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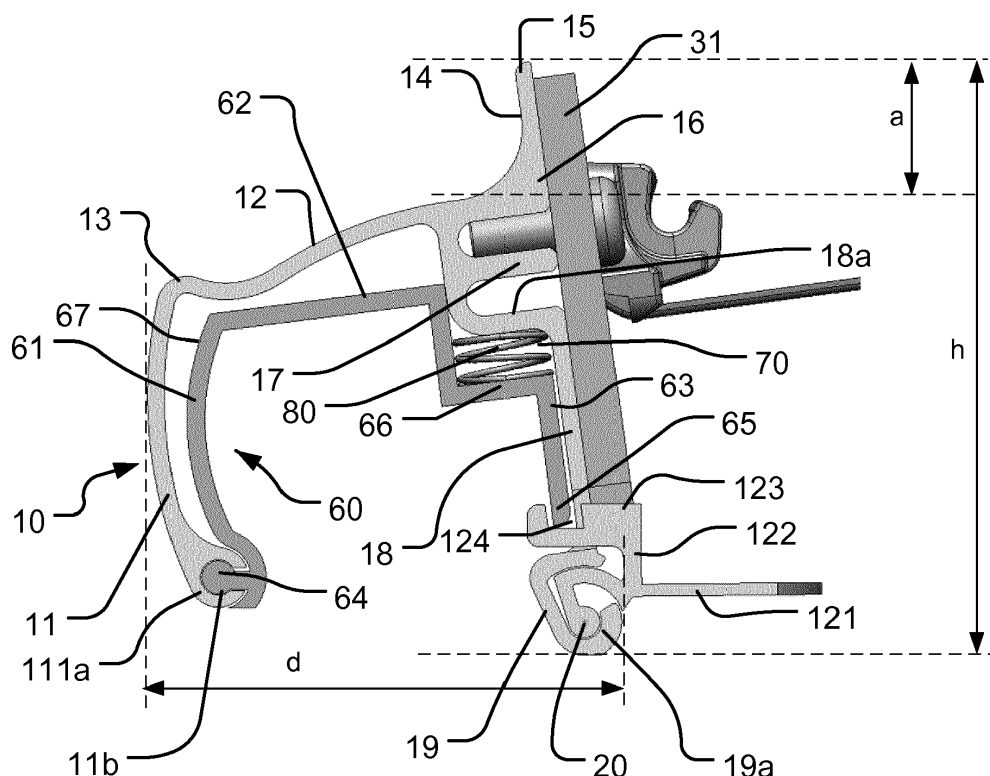
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(54) **A ventilation and operating assembly having a locking device**

(57) Disclosed is a ventilation and operating assembly for bringing a sash from an open position to a closed position and vice versa relative to a frame of a window. The ventilation and operating assembly comprises a closure portion (14,18) having an inner side and an opposite outer side, a first end edge (19) including a hinge part for

connection to the sash and an opposite second end edge (15), a handle portion (11) including a portion (12) connecting the handle portion (11) with the closure portion (14, 18), and a locking device (60) movable between a locking position and a released position.



**Fig. 6**

## Description

**[0001]** The present invention relates to a ventilation and operating assembly for a sash relative to a frame of a window, comprising a closure portion having an inner side and an opposite outer side, a first end edge including a hinge part for connection to the sash and an opposite second end edge, a handle portion and a portion connecting the handle portion with the closure portion, and a locking device.

**[0002]** Basically, windows may be provided in a number of varieties and include more or less complicated structures in order to allow ventilation of a room and to fulfil other functions such as opening of the sash.

**[0003]** It is known from prior art to provide a window with such a ventilation assembly in order to create a desirable indoor climate in buildings, e.g. houses, where the ventilation assemblies comprise at least one ventilation position to ensure a flow of air from one side of the window to another side of the window, in this way creating the more desirable indoor climate, where the air flow in the room is optimized.

**[0004]** Applicant's international publications WO 94/04782 and WO 2004/063498 disclose operating and locking assemblies for use in windows with a ventilation arrangement separated from the operating means. Although these assemblies function well, there are a number of limitations as regards the conditions during manufacture, transportation and use.

**[0005]** In its most simple form, a ventilation and operating assembly, of the kind mentioned in the introduction, comprises a ventilation flap. The side of the ventilation flap facing a ventilation aperture in the sash functions as a closure portion and is hingedly connected to the sash at the bottom edge and covers the ventilation opening in the sash, and a handle is attached to the ventilation flap to operate the ventilation flap to the ventilating and operating positions.

**[0006]** Improvement of ventilation assemblies has experienced further development as for example disclosed in WO 02/084043 A1, and WO 2012/034558 A1, which discloses a ventilation assembly for a ventilation window having a sash arranged to be openable with respect to a stationary window frame by pivotal movement about a pivot axis parallel to a pair of opposed sash members. In this ventilation assembly, the lock assembly comprises a casing, a locking arm, a lock mechanism arranged in the casing for enabling the locking arm to be displaceable, via an actuator slide displaceable in a slot in the casing, between a first end position defining an unlocked position, a second end position defining a locked position and a third, intermediate position where the window is slightly open to achieve ventilation.

**[0007]** In principle, the ventilation and operating assembly is locked in its closed position, due to the engagement with the locking means. However, in case increased security against unauthorized access from the outside is desired, it has been suggested to include burglary pre-

venting elements in the ventilation passage as described in EP 969 178 A1.

