



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.05.2016 Bulletin 2016/18

(51) Int Cl.:
E06B 9/15 (2006.01) **E06B 9/92 (2006.01)**
E04D 13/035 (2006.01)

(21) Application number: **15190807.6**

(22) Date of filing: **21.10.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

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(30) Priority: **29.10.2014 DK 201470660**

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(54) **SCREENING DEVICE FOR A ROOF WINDOW AND METHOD FOR MOUNTING SUCH A SCREENING DEVICE ON A ROOF WINDOW**

(57) The invention concerns a screening device (13) for a roof window (1) the screening device comprising a top element (14) and two side rails (17, 18), the two side rails each having a longitudinal slot (172, 182), a screening body (22) having mutually opposite side sections guided in the longitudinal slots, the two side rails further comprising a guide channel (171, 181) for at least one gliding bracket (23, 24) which is adapted for being mounted at or on a bottom part of the sash of the window, the screening device (13) further comprising a bracket system for mounting the top element of the screening device on the roof window. The bracket system comprises two

mounting brackets (50), each with a first bracket part (51) and a second bracket part (52), the first bracket part comprising a section (511) for mounting the first bracket part on the roof window and means (518) for being connected to corresponding means (528) of the second bracket part, the second bracket part (52) comprises an element (521) for attachment to the side rail and a reception element (530) for reception of a corresponding reception element (141, 142) of the top element (14). The invention further concerns a method for mounting such a screening device (13) on a roof window (1).

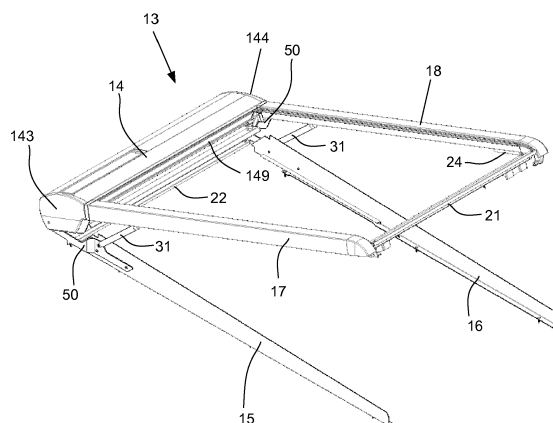


Fig. 2

Description

[0001] The present invention relates in a first aspect to a screening device for mounting on a roof window, particularly a top hung roof window or a roof window with its hinge axis arranged at a position between that of a center hung roof window and a top hung roof window. The present invention relates in a second aspect to a roof window with such a screening device. Furthermore, the present invention relates in a third aspect to a method for installation of a screening device on a roof window.

[0002] In connection with top hung roof windows or roof windows with a hinge axis arranged at a position between that of a center hung roof window and a top hung roof window, and particularly in connection with such roof windows used as emergency exits, the installation of a screening device adds a considerable amount of extra weight to the roof window. This extra weight causes the roof window to become unstable when in an open position due to the effect of gravity on the combined weight of the sash and the screening device tending to draw the sash towards the closed position.

[0003] The problem of instability of top hung roof windows in their open position has been attempted solved in e.g. EP 1 764 453 A1, which teaches the use of an extendable lifting arm comprising a spring biased part such as a gas spring urging the lifting arm towards its extended position thereby counteracting the roof window's own weight thus keeping the roof window stable in its open position. EP 1 764 453 A1, however, does not mention screening devices at all.

[0004] There is thus a desire to provide a solution to the problem related to the added extra weight of the screening device to the roof window.

[0005] Furthermore, screening devices, and particularly roller shutters, are traditionally mounted on roof windows by first mounting the top element of the screening device on the top frame element of the roof window and subsequently connecting the side elements or channels of the screening device to the top element by snapping them into place.

[0006] As screening devices are very often retrofitted to already installed windows, there is a desire for providing an alternative screening device which is very simple and straight forward to install on a roof window, especially when retrofitted to already installed windows, as well as an alternative method for installing such a screening device which is very simple and straight forward to carry out, especially on already installed windows.

[0007] The object of the invention therefore is to provide a screening device which is simple and straight forward to install on a roof window when standing inside a building in which the roof window has already been installed. The object of the invention is likewise to provide a simple and straight forward method for installing such a screening device on a roof window when standing inside a building in which the roof window has already been installed.

[0008] In a first aspect of the invention this and other objects are achieved by means of a screening device for mounting on the side of a roof window facing the exterior when the roof window is mounted in a roof construction, the roof window comprising a frame and a sash, and the screening device comprising a top element and two side rails, the two side rails each having a longitudinal slot, a screening body, such as a roller shutter body comprising a plurality of slats, the screening body having mutually opposite side sections being guided in the longitudinal slots of the respective side rails, and at least one gliding bracket, the two side rails further comprising a guide channel for the at least one gliding bracket, a first part of the at least one gliding bracket being adapted for being mounted at or on a bottom part of the sash of the window, the screening device further comprising a bracket system for mounting the top element of the screening device on the roof window, wherein the bracket system comprises two mounting brackets, each mounting bracket comprising a first bracket part and a second bracket part, the first bracket part comprising a section for mounting the first bracket part on the roof window, the first bracket part further comprising means for connection or being connected to corresponding means of the second bracket part in such a way that the second bracket part is rotatable with respect to the first bracket part, the second bracket part comprises an element for attachment to the side rail, the second bracket part further comprises a reception element for reception of a corresponding reception element provided on a side wall of the top element, and the top element being adapted for being locked with respect to the side rails.

[0009] Thereby, and particularly in virtue of each mounting bracket comprising the features mentioned above, a screening device is provided which is very simple and straight forward to install on a roof window when standing inside a building in which the roof window has already been installed.

[0010] The provision of a bracket system comprising two mounting brackets provides for a screening device being particularly robust when mounted on a roof window.

[0011] By providing each mounting bracket with a first bracket part and a second bracket part, the first bracket part comprising a section for mounting the first bracket part on the roof window, the first bracket part further comprising means for connection or being connected to corresponding means of the second bracket part in such a way that the second bracket part is rotatable with respect to the first bracket part, a screening device is provided in which the top element may rotate with respect to the roof window when the screening device is mounted on a roof window. When opening the roof window this in turn enables the screening device to follow the movement of the roof window in such a way that the opening and closing of the roof window may follow smoothly and with ease.

[0012] The provision of a second bracket part further comprising a reception element for reception of a corre-

sponding reception element provided on the top element provides a particularly significant contribution to the screening device being simple and straight forward to install on a roof window when standing inside a building in which the roof window has already been installed.

[0013] By adapting the top element for being locked with respect to the side rails a screening device is provided which is particularly secure and robust in its mounted state on a roof window.

[0014] In an embodiment the screening device further comprises two side covers and the side covers form part of the section for mounting the first bracket part on the roof window.

[0015] This provides for a particularly simple and robust connection between and way of mounting the first bracket part on the roof window.

[0016] In an embodiment the screening device further comprises a supporting element for connecting the first bracket part of the respective two mounting brackets of the bracket system, particularly for connecting an intermediate section of the first bracket part of the respective two mounting brackets of the bracket system extending between the section for mounting the first bracket part on a window and the means for connection or being connected to the second bracket part.

[0017] Such a supporting element may take up loads, such as from the weight of the top element, which would otherwise be inflicted on the mounting bracket and particularly the first bracket part thereof. Thereby a particularly stable, sturdy and durable screening device is provided for.

[0018] In an embodiment the means of the first bracket part for connection or being connected to the second bracket part forms any one of an unreleasable connection and a releasable connection with the corresponding means of the second bracket part.

[0019] An unreleasable connection has the advantage of keeping together the first and second bracket parts at all times and especially during transport and mounting, thereby reducing the risk of parts going missing.

[0020] A releasable connection between the first and second bracket parts has the advantage of making it possible to attach the second bracket part to the side rail of the screening device, and in embodiments where the screening device further comprises two side covers the first bracket part to the side cover, at the factory, thus likewise reducing the risk of parts going missing.

[0021] In an embodiment the reception element comprised by the second bracket part comprises a recess with an open end arranged at an end of the second bracket part and the corresponding reception element provided on the top element comprises a pin extending substantially perpendicular to a side wall of the top element. Alternatively, the reception element comprised by the second bracket part comprises a pin extending substantially perpendicular to the second bracket part and being arranged at an end of the second bracket part, and the corresponding reception element provided on the top el-

ement comprises a recess with an open end arranged in a side wall of the top element.

[0022] In an embodiment the reception element comprised by the second bracket part and the corresponding reception element provided on the top element are adapted to form a snap-locking connection.

[0023] By any of these three embodiments a screening device is provided in which the connection between the second bracket part and the top element is particularly simple in both construction and use.

[0024] In an embodiment a front end of the top element is adapted for connection to an end of one of the respective two side rails in such a way that the top element cannot rotate with respect to the second bracket part.

[0025] In an embodiment any one of the top element and the second bracket part further comprises an element for locking the top element to the second bracket part.

[0026] By any of these two embodiments taken alone or in combination a screening device is provided in which the top element is held in place and connected to the side rails and/or second bracket part in a particularly secure and reliable manner.

[0027] In an embodiment the screening device further comprises at least one, preferably two, spring biased lifting arm, a first connector element arranged at one end of the at least one spring biased lifting arm and a second connector element arranged at an opposite end of the at least one spring biased lifting arm, and the first bracket part comprises a connector element for connection to one of the first connector element and the second connector element of the at least one spring biased lifting arm, and the second bracket part comprises a connector element for connection to the other of the first connector element and the second connector element of the at least one spring biased lifting arm.

