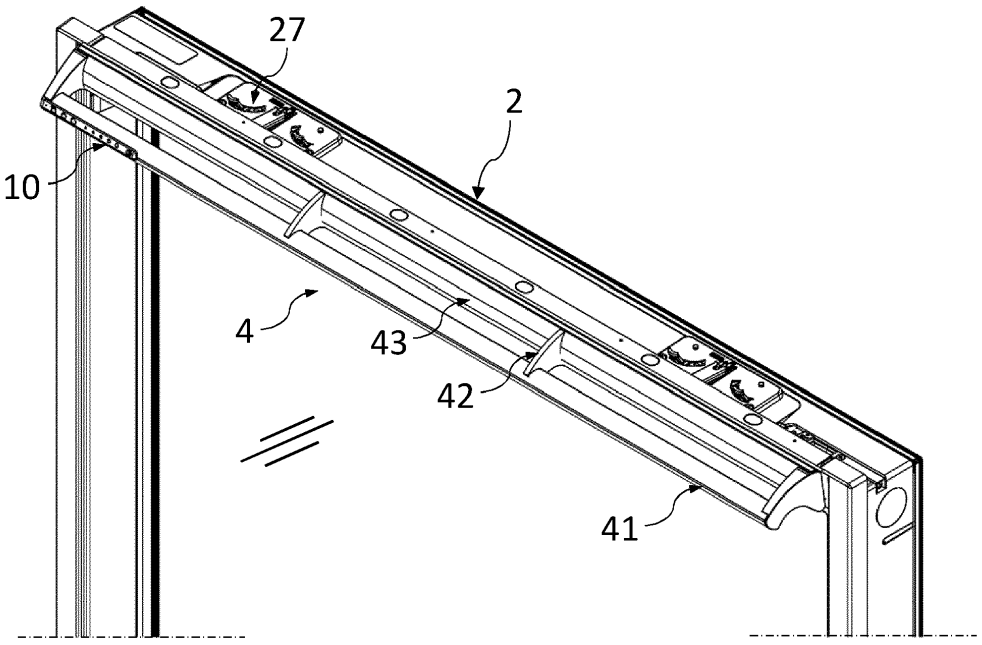

Fig. 4a

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Description

Technical Field

[0001] The present invention relates to a roof window arrangement comprising a roof window with a stationary frame and a sash carrying a pane, in which the sash includes at least a top member defining a width of the sash, two mutually parallel side members defining a length of the sash, and a bottom member parallel to the top member, and is connected to the stationary frame by means of a set of hinges and configured to assume at least an open position and a closed position by rotation about a hinge axis substantially parallel to the top member of the sash, and a manual operating assembly configured to assist in operation of the sash between the open and the closed positions, said manual operating assembly including a handle portion located at the top member of the sash and having a longitudinal extension substantially in parallel with the top member of the sash.

Background Art

[0002] Roof windows are typically provided either as manual roof windows, or electrical roof windows.

[0003] Roof windows which are electrically operated are typically located in so-called out-of-reach positions, but are also prepared for manual operation and consequently comprise both electrical and manual operating assemblies. A number of appliance members may be associated with the roof window in the roof window arrangement, including at least one appliance member in form of a remote control unit. The remote control unit is most often hand-held and may, when not used, be located in a console mounted on, for instance, a wall of a room in the building in which the roof window is installed. Thus, during normal operation of an out-of-reach roof window, the roof window is brought to, for instance, an open position by activating the electrical operating assembly by means of the remote control unit to position the sash at an angle relative to the frame. Such roof window arrangements often include sensors, allowing the sash to be closed automatically in case of rain detected by a rain sensor. The roof window is normally prepared also for manual operation, as manual opening of the roof window at any time, including during power outage, may be a requirement for safety reasons, and/or for reasons that it is desirable to clean the outside of the pane from the interior of the room, requiring the sash to pivot through about 180°. However, manual opening of an electrically operated roof window decouples the electrical operating assembly, and the electrical operating assembly then needs to be reconnected to ensure correct operation, including subsequent closing of the sash by means of the electrical operating assembly. Since manual opening is only rarely relevant, the user will most often remember to reconnect the electrical operating assembly subsequently. Many examples of such roof window arrangements are known in the art, including Applicant's EP 3 235 993 A1.

[0004] However, in case such a roof window is instead installed within reach, it is understandable that a user might open the roof window manually, either because he or she does not know that the roof window is set up for electrical operation, or believing that the subsequent closing will reactivate the electrical operating assembly, or because the remote control unit is not immediately locatable. Although the user will experience that the sash is in fact positioned in an open position by handling the manual operating assembly, this action thus decouples the electrical operating assembly and as a consequence, the sash will not be able to be closed again by activating the electrical operating assembly, neither by means of the remote control unit, nor automatically in response to signals from, for instance, a rain sensor.

Summary of Invention

[0005] With this background, it is therefore an object of the invention to provide a roof window arrangement which ensures that operation of the roof window is rendered more flexible.

[0006] This and further objects are achieved with a roof window arrangement of the kind mentioned in the introduction which is furthermore characterised in that the handle portion, or at least one of the handle portions, of the manual operating assembly comprises receiving means configured to receive at least one exchangeable appliance member in a releasable connection, that the receiving means comprise a recess or cut-out in the handle portion, and that the at least one appliance member is selected from the list of a dummy element covering the recess or cut-out, a sensor unit for temperature, relative humidity, air quality etc.; a remote control unit configured to cooperate with an electrical operating assembly and/or a screening assembly and/or accessory devices; and an information unit including a status indicator, a watch etc.

[0007] By providing accommodation of the exchangeable appliance member in the handle portion, or in one of the handle portions, of the manual operating assembly, this appliance member is immediately available in a place which is logical to the user. The releasable connection entails that the appliance member is easily exchangeable for another appliance member and thus renders the roof window arrangement suitable for retrofitting and upgrading.

[0008] For instance, a roof window arrangement may be provided in a standard delivery condition in which the appliance member is present in the form of a dummy element. In order to prepare the roof window for electrical operation, an electrical operating assembly with a remote control unit may be supplied either together with the roof window arrangement, or separately, following which the dummy element is removed from the cut-out or recess, and the remote control inserted into the cut-out or recess in the handle portion of the manual operating assembly.

Thus, a user wishing to operate the roof window will find the remote control unit at the place he or she would look to in any event, thus rendering operation logical and intuitive.

[0009] In a presently preferred embodiment, the receiving means comprise a cut-out formed as a longitudinally extending track formed in the handle portion of the manual operating assembly. Placing the cut-out in the handle portion itself renders the appliance member particularly inconspicuous in use, and the formation of a track provides for a mechanically simple and reliable solution. Preferably, said track extends between an open end at an end of handle portion and a transition end, and the appliance member is configured to be slidably engaged in the track in the handle portion. In this manner, a secure engagement between the appliance member and the handle portion of the manual operating assembly is achievable in a simple manner, which makes the appliance member easy to install and disengage again if desirable.

[0010] In a further presently preferred embodiment, the handle portion is formed as a handle bar profile. This provides for efficient manufacturing and handling. Preferably, the handle bar profile of the handle portion is formed as an extruded profile. In a further development of this embodiment, the track is formed as a cut-out in at least one section of the handle bar profile.

[0011] In one embodiment, the handle bar profile has a generally closed configuration defining a hollow interior. This makes it possible to accommodate portions of the appliance member out of sight and protected from the surroundings. In a development of this embodiment, the cross-section of the handle bar profile is generally triangular and defining at least a front edge section, a top section, a bottom section and a back section. To enhance the user experience even further, the cut-out forming the track may be provided substantially coinciding with the front edge section and spanning parts of the top section and the bottom section.

[0012] In a still further presently preferred embodiment, the manual operating assembly comprises a ventilation flap and the handle portion is connected to a closure portion via a connection portion extending between the closure portion and the handle portion such that a distance is provided between the handle portion and the closure portion, said closure portion being configured to selectively close off and open up passage through at least one ventilation opening at the sash top member.

[0013] Other presently preferred embodiments and further advantages will be apparent from the subsequent detailed description and drawings.

Brief Description of Drawings

[0014] In the following description embodiments of the invention will be described with reference to the schematic drawings, in which

Fig. 1a is a schematic perspective view of a prior art roof window arrangement comprising a wall-mounted remote control unit, shown on a larger scale;

Fig. 1b is a schematic partial perspective view of another prior art roof window assembly comprising an appliance member in the form of a hand-held remote control unit and another appliance member in the form of a screening assembly;

Fig. 2 is an isometric view of a roof window arrangement in a first embodiment of the invention, with the roof window shown in an open position;

Fig. 3 is an isometric view of details of the roof window arrangement of Fig. 2, from another angle and with the roof window in a closed position;

Figs 4a and 4b are partial isometric views of the upper part of the roof window arrangement of Fig. 3;

Fig. 5 is an isometric view of a manual operating assembly with the appliance member of the roof window arrangement in the first embodiment shown in Figs 2 to 4b;

Fig. 6 is a partial perspective view, on a larger scale, of the manual operating assembly of Fig. 5, with the appliance member comprising a remote control unit;

Fig. 7 is an exploded perspective view of details of the manual operating assembly of Figs 5 and 6, with the remote control unit;

Fig. 8 is a partial perspective view of the details of Fig. 7;

Figs 9 and 10 are sectional views along the lines IX-IX and X-X, respectively, of Fig. 8;

Fig. 11 is a perspective view of a detail of the remote control unit;

Fig. 12 is a back view of the detail of Fig. 11;

Fig. 13 is a partial perspective view of the manual operating assembly of the first embodiment, corresponding in substance to Fig. 6, from another angle and on a larger scale;

Figs 14 and 15 are views corresponding to Fig. 13, of alternative embodiments of the manual operating assembly and the appliance member of the roof window arrangement according to the invention;

Fig. 16 is a partial perspective exploded view of a further embodiment of the manual operating assembly and the appliance member of the roof window arrangement according to the invention;

Fig. 17 is a further exploded view of the details of Fig. 16;

Figs18 and 19 are isometric views, corresponding substantially to Figs 5 and 6, of a manual operating assembly with a appliance member in a second embodiment of the roof window arrangement according to the invention;

Fig. 20 is an isometric view, corresponding substantially to Fig. 5, of a manual operating assembly with a appliance member in a third embodiment of the roof window arrangement according to the invention;

Fig. 21 is an isometric view, corresponding substantially to Fig. 5, of a manual operating assembly with

a appliance member in a fourth embodiment of the roof window arrangement according to the invention;
Fig. 22 is a plan view of a touch panel of a remote control unit in another embodiment;
Figs 23 to 26 are perspective views of touch panels in further embodiments;
Fig. 27 is a partial perspective view, corresponding in substance to Fig. 6, of an appliance member of the set of appliance members of a roof window arrangement in a fifth embodiment of the invention;
Fig. 28 is a perspective view, on a larger scale, of the appliance member of Fig. 27;
Fig. 29 is a perspective view of another appliance member of the set of appliance members of a roof window arrangement in a sixth embodiment of the invention; and
Fig. 30 is a perspective view, on a larger scale, of the appliance member of Fig. 29.

Description of Embodiments

[0015] In the figures of the drawings, embodiments of a roof window arrangement according to the invention are shown.

[0016] Referring initially to Figs 1a and 1b, a prior art roof window arrangement is shown. The prior art roof window arrangement as shown in Figs 1a and 1b comprises a stationary frame 1'. Installed in the stationary frame 1' is a sash 2' having a manual operating assembly 4' for opening or closing the roof window. The prior art roof window arrangement presented is provided with an electrical operating assembly 6'. The electrical operating assembly 6' functions as an alternative to the manual operating assembly 4' and is capable of opening and closing the roof window. As shown in Fig. 1b, the prior art roof window arrangement further includes a screening assembly 7'. Further screening assemblies may be provided, for instance as one or more interior screening assemblies. The electrical operating assembly 6' is controllable through a remote control unit 10', allowing a user to control the roof window arrangement from a distance. Examples of a remote control unit 10' are a hand-held remote control unit or a wall-mounted remote control unit, which may for instance be a separate unit to be taken out from a console fastened to the wall.

[0017] In the following, embodiments of roof window arrangements to replace the roof window arrangements of the prior art will be described. Elements having the same or analogous function as in the prior art arrangement carry the same reference numerals without the ' mark.

[0018] Referring now to Figs 2 and 3, a roof window arrangement according to a first embodiment of the invention is shown in an open and in a closed position. The roof window arrangement shown comprises a roof window with a stationary frame 1, connected to the stationary frame 1 is a sash 2 carrying a pane 3. The sash 2 is connected to the stationary frame 1 by means of a set of hinges 5 and configured to assume at least an open position and a closed position by rotation about a hinge axis substantially parallel to the top member 21 of the sash 2. The sash 2 comprises at least a top member 21 defining a width of the sash, two mutually parallel side members 22, 23 defining a length of the sash, and a bottom member 20 parallel to the top member 21. Mounted on the sash 2 is a manual operating assembly 4, which is configured to assist in operation of the sash 2 between the open and the closed positions. The manual operating assembly 4 has a handle portion 41 located at the top member 21 of the sash 2 and has a longitudinal extension substantially in parallel with the top member 21 of the sash 2.

[0019] In the shown first embodiment, the sash 2 is provided with a schematically shown electrical operating assembly 6, configured to at least assist in operation of the sash 2 between the open and the closed position. For the opening and closing of the window, the electrical operating assembly 6 may be configured to control the manual operation assembly 4 in a manner known *per se.* As will be described in further detail below, the electrical operating assembly 6 is here configured to cooperate with at least one appliance member 10.

[0020] The roof window arrangement according to the invention comprises at least one exchangeable appliance member to be connected to the handle portion of the manual operating assembly in a releasable manner. The at least one appliance member of the roof window arrangement is selected from a list of a dummy element, a sensor unit, a remote control unit, and an information unit. The sensor unit may for instance include a gesture sensor, allowing the user to activate the functionality of the roof window arrangement by a certain movement pattern, for instance clapping or waving. Since such functionality may include opening of the roof window, it is of course necessary to ascertain that the sensor is not able to be triggered by movements from the exterior of the building, i.e. from the outer side of the roof window.

