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(54) **LOCKING SYSTEM, SAFETY LOCK AND METHOD FOR OPENING AND CLOSING AN ELEMENT**

(57) A locking system (1) for an openable and closable element (2) which system comprises a safety lock (8) on the edge of the element (2) and a locking member (9) on its opposite edge and a tensile stress conveying member (10) between the safety lock (8) and the locking member (9). The safety lock (8) comprises a turning member (11) for opening and closing the locking of the safety lock (8) and the locking member (9) and a locking part (12) arranged to move between the open and closed positions, which locking part (12) is arranged to prevent the motion of the turning member (11) the locking part (12) being in the closed position and to allow the motion of the turning member (11) the locking part (12) being in the open position. The locking system (1) is arranged in the open position of the locking part (12) to allow the motion of the turning member (11), whereby the tensile stress conveying member (10) turns at least partially inside the safety lock (8) thus opening the locking of the safety lock (8) and the locking member (9).

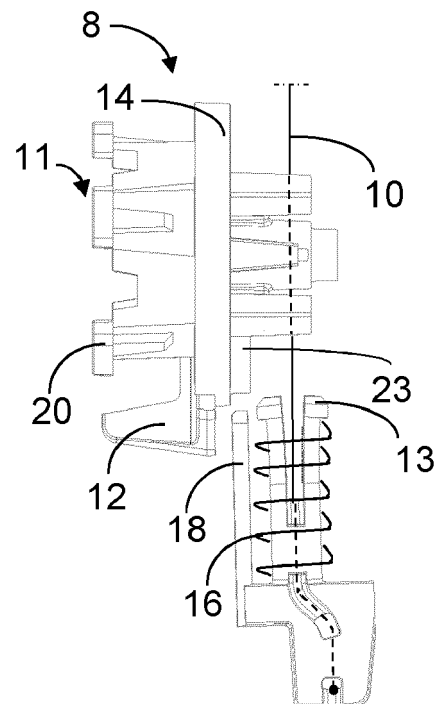


Fig. 3b

Description

Background of the invention

[0001] The invention relates to a locking system for an openable element. Particularly, the invention relates to a safety lock used in locking the openable element and a method related to the locking of the element.

[0002] Terrace glazing extending from floor to ceiling, balcony glazing on top of a balcony railing or glazing forming at least a part of an exterior wall are some examples of structures or arrangements which can comprise one or more elements which are openable. Such an arrangement usually includes a bottom guide located in connection with the bottom part of the elements and a top guide located in connection with the top part of the elements for supporting the top part of the elements and transferring the elements on the top part of the elements. The arrangement usually also comprises a locking system installed in the guides which includes locks fastened on the top and bottom edge of the element and a tensile stress conveying member, such as a cable, a belt or a bar. Additionally, the locking system comprises a turning knob which simultaneously controls the locks of the top and bottom edge into the closed and the open position by means of the tensile stress conveying member.

[0003] The above systems can be installed on balconies, patios or other spaces which are located in e.g. blocks of flats, schools, service flats, residential care homes, nursing homes for those with memory disease or other public facilities. The locking system is easy to open, just by turning the knob, and thus it is not a very safe arrangement for families with children or in environments including many elderly people or people with memory disease.

Brief description of the invention

[0004] An object of the invention is to provide a novel type of a lock, locking system and method so as to enable the solving of the above-mentioned problems. The object of the invention is achieved by a safety lock, a system and a method which are characterized by what is disclosed in the independent claims. Some preferred embodiments of the invention are disclosed in the dependent claims.

[0005] The invention is based on a new idea, in which, a method, a system and a safety lock comprising a locking part operating as a childproof lock have been developed. This locking part moves between the open and locked positions preventing the turning member from moving when the locking part is in the locked position and allowing the turning member to move when the locking part is in the open position.

[0006] An advantage of the method, system and safety lock according to the invention is that the locking part prevents the opening of the element, such as balcony glazing, solely by turning the turning member. In the ar-

rangement according to the invention, the locking part being in connection with the turning member must be first pressed home, after which, the turning member can be turned. The turning of the turning member releases the locking of the element, whereby the element can be opened. Such an opening system is easy for an adult to open by one hand but difficult to open for a child, a person with memory disease or an elderly person, which protects them from climbing out and running away. An advantage of this arrangement is also that the locking part is close to the turning member, whereby the locking part can be pressed home by one finger and the same hand can be used for turning the turning member.

Brief description of the drawings

[0007] The invention will now be described in closer detail in connection with preferred embodiments and with reference to the accompanying drawings, in which

Figure 1 is a schematic front view of an arrangement according to an embodiment;

Figure 2 is a schematic front view diagonally down of a safety lock according to an embodiment;

Figure 3a shows a schematic rear view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the locked position;

Figure 3b shows a schematic side view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the locked position;

Figure 3c shows a schematic front view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the locked position;

Figure 4a shows a schematic rear view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the open position;

Figure 4b shows a schematic side view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the open position;

Figure 4c shows a schematic front view of a cross section of the safety lock in accordance with Figure 2 the locking part being in the open position;

Figure 5 shows a method for opening and closing an element by means of a locking system;

Figure 6a is a schematic rear view of a safety lock according to an embodiment; and

Figure 6b is a schematic rear view of a safety lock according to an embodiment.