[0028] Thereby a screening device is provided which is not only simple and straight forward to install on a roof window when standing inside a building in which the roof window has already been installed, but which in virtue of the at least one spring biased lifting arm and the mounting brackets being adapted for connection with the spring biased lifting arm also compensates the added extra weight of the screening device to the roof window in an opened position of the roof window and particularly in a rolled down position of the screening body of the screening device.

[0029] In an embodiment the first bracket part comprises an intermediate section and the section for mounting the first bracket part on the roof window and the intermediate section of the first bracket part are offset with respect to each other in such a way that, when the screening device is mounted on a roof window, the at least one spring biased lifting arm is arranged between the first bracket part and the second bracket part in a closed position of the roof window.

[0030] Thereby a screening device is provided in which the spring biased lifting arm is substantially completely

concealed by the first bracket part and the second bracket part in a closed position of the roof window. This in turn provides not only for a more appealing aesthetical appearance of the screening device but also for a screening device which is more safe in use and which is more compact in its closed position whether when mounted on the window or during transport before mounting.

[0031] In an embodiment obtaining this advantage in a particularly simple way, the first bracket part further comprises a connection leg, the connection leg connecting the section for mounting the first bracket part on the roof window and the intermediate section, and the connection leg being arranged in an angle with respect to the section for mounting the first bracket part on the roof window and the intermediate section such that the section for mounting the first bracket part on the roof window and the intermediate section are offset with respect to each other in such a way that, when the screening device is mounted on a roof window, the at least one spring biased lifting arm is arranged between the first bracket part and the second bracket part in a closed position of the roof window.

[0032] The screening device may e.g. be a roller shutter or an externally mounted roller blind, e.g. an awning blind.

[0033] The screening device according to the invention is furthermore a sash mounted screening device.

[0034] In an embodiment the section for mounting the first bracket part on the roof window and the intermediate section of the first bracket part are offset by a distance being at least equal to the diameter of the at least one spring biased lifting arm.

[0035] In an embodiment the section for mounting the first bracket part on the roof window and the intermediate section of the first bracket part are offset by a distance of at least 1.5 cm, preferably at least 2 cm and most preferably at least 2.5 cm.

[0036] In an embodiment the connection leg of the first bracket part is arranged in an angle of at least 90°, at least 120°, or at least 140°, with respect to the section for mounting the first bracket part on the roof window and the intermediate section of the first bracket part.

[0037] In an embodiment the connection leg of the first bracket part is arranged centrally on the first bracket part seen in a length direction of the first bracket part.

[0038] In an embodiment the connection leg of the first bracket part comprises a length measured between and perpendicular to the transition to the first bracket part and the second bracket part, respectively, being at least 1.5 cm, preferably at least 2 cm and most preferably at least 2.5 cm.

[0039] In an embodiment the connection leg of the first bracket part comprises a length measured between and perpendicular to the transition to the first bracket part and the second bracket part, respectively, being at least equal to the diameter of the at least one spring biased lifting arm.

[0040] In an embodiment the section for mounting the

first bracket part on the roof window comprises a length of at least 10 cm, preferably at least 12 cm, most preferably at least 15 cm.

[0041] In an embodiment the second bracket part further comprises an intermediate section and a connection leg, the connection leg being arranged in an angle with respect to the section for attachment to the side rail and the intermediate section such that the section for attachment to the side rail and the intermediate section are offset with respect to each other.

[0042] In an embodiment the connection leg of the second bracket part is arranged centrally on the second bracket part seen in a length direction of the second bracket part.

[0043] In an embodiment the section for attachment to the side rail of the second bracket part comprises a length of at least 20 cm, preferably at least 25 cm, most preferably at least 30 cm.

[0044] In another embodiment the section for attachment to the side rail of the second bracket part comprises a length being at least 1.5 times, preferably at least 2 times, the length of the section for mounting the first bracket part on the roof window of the first bracket part.

[0045] In an embodiment the second bracket part comprises a flange extending substantially perpendicular to the remaining part of the section for attachment to the side rail of the second bracket part and being adapted for connection to a side rail of the screening device.

[0046] In an embodiment the section for mounting the first bracket part on the roof window and the intermediate section of the first bracket part extend in mutually substantially parallel planes, and/or the section for attachment to the side rail and the intermediate section of the second bracket part extend in mutually substantially parallel planes.

[0047] In a second aspect of the invention the above-mentioned and other objects are achieved by means of a roof window comprising a screening device according to the first aspect of the invention.

[0048] In an embodiment the roof window further comprises at least one spring biased lifting arm comprising a first end connectable to a side sash member or side frame member of the window and a second end connectable to an opposite side frame member or side sash member of the window.

[0049] In an embodiment the roof window further comprises at least one spring biased lifting arm comprising a first end connectable to a side sash member or side frame member of the window and a second end connectable to an opposite side frame member or side sash member of the window and the roof window further comprises a screening device according to the first embodiment of the invention which screening device comprises at least one spring biased lifting arm. This embodiment is particularly preferred in case the roof window is an emergency exit roof window.

[0050] The roof window may be a top hung roof window, a center hung roof window or even a roof window

with its hinge axis arranged at a position between that of a center hung roof window and a top hung roof window. The roof window may furthermore be an emergency exit roof window.

[0051] In a third aspect of the invention the above-mentioned and other objects are achieved by means of a method for installation of a screening device according to the first aspect of the invention on the side of a roof window facing the exterior when the roof window is mounted in a roof construction, the method comprising the steps of:

- a) providing a screening device according to the first aspect of the invention,
- b) mounting one end of the gliding bracket at or on a bottom part of the sash of the window,
- c) mounting the first bracket part of the two mounting brackets of the bracket system on the roof window by means of the section for mounting the first bracket part on the roof window,
- d) attaching an end of the side rails of the screening device to the second bracket part of the two mounting brackets of the bracket system,
- e) bringing the reception element provided on the top element of the screening device into engagement with the reception element of the second bracket part of the two mounting brackets of the bracket system, and
- f) locking the top element in relation to the side rails, wherein steps c), d), e) and f) are carried out in the above-mentioned order, step b) is carried out before or after any one of steps c), d), e) and f), and a further step of connecting the gliding bracket to the side rail of the screening device is carried out before or after any one of steps b) to f).

[0052] This method is peculiar particularly in that the side rails of the screening device is mounted before mounting the top element of the screening device, but also in that one is not bound to mount the gliding bracket at any particular time during the process. Also, step e) mentioned above provides for a particularly simple way of carrying out the actual mounting of the top element.

[0053] Hence, and particularly in virtue of the order in which the steps mentioned above are carried out, a method for installing a screening device according to the invention is provided which is very simple and straight forward to carry out when standing inside a building in which the roof window has already been installed and which is thus also less time consuming and less prone for mistakes, such as e.g. dropping parts out the roof window, being made in the process.

[0054] In an embodiment the method further comprises the step of, after step b) or c), connecting the respective second bracket part of the two mounting brackets of the bracket system to the respective first bracket part of the two mounting brackets of the bracket system, preferably by means of a snap connection.

[0055] In an embodiment the method further comprises the steps of providing at least one spring biased lifting arm, which prior to the step a) has been connected to one of the first bracket part of one the two mounting brackets of the bracket system and the second bracket part of one of the two mounting brackets of the bracket system, and connecting the at least one spring biased lifting arm to the other one of the first bracket part of one the two mounting brackets of the bracket system and the second bracket part of one of the two mounting brackets of the bracket system.

[0056] In an embodiment the method further comprises the steps of providing at least one spring biased lifting arm, connecting one end of the at least one spring biased lifting arm to one of the first bracket part of one the two mounting brackets of the bracket system and the second bracket part of one of the two mounting brackets of the bracket system, and connecting the other end of the at least one spring biased lifting arm to the other one of the first bracket part of one the two mounting brackets of the bracket system and the second bracket part of one of the two mounting brackets of the bracket system.

[0057] In an embodiment the method further comprises the step of, after step e) or f), mounting a cover element on the top element, preferably by means of a snap connection, such as to conceal a side wall of the top element and thus also a part of the respective second bracket part of the two mounting brackets of the bracket system.

[0058] In an embodiment the method comprises the further step of mounting a bottom element of the screening device on the bottom sash element of the roof window.

[0059] In an embodiment the method further comprises, prior to step e), the step of mounting a supporting element between the respective first bracket parts of the two mounting brackets.

[0060] In an embodiment the method further comprises the step of mounting a bottom profile between the respective side rails.

[0061] The screening device according to the first aspect of the invention may in an embodiment be used for an emergency exit window of the type comprising a sash and a frame, the sash being top hung in the frame such as to be movable between an open and a closed position, the frame having a top frame member, a bottom frame member and two side frame members and the sash having a top sash member, a bottom sash member and two side sash members, and further comprising at least one spring biased lifting arm comprising a first end connectable to a side sash member or side frame member of the window and a second end connectable to an opposite side frame member or side sash member of the window.

[0062] The invention will be explained in more detail below by means of a non-limiting example of an embodiment and with reference to the schematic drawings, in which:

Fig. 1 shows a perspective view seen from below of a roof window in a closed position and comprising a

screening device according to the first aspect of the invention, the roof window being top hung.

Fig. 2 shows a perspective view seen from above of a screening device according to the first aspect of the invention in an open position.

Fig. 3 shows a perspective view seen from below of the screening device according to Fig. 2 in a closed position.

Fig. 4 shows an enlarged perspective view seen from below of the bottom part of the screening device according to Fig. 2.

Fig. 5 shows a right hand side view of the top part of the screening device according to Fig. 2 with the side cover of the top element removed.

Fig. 6 shows a left hand side view of the top part of the screening device according to Fig. 2 with the side cover of the top element removed.

Fig. 7 shows a perspective view of an embodiment of a mounting bracket of a bracket system of a screening device according to the first aspect of the invention, the mounting bracket comprising a first bracket part and a second bracket part, a spring biased lifting arm being connected to the mounting bracket and being shown in a compressed and an extended version, respectively.

