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(54) **A ROOF WINDOW ARRANGEMENT COMPRISING A MANUAL OPERATING ASSEMBLY WITH AN INTEGRATED CONTROL PART**

(57) In the roof window arrangement, a manual operating assembly (4) assists in the operation of the sash (2) between the open and the closed positions. The manual operating assembly (4) includes a handle portion (41) located at the top member (21) of the sash (2) and has a longitudinal extension in parallel with the top member (21) of the sash (2). An electrical operating assembly (6) is provided as well and assists in the operation of the sash (2) between the open and the closed position. The

manual operating assembly (4) is provided with an integrated control unit (8) to cooperate with the electrical operating assembly (6). The integrated control unit (8) comprises a control part (82) formed in the handle portion (41), or in at least one of the handle portions, of the manual operating assembly (4) and may be comprised in an interactive surface segment (44) of the handle portion (41) of the manual operating assembly (4).

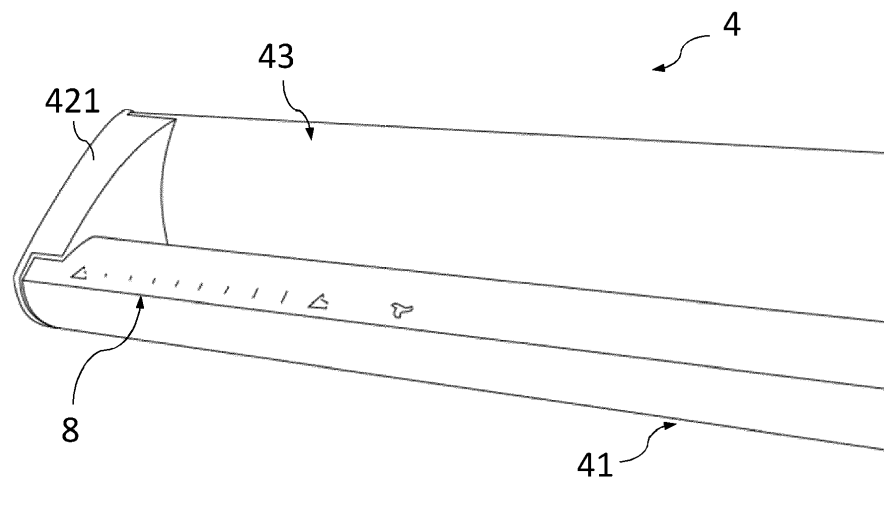


Fig. 4

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, 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, and an electrical operating assembly configured to assist in operation of the sash between the open and the closed position.

Background Art

[0002] 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 a first appliance member in the 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 subse-

quently. Many examples of such roof window arrangements are known in the art, including Applicant's EP 3 235 993 A1.

[0003] However, in case such a roof window is instead installed within reach, it is understandable if a user will 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

[0004] 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 facilitated and rendered more flexible.

[0005] 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 manual operating assembly is provided with an integrated control unit configured to cooperate with the electrical operating assembly.

[0006] Providing the control unit in an integrated manner in the manual operating assembly itself ensures a smooth and unnoticeable appearance of the control unit while at the same time being logical and intuitive to the user.

[0007] In a presently preferred embodiment, the integrated control unit comprises a control part formed in the handle portion. In case more than one handle portion, is present, it may be sufficient to include the integrated control unit in only one of the handle portions. This positioning contributes to facilitating operation, since the user will in any event reach out for the handle portion for operating the roof window.

[0008] Although the integrated control unit may in principle be provided as a separate part and then connected in an integral manner with the handle portion, it is preferred that the control part of the integrated control unit is comprised in an interactive surface segment of the handle portion of the manual operating assembly. Forming the control part in the surface of the handle portion itself provides for a particularly sophisticated design, as the control part is contained within the contours of the handle portion.

[0009] The terms "integrated", "integral" etc. are intended to encompass configurations including separate components which are connected in a substantially inseparable manner and the forming in one piece from the

outset.

[0010] Other presently preferred embodiments and further advantages will be apparent from the subsequent detailed description and drawings.

Brief Description of Drawings

[0011] 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 a first 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 a partial isometric view of the upper part of the roof window arrangement of Fig. 3, with parts of the manual operating assembly removed;

Fig. 4 is a partial isometric view of details of the manual operating assembly in the first embodiment of the invention;

Fig. 5 is a partial isometric view, on a larger scale, of the handle portion of the manual operating assembly of Fig. 4;

Fig. 6 is a cross-sectional view of the handle portion of the manual operating assembly in the embodiment shown in Figs 4 and 5;

Fig. 7 is a plan view of a touch panel of an integrated control unit in another embodiment; and

Figs 8 and 9 are partial isometric views of roof window arrangements in further embodiments.

Description of Embodiments

[0012] In the figures of the drawings, embodiments of a roof window arrangement according to the invention are shown.

[0013] 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 as-

semblies. 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.

[0014] 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.

[0015] 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. 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*.

[0016] 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.