Detailed description of the invention

[0008] Figure 1 schematically shows an arrangement which can constitute, for example, balcony glazing on top of a balcony railing, terrace glazing extending from floor to ceiling or glazing forming at least a part of an exterior wall. The arrangement can comprise one or more elements 2 which can be opened and closed.

[0009] The arrangement according to Figure 1 com-

prises two elements 2 installed on the same line side by side in the horizontal direction. The elements 2 can be glass elements. Each element 2 comprises a plate 3 and a bottom moulding 4 on the bottom edge of the plate 3 for setting the element 2 to be supported by a bottom guide or rail 5 included in the arrangement. The plate 3 can be manufactured of transparent or non-transparent material, such as glass, plastic or some other suitable material. The top edge of each plate 3 further contains a top moulding 6 for supporting the top part of the element 2 to a top guide 7 included in the arrangement. The top guide 7 located into connection with the top part of the elements 2 enables the supporting of the top part of the elements 2 and the transferring of the elements 2 on the top part of the elements 2.

[0010] The arrangement in accordance with Figure 1 can additionally comprise a locking system 1 for the openable and closable element 2 which system comprises a safety lock 8 on the edge of the element 2 and a locking member 9 on its opposite edge and a tensile stress conveying member 10 between the safety lock 8 and the locking member 9. The tensile stress conveying member 10 can be e.g. a cable, a strap, a string, a wire, a fibre string or a rig fibre. The safety lock 8 can be located in the bottom part of the element 2 and it can be fastened to the bottom moulding 4, e.g. at its bottom. The locking member 9 can be located in the top part of the element 2 and it can be fastened to the top moulding 6, e.g. on its top surface. The locking member 9 can be e.g. a pin lock which comprises a pin and an automatic return member, such as a spring. The automatic return member tries to keep the pin up in the locking position in connection with the top guide 7 thus locking the top end of the element 2 in place. The locking member 9 can be opened by pulling the tensile stress conveying member 10 being fastened to the locking member 9, advantageously a pin, whereby the pin moves to the open position and the automatic return member compresses and opens the locking of the top end of the element 2. In Figure 1, the pin can press downwards from the effect of the pulling motion. When the pulling motion is stopped from the tensile stress conveying member 10, the pin returns automatically to the locking position, e.g. upwards in accordance with Figure 1, by means of the automatic return member.

[0011] Figure 2 is a schematic front view diagonally down of a safety lock 8 according to an embodiment, which lock can be used e.g. in an arrangement in accordance with Figure 1 for opening and closing the locking of the element 2. The safety lock 8 is installed in the system in accordance with Figure 1 such that it can be inside the bottom moulding 4 of the element 2 e.g. in balcony glazing, whereby the element can be opened from inside the balcony. The safety lock 8 comprises a body 17 and a bolt 13 operationally connected to the body 17 to lock the element 2 in place to the bottom guide 5. The safety lock 8 further comprises a turning member 11 fastened to the body 17 for opening and closing the locking of the bolt 13 of the safety lock 8. The turning member 11 can

be fastened to the body 17 rotatably. According to an embodiment, the rotatable turning member 11 comprises a body 14 of the rotatable turning member 11 (Figure 3) and a grip surface 20 of the knob. The grip surface 20 is a soft part which is pressed on top of the body 14 of the turning member 11. The grip surface covers part of a locking part 12 and an automatic return member 15 of the locking part 12 and it is nice to use. The turning member 11 is located at the front of the safety lock 8, whereby it is easy to turn e.g. from inside a balcony. According to an embodiment, the turning member 11 is able to turn around its axis in both directions. i.e. in the case in accordance with the figure, it is possible to turn the turning member 11 both clockwise and anticlockwise according to arrows 19. The turning member 11 can be e.g. a knob or a handle. The safety lock 8 also comprises a locking part 12 fastened to the body 14 of the turning member 11 arranged to move between the open and the closed positions. The locking part 12 can be fastened to the body 14 of the turning member 11 slidably. The locking part 12 can be a lock preventing the motion, such as turning, of the turning member 11. The body 14 of the rotatable turning member 11 also comprises an automatic return member 15 of the locking part 12. The safety lock 8 and the locking element 9 of the locking system 1 can be arranged to be opened by pressing the locking part 12 home and by simultaneously turning the turning member 11. The locking system 1 can also be arranged to return the opened safety lock 8 and the locking element 9 automatically to the locked position. If the locking part is located on the side of the turning member 11, the automatic return member 15 of the locking part 12 is then horizontal, whereby the turning member 11 and the automatic return member 15 of the locking part 12 move in the horizontal direction. The locking part 12 can be located in any direction in relation to the turning member 11, whereby the automatic return member 15 of the locking part 12 can be located correspondingly in the same direction.

[0012] The locking part 12 can be arranged to prevent the motion of the turning member 11 the locking part 12 being in the locked position i.e. closed and to allow the motion of the turning member 11 the locking part 12 being in the open position. The locking system 1 can be arranged in the open position of the locking part 12 to allow the motion of the turning member 11, whereby the tensile stress conveying member 10 turns at least partially inside the safety lock 8 thus opening the locking of the safety lock 8 and the locking member 9 simultaneously for opening and locking the element 2.