Fig. 8 shows a perspective view of an embodiment of the first bracket part of the mounting bracket according to Fig. 7.

Fig. 9 shows a perspective view of an embodiment of the second bracket part of the mounting bracket according to Fig. 7.

Fig. 10 shows a perspective view of the first bracket part of the mounting bracket according to Fig. 7 in an embodiment where a side cover of a screening device according to the first aspect of the invention forms part of a section for attaching the first bracket part on the roof window.

Fig. 11 shows a perspective view of the second bracket part of the mounting bracket according to Fig. 7 connected to a side rail of a screening device according to the first aspect of the invention.

[0063] The roof window 1 shown in Fig. 1 is adapted for mounting in an inclined roof. The roof window 1 comprises a frame 2 and an openable sash 3 supporting a glass pane 12. The sash 3 may be top hung or center hung, but is in the embodiment shown in Fig. 1 both top hung and center hung. The frame 2 comprises a top frame member 4, a bottom frame member 5 and two side frame members 6, 7. The sash comprises a top sash member, which is not visible on Fig. 1, a bottom sash member 9 and two side sash members 10, 11.

[0064] The roof window 1 further comprises a screening device 13, which may in principle be any feasible type of screening device 13. In one embodiment the screening device is a roller shutter. In another embodiment the screening device may be a roller blind.

[0065] Turning now to Figs. 2 and 3, an embodiment

of a screening device 13 according to the invention will be described in more detail. The screening device 13 generally comprises a screening body 22, a top element 14, two side covers 15, 16, two side rails 17, 18 and a bracket system comprising a pair of mounting brackets 50.

[0066] The screening body 22 comprises opposite side sections guided in longitudinal slots 172, 182 of the side rails 17, 18 and is movable between a rolled up position in the top element 14 and a rolled out position covering the pane 12 of the window 1. The screening body 12 may be a one piece screening body or it may comprise a plurality of slats.

[0067] The screening device 13 further comprises a bottom element 19 and a bottom profile 21 arranged extending between the respective side rails 17 and 18 at an end opposite to the top element 14, as well as a supporting element 20 arranged between the opposite mounting brackets 50. It is noted that the bottom element 19, supporting element 20 and bottom profile 21 are all optional elements which in some embodiments may be omitted.

[0068] The screening device 13 further comprises a spring biased lifting arm, which is denoted 31 in a compressed state shown in Figs. 1, 2 and 7 and which is denoted 32 in an extended state shown in Figs. 3, 7 and 10, and the roof window 1 comprises a spring biased lifting arm. In combination the spring biased lifting arms 31 and the spring biased lifting arm of the roof window 1 more or less counterbalance the combined weight of the sash 3 and the screening device, whereby the window can be operated easily, and even be parked in an arbitrary position. In Fig. 1 the sash 3 is shown in a closed position, while when the sash 3 in an open position the window can be used as an emergency exit.

[0069] In an alternative, which is especially preferred for center hung roof windows, one or both of the spring biased lifting arms may be omitted.

[0070] In another alternative the spring biased lifting arm of the roof window may be dimensioned such that it on its own more or less counterbalance the combined weight of the sash 3 and the screening device. Thereby it becomes possible to omit the spring biased lifting arm 31 of the screening device 13.

[0071] In yet another alternative the screening device 13 and/or the roof window 1 may comprise an auxiliary lifting arm or relieving arm provided to relieve the spring biased lifting arm of the roof window 1 and/or one or more of the spring biased lifting arms 31 of the screening device 13 such as to ensure a sliding and smooth closure of the window. The auxiliary lifting arm or relieving arm may for instance be provided connected in parallel or in series with the spring biased lifting arm of the roof window 1 and/or one or more of the spring biased lifting arms 31 of the screening device 13. The auxiliary lifting arm or relieving arm may by way of example be a further gas spring or an otherwise spring-biased element.

[0072] In general terms, the spring biased lifting arm

of the roof window 1 is arranged to lift the sash 3 in respect to the frame 2. At a first end the spring biased lifting arm of the roof window 1 is connected to a sash element of the sash 3 by means of a connector element. At a second end the spring biased lifting arm of the roof window 1 is connected to a frame element of the frame 2 by means of a connector element, said frame element being opposite to the sash element.

[0073] In general terms, the spring biased lifting arm 31 is arranged to lift the screening device 13 in respect to the frame 2. At a first end 311 the spring biased lifting arm 31 is connected to a first bracket part 51 of a mounting bracket 50 by means of a connector element 313. At a second end 312 the spring biased lifting arm 31 is connected to a second bracket part 52 of a mounting bracket 50 by means of a connector element 314.

[0074] Where shown in the extended state, the spring biased lifting arm 32 is intended to lift the screening device 13 in respect to the frame 2, but is not yet fully mounted on the screening device. At a first end 321 the spring biased lifting arm 32 is connected to a first bracket part 51 of a mounting bracket 50 by means of a connector element 323. At a second end 322, however, the spring biased lifting arm 32 comprises a connector element 324 which has not yet been connected to a second bracket part 52 of a mounting bracket 50.

[0075] The spring biased lifting arm 31 is in the embodiment shown provided in the form of a gas spring. However, many other embodiments of the spring biased lifting arm 31 thereof are also possible, one example being a lifting device of the type described in EP 1 764 453 A1. It is noted that this also applies to the spring biased lifting arm of the roof window 1.

[0076] In the embodiment shown, the roof window 1 is equipped with two spring biased lifting arms, one at each side of the sash 3. In the embodiment shown, the screening device 13 is likewise equipped with two spring biased lifting arms 31, one at each mounting bracket 50.

[0077] Furthermore, the spring biased lifting arm 31 is shown connected to the mounting bracket 50. This construes one possible way of delivering the screening device 13. Alternatively the spring biased lifting arm 31 and/or the mounting bracket(s) 50 may be delivered separated from each other and/or from the remaining parts of the screening device 13.

[0078] Turning now to Fig. 4, the bottom part of the screening device 13 featuring the bottom element 19 and the bottom profile 21 is shown seen from below and in more detail. As shown a gliding bracket 23 and 24, respectively, is provided at the bottom end of the respective side rail 17 and 18. Each of the gliding brackets 23, 24 comprise a first part 231 and 241, respectively, for being mounting at or on a bottom part, such as the bottom element 9 or an adjacent part of the side element 10 or 11, of the sash 3 of the roof window 1. Each of the gliding brackets 23, 24 further comprise a second part 232 and 242, respectively, for being arranged in a corresponding respective guide channel 171, 178 of the side rail 17, 18.

[0079] When the screening device 13 is mounted on a roof window 1 and the roof window 1 is opened, the respective second parts 232, 242 of the gliding brackets 23, 24 are guided in a sliding manner in the guide channels 171, 181 of the side rails 17, 18 such as to allow the screening device 13 to follow the opening movement of the sash 3 of the roof window 1.

[0080] As is further shown each side rail 17, 18 further comprise a longitudinal slot 172, 182, respectively, for guiding mutually opposite side sections of the screening body 22 of the screening device 13.

[0081] With reference also to Figs. 5 and 6, the top element 14 comprises two elements 147 and 148, respectively, for connection to the side rails 17 and 18, respectively, at a front side 149 (Fig. 2) of the top element 14. The top element 14 further comprises two side covers 143 and 144 (cf. Fig. 1 to 3, removed in Fig. 5 and 6) mounted on respective side walls 145 and 146. The top element 14 further comprises two reception elements 141 and 142, respectively, one on each of the side walls 145 and 146. The two reception elements 141 and 142 are protruding substantially perpendicular from the respective side wall 145, 146 and are in the embodiment shown provided as pins.

[0082] Furthermore, the top element 14 is adapted for being locked with respect to the side rails 17, 18. This may be achieved in virtue of the construction of the two elements 147 and 148, which may e.g. form a snap-locking connection with the top element 14. Alternatively, this may be achieved by means of screws or the like connecting the top element 14 and the side rails 17, 18, particularly by being screwed into the side rails 17, 18 and further into the top element 14. In yet another alternative, this may be achieved indirectly in virtue of both the top element 14 and the side rails 17, 18 being locked to the second bracket part 52 without being locked directly to each other.

[0083] The screening device 13 further comprises a bracket system comprising two mounting brackets 50 for mounting the top element 14 of the screening device 13 on the roof window 1. Figs. 7 to 11 show details of such a mounting bracket 50 and are referred to in the following.

[0084] Turning first to Figs. 7 to 9, Fig. 7 shows an embodiment of a mounting bracket 50 according to the invention. Each mounting bracket 50 generally comprises a first bracket part 51 and a second bracket part 52, and Figs. 8 and 9, respectively, show the first bracket part 51 and the second bracket part 52 of the mounting bracket 50 separately.

[0085] The first bracket part 51 and the second bracket part 52 of the mounting bracket 50 are adapted for being connected in such a way that the second bracket part 52 is rotatable with respect to the first bracket part 51. Likewise one of the first bracket part 51 and the second bracket part 52 of the mounting bracket 50 may comprise a locking and/or releasing mechanism (not shown) adapted for locking and or releasing the connection between the first bracket part 51 and the second bracket part 52.

[0086] Generally, the first bracket part 51 comprises a section 511 for mounting the first bracket part on the roof window 1 and the second bracket part 52 comprises an element 521 for attachment to the side rail 17 or 18 of the screening arrangement 13. In some embodiments the side cover 15 may form part of the section 511 for mounting the first bracket part on the roof window 1.

[0087] Generally, the first bracket part 51 further comprises means 518 for connection or being connected to corresponding means 528 of the second bracket part 52 in such a way that the second bracket part 52 is rotatable with respect to the first bracket part 51.