[0021] Referring now to Figs 4a and 4b, partial, isometric views of the upper part of the roof window arrangement of Fig. 3 are shown, with and without the manual operating assembly 4, respectively. The manual operating assembly 4 and the first appliance member 10 according to a first embodiment of the invention are shown.

[0022] In the shown first embodiment, the at least one appliance member 10 comprises a remote control unit configured to cooperate with the electrical operating assembly 6, and in the following, reference will be made in equal measures to the first appliance member and the remote control unit 10. When the first appliance member is referred to as a remote control unit 10 in the description, this is not to be considered a limitation of the invention but is meant as an exemplary embodiment. The first appliance member in the form of the remote control unit 10 is thus located in the handle portion 41 of the manual operating assembly 4. In the embodiment shown, the handle portion 41 has such a longitudinal extension, or

length, that it extends substantially throughout the width of the sash 2.

[0023] According to the invention, the handle portion 41 is provided with receiving means configured to receive the first appliance member 10. The receiving means are configured to receive the first appliance member 10 in a releasable connection. The receiving means comprise a recess or cut-out in the handle portion. In principle, any aperture capable of functioning as a utility recess will fulfil the task of such receiving means, and the following, presently preferred examples will be described in connection with embodiments.

[0024] In the first embodiment, the receiving means comprise a cut-out formed as a longitudinally extending track 412 in the handle portion 41 of the manual operating assembly 4 to be described in further detail below. The manual operating assembly 4 here comprises a ventilation flap, which is pivotally connected to the sash top member 21 by a flap hinge, or set of flap hinges (not visible) located in a flap hinge recess 26. A pivotal connection allows the manual operating assembly 4 to rotate about an axis in a plane parallel to the plane of the pane 3. With the manual operating assembly 4 being a ventilation flap, further possibilities than just opening and closing the window are given, as a ventilating position is also provided. The manual operating assembly in the form of the ventilation flap 4 is in the shown embodiment controlled by the handle portion 41, where the handle portion 41 is connected to a closure portion 43 via a connection portion 42 extending between the closure portion 43 and the handle portion such that a distance is provided between the handle portion 41 and the closure portion 43. The closure portion 43 is here configured to selectively close off and open up passage through at least one ventilation opening 25 at the sash top member 21. A lock mechanism 27 is provided to be operated by the manual operating assembly 4; alternatively no lock mechanism is provided and the locking is provided for in other manners. The lock mechanism 27 is connected to the closure portion 43 and the sash top member 21, allowing to lock in place the manual operating assembly 4 in relation to the sash top member 21 and thus the sash 2 relative to the frame. It is noted that while the manual operating assembly 4 is configured to rotate about a hinge axis provided by the flap hinge or hinges, the handle portion 41 is fixed, and not rotatable, relative to the other parts of the manual operating assembly 4, i.e. the connection portion 42 and the closure portion 43.

[0025] Reference is now made to Figs 5 and 6, which show isometric views of a manual operating assembly 4 with the first appliance member 10 according to a first embodiment of the roof window arrangement. At opposite ends of the manual operating assembly 4 are a left-hand end console 421 and a right-hand end console 422, the distance between the left-hand end console 421 and the right-hand end console 422 defining a longitudinal extension, or length, of the manual operating assembly. The backside of the manual operating assembly 4 is made of a plate element 431, to which a foam element 432 is connected. The foam element 432 is positioned to be in-between the plate element 431 and the sash 2, when the manual operating assembly 4 is mounted on the sash to contribute to tightness and sound-dampening. The handle portion 41 is formed as a handle bar profile 411, but may be formed to take any shape suitable for being gripped or grabbed. The handle bar profile 411 can in principle be made by any suitable material and manufacturing technology, but is here provided as an extruded profile of a metal material, allowing for the creation of a wide variety of cross-sectional profiles. The first appliance member 10 is placed within the handle portion 41, here in a cut-out or recess configured to receive the first appliance member 10 as will be described in further detail below.

[0026] Referring now to Fig. 7, an exploded perspective view of details of the manual operating assembly of Figs 5 and 6, with the first appliance member in the form of a remote control unit 10, is shown. It can be seen that the remote control unit 10 comprises a base part 101, the base part 101 having reception means 1011 for a control part 102 and reception means for power means (not shown in this figure). The power means of the remote control unit 10 can be batteries, solar cells or other suitable power means. If batteries are used for power means of the remote control unit 10, the reception means for power means are formed as a battery compartment 1012. The battery compartment 1012 for the remote control unit 10 can be formed in a hollow in the base part 101. A USB stick may be provided at the end or back side of the handle portion, for instance for charging of batteries, or for connecting accessories including auxiliary equipment. This may include solar cells. The control part 102 includes a touch panel 1021 and a print circuit board 1022. As an alternative to the touch panel 1021, individual buttons may be used. The reception means for the control part 102 may be in the form of a longitudinally extending track 1011 having upstanding flanges 1011a in the base part 101 to cooperate with engagement means of the control part 102. Retention means for the control part can be provided at the open end 4121 of the track 412. The retention means could be an end cap 103 configured to be releasable connected to the base part 101 of the remote control unit 10 and/or the handle bar profile 411.

[0027] As shown on Fig. 7, the receiving means for the remote control unit 10 are here formed as the longitudinally extending track 412. The track 412 may be formed in the handle portion 41 or part of the handle portion. The track 412 is suitable for slidably receiving an appliance member of the set of appliance members. The track 412 extends between an open end 4121 and a transition end 4122 of the handle portion. As shown, other than the touch panel 1021 of the control part 102, the remaining portions and parts of the remote control unit 10 are accommodated within a hollow interior 413 of the handle bar profile 411 which is here formed with a generally closed configuration.

[0028] Referring to Fig. 8, which shows the remote control unit 10 releasably connected to the handle portion 41, the handle bar profile 411 is shown with the end cap 103 keeping the remote control unit 10 in place. Additionally, the end cap 103 closes off the hollow interior 413 of the handle bar profile 411. Alternatively or additionally, other retention means for keeping the remote control unit 10 in place in the handle portion 41. Such retention means may be positive including a form lock, or non-positive, for instance by friction or other force-locking mechanisms.

[0029] Reference is now made to Figs 9 and 10, which are cross-sectional views along the lines IX-IX and X-X, respectively, of Fig. 8. The cross-section of the handle bar profile 411 shown is triangular, and defines a front edge section 4110, a top section 4111, a bottom section 4112 and a back section 4113. Other cross-sections of the handle bar profile 411 such as rectangular, square, rounded including circular, elliptical, and oval, would also be possible. The cross-sectional configuration of the remote unit 10 may be substantially uniform. The remote unit 10 may have a substantially plane configuration throughout the majority of its length, or substantially triangular, for instance to substantially coincide with the triangular shape of the cross-section of the handle bar profile 411. Here, the touch panel 1021 of the remote control unit 10 is substantially plane and rectangular. It is advantageous if the cross-sectional configuration of the interior parts of the remote control unit 10 can lie within the contours of the triangular shape of the cross-section of the handle bar profile 411. It is seen that the track 412 for receiving the remote control unit 10 is a cut-out, made in at least one of the sections 4110, 4111, 4112 of the handle bar profile. The cut-out forming the track 412 is provided substantially coinciding with the front edge section and spanning parts of the top section 4111 and the bottom section 4112.

[0030] In principle, the appliance members could be placed at any circumferential location of the handle portion throughout the embodiments of the roof window arrangement. However, it is preferred that the appliance member is located at a face of the handle portion and at a position which is immediately visible to the user and thus coincides with a line of vision of the user when standing in front of the roof window.

[0031] Referring to Figs 11 and 12, with Fig. 11 being a perspective front view of a detail of the remote control unit 10, according to the first embodiment of the invention, and Fig. 12 being a back view of the detail of the remote control unit 10 shown in Fig. 11, it is shown how the engagement means of the control part 102 include a plate portion 1023, which is provided on a back side of the touch panel 1021. The plate portion 1023 has a substantially rectangular configuration. The plate portion 1023 has a set of edge flanges 1023c extending between a back edge 1023a and a front edge 1023b. The set of edge flanges 1023c are configured to engage with the upstanding flanges 1011a of the longitudinally extending track 1011 of the base part 101. The front edge 1023b being configured to engage with the transition end 4122 of the track 412 of the handle bar profile 411.

[0032] Referring now to Figs 13, 14 and 15, Fig. 13 shows a partial perspective view of the manual operating assembly 4 according to the first embodiment of the invention described in the above. Figs 14 and 15 show corresponding views of alternative embodiments of the manual operating assembly according to the invention. The remote control unit 110 of the alternative embodiments corresponds in substance to the remote control unit 10 of the first embodiment and only differences will be described in detail.

[0033] In the first embodiment shown in Fig. 13, and in the embodiment of Fig. 14, the end cap 103 closes off the handle bar profile 411. In the alternative embodiment shown Fig. 15, the end console 421 is provided with a cover section 421a, with the cover section 421a acting as retention means, removing the need for the end cap 103. Another feature of the alternative embodiments of Figs 14 and 15 is the cross-sectional configuration of the remote control unit 110, in particular of the touch panel 1021. For a further description of this feature, confer the below description of Figs 16-17 and 23-26.

[0034] Reference is now made to Figs 16 and 17, with Fig. 16 being a partial perspective exploded view of handle bar profile 411 and the remote control unit 110 corresponding to the alternative embodiment described in the above under Fig. 15. The remote control unit 110 is here shown with power means in the form of batteries 1040 located in a battery compartment element 1013. The remote control unit 110 comprises a plurality of additional elements 1014, 1015, 1016, 1017 and 1018, of which additional element 1014 provides for a base for securing the touch panel 1021 and the remaining additional elements.

[0035] Referring to Figs 18 and 19, which are isometric views corresponding substantially to Figs 5 and 6, of a manual operating assembly 104 with the remote control unit 10 in a second embodiment of the roof window arrangement according to the invention, it is shown how the manual operating assembly 104 in addition to the handle portion 141 has a closure portion 143 connected to the handle portion 141 via a connection portion 142 extending between the closure portion 143 and the handle portion 141, such that a distance is provided between the handle portion 141 and the closure portion 143. The closure portion 143 is, as in the first embodiment, configured to selectively close off and open up passage through at least one ventilation opening at the sash top member. The handle bar profile 1411 has a generally open, inverted U-shaped configuration in which the handle portion 141 and the closure portion 143 form legs of the U-shape and the connection portion 142 forms a base of the U-shape. Furthermore, a track 1412 may be provided in an end section 14111 of the handle bar profile 1411. The handle portion 141 is provided with receiving means configured to receive the remote control unit 10.

As in the first embodiment, the manual operating assembly 104 is configured to rotate about a hinge axis provided by the flap hinge or hinges, and the handle portion 141 is fixed, i.e. not rotatable, relative to the other parts of the manual operating assembly 104, i.e. the connection portion 142 and closure portion 143.

[0036] Referring to Fig. 20, which is an isometric view, corresponding substantially to Fig. 5, of a manual operating assembly 204 with the remote control unit 10 in a third embodiment of the roof window arrangement according to the invention. Fig. 20 shows the third embodiment where the handle portion is separated into two parts, namely a left handle portion 241a and a right handle portion 241b. The handle portion being split into two parts only serves as an example, with a higher number of handle portions being possible. The number and extension of each handle portion may, for instance, be chosen in accordance with the width of the window. The handle portions 241a, 241b each have a smaller longitudinal extension than the width of the sash 2, preferably in the range of 20 to 40% of the width of the sash 2. In the depiction the remote control 10 unit is connected to one of the handle portions, though each handle portion may be configured to receive an appliance member, further the handle portions can be configured to receive or cooperate with different appliance members.

[0037] Fig. 21 is an isometric view, corresponding substantially to Fig. 5, of a manual operating assembly 304, with the remote control unit 10 in a fourth embodiment of the roof window arrangement according to the invention. In Fig. 21 instead of the handle portion 341 being split into parts, it is instead centred and does not extend throughout the whole width of the sash. The handle portion 341 has a smaller longitudinal extension than the width of the sash 2, preferably in the range of 20 to 40% of the width of the sash 2. In this embodiment the manual operating assembly 4 may include a lock mechanism connected to the handle portion 341 and to the sash top member 21, with the lock mechanism being arranged to lock in place the handle portion 341 in relation to the sash top member 21. The aperture forming the receiving means is here provided as a recess of a sufficient depth to accommodate the remote control unit 10.

[0038] Fig. 22 is a plan view of a touch panel 1021 of the remote control unit 10 in an embodiment according to the invention. The touch panel 1021 can have one or more icons 1021a, preferably the touch panel 1021 is equipped with icons 1021a symbolizing opening of the window, closing of the window, ventilation, and if the roof window arrangement includes a screening assembly the icons 1021a can also cover selection and control of an exterior screening assembly, selection and control of an interior screening assembly. It is noted that the selection and control of the interior screening assembly is carried out by means of a single icon which in turn is different from the icon for selecting and controlling the exterior screening assembly, or for operating the window itself. More icons 1021a may be added to add to the functionality of the remote control unit 10. The icons 1021a for opening and closing the window may further include a range of icons 1021a, each symbolizing a different opening or closing degree of the window. The design of icons 1021a shown is only an example, different designs for icons may be envisioned.

[0039] Referring to Figs 23 to 26 showing perspective views of remote control units 110, 210, 310 and 410, of which the respective touch panels are provided with various cross-sectional configurations. If the remote control unit and/or only the touch panel has a substantially plane configuration throughout the majority of its length, the remote control unit 10 is preferably provided with at least one upstanding edge 2101, 2102; 3101, 3102 to conform to the remaining portions of the handle portion 41. The cross-sectional configuration of the touch panel 1021 may be substantially triangular, for instance to substantially coincide with the triangular shape of the cross-section of the handle bar profile 411 or the remote control unit 10. If the cross-sectional configuration of the remote control unit lies within the contours of the triangular shape of the cross-section of the handle bar profile 411, it is preferably provided with upstanding edges 2101, 2102; 3101, 2102 substantially coinciding with the triangular shape of the cross-section of the handle bar profile 411.