[0013] The locking part 12 can operate as a childproof lock thus increasing safety e.g. on glazed balconies. The locking part 12 can be located just in the immediate vicinity of the turning member 11, e.g. at the base of the turning member 11. This enables the possibility of pressing the locking part 12 home by one finger and of turning the turning member 11 simultaneously by the same hand, whereby the locking opens. This way, an adult can open

the locking easily by one hand but, for a child, an elderly person or a person with memory disease, it is difficult. In Figure 2, the locking part 12 is in the locked position, whereby it is visible outside as an extension outside the turning member 11. In the locked position, the locking part 12 prevents the moving or rotating of the turning member 11 into any direction, whereby the safety lock 8 remains locked. As seen from Figure 2, the extension of the locking part 12 extends from an opening of the body 17 outside of it in the locked position. The body 17 comprises a slot into which the locking part 12 fits in the locked position, which prevents the rotational motion of the locking part 12, whereby the turning member 11 remains in place and it cannot be rotated. When opening the safety lock 8, the locking part 12 can be pressed to the open position, i.e. in the case according to Figure 2 upwards, whereby the locking part 12 is pressed inside the body 17 thus enabling the turning of the turning member 11 and the opening of the safety lock 8. When the turning member 11 is released, it tries to return in its place in the slot by means of the automatic return member of the locking member 9, the automatic return member 16 of the bolt 13 (Figure 3a), the automatic return member 15 of the locking part 12 (Figure 3c) and the design of the slot.

[0014] Figure 3a shows a schematic rear view of a cross section of the safety lock 8 in accordance with Figure 2 the locking part 12 being in the locked position. This means that, when using e.g. the balcony glazing in accordance with Figure 1, the rear part of the safety lock 8 is directed towards the outside of the balcony. Figure 3b shows a schematic side view of the cross section of the safety lock 8 in accordance with Figure 2 and Figure 3c shows a schematic front view of the cross section of the safety lock 8 in accordance with Figure 2. In Figure 3c, the front part of the safety lock 8 is visible from inside the balcony. The body 17 and the gripping surface 20 shown in Figure 2 have been removed from Figures 3a-3c for clarity. The safety lock 8 shown in Figures 3a-3c can be used in the arrangement in accordance with Figure 1 which comprises the locking system 1 for the openable and closable element 2. The locking system 1 comprises the safety lock 8 on the edge of the element 2 and the locking member 9 on its opposite edge and the tensile stress conveying member 10 between the safety lock 8 and the locking member 9. The safety lock 8 comprises the turning member 11 for opening the locking of the safety lock 8 and the locking member 9. Furthermore, the safety lock 8 comprises the locking part 12 arranged to move between the open and the locked positions, whereby the locking part 12 is arranged to prevent the rotational motion of the turning member 11 the locking part 12 being the locked position i.e. closed. The locking system 1 is arranged in the open position of the locking part 12 to allow the motion of the turning member 11, whereby the tensile stress conveying member 10 transfers or moves at least partially inside the safety lock 8 thus opening the locking of the safety lock 8 and the locking member 9 for opening and locking the element 2.

[0015] Figure 3b shows how the locking part 12 can be located into connection with the turning member 11. Figure 3c shows a front view of the safety lock 8, like Figure 2, and it shows how the automatic return member 15, such as a spring, of the locking part 12 pushes the locking part 12 outwards from inside or at the base of the turning member 11, whereby the locking part 12 is normally in the locked position. Hence, part of the locking part 12 remains outside the turning member 11 and the body 17 and is, seen from the figure, below the turning member 11 preventing the turning of the turning member 11 in any direction. When the locking part 12 is in the locked position, the turning member 11 is not able to move or turn. Pulling the tensile stress conveying member 10 can cause the pressing down of the pin of the locking member 9 and the opening of the locking of the top part of the element 2. Even though the locking member 9 opened, the element 2 would still remain locked due to the safety lock 8.

[0016] The safety lock 8 additionally comprises the bolt 13 operationally connected to its body 17, around the top part of which bolt there is an automatic return member 16, such as a spring, of the bolt 13 which keeps the bolt 13 automatically in the locked position and at the bottom seen from Figure 3c. One end of the tensile stress conveying member 10 of the locking system 1 is fastened to the locking member 9, advantageously to the pin of the locking member 9, and the other end to the safety lock 8. In Figure 3a, the tensile stress conveying member 10 comes from the locking member 9 to the safety lock 8 passing through the body 17 of the safety lock 8 and making its way further through the bolt 13 and the automatic return member 16 of the bolt 13 finally to the bottom part of the bolt 13.

[0017] The tensile stress conveying member 10 is thus of one piece extending from the pin of the locking member 9 through the safety lock 8 to the bolt 13. When passing through the safety lock 8, the tensile stress conveying member 10 passes through the body 17 of the safety lock and from between pins 21 and 22 of the body 14 of the turning member 11. The pivot pins 21 are located at a distance from the centre axis of the body 14 of the turning member 11. Hence, when the turning member 11 is turned around its centre axis, the pivot pins 21 deviate the tensile stress conveying member to the side away from the straight line, such as was illustrated in e.g. Figures 3a and 4a. Then, the tensile stress conveying member 10 moves inside the body 17 and the distance between the ends of the tensile stress conveying member decreases. This pulls the pin of the locking member 9 and the bolt 13 of the safety lock 8 to the open position.