[0088] Generally, the second bracket part 52 further comprises a reception element 530 for reception of a corresponding reception element 141, 142 provided on the top element 14 as described above.

[0089] In the embodiment shown, the first bracket part 51 further comprises an intermediate section 512 and a connection leg 513. The second bracket part 52 further comprises an intermediate section 522 and a connection leg 523. It is noted that one or both of the connection legs 513 and 523 may in some embodiments be omitted.

[0090] With reference also to Fig. 8, further details of the first bracket part 51 will now be described.

[0091] The first bracket part 51 comprises a length direction A. The means 518 for connection or being connected to corresponding means 528 of the second bracket part 52 is arranged at an end of the intermediate section 512 opposite to the section 511 for mounting the first bracket part on the roof window 1 seen in the length direction A.

[0092] The section 511 for mounting the first bracket part on the roof window comprises a length C, which may be at least 10 cm, at least 12 cm or at least 15 cm.

[0093] The section 511 for mounting the first bracket part on the roof window further comprises a section 514 for connection to the spring biased lifting arm 31, 32 of the screening device 13. The section 514 comprises a connector element 5141 adapted for connection with a complementary connector element 323 or 324 of the spring biased lifting arm 32 and/or with a complementary connector element 313 or 314 of the spring biased lifting arm 31.

[0094] The section 511 for mounting the first bracket part on the roof window 1 further comprises at least one opening 519, such as a circular or elliptical hole, for receiving a connection element, such as e.g. a screw or a rivet, for connecting the first bracket part 51 of the mounting bracket 50 to the roof window 1. Alternatively, the at least one opening 519 may be provided in the form of a recess or other marking. It is noted that the provision of such an opening 519 is optional.

[0095] The first bracket part 51 further comprises a section or a flap 517 extending in an angle with respect to, particularly substantially perpendicular to, the first bracket part 51, or in the embodiment shown more specifically to the remaining part of the intermediate section 512. The section or flap 517 is adapted for mounting of

the supporting element 20 of the screening device 13. It is noted that the provision of such a section or flap 517 is optional

[0096] The connection leg 513 connects the section 511 for mounting the first bracket part on the roof window 1 and the intermediate section 512. Referring to Fig. 8, the connection leg 513 is arranged in an angle α_1 with respect to the section 511 for mounting the first bracket part on the roof window 1 and in an angle α_2 with respect to the intermediate section 512 such that the section 511 for mounting the first bracket part on the roof window 1 and the intermediate section 512 are offset with respect to each other. The angle α_1 and the angle α_2 may be different from one another. Alternatively, the angle α_1 and the angle α_2 may be equal to one another.

[0097] In the embodiment shown the connection leg 513 is arranged substantially centrally on the first bracket part 51 of the mounting bracket 50 as seen in the length direction A of the first bracket part 51. In other embodiments the connection leg 513 may be arranged eccentrically on the first bracket part.

[0098] The connection leg 513 further comprises a length B of measured between and perpendicular to the transition 515 between the section 511 for mounting the first bracket part on the roof window 1 and the connection leg 513 and the transition 516 between the intermediate section 512 and the connection leg 513. The length B is at least 1.5 cm, alternatively at least 2 cm or even at least 2.5 cm.

[0099] Put in other words, the length B of the connection leg 513 of the first bracket part 51 is chosen such that the section 511 for mounting the first bracket part on the roof window 1 and the intermediate section 512 are offset with respect to one another with a distance being at least equal to the diameter of the spring biased lifting arm 31 of the screening device 13. By way of example, in the case the angle α_1 and the angle α_2 are both 90° , the length B is at least equal to the diameter of the spring biased lifting arm 31.

[0100] With reference also to Fig. 9, the second bracket part 52 will now be described in further details.

[0101] The second bracket part 52 comprises a length direction D.

[0102] The section 521 for attachment of the second bracket part to the side rail 17 or 18 comprises a length E of at least 20 cm, alternatively at least 25 cm or at least 30 cm. Expressed in another way, the section 521 for attachment of the second bracket part to the side rail 17 or 18 comprises a length E being at least 1.5 times, alternatively at least 2 times, the length C of the section 511 for mounting the first bracket part on the roof window of the first bracket part 51.

[0103] The section 521 for attachment of the second bracket part to the side rail further comprises a section 524 (cf. Fig. 7) being adapted for connection to the spring biased lifting arm 31 of the screening device 13. The section 524 comprises a connector element 5241 adapted for connection with a complementary connector element

314 or 313 of the spring biased lifting arm 31. The section 524 is arranged at an end of the section 521 for attachment of the second bracket part to the side rail 17 or 18 opposite to the intermediate section 522 seen in the length direction D.

[0104] The section 521 for attachment of the second bracket part to the side rail 17, 18 further comprises at least one opening 529, such as a circular or elliptical hole, for receiving a connection element, such as e.g. a screw or a rivet, for connecting the second bracket part 52 of the mounting bracket 50 to a side rail 17 or 18 of the screening device 13. Alternatively, the at least one opening 529 may be provided in the form of a recess or other marking. It is noted that the provision of such an opening 529 is optional. As shown the opening 529 is in the embodiment shown provided on a flange 527 extending in an angle to, particularly substantially perpendicular to, the remaining part of the section 521 for attachment of the second bracket part to the side rail 17 or 18.

[0105] The reception element 530 is arranged at an end of the intermediate section 522 opposite to the section 521 and is adapted for mounting of the top element 14 of the screening device 13. To this end the top element 14 comprises the complementary reception elements 141, 142 described above and adapted for engagement with the reception element 530 (cf. Fig. 5 and 6). The top element 14 may be adapted for being locked with respect to the second bracket part 52. Therefore, in one embodiment the reception element 530 and the complementary reception element 141, 142 of the top element 14 form a snap-locking, a click-locking or a friction-locking connection. In the embodiment shown this is obtained by providing the reception element 530 as an L-shaped recess.

[0106] The reception element 530 comprises in the embodiment shown in Figs. 5, 6, 7 and 9 a recess 531 with an open end 532 arranged at an end of the second bracket part 52 and the corresponding reception element 141, 142 provided on the top element 14 comprises a pin extending substantially perpendicular to a side wall 145, 146 of the top element 14. As may be seen from especially Figs. 7 and 9, the recess 531 is provided as a cut-out or indentation in the second bracket part 52 at an end of the second bracket part 52, the open end 532 forming the mouth of the recess 531.

[0107] Alternatively, the reception element 530 comprises a pin extending substantially perpendicular to the second bracket part 52 and being arranged at an end of the second bracket part 52, and the corresponding reception element 141, 142 provided on the top element 14 comprises a recess with an open end arranged in a side wall 145, 146 of the top element 14. The recess may be provided as a cut-out or indentation in a side wall 145, 146 of the top element 14.

[0108] The connection leg 523 connects the section 521 for attachment of the second bracket part to the side rail 17, 18 and the intermediate section 522. The connection leg 523 is arranged in an angle with respect to

the section 521 for attachment of the second bracket part to the side rail 17, 18 and in an angle with respect to the intermediate section 522 such that the section 521 for attachment of the second bracket part to the side rail 17, 18 and the intermediate section 522 are offset with respect to each other. Preferably, the connection leg 523 extends in such a way that the section 521 for attachment of the second bracket part to the side rail 17, 18 and the intermediate section 522 extend offset with respect to each other and in a common plane. The angle between the connection leg 523 and the section 521 for attachment of the second bracket part to the side rail 17, 18 and the angle between the connection leg 523 and the intermediate section 522, respectively, may be different from one another. Alternatively, angle between the connection leg 523 and the section 521 for attachment of the second bracket part to the side rail 17, 18 and the angle between the connection leg 523 and the intermediate section 522, respectively, may be equal to one another.

[0109] In the embodiment shown the connection leg 523 is seen in the length direction D arranged displaced from a center of the second bracket part 52 towards the coupling element 528. In other embodiments the connection leg 523 may be arranged substantially centrally on the first part 52 of the mounting bracket 50 as seen in the length direction D of the first part 52. In yet other embodiments the connection leg 523 may be omitted altogether.

[0110] The connection leg 523 further comprises a length measured between and perpendicular to the transition 525 between the section 521 for attachment of the second bracket part to the side rail 17 or 18 and the connection leg 523 and the transition 526 between the intermediate section 522 and the connection leg 523. The length is at least 1.5 cm, alternatively at least 2 cm or even at least 2.5 cm.

[0111] Turning now to Fig. 10, the first bracket part 51 of the mounting bracket 50 and a side cover 15 of the screening device 13 is shown in an embodiment which differs from the above only in that the side cover 15 forms part of the section for mounting the first bracket part 51 on the roof window 1. Furthermore the spring biased lifting arm 31 of the screening device 13 is shown attached to the first bracket part 51.

[0112] Finally, Fig. 11 shows the second bracket part 52 of the mounting bracket 50 connected to a side rail 17 of the screening device 13, and more particularly to an inner surface of the side rail 17.

[0113] It should be noted that the above description of preferred embodiments serves only as examples, and that a person skilled in the art will know that numerous variations are possible without deviating from the scope of the claims.

[0114] The person skilled in the art realizes that the present invention by no means is limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims.