[0040] Referring to Figs 27 and 28, with Fig. 27 being a partial perspective view, corresponding in substance to Fig. 6, of an appliance member of the set of appliance members of a roof window arrangement in a fifth embodiment of the invention, and Fig. 28 being a perspective view, on a larger scale, of the appliance member of Fig. 27. The set of appliance members may include a dummy element 510. The dummy element 510 can be provided to cover the recess or cut-out in the handle portion 41. The dummy element 510 may be designed as to conform to the handle portion 41, allowing for it to be hardly noticeable when inserted in the aperture of the handle portion 41. The dummy element 510 consists of a plate portion 5123, a back edge 5123a, a front edge 5123b and edge flanges 5123c. Where the length of the dummy element 510 is defined by the distance from the back edge 5123a to the front edge 5123b, with the edge flanges 5123c being able to engage with the handlebar profile.

[0041] Referring to Figs 29 and 30, perspective views of another appliance member according to a sixth embodiment of the invention are shown. In this embodiment, the set of appliance members contains a hand unit 610, which may provided separately, for instance in a package containing also the first appliance member, typically in the form of the remote control unit 10 of the first embodiment. The hand unit 610 comprises a hand unit profile 611 with a track 612 to receive the first appliance member 10, and a set of end caps 613.

[0042] Although described in the above for a dummy element and a remote control unit, the set of exchangeable appliance members may also include units such as a sensor unit for temperature, relative humidity, or air quality; or an information unit including a status indicator

for the window, a watch etc. Further conceivable exchangeable appliance members may also include detectors for smoke, sound, or light, and transmitters/receivers etc.

[0043] The invention is not limited to the embodiments shown and described in the above, but various modifications and combinations may be carried out.

List of reference numerals

[0044]

1	stationary frame
2	sash
	20 sash bottom member
	21 sash top member
	22 sash side member
	23 sash side member
	24 top sash unit
	25 ventilation opening
	26 recess for flap hinge
	27 lock mechanism
	28 mounting bracket
3	pane
4; 104; 204; 304	manual operating assembly / ventilation flap
	41 handle portion
	411 handle bar profile
	4110 front edge section
	4111 top section
	4112 bottom section
	4113 back section
	412 track
	4121 open end of track
	4122 transition end of track
	413 hollow interior
	42 connection portion
	421 left-hand end console
	421a cover section
	422 right-hand end console
	423 first centre console
	424 second centre console
	43 closure portion
	431 plate element
	432 foam element
5	hinge
6	electrical operating assembly / chain operator
7'	screening assembly (Fig. 1b)
10	first appliance member / remote control unit
	101 base part
	1011 track
	1011a upstanding flanges
	1012 battery compartment
	1013 battery compartment element
	1014 additional element
	1015 additional element
	1016 additional element
	1017 additional element
	1018 additional element
	102 control part
	1021 touch panel
	1021a icons
	1022 print cirucit board
	1023 plate portion
	1023a back edge
	1023b front edge
	1023c edge flanges
	103 end cap
	1040 batteries
110	remote control unit
210	remote control unit
	2101 back edge
	2102 front edge
310	remote control unit
	3101 back edge
	3102 front edge
410	remote control unit
510	dummy element
	5123 plate portion of dummy
	5123a back edge of dummy
	5123b front edge of dummy
	5123c edge flanges of dummy
610	hand unit
	611 hand unit profile
	612 track
	613 end cap

Claims

1. A roof window arrangement comprising a roof window with a stationary frame (1) and a sash (2) carrying a pane (3), in which the sash (2) includes at least a top member (21) defining a width of the sash, two mutually parallel side members (22, 23) defining a length of the sash, and a bottom member (20) parallel to the top member (21), and is connected to the stationary frame (1) by means of a set of hinges (5) and configured to assume at least an open position and a closed position by rotation about a hinge axis substantially parallel to the top member (21) of the

sash (2), and a manual operating assembly (4) configured to assist in operation of the sash (2) between the open and the closed positions, said manual operating assembly (4) including a handle portion (41) located at the top member (21) of the sash (2) and having a longitudinal extension substantially in parallel with the top member (21) of the sash (2),

characterised in that

the handle portion (41; 141; 341), or at least one of the handle portions (241a), of the manual operating assembly (4) comprises receiving means configured to receive at least one exchangeable appliance member (10) in a releasable connection, that the receiving means comprise a recess or cut-out (412; 1412) in the handle portion (41; 141; 241a; 341), and that the at least one appliance member is selected from a list of:

- a dummy element covering the recess or cut-out;
- a sensor unit for temperature, relative humidity, air quality etc.;
- a remote control unit configured to cooperate with an electrical operating assembly and/or a screening assembly and/or accessory devices; and
- an information unit including a status indicator, a watch etc.

2. A roof window arrangement according to claim 1, wherein the receiving means comprise a cut-out formed as a longitudinally extending track (412; 1412) formed in the handle portion (41;141) of the manual operating assembly (4).

3. A roof window arrangement according to claim 2, wherein said track (412) extends between an open end (4121) at an end of handle portion (41) and a transition end (4122), and wherein the at least one appliance member (10) is configured to be slidably engaged in the track (412) in the handle portion (41).

4. A roof window arrangement according to claim 2 or 3, wherein the handle portion (41; 141) is formed as a handle bar profile (411; 1411), preferably as an extruded profile, and wherein the track (412; 1412) is formed as a cut-out in at least one section (4110, 4111, 4112; 14111) of the handle bar profile (411; 1411).

5. A roof window arrangement according to claim 4, wherein the handle bar profile (411) has a generally closed configuration defining a hollow interior (413).

6. A roof window arrangement according to claim 5, wherein the cross-section of the handle bar profile (411) is generally triangular and defining at least a front edge section (4110), a top section (4111), a bottom section (4112) and a back section (4113), and wherein the track (412) is provided substantially coinciding with the front edge section and spanning parts of the top section (4111) and the bottom section (4112).

7. A roof window arrangement according to any one of the preceding claims, wherein the manual operating assembly comprises a ventilation flap (4) and wherein the handle portion (41) is connected to a closure portion (43) via a connection portion (42) extending between the closure portion (43) and the handle portion such that a distance is provided between the handle portion (41) and the closure portion (43), said closure portion (43) being configured to selectively close off and open up passage through at least one ventilation opening (25) at the sash top member (21), the manual operating assembly preferably also comprising a lock mechanism.

8. A roof window arrangement according to claim 4, wherein the manual operating assembly in addition to the handle portion (141) comprises a closure portion (143) connected to the handle portion (141) via a connection portion (142) extending between the closure portion (143) and the handle portion (141) such that a distance is provided between the handle portion (141) and the closure portion (143), said closure portion (143) being configured to selectively close off and open up passage through at least one ventilation opening at the sash top member, wherein the handle bar profile (1411) has a generally open, inverted U-shaped configuration in which the handle portion (141) and the closure portion (143) form legs of the U-shape and the connection portion (142) forms a base of the U-shape, and wherein the track (1412) is provided in an end section (14111) of the handle bar profile (1411).

9. A roof window arrangement according to any one of the preceding claims, wherein the handle portion (41; 141) extends substantially throughout the width of the sash (2), or wherein the handle portion (341), or each of the handle portions (241a, 24b), has a smaller longitudinal extension, or length, than the width of the sash (2), preferably in the range of 20 to 40% of the width of the sash (2).

10. A roof window arrangement according to any one of the preceding claims, wherein the roof window furthermore comprises an electrical operating assembly (6) configured to assist in operation of the sash (2) between the open and the closed position, and wherein the exchangeable appliance member comprises a remote control unit (10) configured to cooperate with the electrical operating assembly (6).

11. A roof window arrangement according to claim 10,

wherein the remote control unit (10) comprises a base part (101) including reception means (1011, 1012) for a control part (102) and for power means, the control part (102) preferably including a touch panel (1021) and a print circuit board (1022), and wherein the reception means for the control part (102) includes a longitudinally extending track (1011) with upstanding flanges (1011a) in the base part (101) to cooperate with engagement means of the control part (102).

12. A roof window arrangement according to claims 11 when dependent on any one of claims 3 to 9, wherein the engagement means of the control part (102) includes a plate portion (1023) provided on the back side of the touch panel (1021) and having a substantially rectangular configuration with a set of edge flanges (1023c) extending between a back edge (1023a) and a front edge (1023b), said set of edge flanges (1023c) being configured to engage with the upstanding flanges (1011a) of the longitudinally extending track (1011) of the control part (102), and the front edge (1023b) being configured to engage with the transition end (4122) of the track (412) of the handle bar profile (411), retention means for the control part (102) being preferably provided at the open end (4121) of the track (412), comprising an end cap (103) configured to be releasable connected to the base part (101) of the remote control unit (10) and/or the handle bar profile (411), or a cover section (421a) of an end console (421) of the connection portion (42).

13. A roof window arrangement according to any one of claims 11 and 12, wherein the power means of the remote control unit (10) comprise batteries and the reception means for power means are formed as a battery compartment (1012), preferably formed in a hollow in the base part (101), or comprising a battery compartment element (1013) and a plurality of additional elements (1014-1018).

14. A roof window arrangement according to any one of claims 11 to 13, wherein the cross-sectional configuration of the remote control unit (10; 110; 410) is substantially uniform, preferably a substantially plane configuration throughout the majority of its length, more preferable with at least one upstanding edge (2102; 3101, 3102).

15. A roof window arrangement according to any one of claims 11 to 13 when dependent on claim 6, wherein the cross-sectional configuration of the remote control unit (110) is substantially triangular and substantially coincides with the triangular shape of the cross-section of the handle bar profile (411), the cross-sectional configuration of the remote control unit (10; 210; 310) lying within the contours of the triangular shape of the cross-section of the handle bar profile (411), preferably with upstanding edges (2102; 3101, 2102) substantially coinciding with the triangular shape of the cross-section of the handle bar profile (411).

16. A roof window arrangement according to any one of the preceding claims, wherein the at least one exchangeable appliance member forms part of a set of appliance members including at least a first appliance member in the form of a remote control unit (10) configured to cooperate with the electrical operating assembly (6) and/or with another appliance member of the set of appliance members.

17. A roof window arrangement according to claim 16, wherein said set of appliance members comprises a hand unit (610) with a hand unit profile (611) with a track (612) to receive the remote control unit (10), and a set of end caps (613).

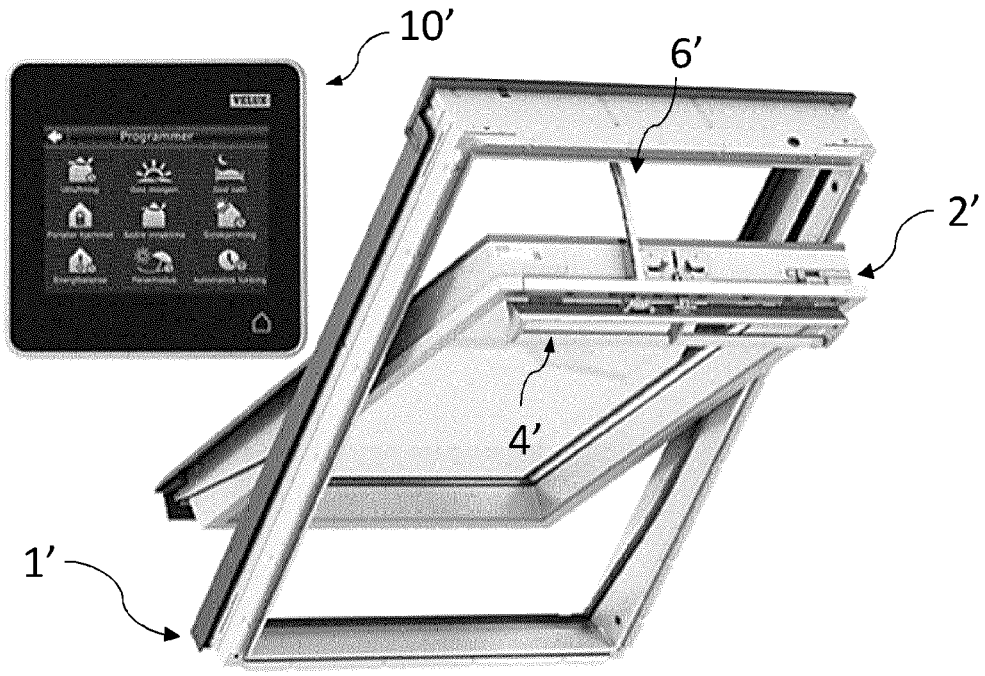


Fig. 1a (PRIOR ART)

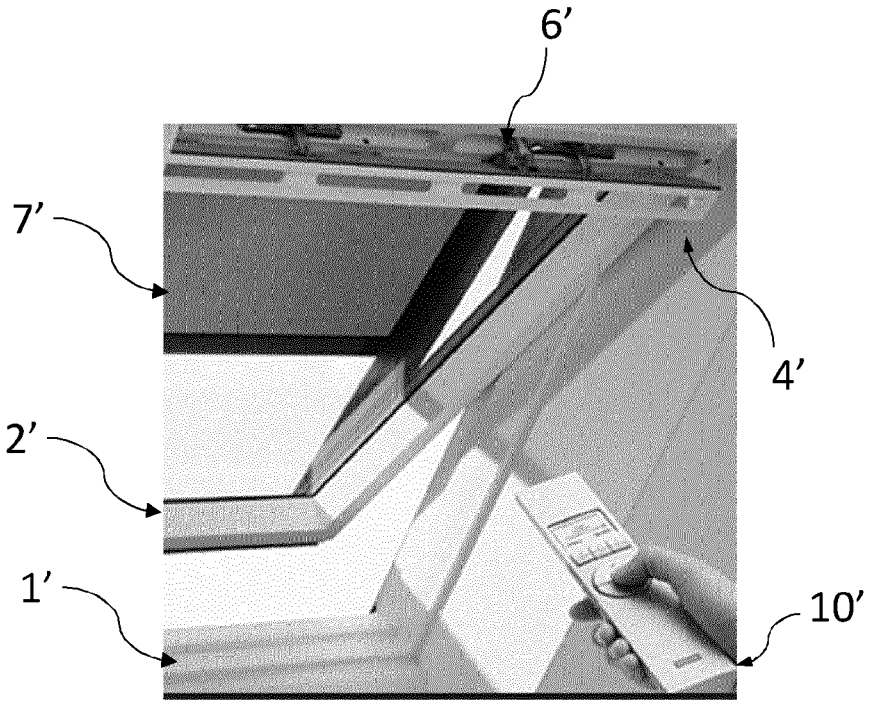


Fig. 1b (PRIOR ART)