[0018] In the embodiment shown in the figures, the tensile stress conveying member 10 is arranged to rotate the middle pin 22 of the body 14 of the turning member 11. The tensile stress conveying member 10 could also be arranged to pass through the middle pin 22 i.e. linearly between the pivot pins 21, if the middle pin 22 included a hole or a slot. The middle pin 22 is useful for the struc-

ture and the bearing of the safety lock, but the structure of the safety lock 8 could also be implemented without the middle pin 22, whereby the tensile stress conveying member 10 could also pass between the pivot pins 21 linearly.

[0019] When the tensile stress conveying member 10 is of one piece through the safety lock 8 from the pin of the locking member 9 to the bolt 13, it is enough to tighten the tensile stress conveying member 10 only from one end. E.g. tightening from the top end will also affect the bolt 13. The one-piece structure in question also facilitates the centring of the pin of the locking member and the bolt 13 and gives an opportunity to adjust their location and motion simply by switching the automatic return members in connection with them.

[0020] Figure 4a shows a schematic rear view of the cross section of the safety lock 8 in accordance with Figure 3a the locking part 12 being in the open position. Figure 4b shows a schematic side view of the cross section of the safety lock 8 in accordance with Figure 3b and Figure 4c shows a schematic front view of the cross section of the safety lock 8 in accordance with Figure 3c the locking part 12 being in the open position. Similarly like in Figures 3a-3c, the safety lock 8 shown in Figures 4a-4c can be used in the arrangement in accordance with Figure 1. The locking part 12 of the safety lock 8 is arranged to move or slide between the open and locked positions and to allow the motion of the turning member 11 the locking part 12 being in the open position, whereby the tensile stress conveying member 10 turns at least partially inside the safety lock 8, such as shown in Figure 4a, thus opening the locking of the safety lock 8 and the locking member 9. It is shown in Figure 4c how the locking part 12 has been pressed by e.g. a finger inside the turning member 11, whereby it is no longer visible outside the turning member 11. Seen from Figure 3c, the locking part 12 can be pressed upwards inside the turning member 11 or at its base. After this, the turning member 11 can be turned in the desired direction i.e., seen from Figure 4c, either clockwise or anticlockwise. The locking part 12 remains inside the turning member 11 when the locking part 12 has been pressed. According to an embodiment, the locking part 12 must be held pressed inside until the turning member 11 has been turned for 15°. When the tensile stress conveying member 10 transfers at least partially inside the body 14 of the turning member 11, it is shortened and simultaneously pulls the pin of the locking element 9 and the bolt 13 of the safety lock 8 to the open position. Then, the pin of the locking element 9 presses down in the embodiment of Figure 1 and the bolt 13 of the safety lock 8 rises up and the locking being in both ends, e.g. top and bottom, of the element 2 opens, whereby the element 2 can be opened.

[0021] Figures 4a-4c show how the automatic return element 16, such as a spring, of the bolt 13 is compressed. In an embodiment, the bolt 13 further comprises a pin part 18 which prevents the bolt 13 from opening when the locking part 12 is in the locked position. If the

bolt 13 tries to open i.e. rise upwards in accordance with Figure 3b when e.g. pulling the tensile stress conveying member 10, the pin part 18 stops to a stopper 23 of the body 14 thus preventing the safety lock 8 from opening.

5 This ensures that the locking system 1 is not able to open even though the tensile stress conveying member 10 is pulled. As illustrated in Figure 4a, when turning the turning member 11, the stopper 23 turns away from the path of the pin part 18 thus enabling the motion of the bolt 13 to the open position. The widths of the stopper 23 and the pin part 18 determine how much the turning member must be turned to enable the motion of the bolt 13.

10 **[0022]** The locking member 12 and the bolt 13 of the safety lock 8 and the pin of the locking member 9 include an automatic return member 15, 16, such as a spring, which tries to return the pin of the locking member 9 and the locking part 12 and the bolt 13 of the safety lock 8 to the locked position. When the locking part 12 is released from the open position, its automatic return member 15 returns the locking part 12 to the locked position. When the turning member 11 is let go totally, the turning member 11 returns or turns back to its initial position and the tensile stress conveying member 10 is released at least partially from inside the safety lock 8 thus locking the safety lock 8 and the locking member 9. When the turning member 11 returns back to its initial locked position by turning into the opposite direction compared with the direction of the turning of the turning member 11 in the beginning, the tensile stress conveying member 10 loosens back to its original dimension thus returning the pin of the locking member 9 and the bolt 13 of the safety lock 8 to the locking position due to the automatic return members. Hence in the embodiment in accordance with Figure 1, the pin of the locking member 9 rises again up and the bolt 13 of the safety lock 8 lowers down to its original position at the bottom. The automatic return members 15, 16 in the locking part 12 and the bolt 13 of the safety lock 8 and in the pin of the locking member 9 also return to their normal position. According to an embodiment, when the turning member 11 is let go totally, the turning member 11 turns automatically back to its initial position and the tensile stress conveying member 10 is released at least partially from inside the safety lock 8 thus locking the safety lock 8 and the locking member 9. In another embodiment, the return of the turning member 11 to its original position must be helped a little by turning the turning member 11 into the opposite direction than the direction of opening the locking. If the turning member 11 needs to be helped in its return is dependent on clearances, the tension of the tensile stress conveying member 10 and the tightness of the assembly screws.