[0017] Referring now also to Figs 4 and 5, the manual operating assembly 4 is provided with a left-hand end console 421 and a counterpart right-hand end console at the opposite end, 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.

[0018] 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.

[0019] The electrical operating assembly 6 of the roof window arrangement is configured to cooperate with an integrated control unit 8 as will be described in further detail below. The presence of an integrated control unit 8 does not exclude the presence of a remote control unit 10' as in the prior art, as long as suitable pairing and correspondence of the units is ensured.

[0020] In the embodiment shown, the integrated control unit 8 comprises a control part 82 formed in the handle portion 41 of the manual operating assembly 4. In cases in which there are more than one handle portion, the integrated control unit 8 may be provided in only one of the handle portions.

[0021] The integrated control unit could in principle be provided as a separate part and then connected in an integral manner with the handle portion. However, it is preferred that the control part 82 of the integrated control unit 8, as in the embodiment shown, is comprised in an interactive surface segment 44 of the handle portion 41 of the manual operating assembly 4.

[0022] Here, the control part 82 comprises a longitudinally extending touch panel 821 with a series of icons 821a. The icons 821a will be described in further detail below in connection with the embodiment shown in Fig. 7.

[0023] In the embodiment shown, the handle bar profile 411 has a generally closed configuration defining a hollow interior 413. Solid configurations are conceivable as well.

[0024] Reference is now made also to Fig. 6. The cross-section of the handle bar profile 411 shown is tri-

angular, 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.

[0025] Here, the control part 82 including the touch panel 821 of the integrated control unit 8 is located in the top section 4111, but other positions are possible and may be selected in accordance with the location of the roof window arrangement.

[0026] In a not-shown embodiment, the touch panel of the control portion extends continuously over at least two sections. This renders the roof window arrangement more versatile as regards positioning, as the user will be able to see the touch panel from various angles. For instance, the touch panel may over the top section 4111 and the bottom section 4112 including a front edge section 4110 between the top section 4111 and the bottom section 4112.

[0027] Further it is shown in Fig. 6 how the integrated control unit 8 in the embodiment shown comprises a base part 81 in integral connection with the handle portion 41, or at least one of the handle portions, of the manual operating assembly 4. Typically, the base part 81 may be provided as a separate component which is then connected to the handle portion 41, for instance to the control part 82.

[0028] In this embodiment, in which the base part 81 is accommodated in the hollow interior 413 of the handle bar profile 411, the base part 81 is typically slid in from one end of the handle bar profile 411 during manufacture.

[0029] As shown, at the transition from the base part 81 to the control portion 82 a print circuit board 822 is accommodated in the handle portion 41, below the touch panel 821.

[0030] Power means for the remote control unit 8 may also be comprised in the handle portion 41 of the manual operating assembly 4.

[0031] The power means may include a connector to be connected to the main power supply, or the power means for the remote control unit may comprise batteries configured to be received in a battery compartment 812 in the base part 81 accommodated in the hollow interior 413 of the handle bar profile 411.

[0032] Batteries may be installed from the end of the handle portion, or slid in through a slot (not shown).

[0033] 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.

[0034] The control part 82 may be configured in any suitable manner allowing proper operation of the integrated control unit 8. In one not shown embodiment, the interactive surface segment 44 has a reduced material thickness relative to the remaining parts of the handle bar profile 411. This allows for improved connectivity between the surface of the handle portion and the control part of the integrated control unit.

[0035] Fig. 7 is a plan view of a touch panel 821 of an integrated control unit 8 in another embodiment according to the invention. The touch panel 821 can have one or more icons 821a, preferably the touch panel 821 is equipped with icons 821a symbolizing opening of the window, closing of the window, ventilation, and if the roof window arrangement includes a screening assembly the icons 821a 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 821a may be added to add to the functionality of the integrated control unit 8. The icons 821a for opening and closing the window may further include a range of icons 821a, each symbolizing a different opening or closing degree of the window. The design of icons 821a shown is only an example, different designs for icons may be envisioned.

[0036] Figs 8 and 9 show isometric views of a manual operating assembly 104 and 304, respectively, with the remote control unit 8 in a second and third embodiment of the roof window arrangement according to the invention. In Fig. 8 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. 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 the closure portion 143. In Fig. 9, the handle portion 341 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.

[0037] The roof window arrangement may also include a set of appliance members configured to cooperate with the roof window, and/or with the manual operating assembly 4, and/or with the electrical operating assembly

6 and/or with other appliance members of the set of appliance members.

[0038] It further, not shown embodiments, the integrated control unit 8 further comprises voice receiving means configured to cooperate with the electrical operating assembly 6.

[0039] The integrated control unit 8 may further comprise network means configured to cooperate with the electrical operating assembly 6, the network means being communicatively connectable to a wireless transmit / receive unit.

[0040] Sensors configured to detect environmental conditions, including light, temperature, movement, sound, smoke etc. may be provided. Such sensors 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.

[0041] The integrated control unit may also be provided with backlight illumination means. If sensors are provided, then the backlight illumination means may be configured to cooperate with the sensors.