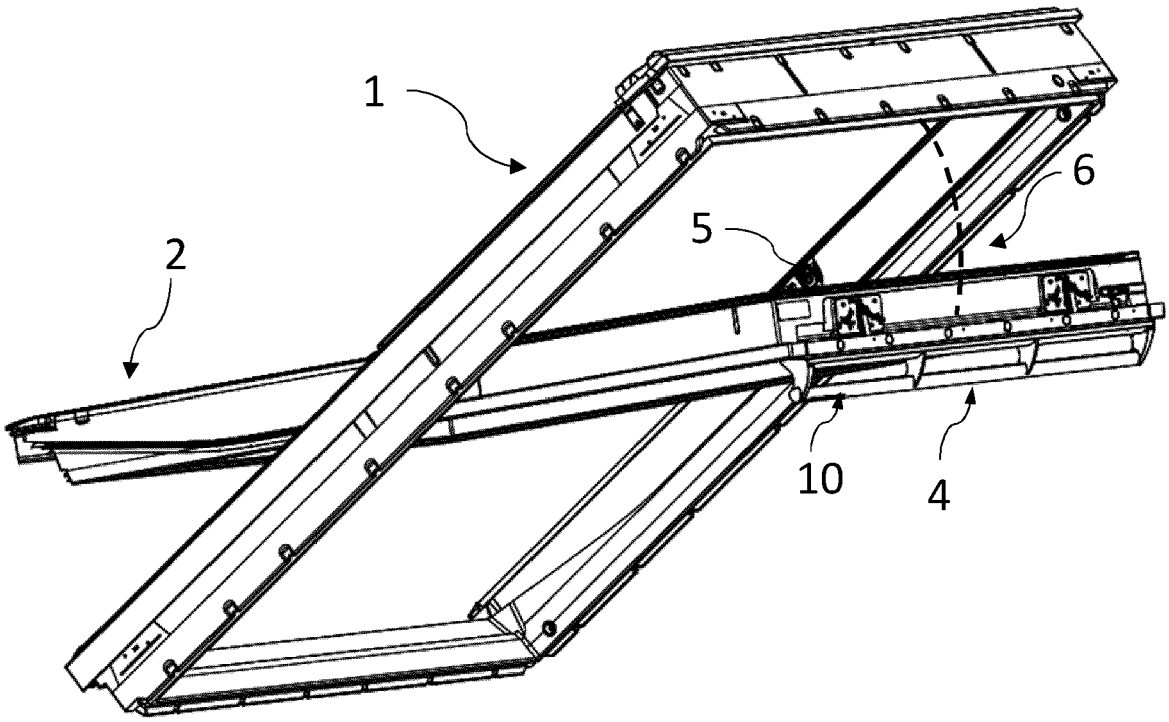


Fig. 2

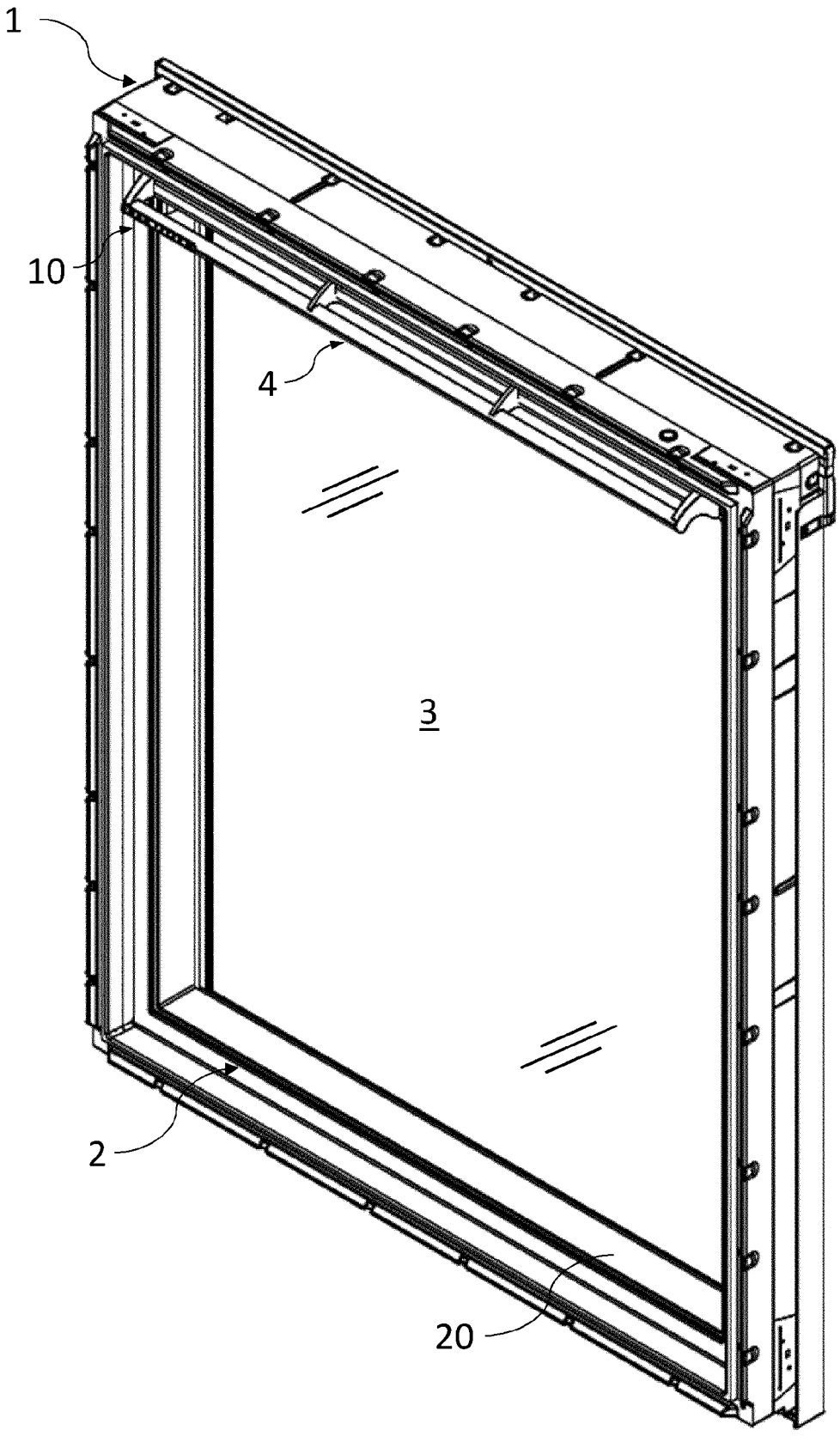


Fig. 3

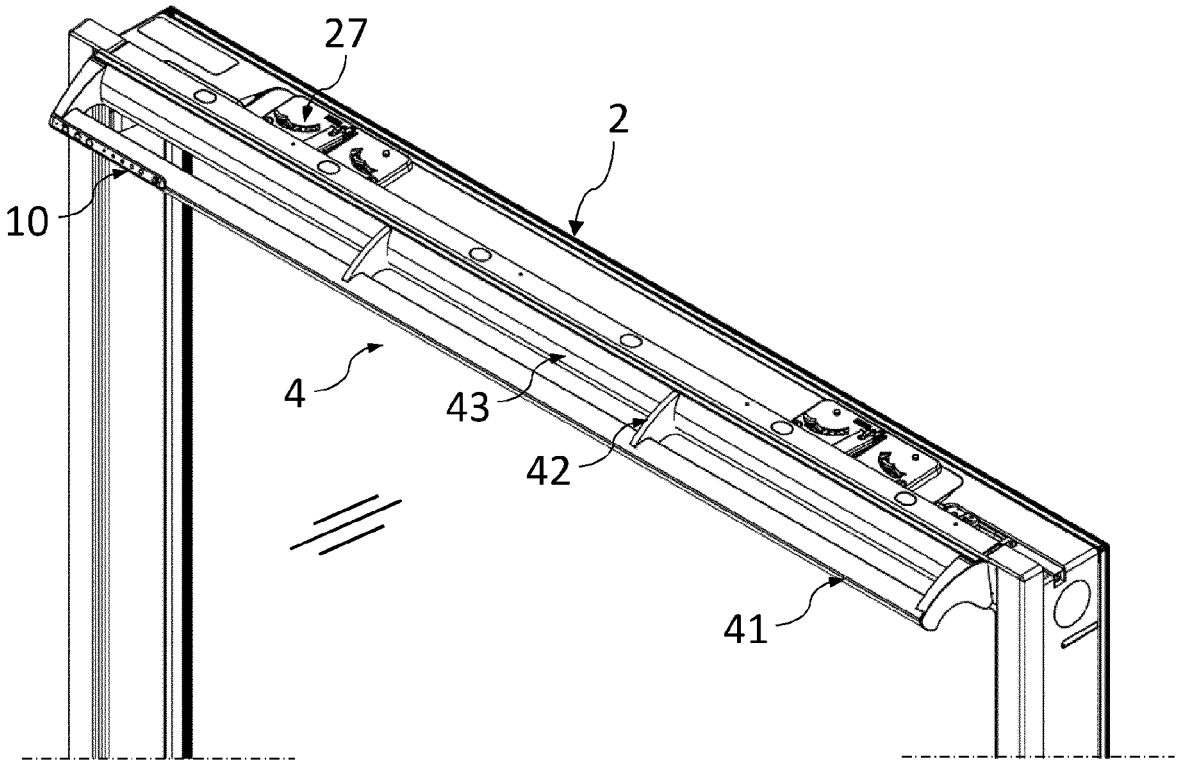


Fig. 4a

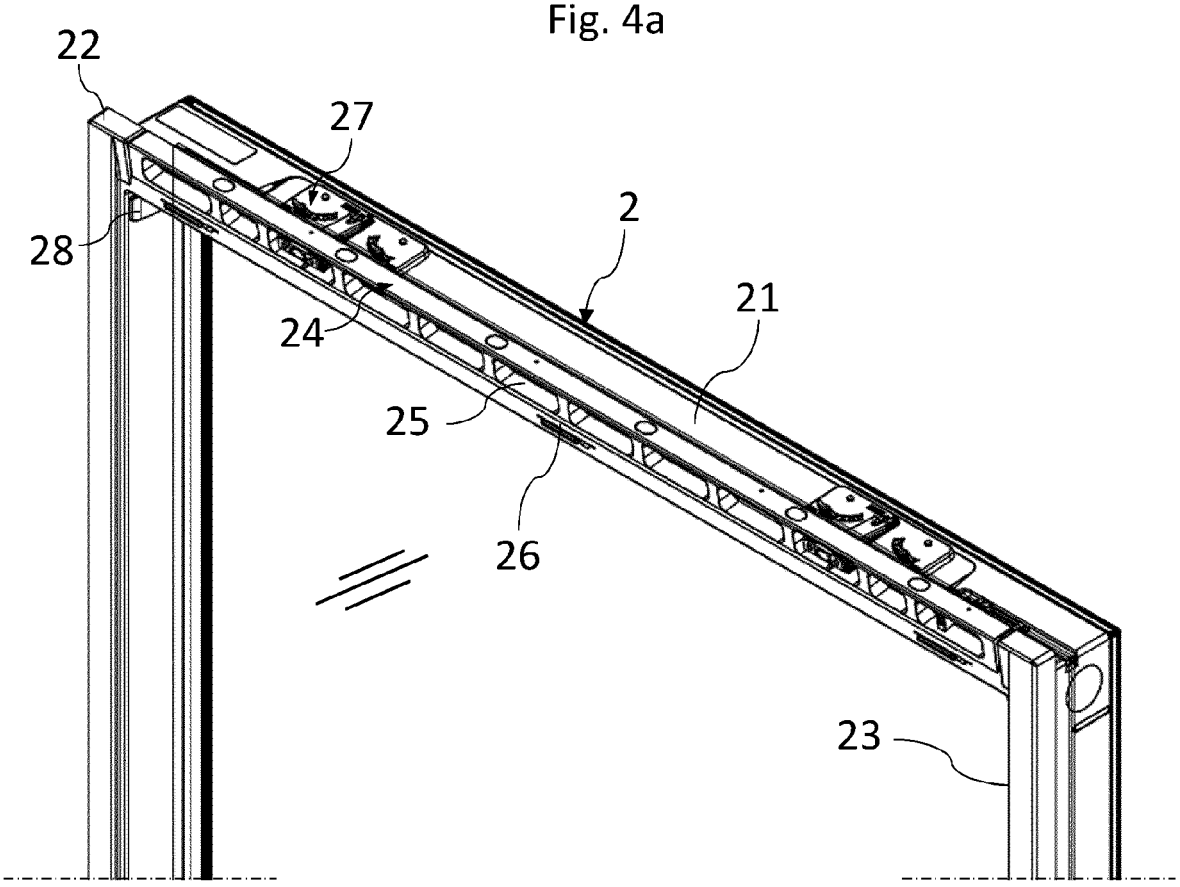


Fig. 4b

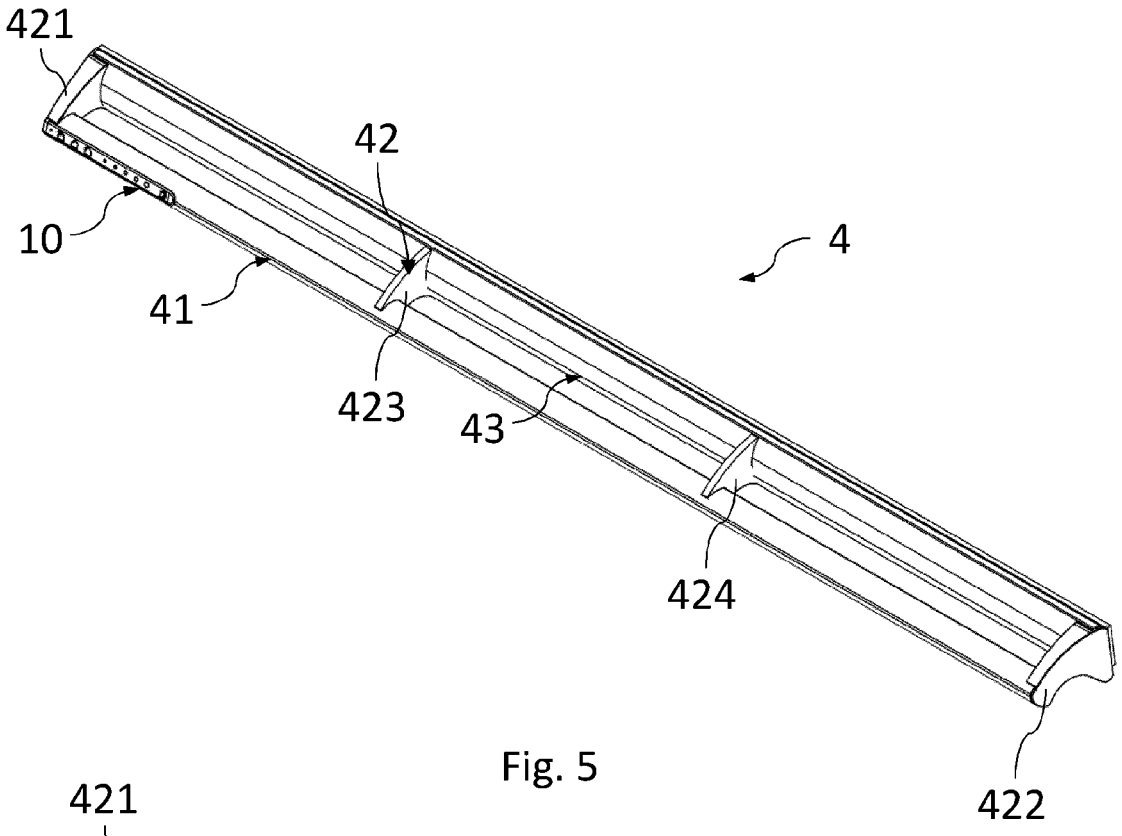
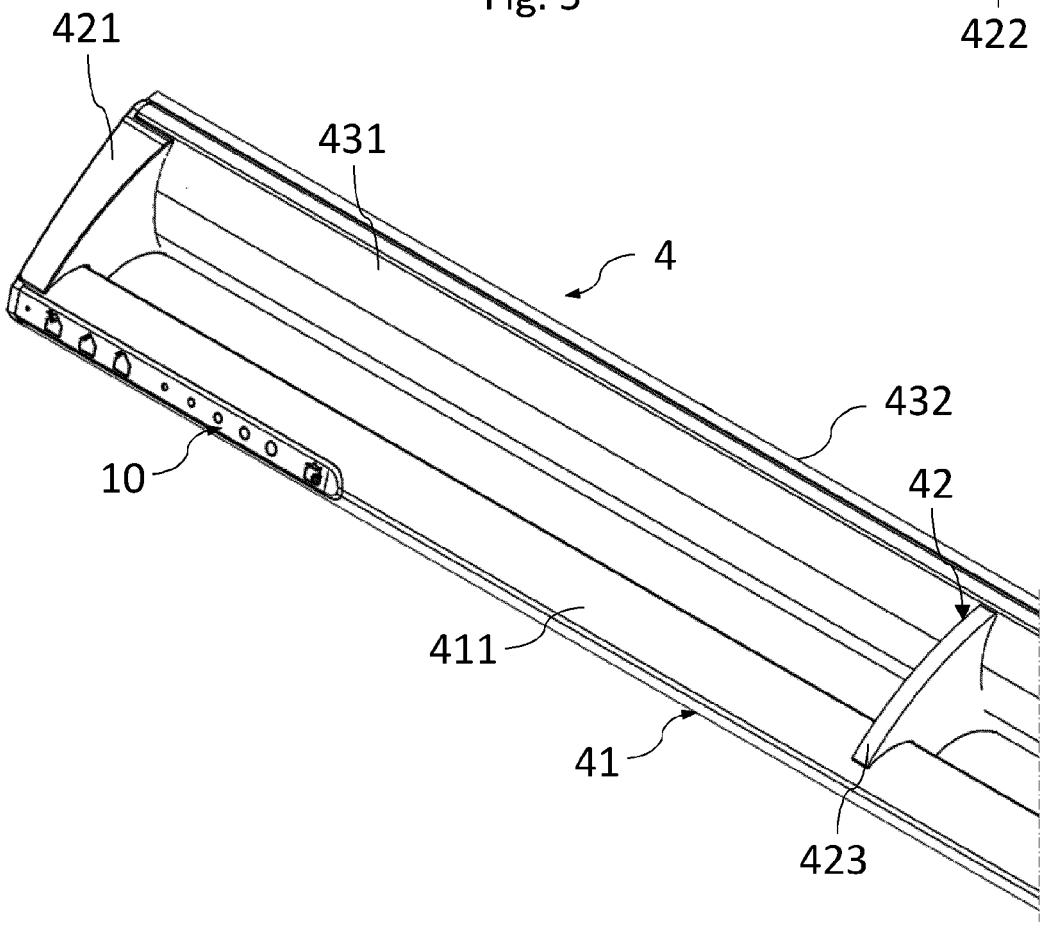


Fig. 5