**[0008]** A further example is shown and described in WO 2009/141447 A1 and suggests selectively operable locking means. However, due to the selectivity, the locking means described in this document has the disadvantage that the locking means is only active when the user has set the locking means in the activated position. In case the activation is for some reason not carried out, for instance due to the user's forgetting to activate, the ventilation and operating assembly may at least theoretically be forced open.

**[0009]** With this background it is an object of the present invention to improve a ventilation and operating assembly of the kind mentioned in the introduction with respect to security and ease of operation.

**[0010]** This and further objects are met by the provision of a ventilation and operating assembly which is further characterized in that the locking device is connected with the handle portion in such a way that the locking device automatically takes the locking position when the ventilation and operating assembly is in its closed position and is at least semi-automatically released when the handle portion is operated.

**[0011]** Thereby, an automated and secure locking of the ventilation and operating assembly is achieved, which prevents unauthorized access from the outside, while at the same time maintaining the ease of operating the assembly.

**[0012]** Further presently preferred embodiments and further advantages will be apparent from the following detailed description and the dependent claims.

**[0013]** The invention will be described in more detail below by means of a non-limiting example of an embodiment and with reference to the schematic drawing, in which

Fig. 1 shows a perspective view of a window with a ventilation and operating in an embodiment corresponding to a prior art window according to parts of the invention;

Fig. 2 shows a perspective view of a prior art window with a ventilation and operating assembly taking along line X-X of Fig. 1;

Fig. 3 shows a cross-sectional view of the prior art window in Fig. 2, where some parts have been removed;

Fig. 4 shows a cross-sectional view of Fig. 1, taken along the line X-X, where the ventilation and operating is seen from behind;

Fig. 5 shows a more detailed cross-sectional view of the ventilation and operating assembly corresponding to Fig. 4;

Fig. 6 is a cross-sectional view along a line corresponding to line X-X in Fig. 1 according to an embodiment of the invention where the locking device is in an open position, and

Fig. 7 is a cross-sectional view along the line corre-

sponding to line X-X in Fig. 1 according to an embodiment of the invention, where the locking device is in a locked position.

**[0014]** In the drawings, in particular referring to Fig. 1, is shown an example of a prior art ventilation and operating, in which no locking device has been incorporated. The window shown in Fig. 1 comprises a stationary frame 1 and a sash 2 carrying a pane 3. The stationary frame 1 has, in a manner known *per se*, a bottom member, a top member, and two side members, which together define a frame plane, and the sash 2 has, in a corresponding manner, a bottom member, a top member, and two side members encasing the pane 3 and defining a sash plane. The sash 2 is connected to the frame 1 by means of a set of hinges (not shown). Only the top member of the frame 1 and the top member of the sash 2 will be referred to in further detail. The window may for instance be a roof window to be built into an inclined roof surface (not shown). At the top of the window, in Figs 1 and 2 represented by a top member 1 a of the frame 1 and a top member 2a of the sash 2, an operating and ventilation assembly 10 is provided.

**[0015]** In more details Fig. 2 shows a cross-sectional view of the prior art window of Fig. 1, where it is seen how in a manner known *per se* the ventilation and operating assembly 10 is connected to a top member 2a of the sash 2 and the top member 1 a of the frame 1. It is known that the ventilation and operating assembly 10 functions to provide both ventilation and opening/closing of the sash 2 relative to the frame 1. However, it is conceivable to have the ventilation and operating assembly as providing ventilation only.

**[0016]** The ventilation and operating assembly 10 of Figs 2 and 3 comprises three main portions, namely a closure portion, a handle portion and a portion connecting the handle with the closure portion. Starting from the left-hand side of Fig. 3, which is the side intended to face the interior of the room of the building into which the window is installed, the handle portion 11 is connected to the portion 12 connecting the handle portion with the closure portion via a first transition section 13. In turn, the portion 12 is connected to the closure portion formed by an upper section 14 and a lower section 18 via a second transition section 16. The closure portion composed by lower section 18 and upper section 14 forms a substantially plane inner side facing a ventilation aperture generally designated 50 (cf. Fig. 2).

**[0017]** A resilient or soft foam in the form of a sealing plate 31 ensures tightness of the structure when the ventilation and operating assembly is closed. At a first end edge 19 of the closure portion 14, 18, a hinge part for connection of the ventilation and operating assembly 10 to the sash 2 is provided in that a channel (not shown) formed by an upstanding rim 19a, receives an enlarged section 20 of a sash hinge part 21 connected to the sash top member 2a. At the opposite end of the closure portion 14, 18, a second end edge 15 is provided.

**[0018]** Further shown in Fig. 3 is a lock mechanism 30 which is arranged in connection with the closure portion 14, 18 and the sash top member 2a. The lock mechanism 30 is of a type known *per se* and may be formed as described in WO 2012/034558 A1.

**[0019]** Thus, as shown in more detail in Figs. 4 and 5, the lock mechanism 30 comprises a housing 32, a locking arm 33 movable in a track in the housing and two upstanding pawls 34 cooperating with a striking plate 40 mounted on the frame top member 1 a. The housing 32 of the lock mechanism 30 is attached to the sash top member 2a through engagement means represented by a pin 22. Furthermore the locking arm 33 of the housing is attached to the sealing plate 31 of the ventilation and operating assembly 10 through engagement means, such as screws.