[0042] Correspondingly, the handle portion, or at least one of the handle portions, of the manual operating assembly may be provided with light indicators configured to cooperate with the sensors.

[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 | 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
- 413 hollow interior
- 42 connection portion
- 421 left-hand end console
- 43 closure portion
- 44 interactive surface segment

- 5 hinge

- 6 electrical operating assembly / chain operator

- 7' screening assembly (Fig. 1b)

- 8 integrated control unit
 - 81 base part
 - 812 battery compartment
 - 82 control part
 - 821 touch panel
 - 821a icons
 - 822 print circuit board

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 connect-
 ed to the stationary frame (1) by means of a set of
 hinges (6) 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),
 a manual operating assembly (4) configured to assist
 in operation of the sash (2) between the open and
 the closed positions, said manual operating assem-
 bly (4) including a handle portion (41) located at the
 top member (21) of the sash (2) and having a longi-
 tudinal extension substantially in parallel with the top
 member (21) of the sash (2), and
 an electrical operating assembly (6) configured to
 assist in operation of the sash (2) between the open
 and the closed position,
characterised in that
 the manual operating assembly (4) is provided with
 an integrated control unit (8) configured to cooperate
 with the electrical operating assembly (6).

2. A roof window arrangement according to claim 1,
 wherein the integrated control unit (8) comprises a
 control part (82) formed in the handle portion (41),
 or in at least one of the handle portions, of the manual
 operating assembly (4).

3. A roof window arrangement according to claim 2,
 wherein the control part (82) of the integrated control
 unit (8) is comprised in an interactive surface seg-
 ment (44) of the handle portion (41) of the manual
 operating assembly (4), preferably comprising a lon-
 gitudinally extending touch panel (821) with a series
 of icons (821a).

4. A roof window arrangement according to any one of
 the preceding claims, wherein the handle portion
 (41) is formed as a handle bar profile (411), prefer-
 ably as an extruded profile.

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 any one of
 claims 3 and 4 to 5, wherein the cross-section of the
 handle bar profile (411) is generally triangular and
 defines at least a top section (4111), a bottom section
 (4112) and a back section (4113), and wherein the
 touch panel of the control portion extends continu-
 ously over at least two sections, preferably over the
 top section and the bottom section including a front
 edge section between the top section and the bottom
 section.

7. A roof window arrangement according to any one of
 the preceding claims, wherein the integrated control
 unit (8) comprises a base part (81) in integral con-
 nection with the handle portion (41), or at least one
 of the handle portions, of the manual operating as-
 sembly (4).

8. A roof window arrangement according to claim 7,
 wherein the base part (81) is accommodated in the
 hollow interior (413) of the handle bar profile (411).

9. A roof window arrangement according to any of
 claims 3 to 8, wherein the control portion (82) in-
 cludes a print circuit board (822) accommodated in
 the handle portion (41), below the touch panel (821).

10. A roof window arrangement according to any one of
 the preceding claims, wherein power means for the
 remote control unit (8) are comprised in the handle
 portion (41) of the manual operating assembly (4),
 and wherein the power means for the remote control
 unit (8) comprise batteries configured to be received
 in the base part (81) accommodated in the hollow
 interior (413) of the handle bar profile (411).

11. A roof window arrangement according to any one of
 claims 3 to 10, wherein the interactive surface seg-
 ment (44) has a reduced material thickness relative
 to the remaining parts of the handle bar profile (411).

12. 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), preferably comprising a lock mechanism (27). 5 10
13. A roof window arrangement according to any of the preceding claims, wherein the integrated control unit (8) further comprises voice receiving means configured to cooperate with the electrical operating assembly (6) and/or network means configured to cooperate with the electrical operating assembly (6), the network means being communicatively connectable to a wireless transmit / receive unit, and/or the integrated control unit (8) is provided with backlight illumination means, preferably configured to cooperate with the sensors. 15 20 25
14. A roof window arrangement according to any of the preceding claims, wherein the roof window arrangement further comprises sensors configured to detect environmental conditions, including light, temperature, movement, sound, smoke etc. 30