45 **[0023]** When the element 2 has been opened, it is possible to close and lock it back safely in its original position. Then, the locking part 12 of the safety lock 8 can be pressed to the open position and the turning member 11 can be turned for opening the bolt 13 of the safety lock 8 and the pin of the locking member to the open position, whereby the element 2 can be returned in its place at the

top and bottom guide 5, 7. When the turning member 11 is let go totally, the turning member 11 turns automatically or when helped back to its initial position and the tensile stress conveying member 10 is released at least partially from inside the safety lock 8 thus closing the locking of the safety lock 8 and the locking member 9.

[0024] The safety lock 8 as described above can be easily installed in existing elements and glazings.

[0025] Figure 5 shows a method for opening and closing an element 2 by means of the locking system 1 described above, which locking system 1 can comprise a safety lock 8 on the edge of the element 2 and a locking member 9 on its opposite edge and a tensile stress conveying member 10 between the safety lock 8 and the locking member 9. The safety lock 8 can comprise a turning member 11 for opening and closing the locking of the safety lock 8 and the locking member 9, which locking part 12 can move between the open and locked positions. The locking part 12 can prevent the motion of the turning member 11 the locking part 12 being in the locked position and allow the motion of the turning member 11 the locking part 12 being in the open position. In the method, the locking system 1 can allow in the open position of the locking part 12 the motion of the turning member 11, whereby the tensile stress conveying member 10 turns at least partially inside the safety lock 8 thus opening the locking of the safety lock 8 and the locking member 9.

[0026] Figure 6a shows a rear view of a safety lock 8 according to an embodiment which comprises a notch 60 in a body 17 of the safety lock 8 and a damping part 62 to be fitted to it. The damping part 62 is a damping cushion manufactured advantageously of elastic material, such as rubber, which is used for improving the damping of vibration and rattling caused by wind. Figure 6b shows an oblique schematic rear view of the safety lock 8 of Figure 6a seen diagonally from top. The safety lock 8 comprises a slot 64 in the body 17 of the safety lock 8 which slot is in the body 17 to facilitate the installation of blinds and to enable the use of the safety lock for all glass thicknesses and moulding types. The slot 64 is located at the back of the body 17 in the top part of the safety lock. The safety lock 8 shown in Figures 6a and 6b can be used in the arrangement in accordance with Figure 1 and the safety lock 8 can include characteristics shown in Figures 2-4c.

[0027] Those skilled in the art will find it obvious that, as technology advances, the basic idea of the invention may be implemented in many different ways. The invention and its embodiments are thus not restricted to the above-described examples but may vary within the scope of the claims.

Claims

1. A locking system (1) for an openable and closable element (2) which system comprises a safety lock

(8) on the edge of the element (2) and a locking member (9) on its opposite edge and a tensile stress conveying member (10) between the safety lock (8) and the locking member (9), which safety lock (8) comprises

a turning member (11) for opening the locking of the safety lock (8) and the locking member (9);

a locking part (12) arranged to move between the open and the locked positions, whereby the locking part (12) is arranged to prevent the motion of the turning member (11) the locking part (12) being in the locked position and to allow the motion of the turning member (11) the locking part (12) being in the open position; and

which locking system (1) is arranged in the open position of the locking part (12) to allow the motion of the turning member (11), whereby the tensile stress conveying member (10) moves at least partially inside the safety lock (8) thus opening the locking of the safety lock (8) and the locking member (9).

2. A locking system (1) according to claim 1, in which the safety lock (8) and the locking element (9) are arranged openable by pressing the locking part (12) home and by simultaneously moving the turning member (11).

3. A locking system (1) according to claim 1 or 2, in which the safety lock (8) additionally comprises a body (17) and a bolt (13) operationally connected to it, and the locking element (9) comprises a pin, which locking system (1) is arranged in the open position of the locking part (12) to allow the motion of the turning member (11), whereby the tensile stress conveying member (10) is of one piece extending through the body (17) of the safety lock (8) from the pin of the locking member (9) to the bolt (13) and arranged to pull the pin of the locking member (9) and the bolt (13) of the safety lock (8) to the open position.

4. A locking system (1) according to claim 3, in which a body (14) of the turning member (11) includes pivot pins (21) which are located at a distance from the centre axis of the body (14), whereby when turning the turning member (11) the pivot pins (21) deviate the tensile stress conveying member (10) making it move partially inside the safety lock (8).

5. A locking system (1) according to claim 3 or 4, which further comprises a pin (18) of the bolt (13) which is arranged in the locked position of the locking part (12) to hit a stopper (23) of the body of the turning member and thus to prevent the bolt (13) from opening.