**[0020]** Especially seen on Fig. 5 the upstanding pawls 34 of the lock mechanism 30, provided on each side of the locking arm 33, is protected by the striking plate 40, which is connected with the top frame member 1a. The striking plate 40 not only protects the upstanding pawls 34, but also creates a supported guidance of the upstanding pawls 34 when the lock mechanism 30 is operated. In this way an operation of the handle 11 in a direction downwards creates a pull in the locking arm 33 of the lock mechanism 30 in a direction towards the handle portion 11. This movement activates the upstanding pawls 34 such that they slide in a guided manner in a track 41 in the lock mechanism 30 along a surface 42 of the striking plate 40. In this way a controlled movement of the upstanding pawls 34 is achieved. The movement of the locking arm 33 thereby activates the upstanding pawls 34, which in turn cooperate with inner mechanism of the lock mechanism 30 as described in applicants application WO 2012/034558 A1 in order to move the lock mechanism between the operating positions thereof.

**[0021]** Parts of this prior art ventilation and operating assembly corresponds to the present invention, and only parts differing from this will be described in more detail. Parts having the same or analogous function are denoted with the same reference numerals, to which 100 has been added.

**[0022]** Referring now to Figs 6 and 7, showing an embodiment of the invention, the prior art ventilation and operating assembly mentioned above have been further developed to include a locking device 60.

**[0023]** In comparison with the prior art, starting from the left in Fig. 6, the rounded end edge 111 a of the handle portion 11, is provided with an aperture 11 b. Furthermore a hinge part 121 of the ventilation and operating assembly is provided with a leg 122 extending towards the bottom of the sealing plate 31, where the leg 122 further extends perpendicular thereto, forming an abutment surface 123. The abutment surface 123 is arranged to extend the width of the first end edge 19 in such a way that it forms at part of the closure portion 14, 18 of the handle. The abutment surface 123 is provided with a groove 124, which as such forms part of the closure portion 14, 18. The aperture 11

b of the rounded end edge 111 a forms a first hinge connection with the enlarged section 20 of the sash hinge part 121.

**[0024]** The locking device 60 of the embodiment comprises a rail member 61 having an outer portion 67 intended to face the handle portion 11, a middle portion 62, which extends in a line along with the portion 12 of the handle portion 11 and an inner portion 63, intended to face the closure portion 14, 18, where the inner portion 63 substantially extend in parallel with the closure portion 14, 18. In one end of the rail member 61 the rail member 61 comprises an engagement element 64 and in the opposite end it comprises a hook portion 65.

**[0025]** With this configuration of the locking device 60 the engagement element 64 of the rail member 61 is arranged to hingedly engage with the aperture 11 b provided in the rounded edge 111 a, and the hook portion 65 of the rail member is arranged to be realisable engaged with the groove 124, when the locking device is operated from a locking position to a released position.

**[0026]** Furthermore the inner portion 63 of the rail member forms a stepped profile 66 with the middle portion 62 of the locking device 60. As is seen in Figs 6 and 7, when incorporating the locking device 60 in the handle portion 11, a space 70 between the stepped profile 66 and an upper abutment surface 18a of the closure portion 18 is formed. In this space 70 a force creating element providing a bias is inserted. The force creating element is inserted so as to create a bias when the locking device is activated to be moved from a locking position to a released position. This element may as shown be a compression spring 80; however other elements creating a biased force are also conceivable, for instance a leaf spring etc.

**[0027]** With this configuration the locking device is operated as follows. When a user grips the handle portion 11 on its inner side, in which the locking device 60 with its rail member 61 is incorporated, the rail member 61 is pressed against the inner side of the handle portion 11. As a result thereof a pivot movement of the engagement means 64 in the aperture 11 b of the end edge 111 a of the handle portion 11 is created, resulting in a release of the hook element 65 from the groove 124 of the closure portion 14, 18, thereby opening the locking device 60. By a further continuous grip in the handle portion 11 and the now released locking device 60, the handle portion 11 can be pivoted around the hinge connection provided by the first end edge 19 and the enlarged section 20 of the sash hinge part 121, whereby the ventilation and operating assembly 10 is opened to a ventilation position.

**[0028]** A following release of the handle portion 11 by the user causes the locking device 60 to return automatically to a locking position, independently from the handle portion 11, due to the force of the spring 80.

**[0029]** Further when closing the ventilation and operating assembly 10 a user may grip the handle portion 11 at any spot on the inner side of the handle portion 11, for example on the rounded end edge 111 a. This simple

handling when closing the operating and ventilation assembly 10 is obtained due to the specific arrangement of the hinge connection 19a, 20, where the specific rounded geometry of the hook portion 65 is adapted to a rounded geometry groove 124, which together with the spring 80 result in a pivot movement of the hinge connection 111 a, 64 of the handle portion 11 and the locking device 60 creating a movement of the hook portion 65, which engages with the groove 124, that is a semi-automatic release is obtained.

**[0030]** With this arrangement, the locking device 60 will in a locked position provide the ventilation and operating assembly with an improved security, and ease of operation when opening the assembly and/or the entire window.

**[0031]** The overall configuration of the ventilation and operating assembly is as follows. In Fig. 4 it is seen how the connection portion 12 is connected to the closure portion 14, 18 at or near the second end edge 15.