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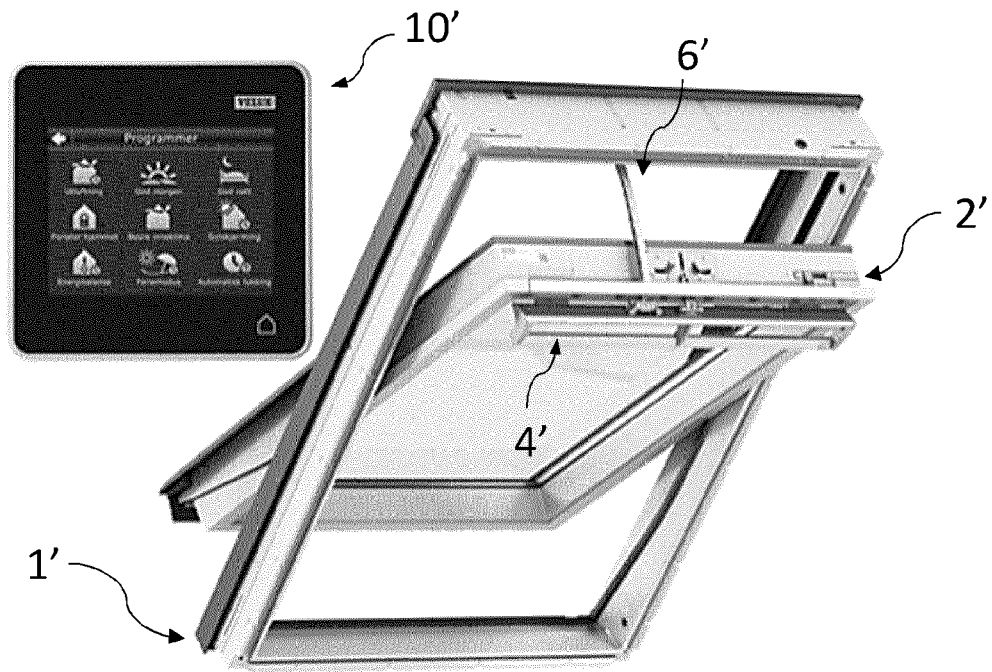


Fig. 1a (PRIOR ART)

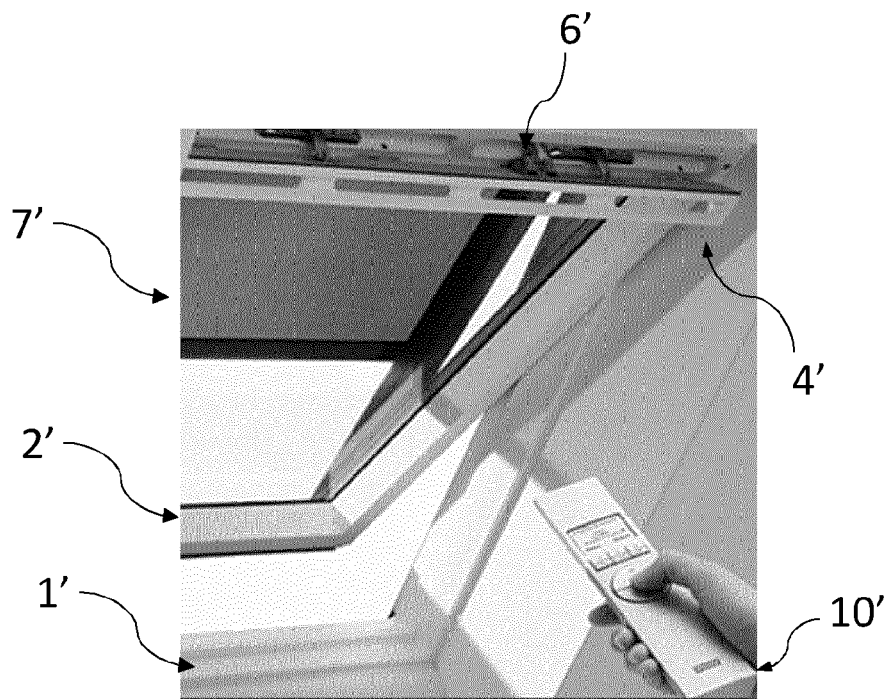


Fig. 1b (PRIOR ART)