Claims

1. A screening device (13), such as a roller shutter, for mounting on the side of a roof window (1) facing the exterior when the roof window (1) is mounted in a roof construction, the roof window (1) comprising a frame (2) and a sash (3), and the screening device (13) comprising:
 - a top element (14) and two side rails (17, 18), the two side rails (17, 18) each having a longitudinal slot (172, 182),
 - a screening body (22), such as a roller shutter body comprising a plurality of slats, the screening body (22) having mutually opposite side sections being guided in the longitudinal slots (172, 182) of the respective side rails (17, 18), and at least one gliding bracket (23, 24),
 - the two side rails (17, 18) further comprising a guide channel (171, 181) for the at least one gliding bracket (23, 24), a first part (231, 241) of the at least one gliding bracket (23, 24) being adapted for being mounted at or on a bottom part of the sash (3) of the window (1),
 - the screening device (13) further comprising a bracket system for mounting the top element (14) of the screening device (13) on the roof window, **characterized in that** the bracket system comprises two mounting brackets (50), each mounting bracket (50) comprising a first bracket part (51) and a second bracket part (52), the first bracket part (51) comprising a section (511) for mounting the first bracket part on the roof window (1),
 - the first bracket part (51) further comprising means (518) for connection or being connected to corresponding means (528) of the second bracket part (52) in such a way that the second bracket part (52) is rotatable with respect to the first bracket part (51),
 - the second bracket part (52) comprises an element (521) for attachment to the side rail (17, 18),
 - the second bracket part (52) further comprises a reception element (530) for reception of a corresponding reception element (141, 142) provided on a side wall (145, 146) of the top element (14), and
 - the top element (14) being adapted for being locked with respect to the side rails (17, 18).
2. A screening device according to claim 1, **characterized in that** the screening device (13) further comprises two side covers (15, 16) and that the side covers (15, 16) form part of the section (511) for mounting the first bracket part (51) on the roof window (1).
3. A screening device according to claim 1 or 2, **characterized in that** the screening device (13) further comprises a supporting element (20) for connecting the first bracket part (51) of the respective two mounting brackets (50) of the bracket system, particularly for connecting an intermediate section (512) of the first bracket part (51) of the respective two mounting brackets (50) of the bracket system extending between the section (511) for mounting the first bracket part (51) on a window and the means (518) for connection or being connected to the second bracket part (52).
4. A screening device according to any one of the above claims, **characterized in that** the means (518) of the first bracket part (51) for connection or being connected to the second bracket part (52) forms any one of an unreleasable connection and a releasable connection with the corresponding means (528) of the second bracket part.
5. A screening device according to any one of the above claims, **characterized in that** the reception element (530) comprised by the second bracket part (52) comprises a recess (531) with an open end (532) arranged at an end of the second bracket part (52) and the corresponding reception element (141, 142) provided on the top element (14) comprises a pin extending substantially perpendicular to a side wall (145, 146) of the top element (14), or **in that** the reception element (530) comprised by the second bracket part (52) comprises a pin extending substantially perpendicular to the second bracket part (52) and being arranged at an end of the second bracket part (52), and the corresponding reception element (141, 142) provided on the top element (14) comprises a recess with an open end arranged in a side wall (145, 146) of the top element (14).
6. A screening device according to any one of the above claims, **characterized in that** the reception element (530) comprised by the second bracket part (52) and the corresponding reception element (141, 142) provided on the top element (14) are adapted to form a snap-locking connection.
7. A screening device according to any one of the above claims, **characterized in that** a front end of the top element (14) is adapted for connection to an end of one of the respective two side rails (17, 18) in such a way that the top element (14) cannot rotate with respect to the second bracket part (52).
8. A screening device according to any one of the above claims, **characterized in that** any one of the top element (14) and the second bracket part (52) further comprises an element for locking the top element (14) to the second bracket part (52).

9. A screening device according to any one of the above claims, **characterized in that** the screening device (13) further comprises at least one, preferably two, spring biased lifting arm (31, 32), a first connector element (313, 323) arranged at one end of the at least one spring biased lifting arm (31, 32) and a second connector element (314, 324) arranged at an opposite end of the at least one spring biased lifting arm (31, 32), and that the first bracket part (51) comprises a connector element (5141) for connection to one of the first connector element (313, 323) and the second connector element (314, 324) of the at least one spring biased lifting arm (31, 32), and that the second bracket part (52) comprises a connector element (5241) for connection to the other of the first connector element (313, 323) and the second connector element (314, 324) of the at least one spring biased lifting arm (31, 32).
10. A screening device according to claim 9, **characterized in that** the first bracket part (51) comprises an intermediate section (512), and that the section (511) for mounting the first bracket part on the roof window and the intermediate section (512) of the first bracket part (51) are offset with respect to each other in such a way that, when the screening device (13) is mounted on a roof window (1), the at least one spring biased lifting arm (31, 32) is arranged between the first bracket part (51) and the second bracket part (52) in a closed position of the roof window (1).
11. A screening device according to claim 10, **characterized in that** the first bracket part (51) further comprises a connection leg (513), the connection leg (513) connecting the section (511) for mounting the first bracket part on the roof window and the intermediate section (512), and the connection leg (513) being arranged in an angle with respect to the section (511) for mounting the first bracket part on the roof window and the intermediate section (512) such that the section (511) for mounting the first bracket part on the roof window and the intermediate section (512) are offset with respect to each other in such a way that, when the screening device (13) is mounted on a roof window (1), the at least one spring biased lifting arm (31, 32) is arranged between the first bracket part (51) and the second bracket part (52) in a closed position of the roof window (1).
12. A roof window (1) comprising a screening device (13) according to any one of the above claims and further comprising at least one spring biased lifting arm comprising a first end connectable to a side sash member (10, 11) or side frame member (6, 7) of the window (1) and a second end connectable to an opposite side frame member (6, 7) or side sash member (10, 11) of the window (1).
13. A method for installation of a screening device (13) according to any one of claims 1 to 11 on the side of a roof window (1) facing the exterior when the roof window (1) is mounted in a roof construction, the method comprising the steps of:
- a) providing a screening device (13) according to any one of claims 1 to 11,
 - b) mounting one end of the gliding bracket (23, 24) at or on a bottom part of the sash (3) of the window (1),
 - c) mounting the first bracket part (51) of the two mounting brackets (50) of the bracket system on the roof window (1) by means of the section (511) for mounting the first bracket part (51) on the roof window (1),
 - d) attaching an end of the side rails (17, 18) of the screening device (13) to the second bracket part (52) of the two mounting brackets (50) of the bracket system,
 - e) bringing the reception element (141, 142) provided on the top element (14) of the screening device (13) into engagement with the reception element (530) of the second bracket part (52) of the two mounting brackets (50) of the bracket system, and
 - f) locking the top element (14) in relation to the side rails (17, 18), wherein
- steps c), d), e) and f) are carried out in the above-mentioned order, wherein step b) is carried out before or after any one of steps c), d), e) and f), and wherein a further step of connecting the gliding bracket (23, 24) to the side rail (17, 18) of the screening device (13) is carried out before or after any one of steps b) to f).
14. A method according to claim 13, **characterized in that** it further comprises the step of, after step b) or c), connecting the respective second bracket part (52) of the two mounting brackets (50) of the bracket system to the respective first bracket part (51) of the two mounting brackets (50) of the bracket system, preferably by means of a snap connection.
15. A method according to claim 13 or 14, **characterized in that** it further comprises the steps of:
- a) providing at least one spring biased lifting arm (31, 32), which prior to the step a) has been connected to one of the first bracket part (51) of one of the two mounting brackets (50) of the bracket system and the second bracket part (52) of one of the two mounting brackets (50) of the bracket system, and
 - b) connecting the at least one spring biased lifting arm (31, 32) to the other one of the first bracket

part (51) of one the two mounting brackets (50) of the bracket system and the second bracket part (52) of one of the two mounting brackets (50) of the bracket system.

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16. A method according to claim 13 or 14, **characterized in that** it further comprises the steps of:

providing at least one spring biased lifting arm (31, 32),

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connecting one end (311, 312, 321, 322) of the at least one spring biased lifting arm (31, 32) to one of the first bracket part (51) of one the two mounting brackets (50) of the bracket system and the second bracket part (52) of one of the two mounting brackets (50) of the bracket system, and

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connecting the other end (311, 312, 321, 322) of the at least one spring biased lifting arm (31, 32) to the other one of the first bracket part (51) of one the two mounting brackets (50) of the bracket system and the second bracket part (52) of one of the two mounting brackets (50) of the bracket system.

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17. A method according to any one of claims 13 to 16, **characterized in that** it further comprises the step of, after step e) or f), mounting a cover element (143, 144) on the top element (14), preferably by means of a snap connection, such as to conceal the side wall (145, 146) of the top element (14) and thus also a part of the respective second bracket part (52) of the two mounting brackets (50) of the bracket system.

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18. Use of a screening device (13) according to any one of claims 9 to 11 for an emergency exit window of the type comprising a sash (3) and a frame (2), the sash (3) being top hung in the frame (2) such as to be movable between an open and a closed position, the frame (2) having a top frame member (4), a bottom frame member (5) and two side frame members (6, 7) and the sash (3) having a top sash member, a bottom sash member (9) and two side sash members (10, 11), and further comprising at least one spring biased lifting arm comprising a first end connectable to a side sash member (10, 11) or side frame member (6, 7) of the window and a second end connectable to an opposite side frame member (6, 7) or side sash member (10, 11) of the window (1).