**[0032]** By the term "at or near" is to be understood that the connection portion 12 is displaced upwards relative to the center. Measured in relation to the total height  $h$  of the closure portion, the displacement from the center may be expressed as a relative distance. For instance, the connection portion 12 is connected to the closure portion 14, 18 at a distance  $a$  from the second end edge 15 not exceeding 30% of the height  $h$  of the closure portion. In absolute numbers, the distance may be expressed as the connection portion 12 is provided in a position lying in the interval ranging from 0 to 20 mm from the second end edge 15 of the closure portion, preferably 10 to 15 mm. In the embodiment shown, the connection portion 12 is connected to the closure portion 14, 18, by the second transition section 16, at approximately 11 mm from the second end edge 15. The height  $h$  typically lies in the interval 40 to 60 mm, preferably 45 to 55 mm, and in the embodiment shown, the height is approximately 47 mm. The relative distance  $a/h$  thus amounts to approximately 23%.

**[0033]** The depth  $d$  of the ventilation and operating assembly will be chosen to lie in the interval 25 to 45 mm, preferably 30 to 40 mm, more preferably approximately 35 mm. In the embodiment shown, the depth  $d$  is approximately 37 mm. The depth  $d$  is preferably chosen such that the entire ventilation and operating assembly lies within the perimeter, i.e. the boundaries of the window frame 1 and does not protrude beyond the frame members. Confer in this regard in particular Fig. 4. This is particular advantageously during transportation, where the handle portion 11 in this way is located as close to the sash as possible in order to reduce the space needed for packaging, but also to prevent damage of the handle portion itself or of other parts. Thus dimensioning of the parts relative to each other should be chosen such that the depth  $d$  is sufficiently low, while still allowing a user to introduce his or her fingers in the space between the inner side of handle portion 11 and the outer side of lower section 18 of the closure portion.

**[0034]** Furthermore with this design, a window is provided with a handle portion 11, which does not extend beyond the depth h of the window frame when installed, and thereby does not take up unnecessary space in the room.

**[0035]** The shape of the ventilation and operating assembly 10 may in principle be chosen to fit the particular window, and different shapes and dimensions for various windows is conceivable, as long as the principle of displacing the connection portion upwards is adhered to.

**[0036]** The overall configuration of the closure portion 14, 18 and the connection portion 12 may be chosen to form a substantially L-shaped structure, the handle portion 11 constituting only a minute gripping means. However, in the shown and preferred embodiment, the handle portion 11 extends substantially in parallel with the closure portion 14, 18 to form a substantially U-shaped overall structure. At the free end edge, the handle portion 11 comprises a rounded edge 11 a in the embodiment shown to increase comfort of use.

**[0037]** In order to preserve the comfort of the handle portion while having a locking device incorporated the locking device 60 substantially follows this overall L-shaped and U-shaped structure described above.

**[0038]** Although the main components of the ventilation and operating assembly according to the invention may be formed as individual elements to be connected with each other, it is preferred that the closure portion 14, 18, the connection portion 12 and the handle portion 11 are integral. This may be obtained by moulding or extrusion or any other suitable technique, and of any material. Preferably however, the assembly is provided as an extruded profile of a metal material such as aluminium.

**[0039]** It should be noted that the above description of preferred embodiments serves only as an example, and that a person skilled in the art will know that numerous variations are possible without deviating from the scope of the claims.

## Claims

1. A ventilation and operating assembly for bringing a sash from an open position to a closed position and vice versa relative to a frame of a window, comprising a closure portion (14,18) having an inner side and an opposite outer side, a first end edge (19) including a hinge part for connection to the sash and an opposite second end edge (15), a handle portion (11) including a portion (12) connecting the handle portion (11) with the closure portion (14, 18), and a locking device (60) movable between a locking position and a release position,  
**characterized in that**  
the locking device (60) is connected with the handle portion (11) in such a way that the locking device (60) automatically assumes the locking position when the ventilation and operating assembly is in its

closed position and is at least semi-automatically released when the handle portion (11) is operated.

2. A ventilation and operating assembly according to claim 1, wherein the locking device (60) comprises a rail member (61) connected hingedly to one end of the handle portion (11) and having at its opposite end a hook element (65) for engagement with a groove portion (124) on the closure portion (14, 18) in the locking position.
3. A ventilation and operating assembly according to claim 2, wherein the hook element (65) of the rail member (61) is adapted to be lifted out of engagement with the groove portion (124) against the bias from a spring.
4. A ventilation and operating assembly according to claim 2, wherein the rail member (61) of the locking device (60) comprises an outer portion (67) intended to face the handle portion (11), a middle portion (62) extending substantially in parallel with the portion (12) of the handle portion (11) and an inner portion (63) intended to face the closure portion (14, 18) of the handle portion (11), the inner portion (63) extending substantially in parallel with the closure portion (14, 18).
5. A ventilation and operating assembly according to claim 2 to 4, wherein the outer portion (67) of the rail member (61) at an end comprises an engagement element (64) and the inner portion (63) at an end comprises the hook portion (65).
6. A ventilation and operating assembly according to claim 4, wherein the inner portion (63) forms a stepped profile (66) with the middle portion (62) of the locking device (60).
7. A ventilation and operating assembly according to claim 1, wherein the portion (12) is connected to the closure portion (14, 18) at a distance (a) from the second end edge (15) not exceeding 30% of the dimension (h) of the closure portion in the height direction.
8. A ventilation and operating assembly according to claim 1, wherein the portion (12) is provided in a position lying in the interval ranging from 0 to 20 mm from the second end edge (15) of the closure portion, preferably 10 to 15 mm.
9. A ventilation and operating assembly according to claim 7, wherein the height (h) lies in the interval 40 to 60 mm, preferably 45 to 55 mm.
10. A ventilation and operating assembly according to any one of the preceding claims, wherein the dimen-

sion ( $d$ ) in the depth direction of the assembly lies in the interval 25 to 45 mm, preferably 30 to 40 mm, more preferably approximately 35 mm.