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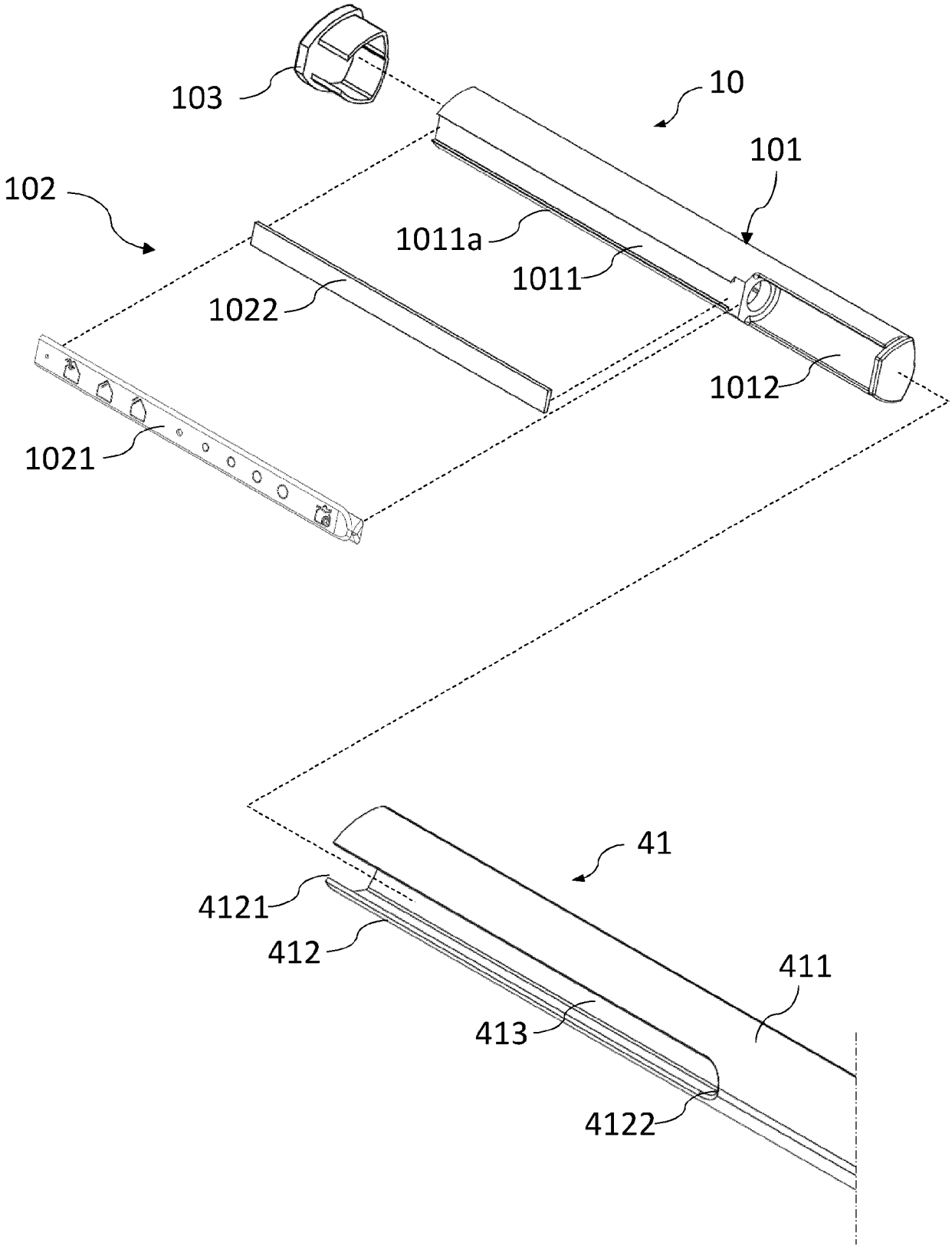
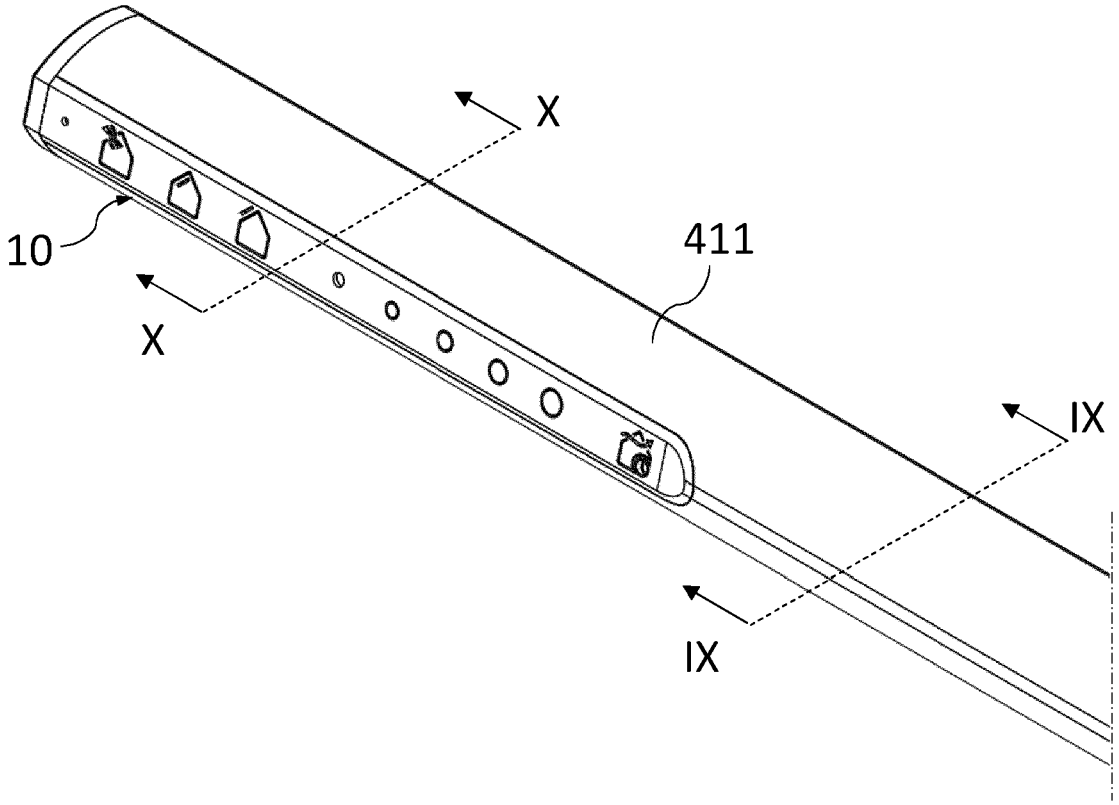

103
10
101
102
1011a
1011
1022
1012
1021
41
4121
412
411
413
4122

Fig. 7



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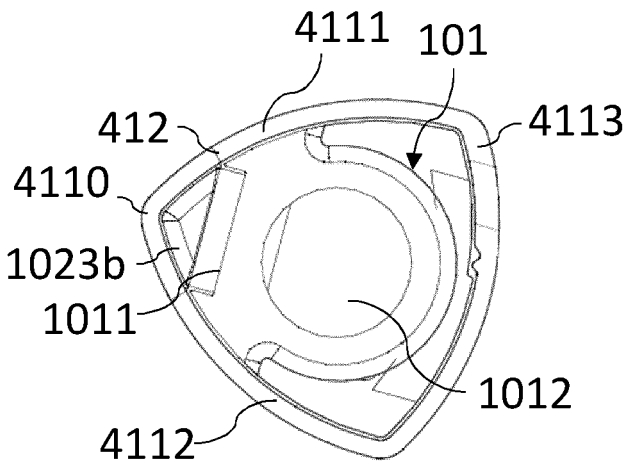