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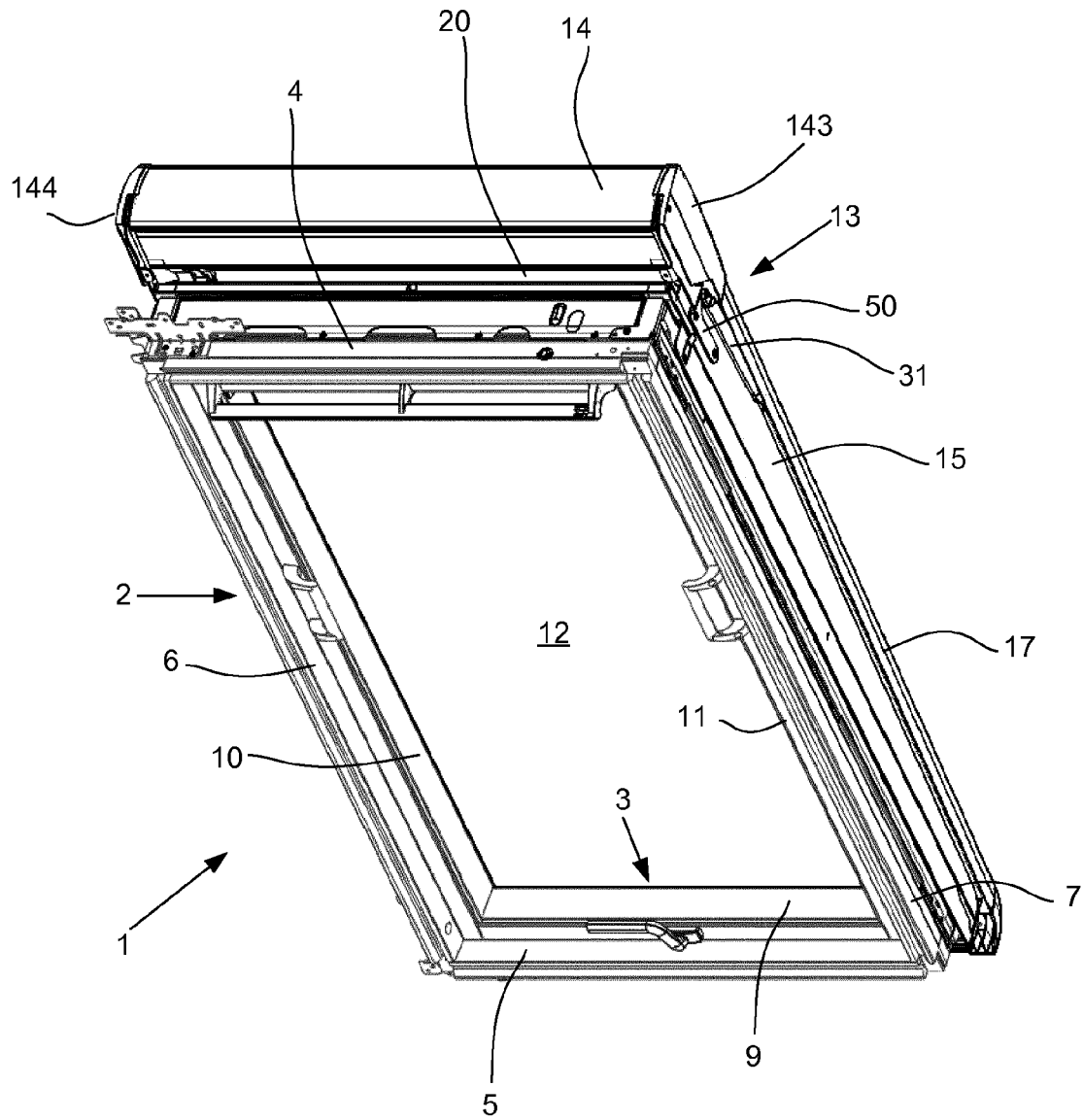