11. A ventilation and operating assembly according to any one of the preceding claims, wherein the closure portion (14, 18) and the portion (12) form a substantially L-shaped structure, and the locking device (60) substantially follows the L-shaped structure of the closure portion (14, 18). 5 10
12. A ventilation and operating assembly according to claim 1, wherein the handle portion (11) extends substantially in parallel with the closure portion (14, 18) to form a substantially U-shaped overall structure, and the locking device (60) substantially follows this overall U-shaped structure. 15
13. A ventilation and operating assembly according to any one of the preceding claims, wherein the closure portion (14, 18) forms an angle with the sash structure, said angle being preferably in the interval 5 to 15°, more preferably 8 to 12°. 20
14. A ventilation and operating assembly according to any one of the preceding claims, wherein the handle portion (11) in the one end comprises a rounded edge (11 a, 111 a). 25
15. A ventilation and operating assembly according to claim 14, wherein the rounded edge (11 a, 111 a) of the handle portion (11) comprises an aperture (11 b). 30
16. A ventilation and operating assembly according to any one of the preceding claims, wherein the closure portion (14, 18), the portion (12) and the handle portion (11) are integral, preferably as an extruded profile of a metal material. 35

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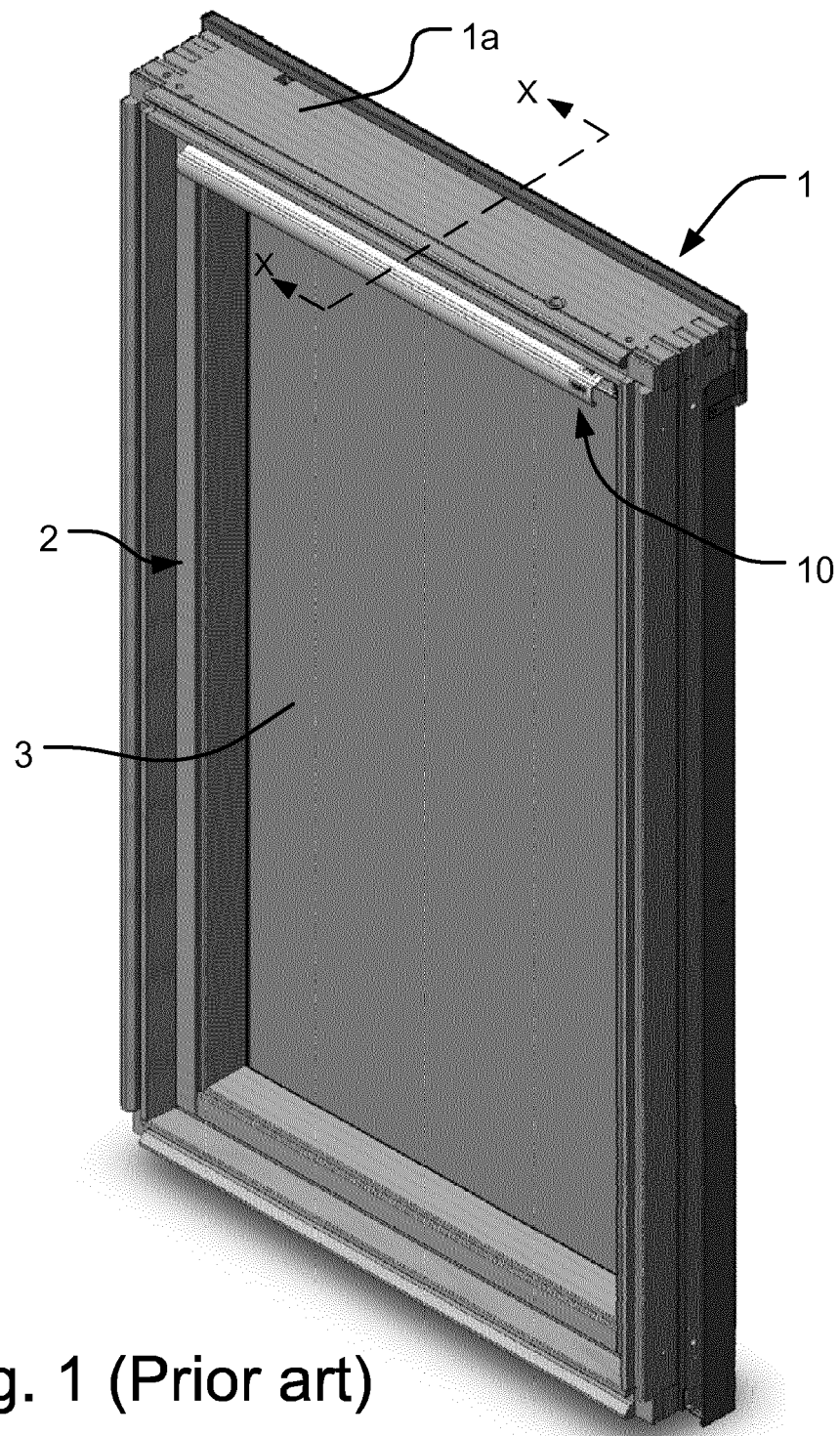
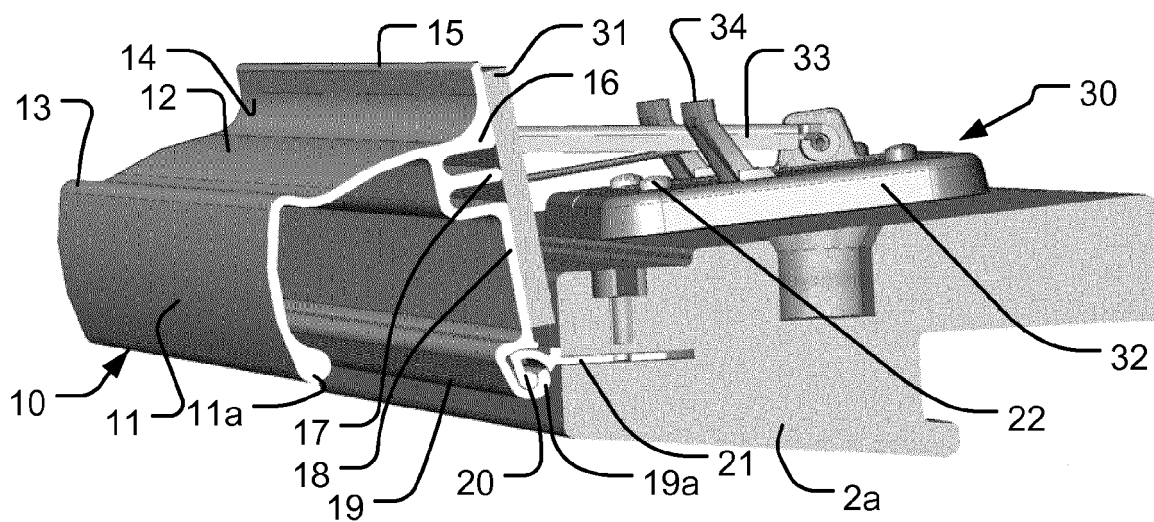
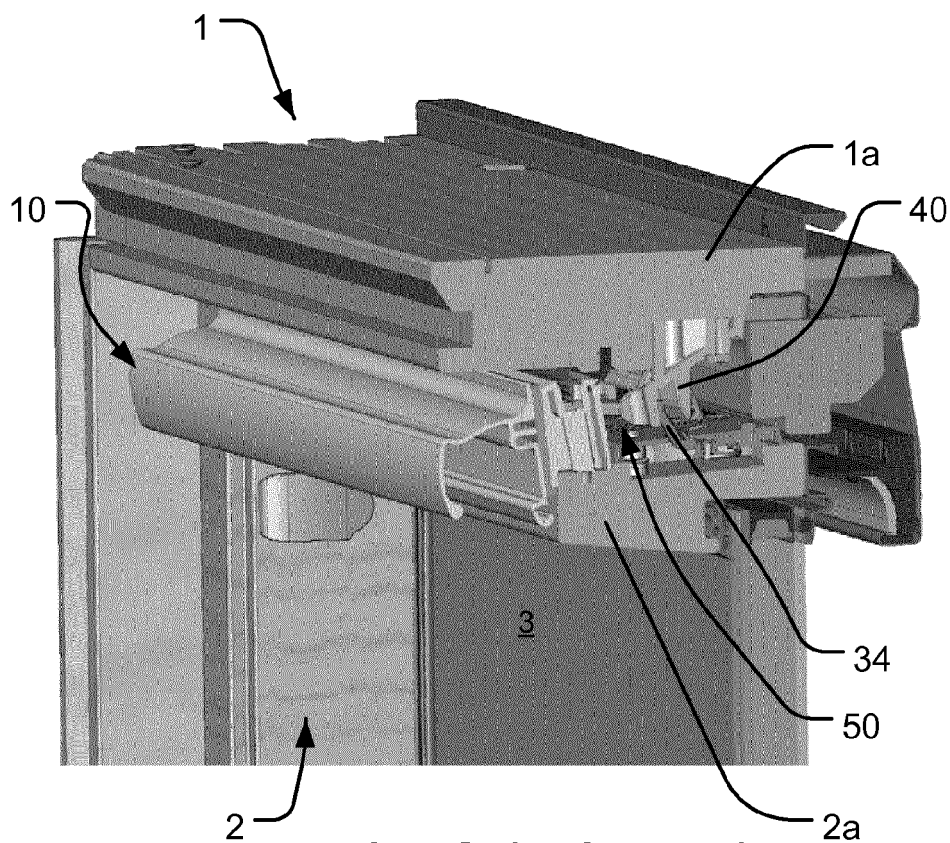


Fig. 1 (Prior art)