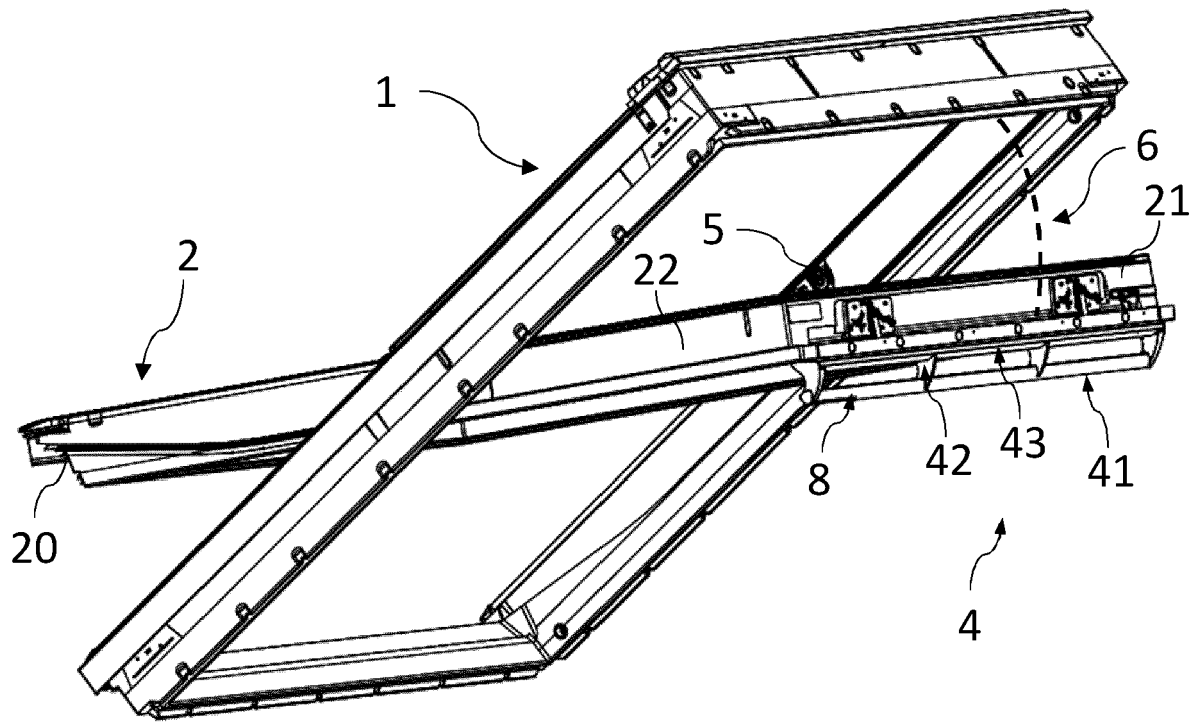


Fig. 2

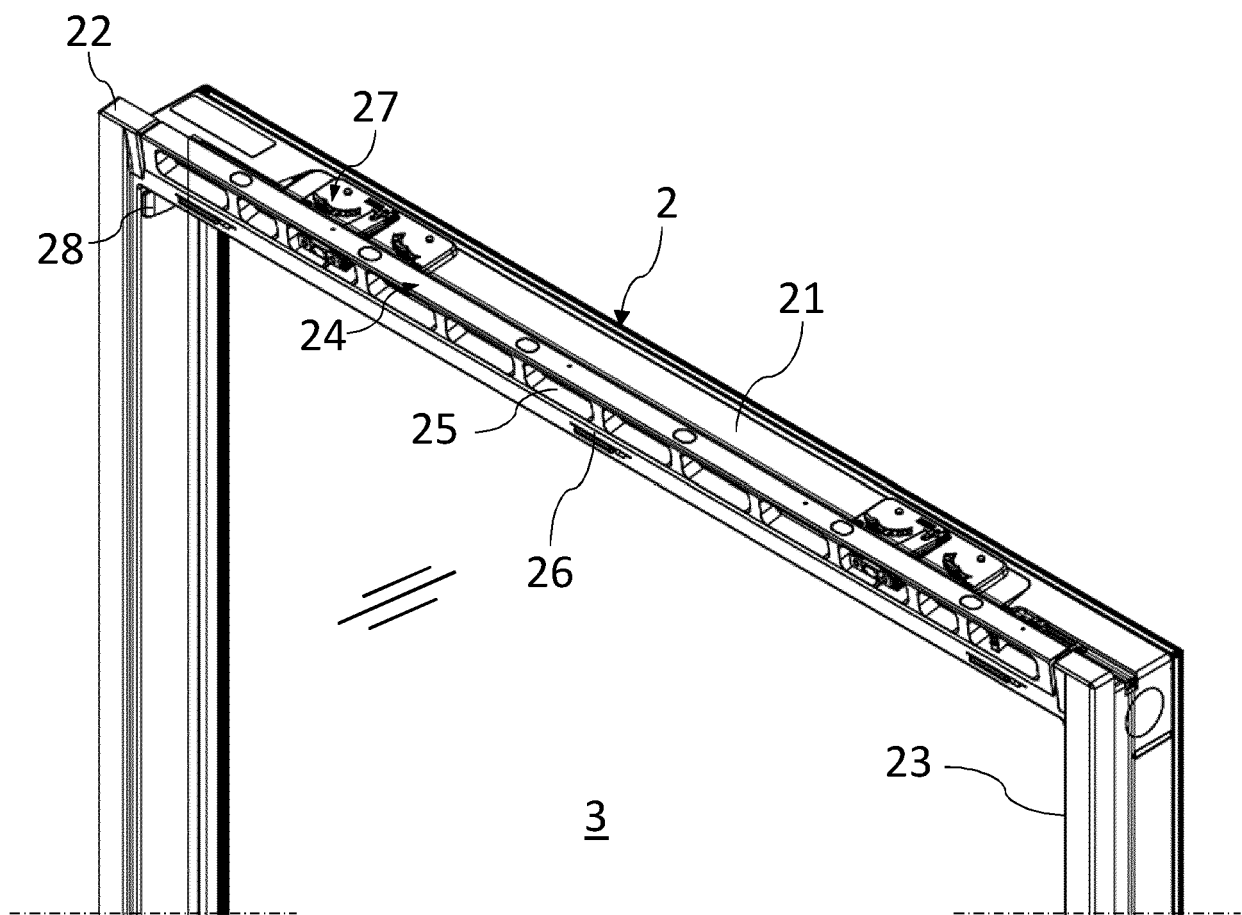


Fig. 3

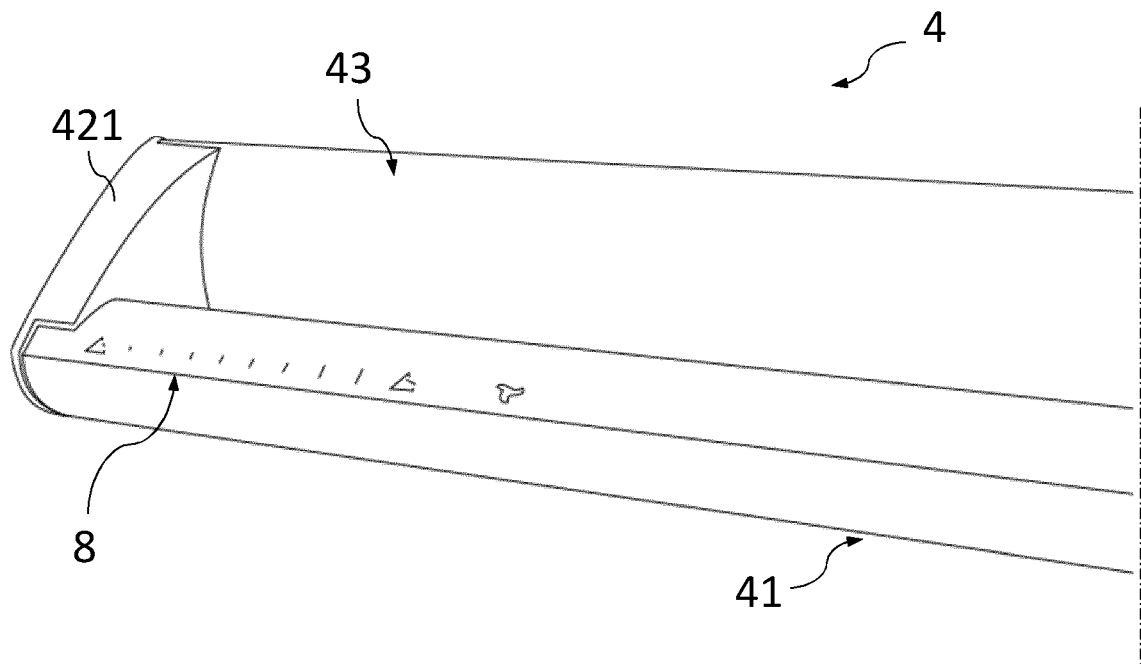


Fig. 4

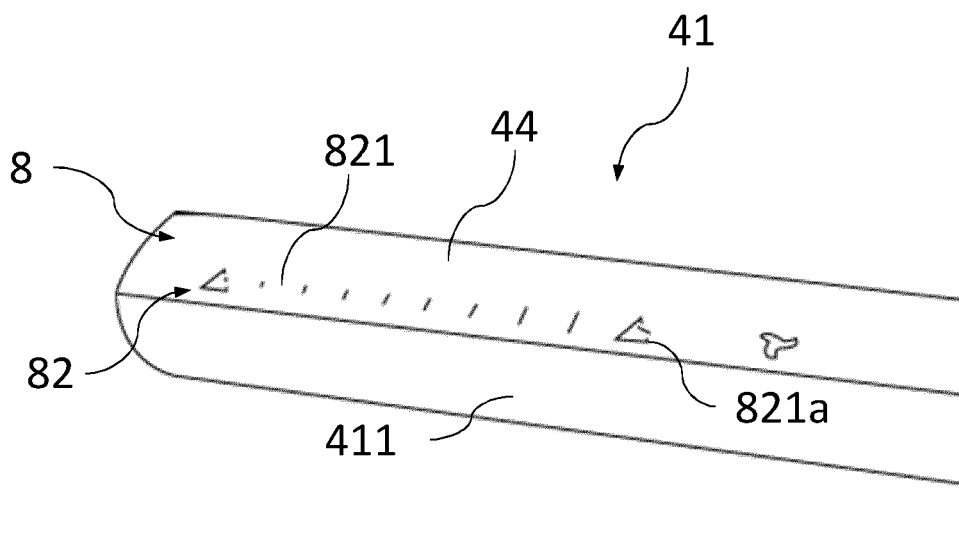


Fig. 5

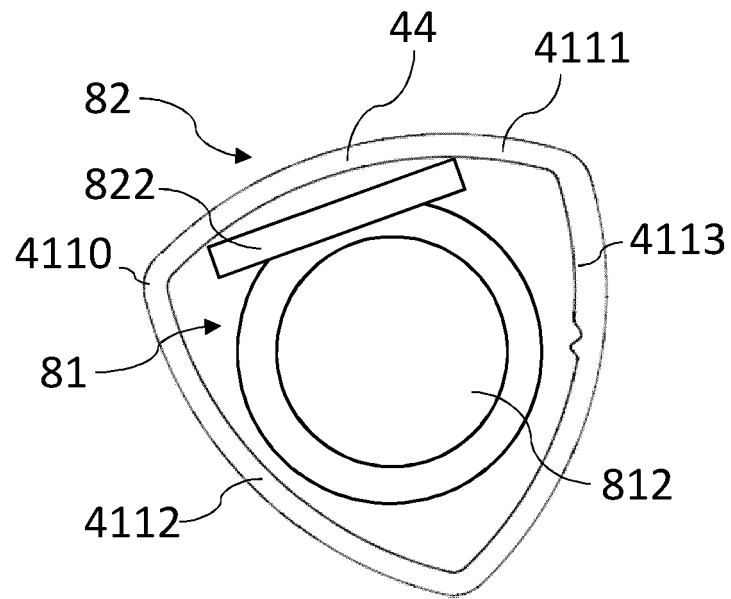


Fig. 6

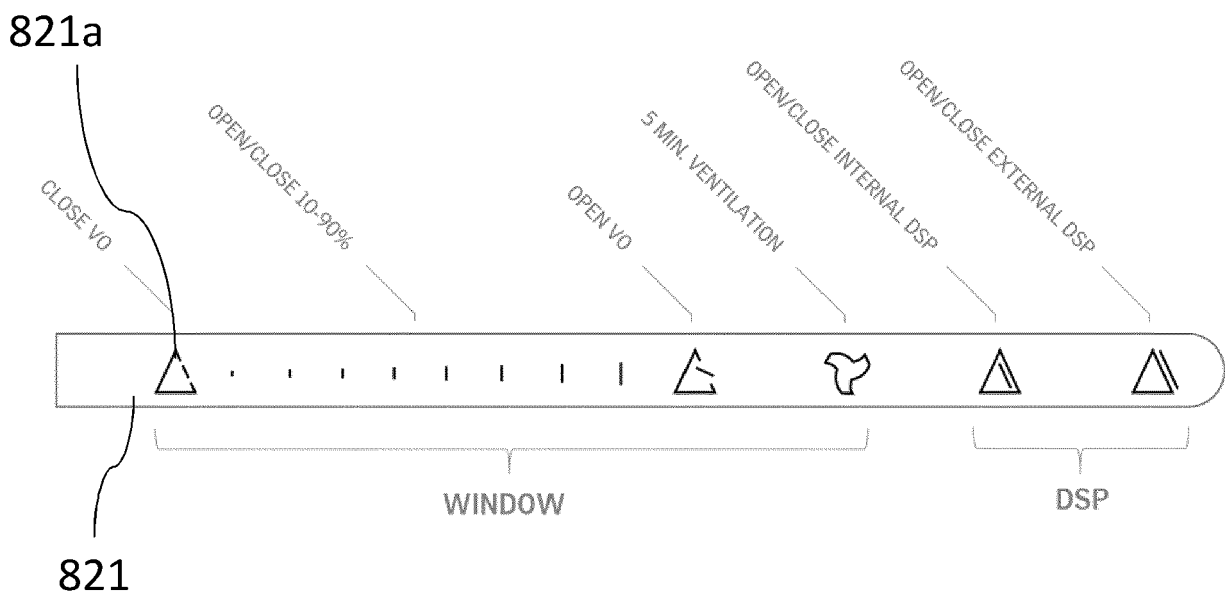


Fig. 7