Fig. 1

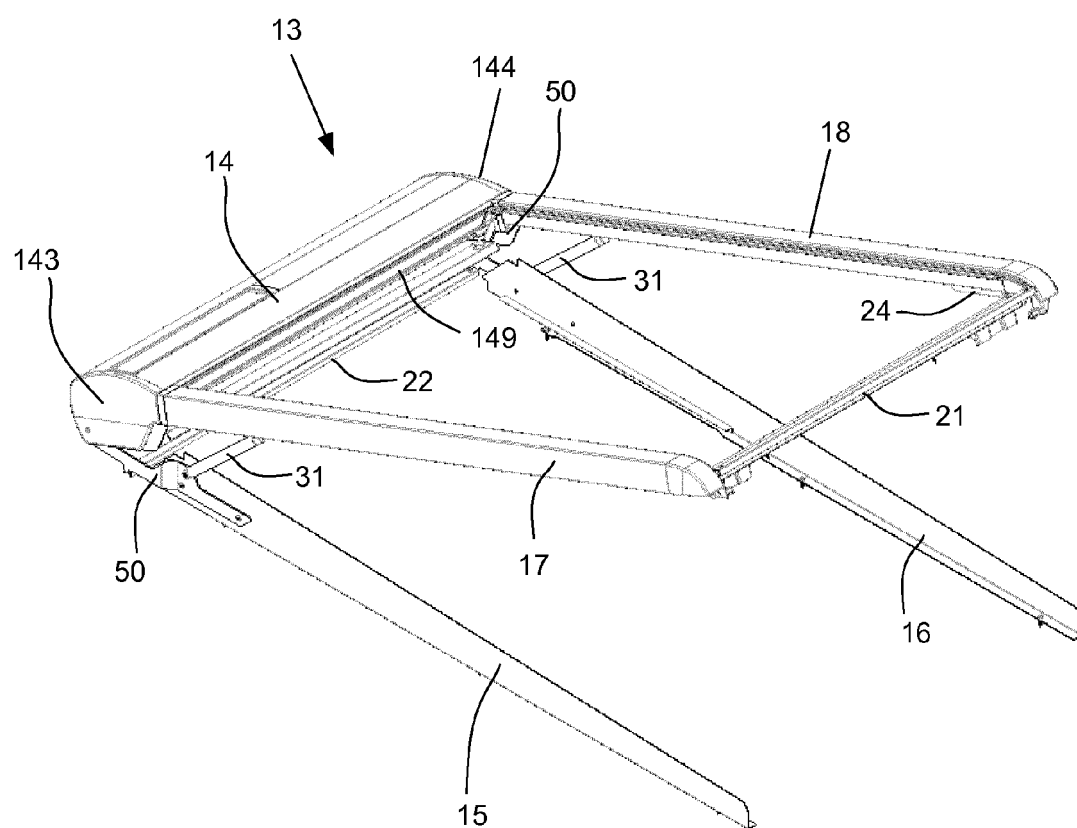


Fig. 2

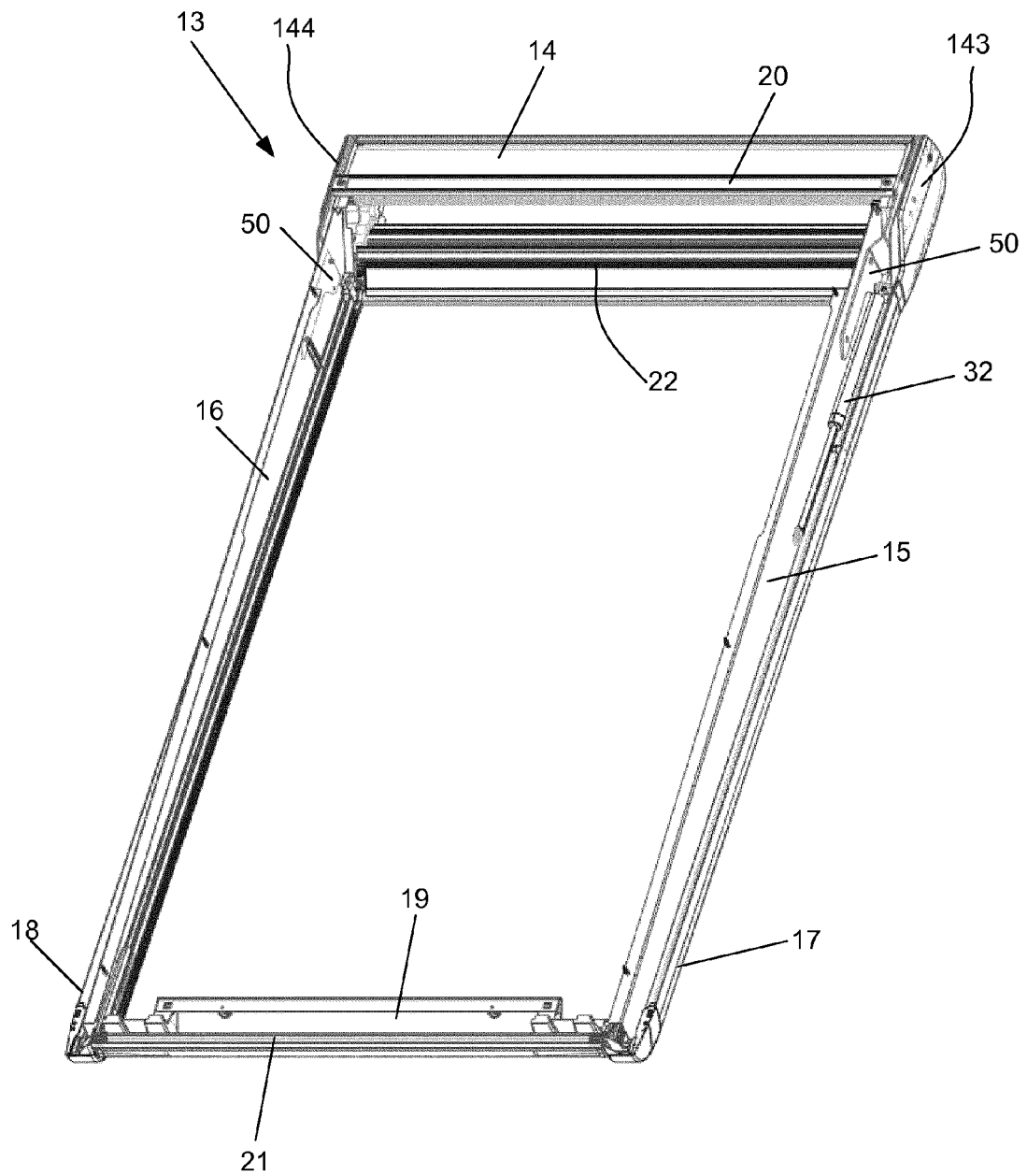


Fig. 3

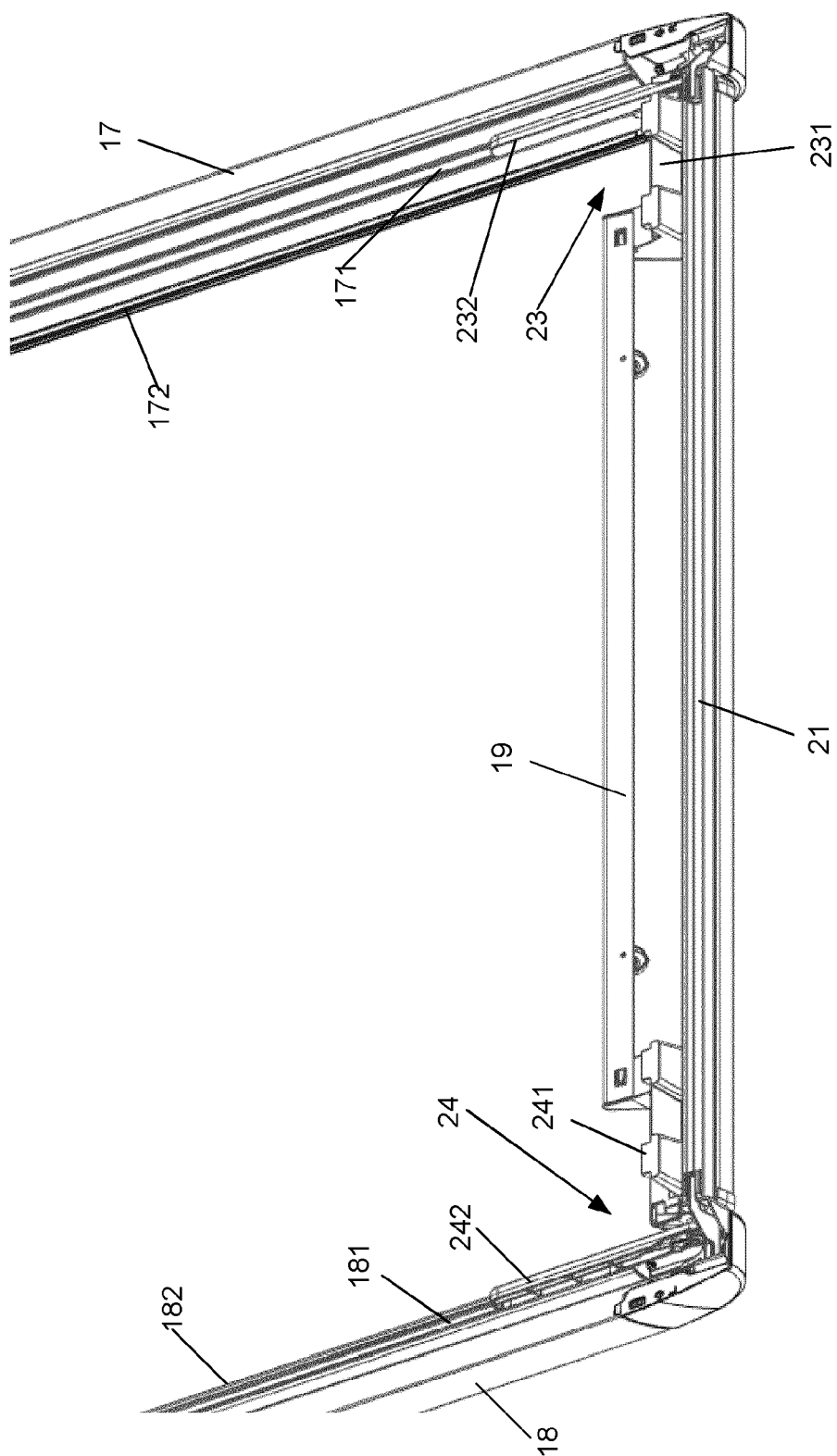
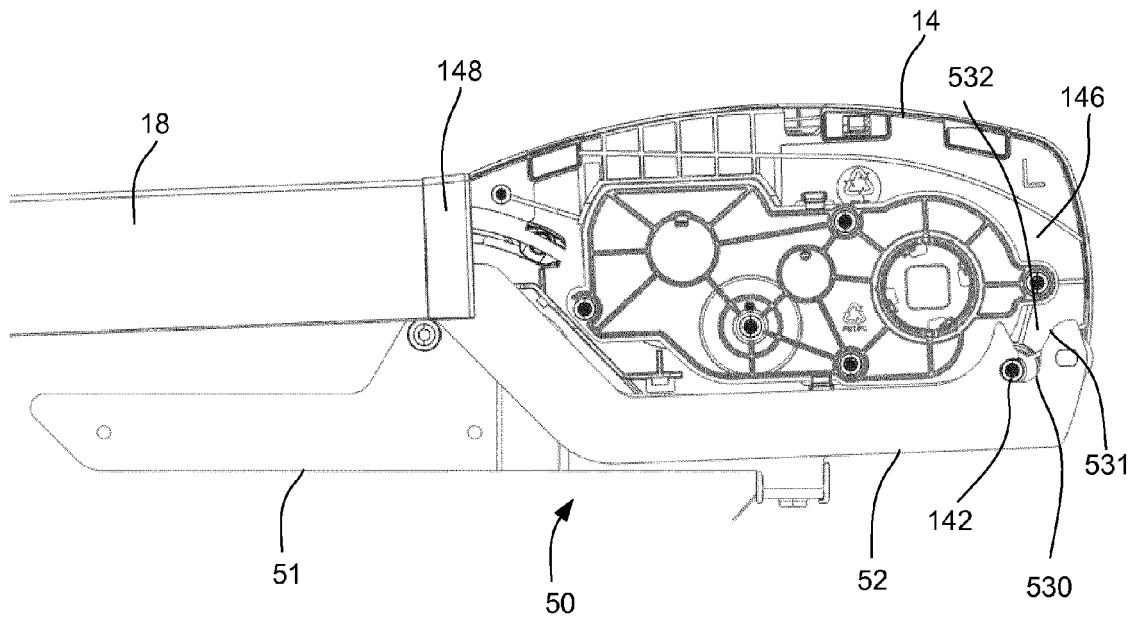
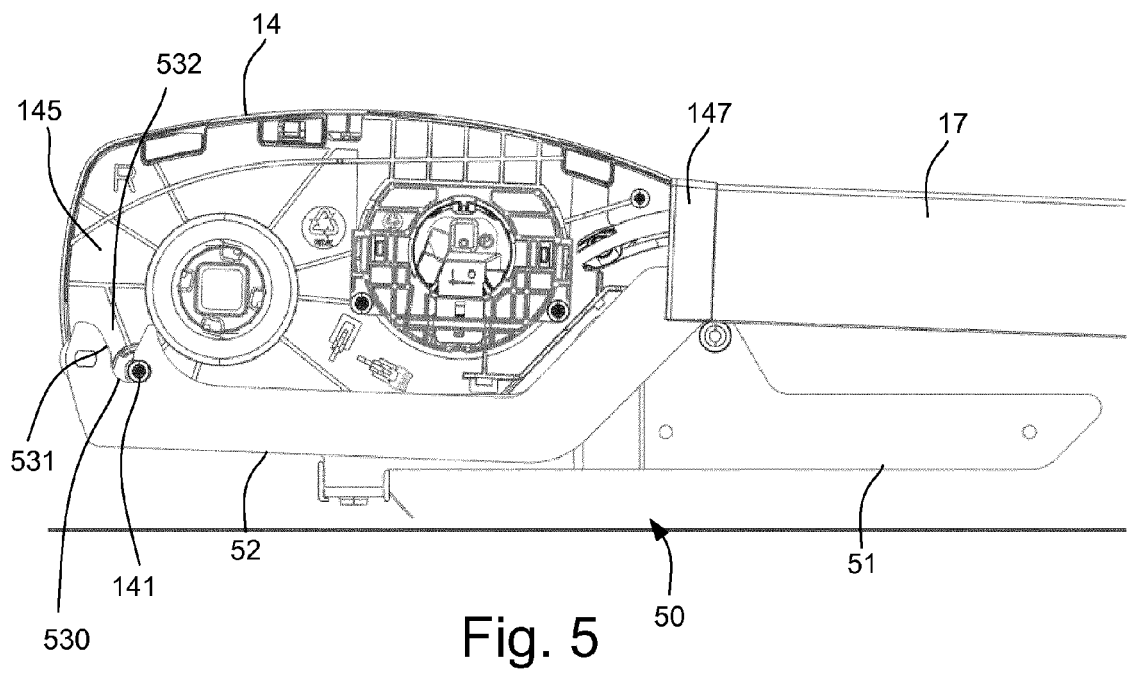