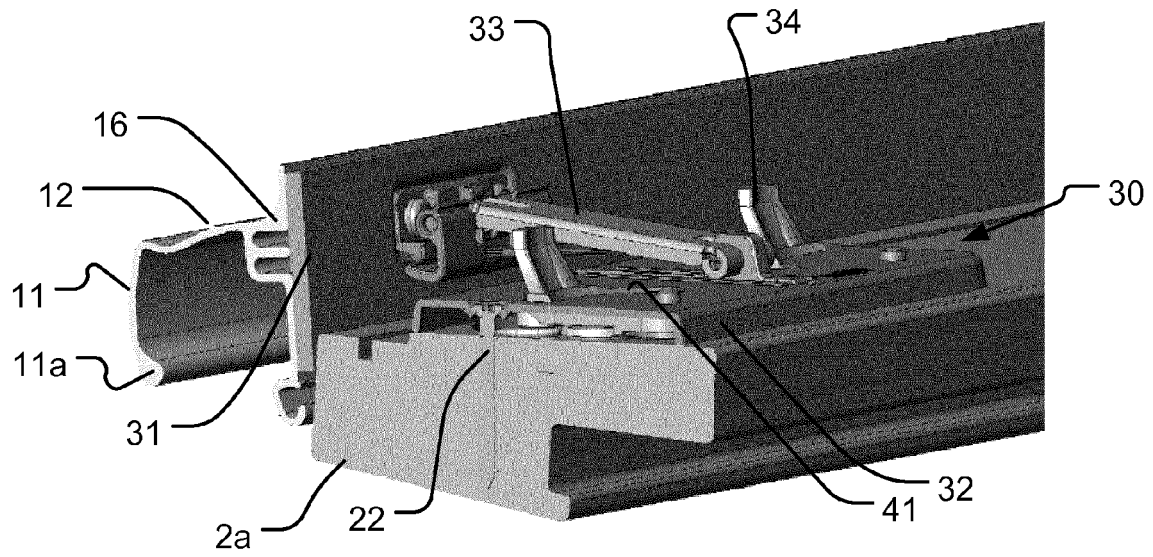


Fig. 4 (Prior art)

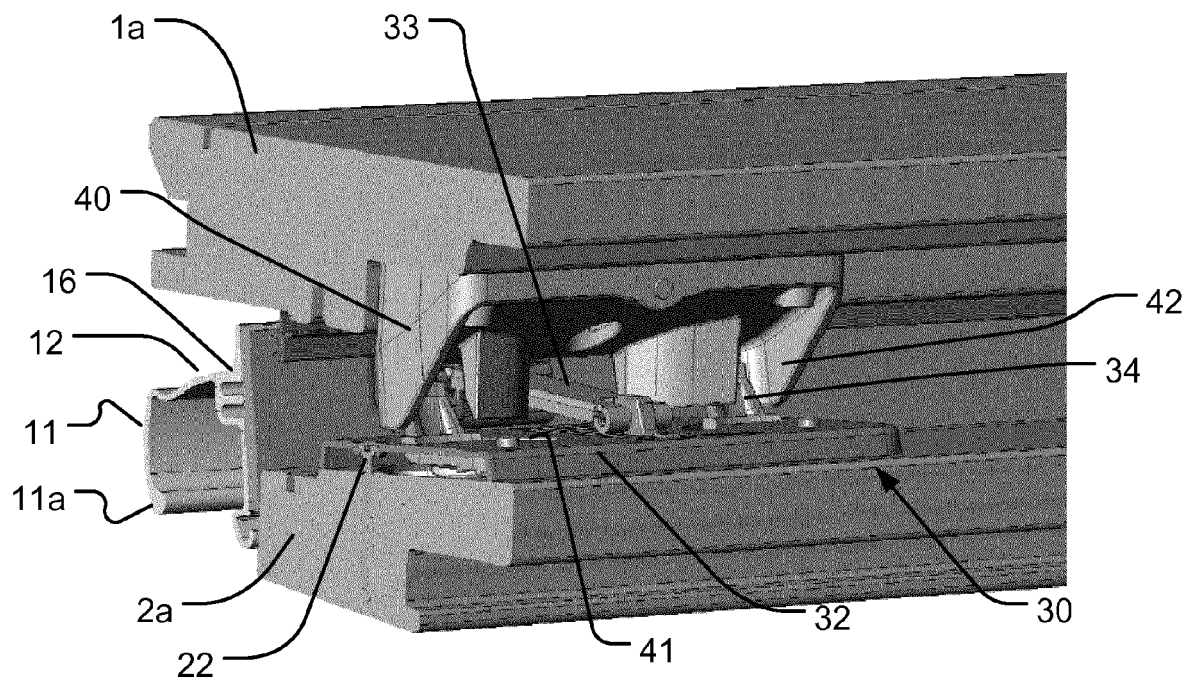


Fig. 5 (Prior art)