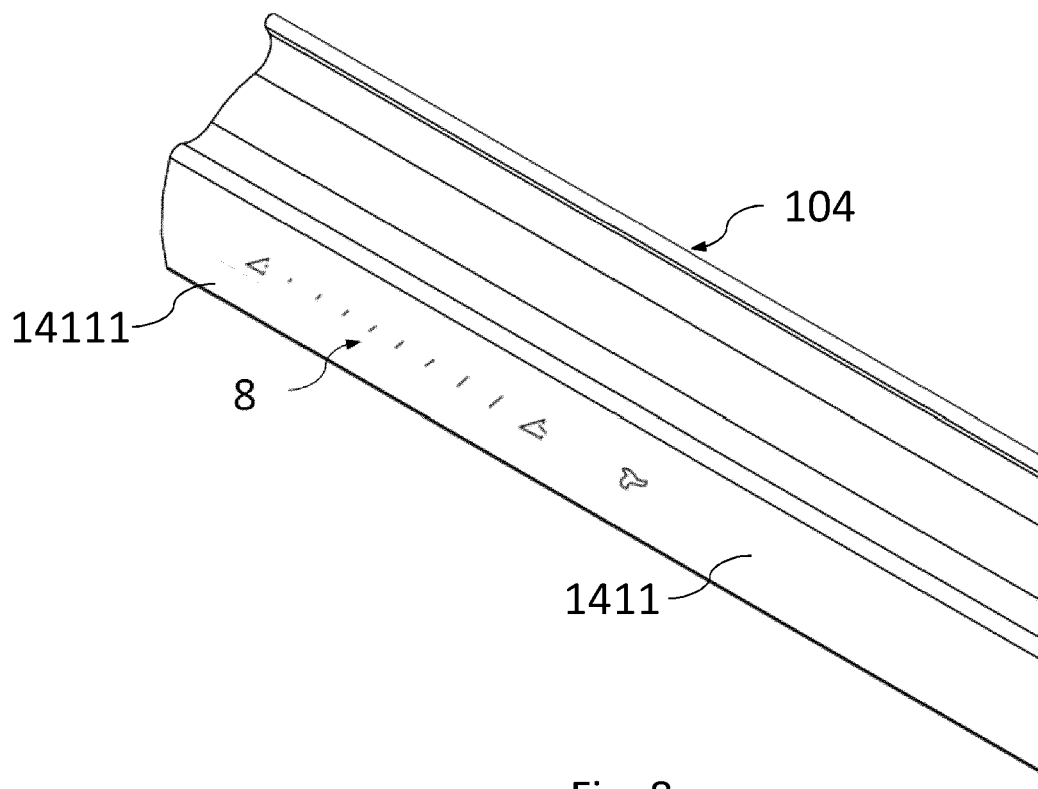


Fig. 8

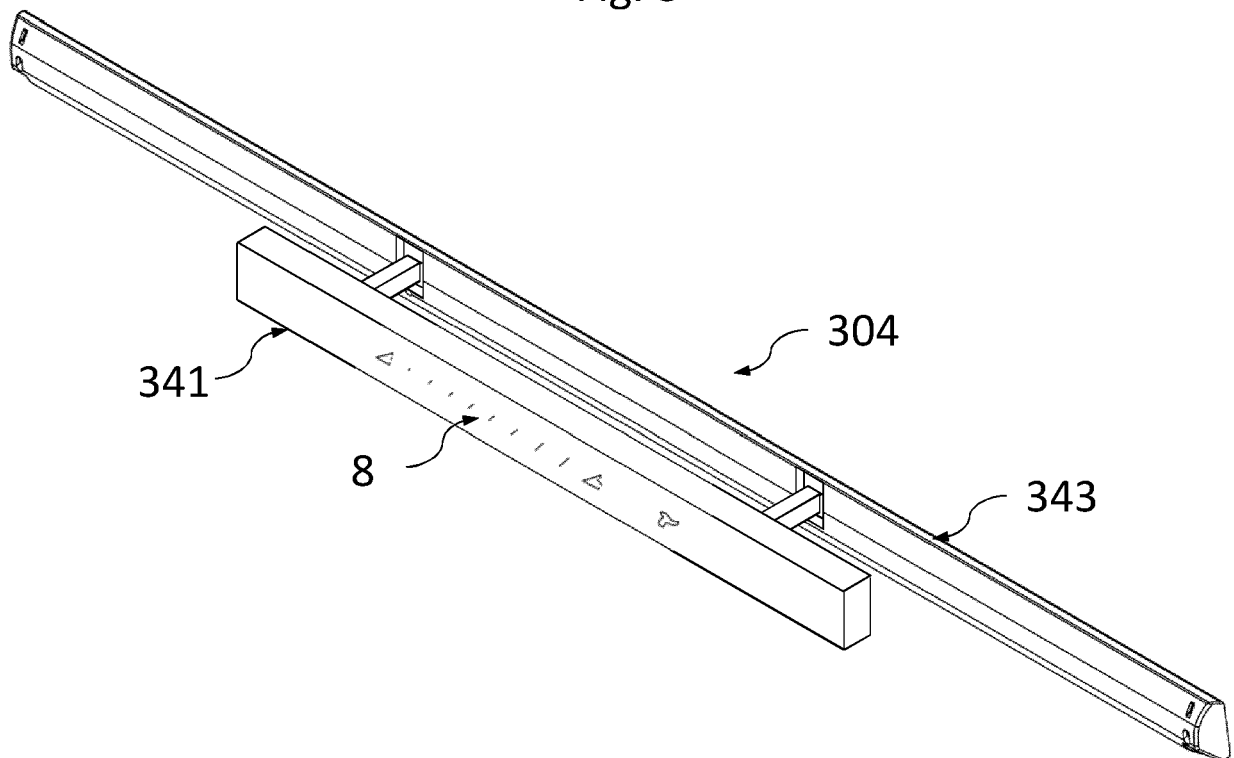


Fig. 9



EUROPEAN SEARCH REPORT

Application Number
EP 20 18 5709

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 235 993 A1 (VKR HOLDING AS [DK]) 25 October 2017 (2017-10-25) * paragraphs [0024], [0027], [0029], [0037]; figures 2-5 *	1-14	INV. E04D13/03 E04D13/035 E04F11/06 E05F15/616 E05B1/00
A	EP 2 957 700 A1 (VKR HOLDING AS [DK]) 23 December 2015 (2015-12-23) * paragraphs [0001] - [0003], [0019]; figure 1 *	1-14	
A	EP 1 856 358 A1 (VKR HOLDING AS [DK]) 21 November 2007 (2007-11-21) * paragraphs [0001] - [0003] *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04D E04F E05G E05F E05C E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 November 2020	Examiner Demeester, Jan
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			

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