Fig. 4



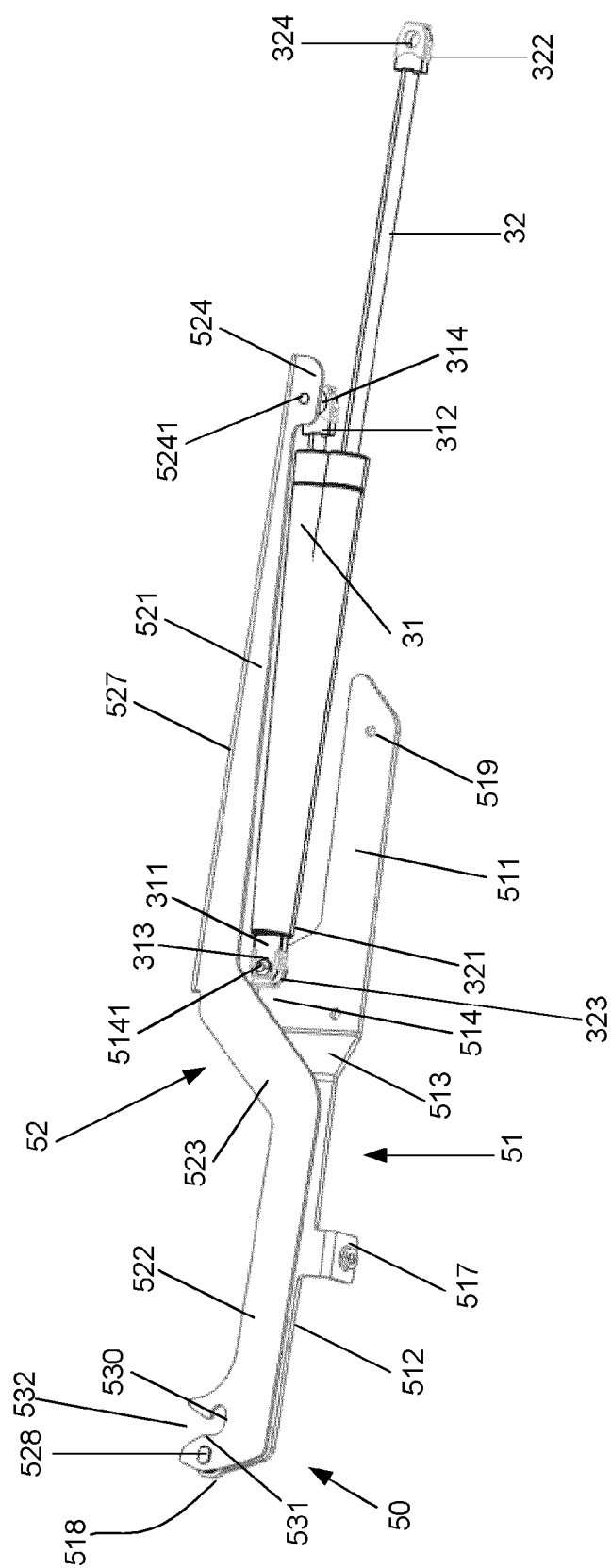


Fig. 7

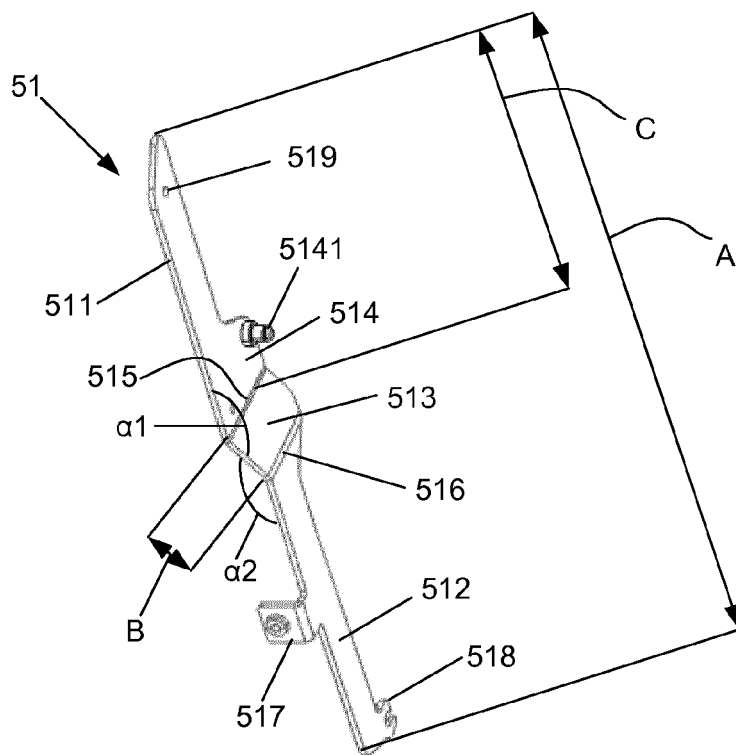


Fig. 8

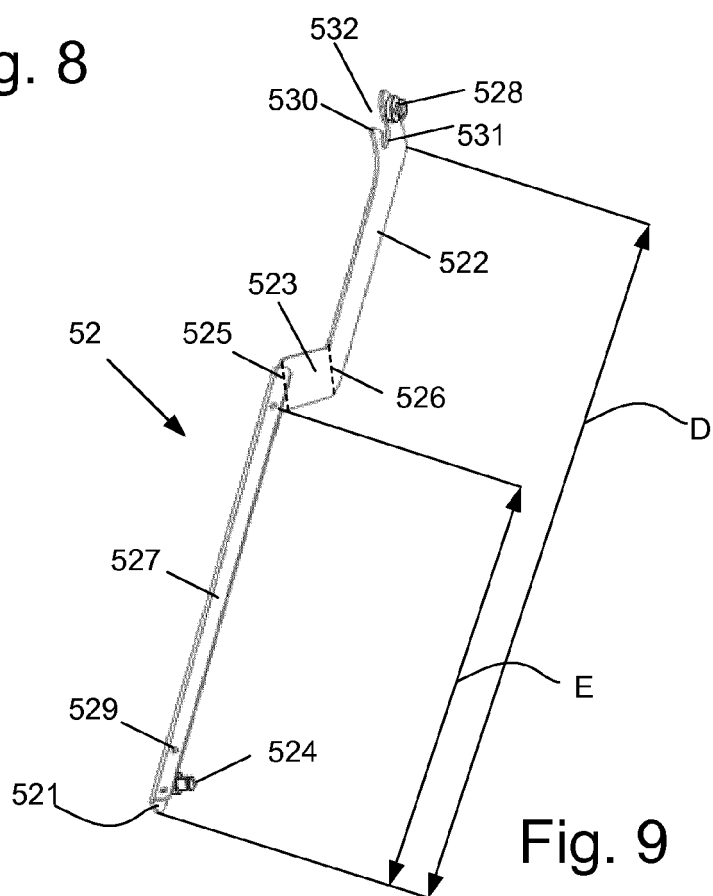


Fig. 9

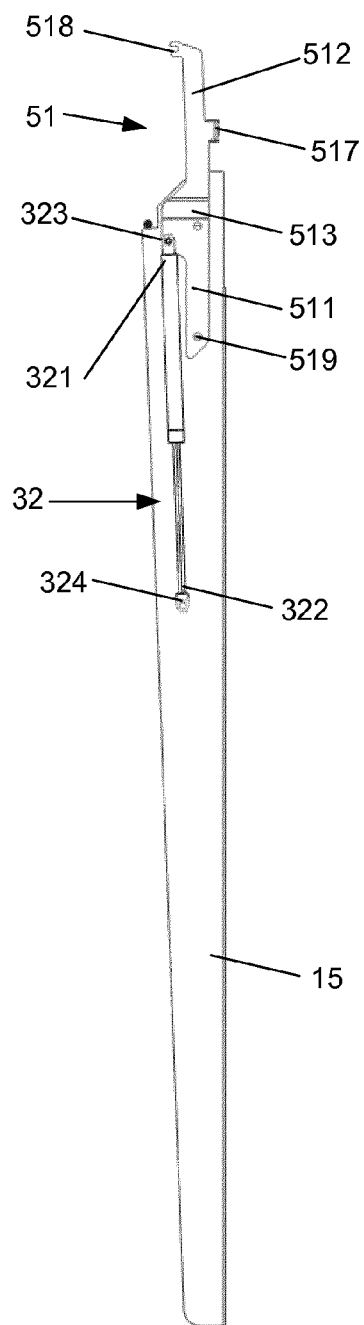


Fig. 10

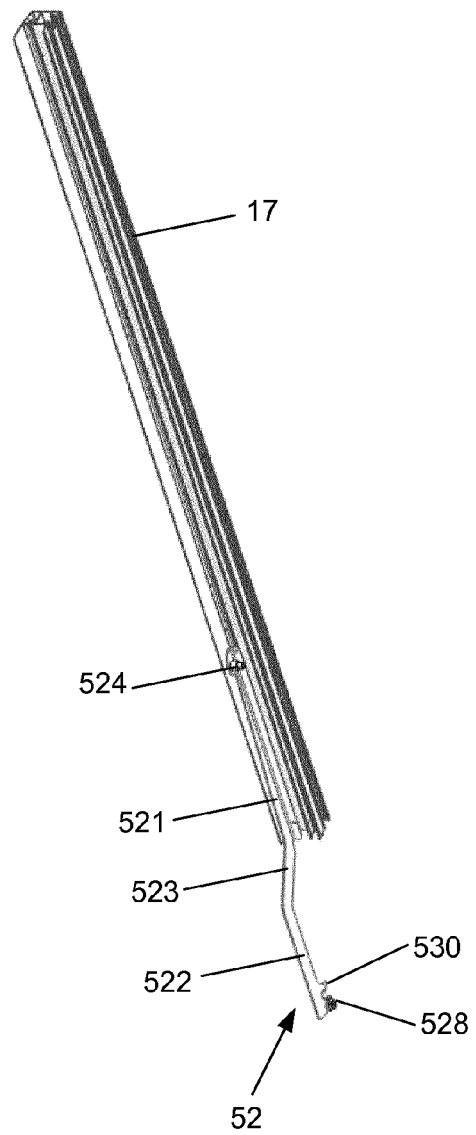


Fig. 11



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 Application Number
EP 15 19 0807

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			E06B E04D
Place of search		Date of completion of the search	Examiner
Munich		25 February 2016	Merz, Wolfgang
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**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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25-02-2016

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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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