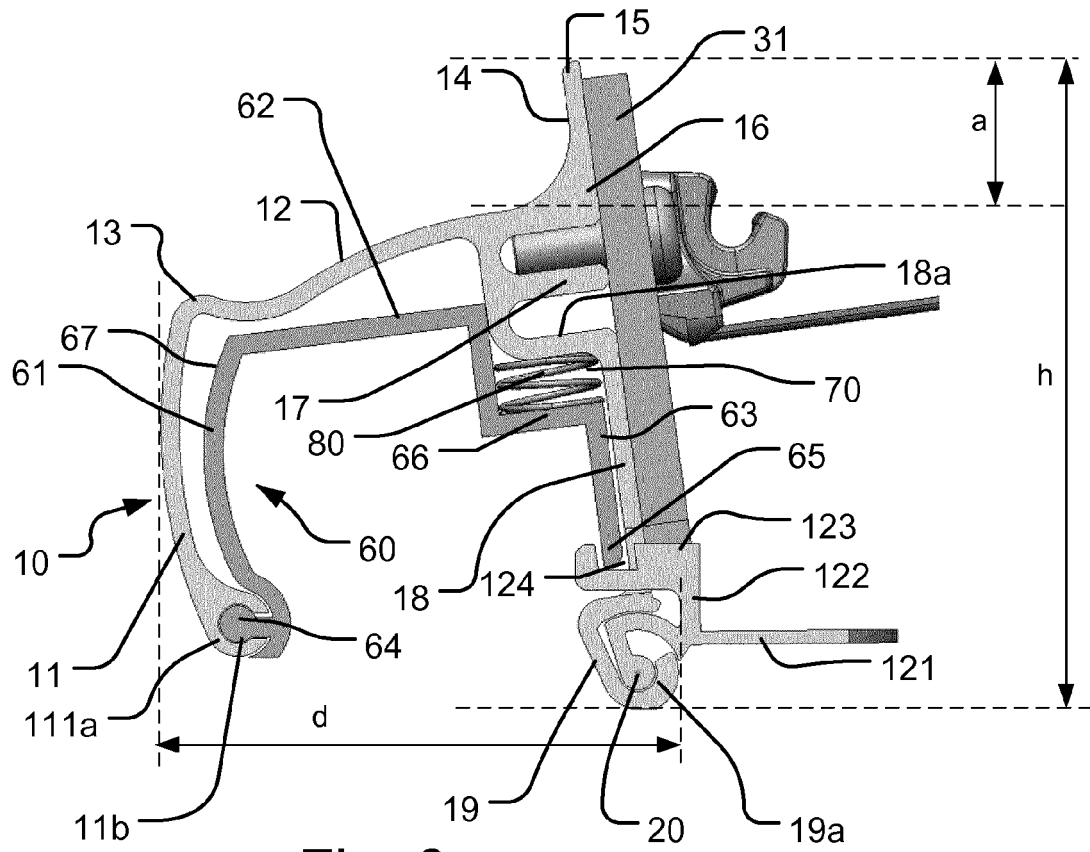


Fig. 6

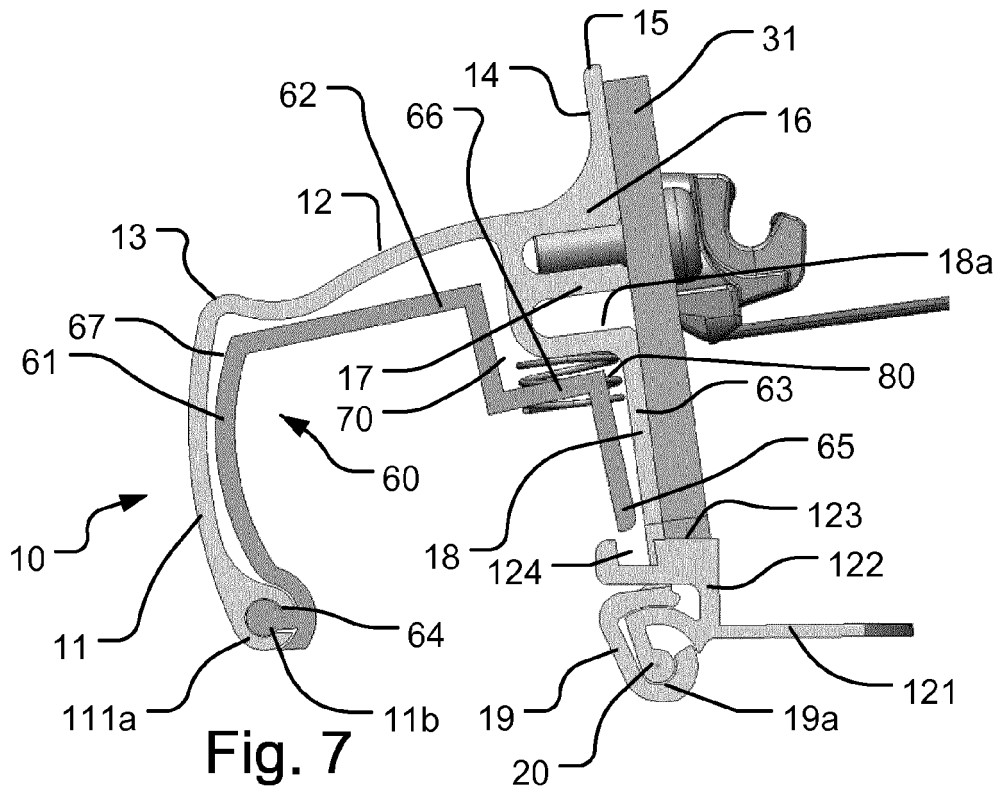


Fig. 7



## EUROPEAN SEARCH REPORT

Application Number  
EP 15 15 7138

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A	* page 9, line 14 - page 10, line 6 * * page 12, line 23 - page 14, line 9; figures 2-4, 6-8 *	2-16	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E06B E05B
Place of search		Date of completion of the search	Examiner
Munich		31 July 2015	Weißbach, Mark
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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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 15 15 7138

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

**REFERENCES CITED IN THE DESCRIPTION**

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