Fig. 9

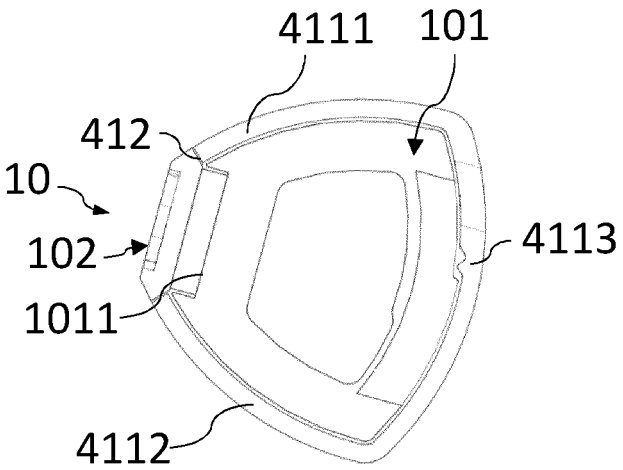


Fig. 10

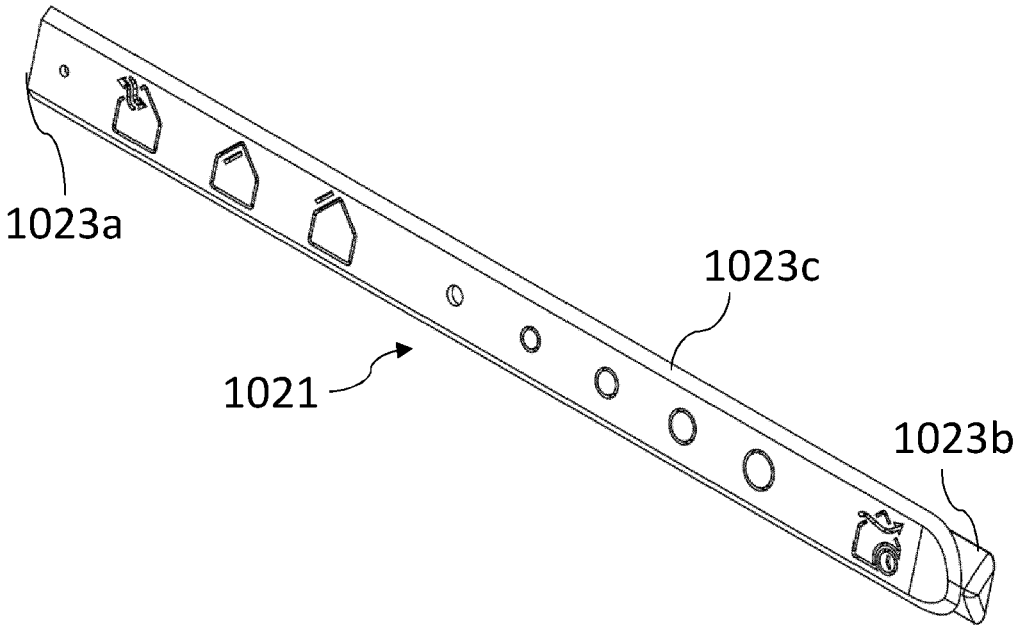


Fig. 11

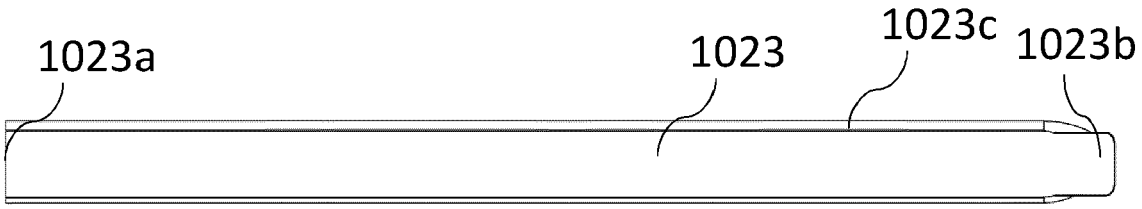


Fig. 12

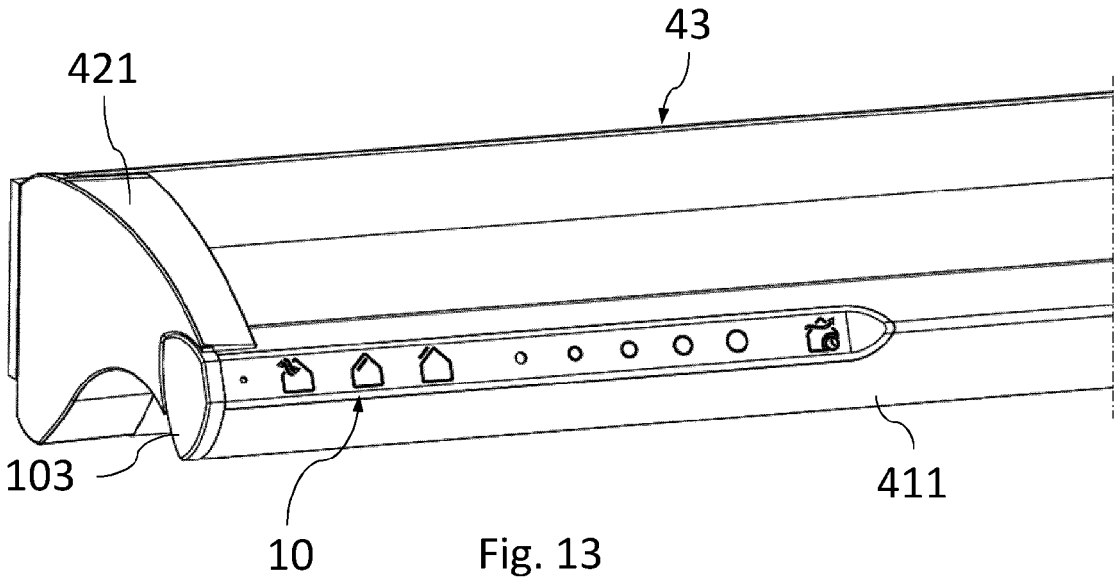


Fig. 13

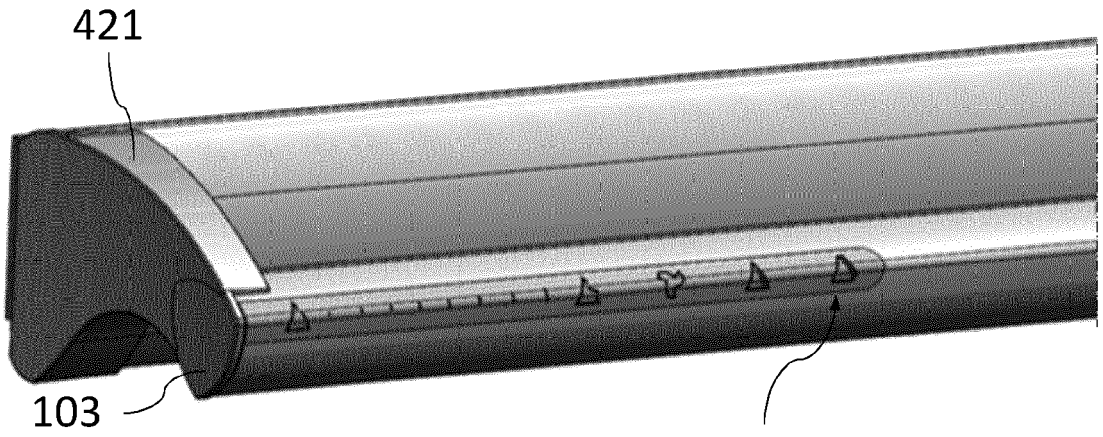


Fig. 14

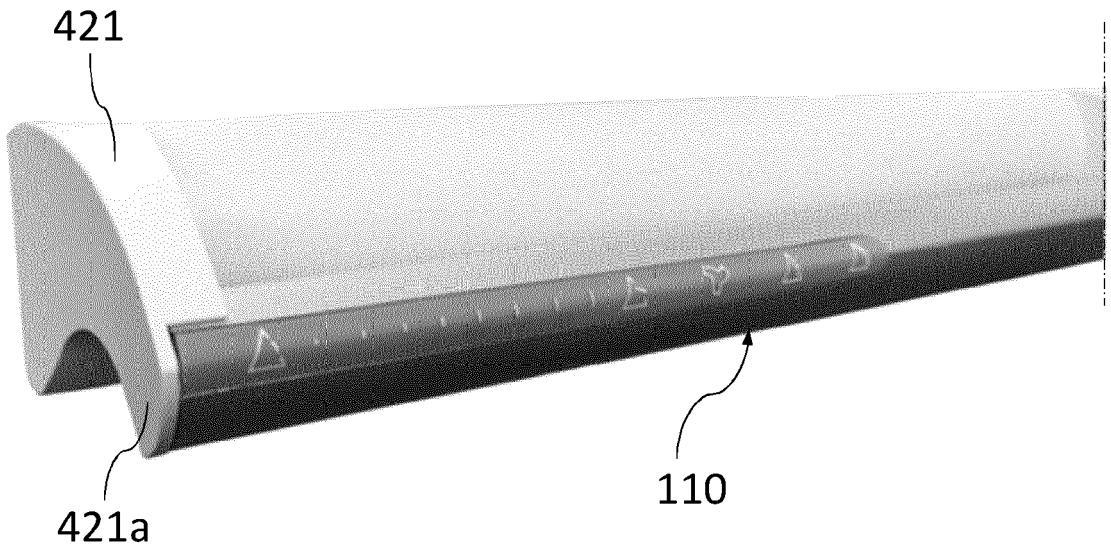


Fig. 15

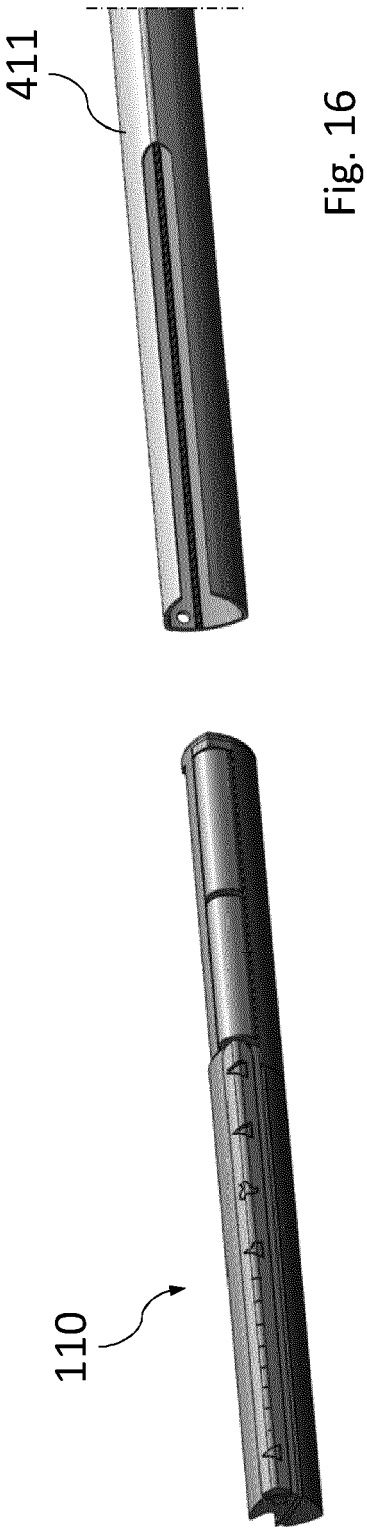

411
110

Fig. 16