6. A safety lock (8) for opening and closing the locking of an element (2), which safety lock (8) comprises

a body (17);
 a bolt (13) operationally connected to the body (17);
 a turning member (11) fastened to the body (17) for
 opening the locking of the bolt (13) of the safety lock
 (8); 5
 a locking part (12) fastened to the body (14) of the
 turning member (11) arranged to move between the
 open and the locked positions, which locking part
 (12) is arranged to prevent the motion of the turning
 member (11) the locking part (12) being in the locked
 position and to allow the motion of the turning mem- 10
 ber (11) the locking part (12) being in the open po-
 sition; and
 which safety lock (8) is arranged in the open position
 of the locking part (12) to allow the motion of the 15
 turning member (11) and to open the safety lock (8).

7. A safety lock (8) according to claim 6, which addi-
 tionally comprises an automatic return member (15)
 of the locking part (12) which member is arranged 20
 to return the locking part (12) to the locked position.
8. A safety lock (8) according to claim 6 or 7, which
 further comprises an automatic return member (16)
 of the bolt (13) which member is arranged to return 25
 the bolt (13) to the locked position.
9. A safety lock (8) according to any one of claims 6-8,
 which additionally comprises a pin (18) of the bolt
 which pin is arranged to prevent the opening of the 30
 bolt (13) the locking part (12) being in the locked
 position.
10. A safety lock (8) according to any one of previous
 claims, which comprises a notch (60) in the body 35
 (17) of the safety lock (8) and a damping part (62)
 to be fitted to it.
11. A safety lock (8) according to anyone of previous
 claims, which comprises a slot (64) in the body 40
 (17) of the safety lock (8) to facilitate installation.
12. A method for opening and closing an element 2 by
 means of a locking system (1), which locking system 45
 (1) comprises a safety lock (8) on the edge of the
 element (2) and a locking member (9) on its opposite
 edge and a tensile stress conveying member (10)
 between the safety lock (8) and the locking member
 (9), the safety lock (8) comprising 50
 a turning member (11) for opening the locking of the
 safety lock (8) and the locking member (9);
 a locking part (12) arranged to move between the
 open and the locked positions, which locking part
 (12) is arranged to prevent the motion of the turning 55
 member (11) the locking part (12) being in the locked
 position and to allow the motion of the turning mem-
 ber (11) the locking part (12) being in the open po-
 sition; in which method

the locking system (1) allowing in the open position
 of the locking part (12) the motion of the turning mem-
 ber (11), whereby the tensile stress conveying mem-
 ber (10) turns at least partially inside the safety lock
 (8) thus opening the locking of the safety lock (8) and
 the locking member (9).