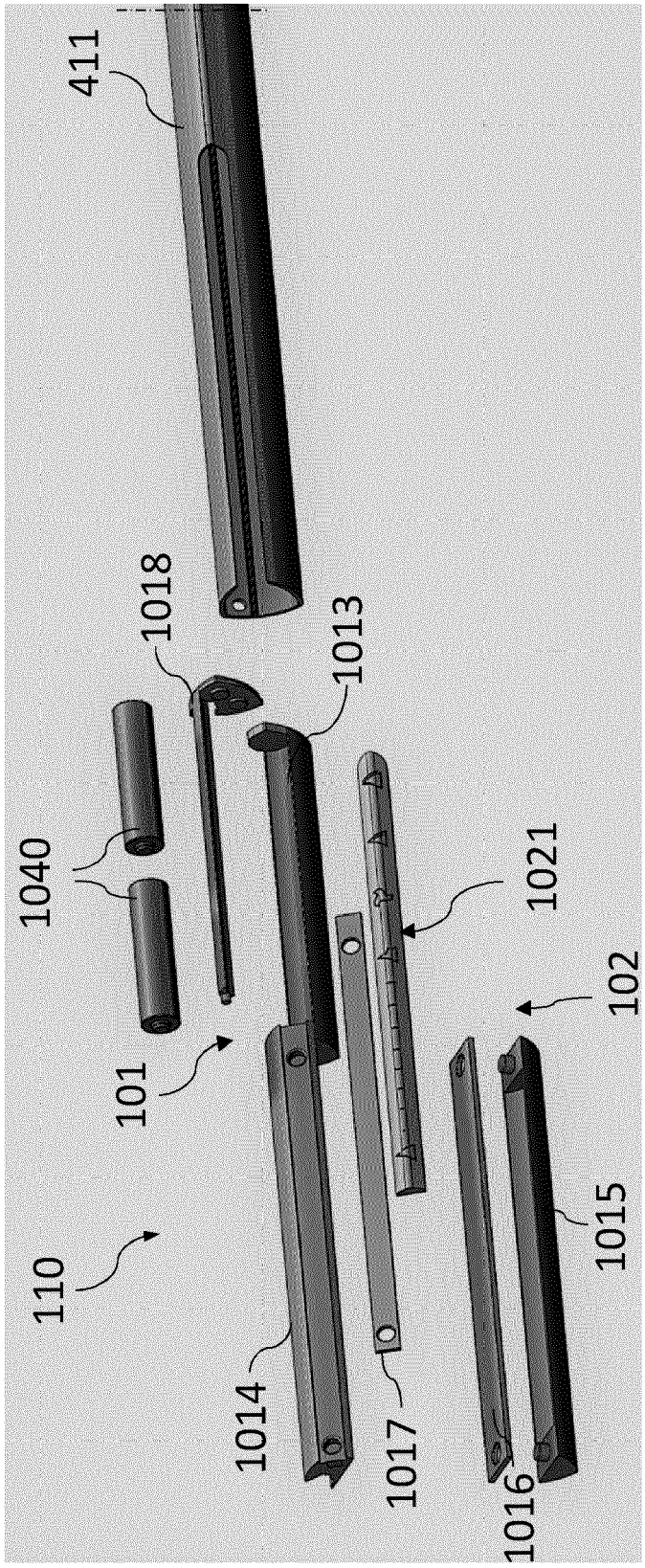

411
1018
1013
1040
1021
102
101
110
1015
1014
1017
1016

Fig. 17

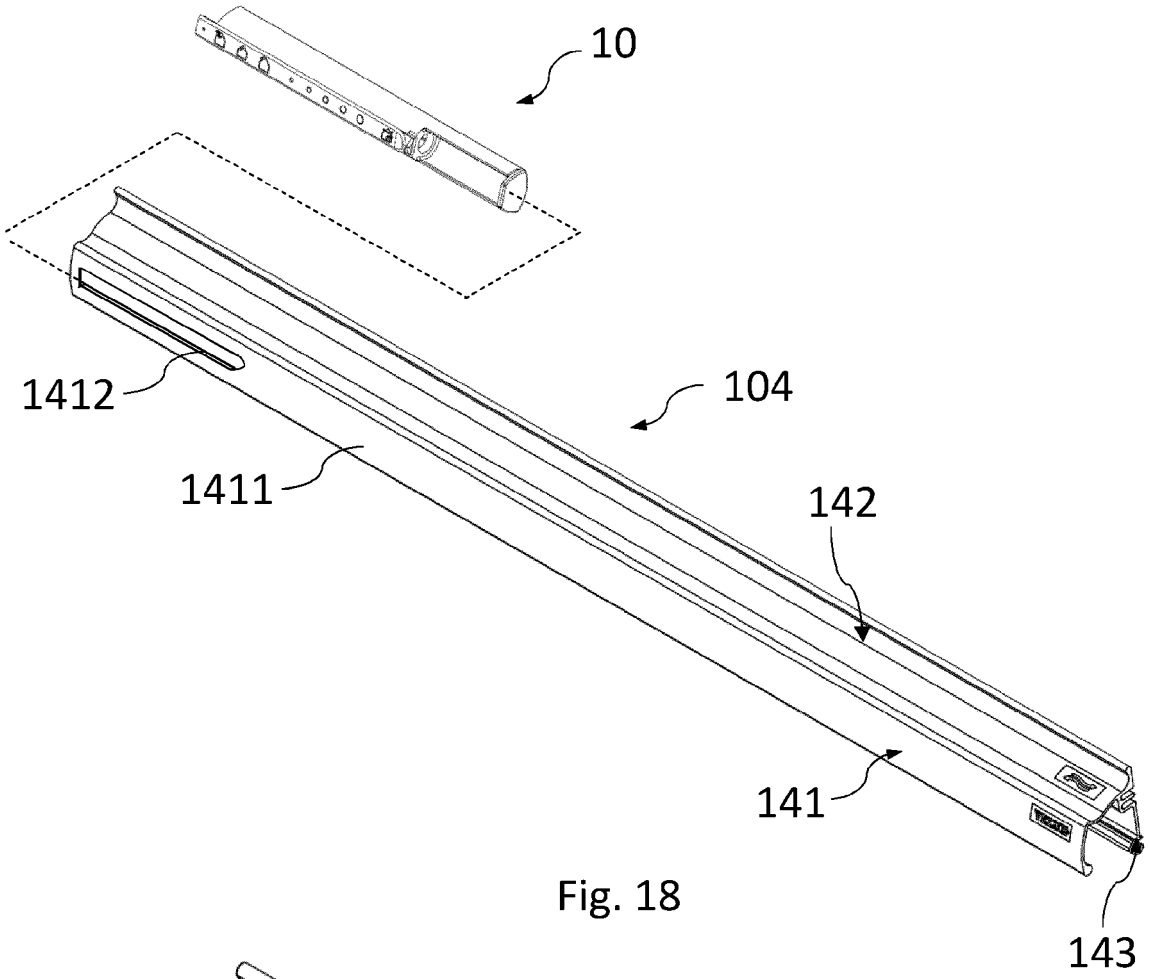
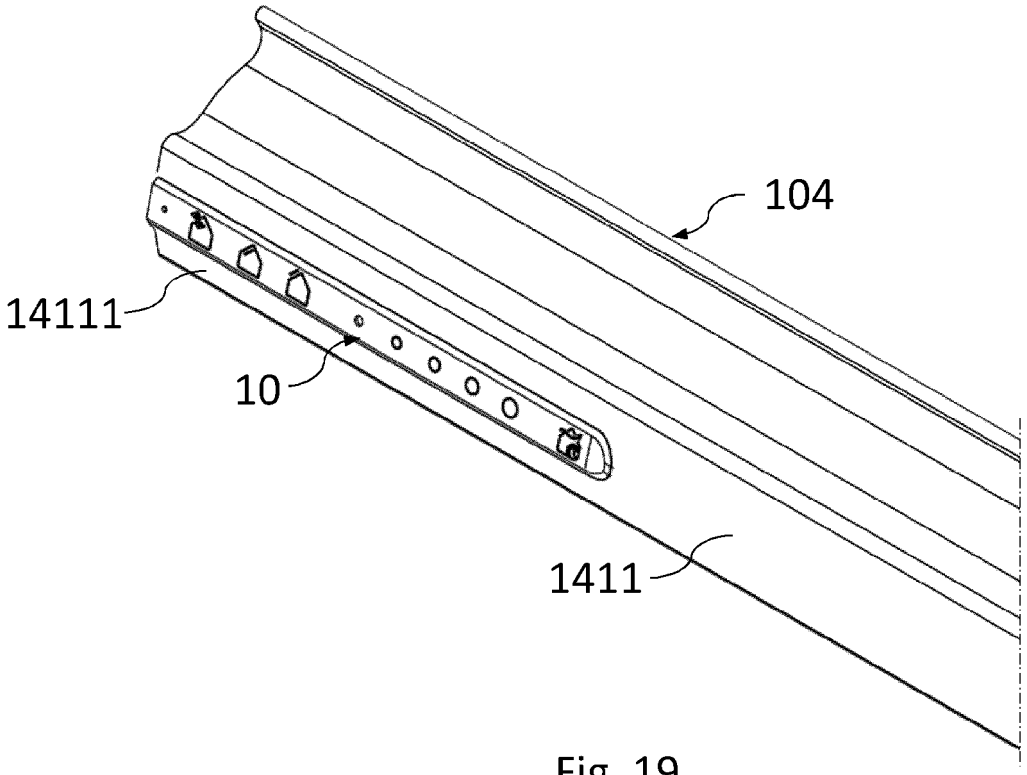


Fig. 18



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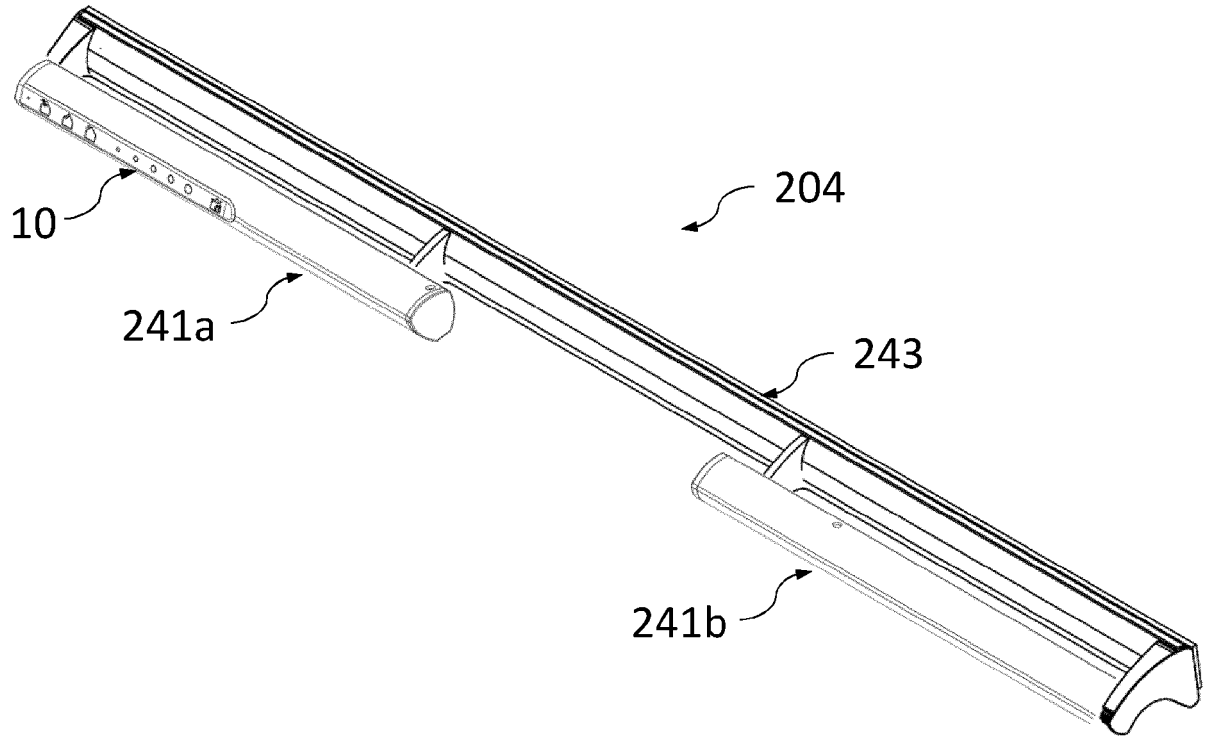


Fig. 20

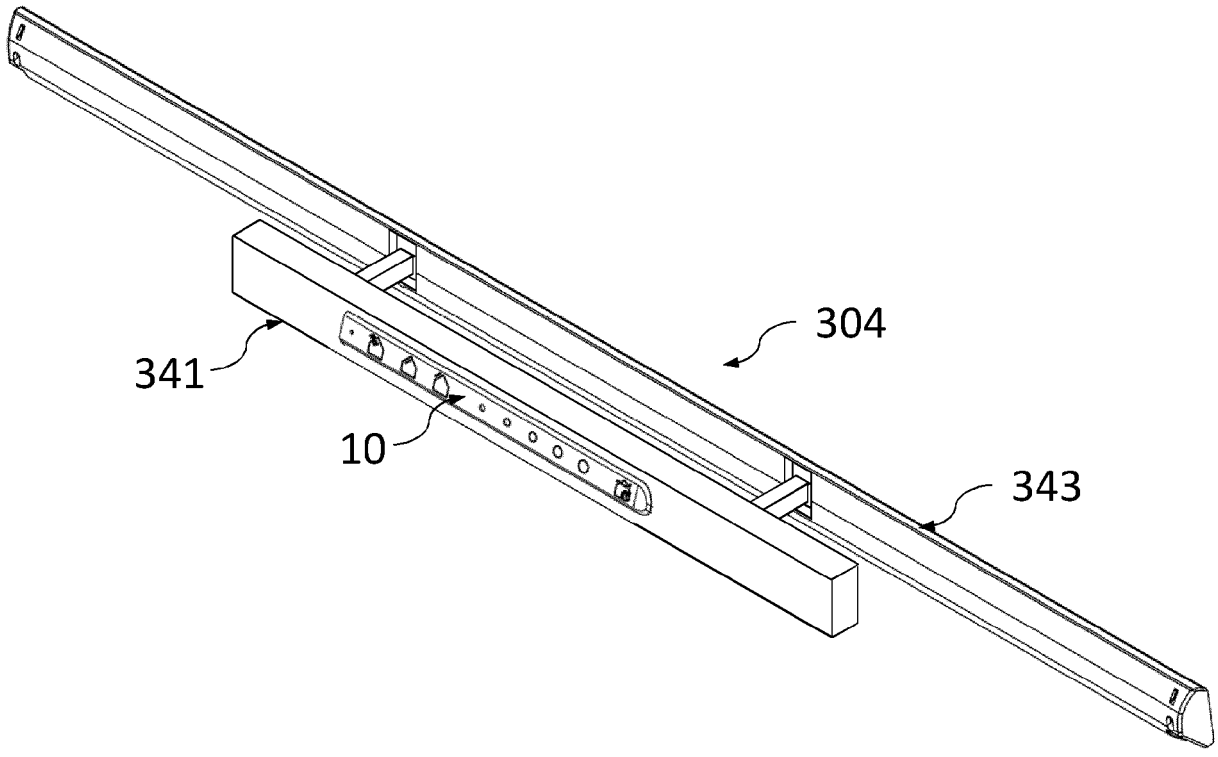
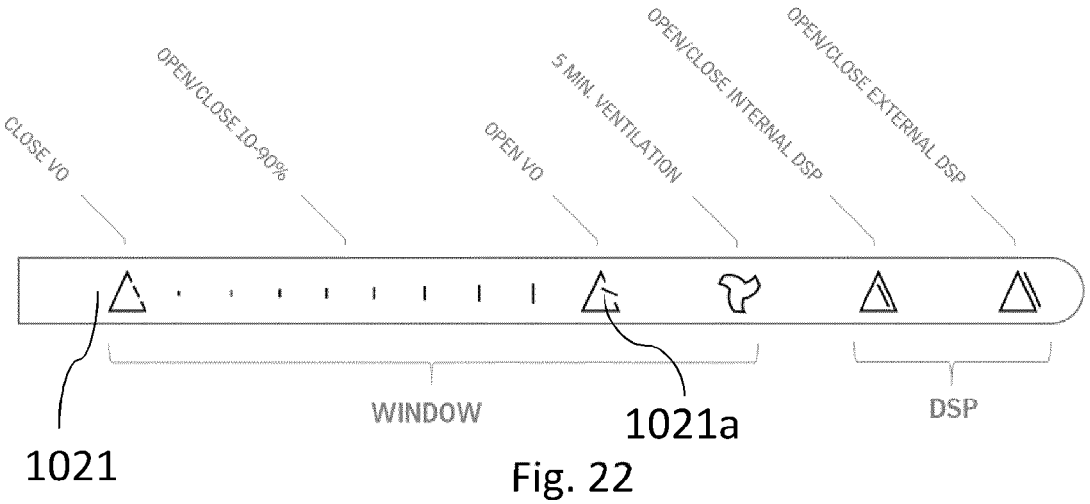


Fig. 21



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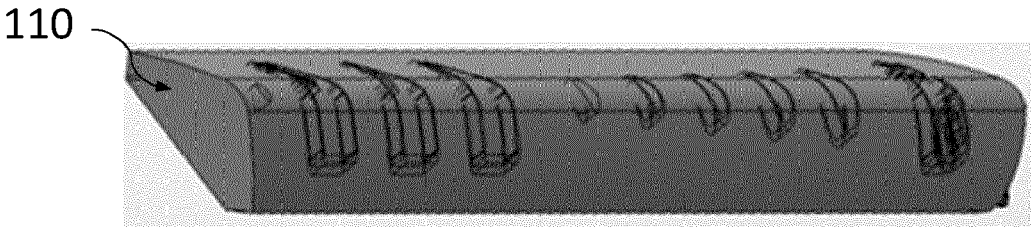

Fig. 23

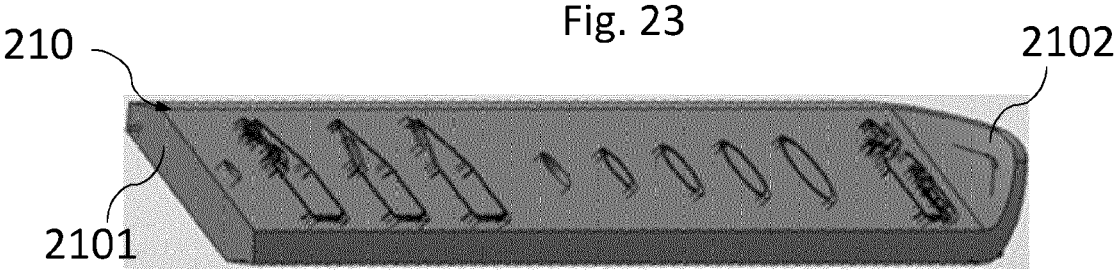

Fig. 24

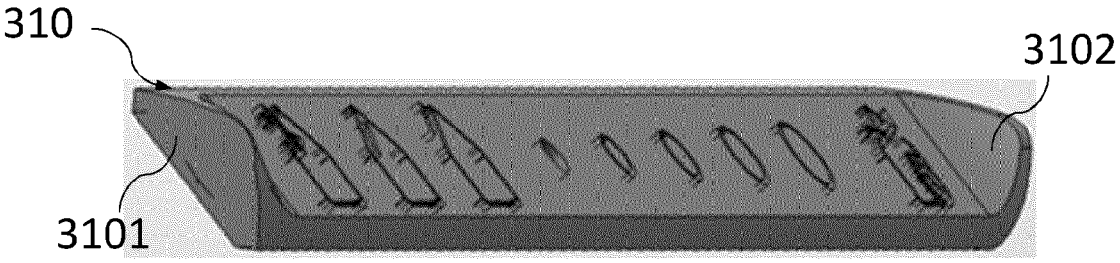

Fig. 25

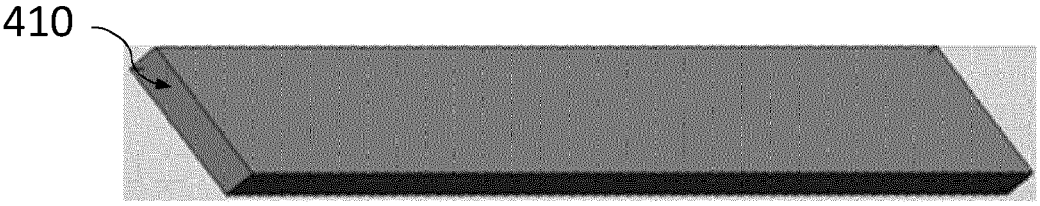

Fig. 26

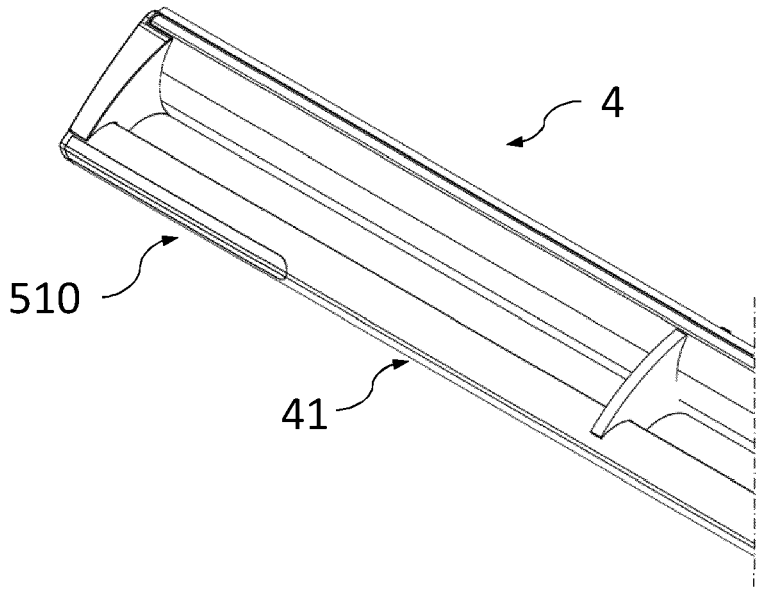

Fig. 27

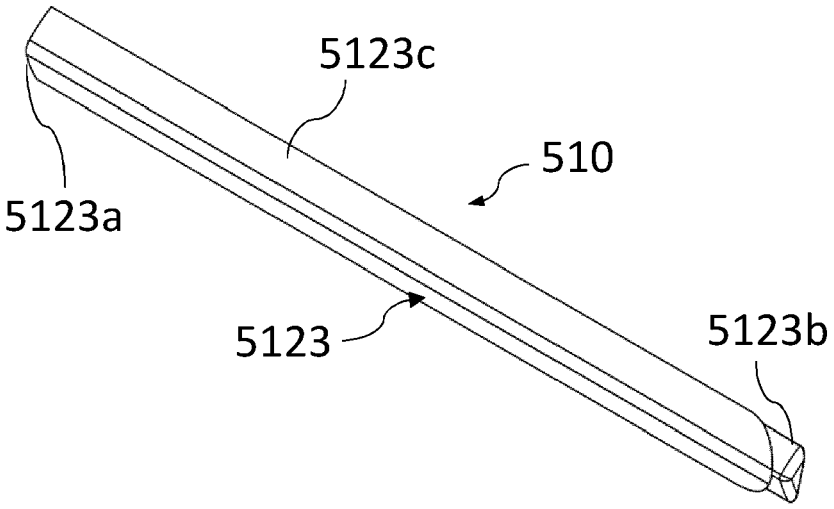

Fig. 28

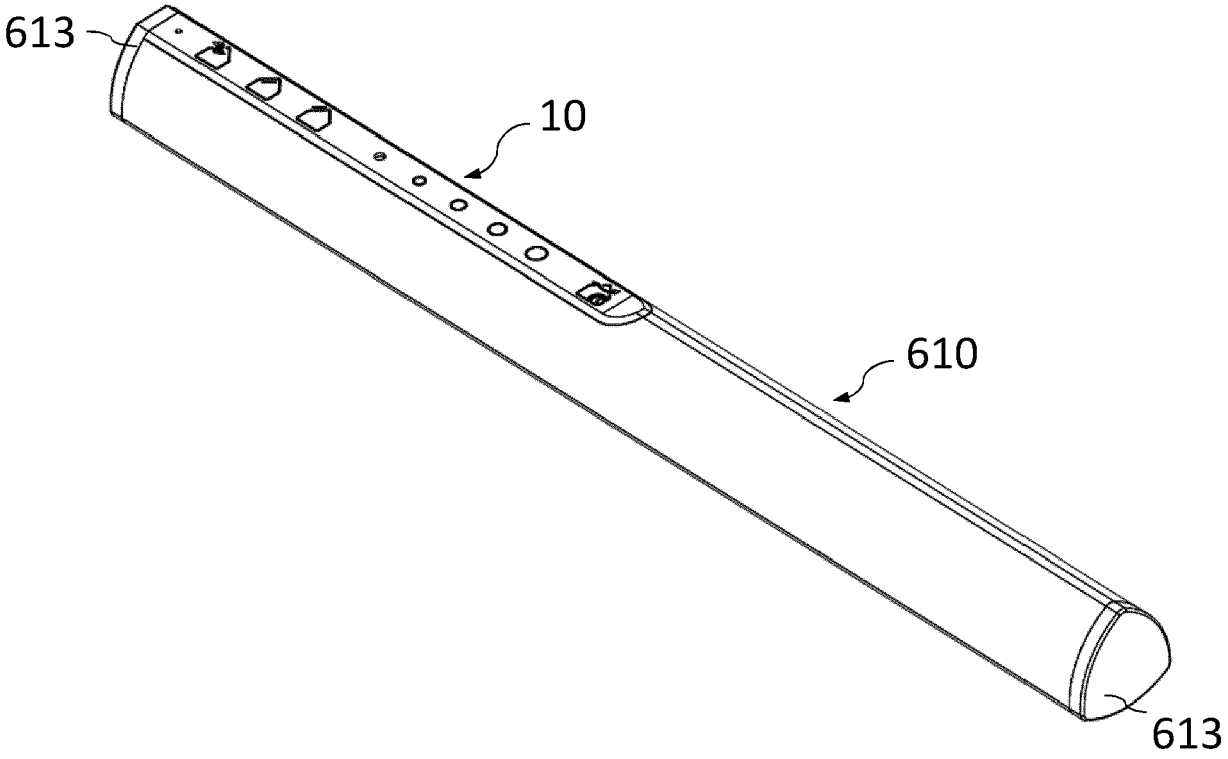

Fig. 29

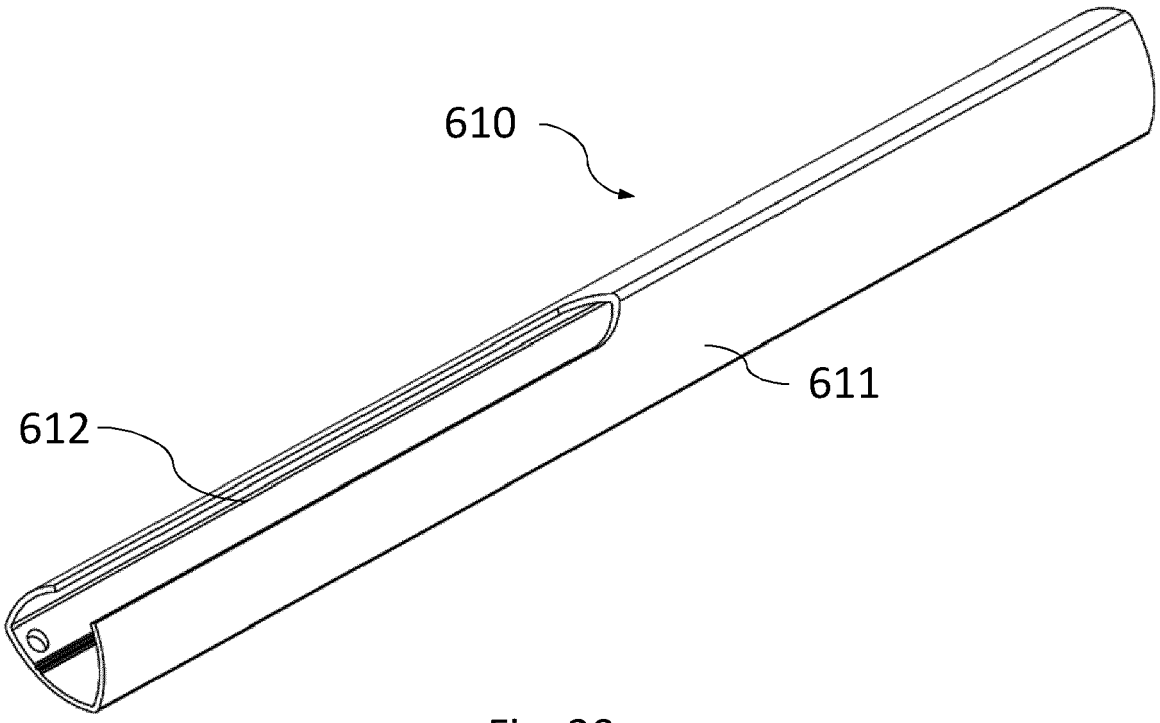

Fig. 30

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 5708

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	US 2009/139848 A1 (KAISER KONRAD [DE]) 4 June 2009 (2009-06-04) * figures 6-7 *	1-17	
A	DE 10 2016 201376 A1 (WILKE HEINRICH HEWI GMBH [DE]) 3 August 2017 (2017-08-03) * figures 1-3 *	1-17	
A	Velux Group: "VELUX - Productcatalogus 2016", , 1 March 2016 (2016-03-01), pages 1-177, XP055618728, Retrieved from the Internet: URL:https://www.verdouw.nu/veluxproductcatalogus.pdf [retrieved on 2019-09-05] * pages 160-163 *	1-17	

TECHNICAL FIELDS SEARCHED (IPC)
E04D
E05F
E05B
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 November 2020	Leroux, Corentine

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09-11-2020

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Patent documents cited in the description

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