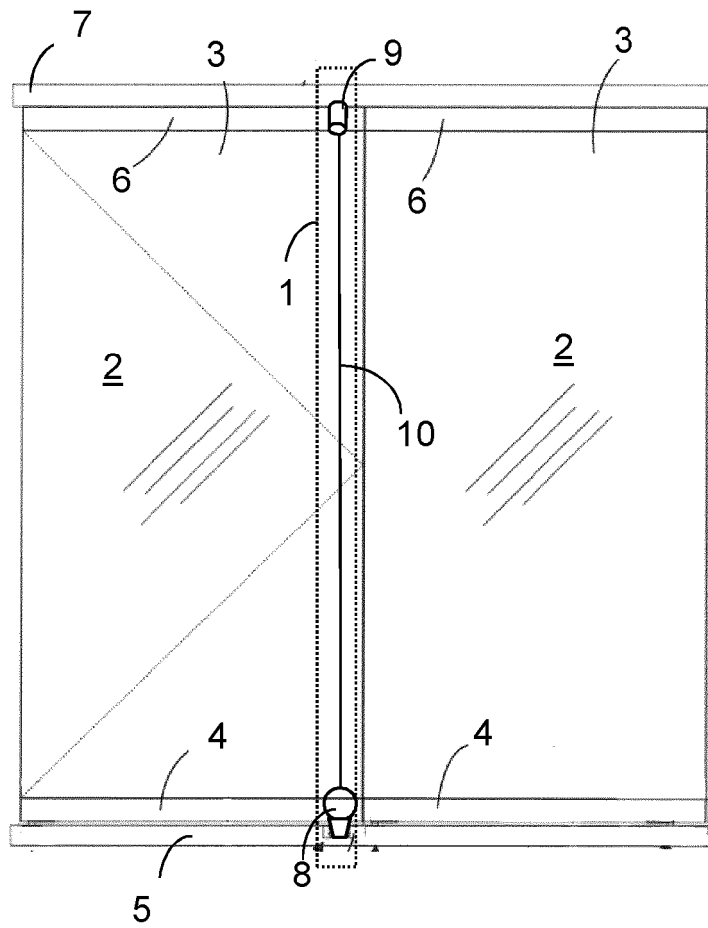


Fig. 1

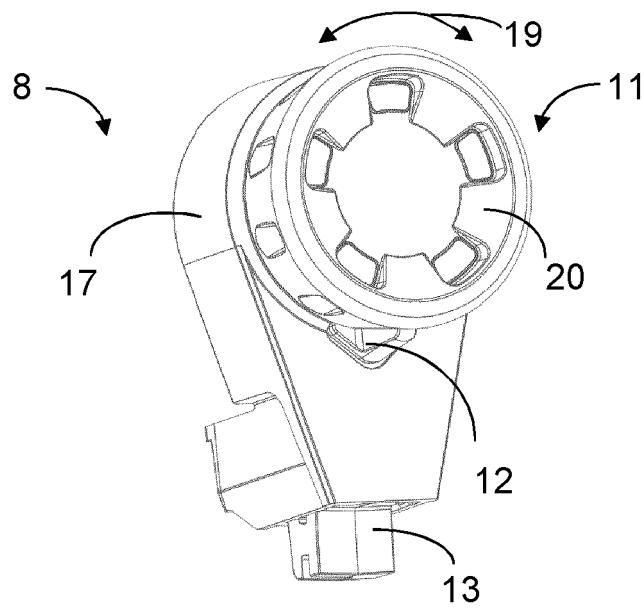


Fig. 2

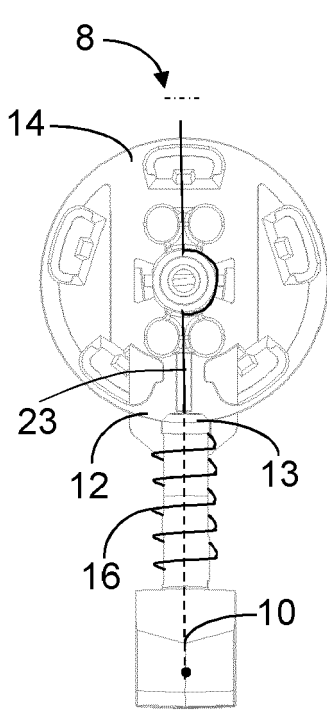


Fig. 3a

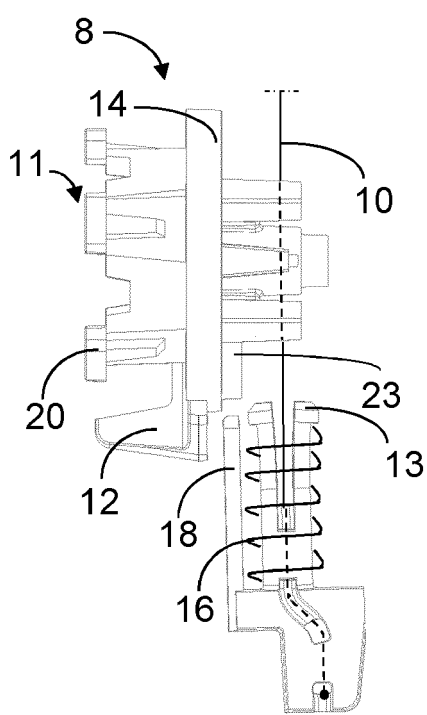


Fig. 3b

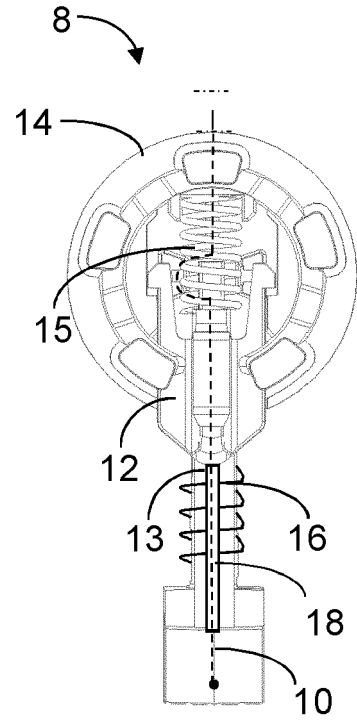


Fig. 3c

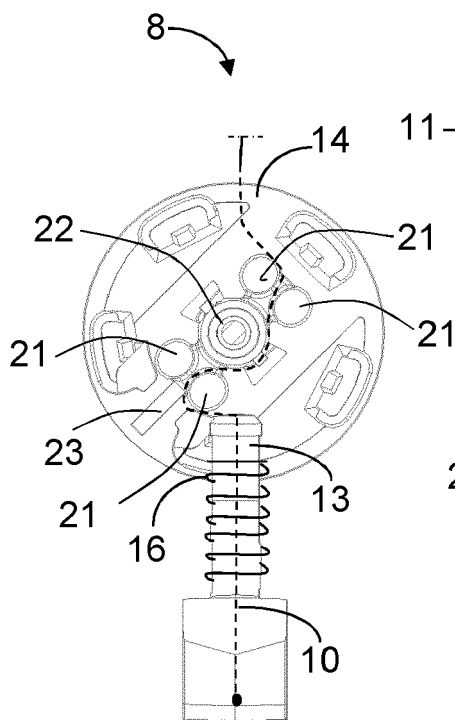


Fig. 4a

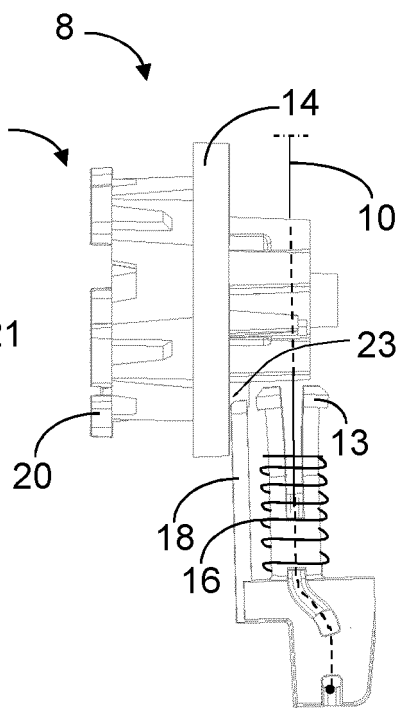


Fig. 4b

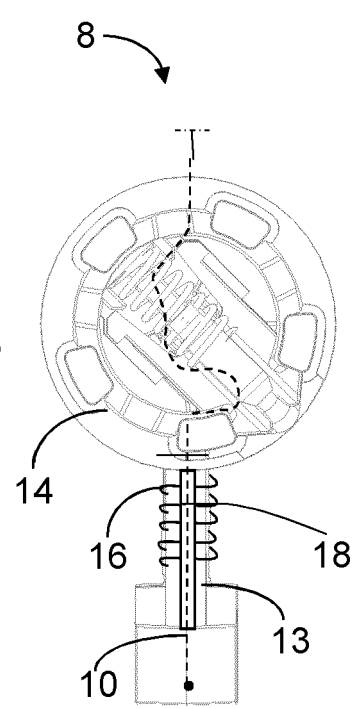


Fig. 4c

The locking system allows in the open position of the locking part the motion of the turning member, whereby the tensile stress conveying member turns at least partially inside the safety lock thus opening the locking of the safety lock and the locking member.

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Fig. 5

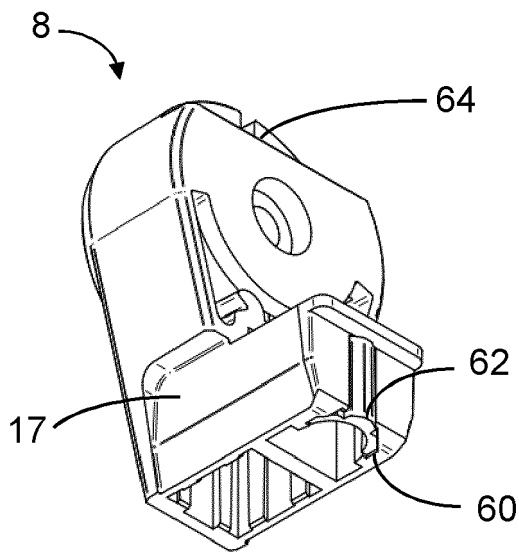


Fig. 6a

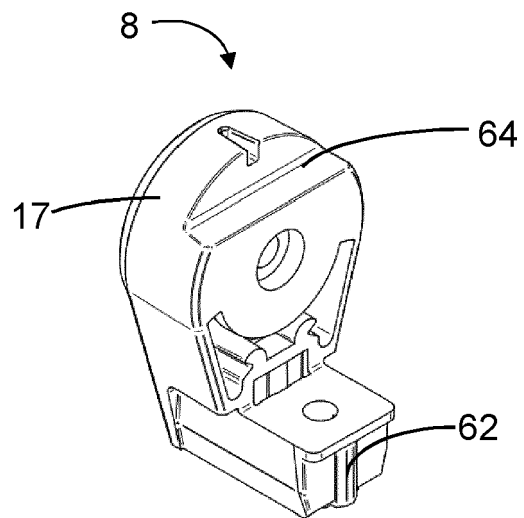


Fig. 6b



EUROPEAN SEARCH REPORT

Application Number
EP 19 20 7656

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2004/011752 A1 (LUMON OY [FI]; HILLIAHO ERKKI [FI]) 5 February 2004 (2004-02-05)	1,3,4, 6-8,12	INV. E05B13/00 E05B13/10 E05B53/00 E05B65/00 E05B65/08 E05C9/04
Y	* the whole document *	2	
A	-----	5,9-11	
X	US 4 575 141 A (BURNS MICHAEL P [US]) 11 March 1986 (1986-03-11)	6-8	
Y	* the whole document *	2	
A	-----	1,3-5, 9-12	
A	EP 1 437 473 A1 (SCHUECO INT KG [DE]) 14 July 2004 (2004-07-14)	1-12	
A	WO 2005/019570 A1 (TALPE JOSEPH [BE]) 3 March 2005 (2005-03-03)	1-12	
	* the whole document *		
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B E05C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		4 March 2020	Cruyplant, Lieve
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			

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 20 7656

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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04-03-2020

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004011752 A1	05-02-2004	AT 516417 T	15-07-2011
		AU 2003246750 A1	16-02-2004
		CN 1556891 A	22-12-2004
		DK 1525366 T3	24-10-2011
		EP 1525366 A1	27-04-2005
		ES 2365134 T3	22-09-2011
		FI 20021409 A	26-01-2004
		NO 326739 B1	09-02-2009
		WO 2004011752 A1	05-02-2004

US 4575141 A	11-03-1986	NONE	

EP 1437473 A1	14-07-2004	AT 356270 T	15-03-2007
		DE 10300859 A1	22-07-2004
		EP 1437473 A1	14-07-2004

WO 2005019570 A1	03-03-2005	AU 2004267227 A1	03-03-2005
		BE 1015654 A3	05-07-2005
		EP 1668210 A1	14-06-2006
		ES 2644985 T3	01-12-2017
		US 2006290148 A1	28-12-2006
		WO 2005019570 A1	03-03-2005
