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(54) **A locking assembly for a ventilating window**

(57) A locking assembly for a ventilating window that has a sash arranged to be openable with respect to a main frame by pivotal movement about an axis that is parallel to a pair of opposed sash members. The locking assembly comprises a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6). A locking mechanism that is arranged in said casing (102) is operable by an operator member (4) that can be accessed from the inside of the window. The operation of the locking mechanism is done via at least one actuator slide (13) that is displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position. The locking mechanism has shielding means (103) that are fixed in relation to the casing (102) and at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window.

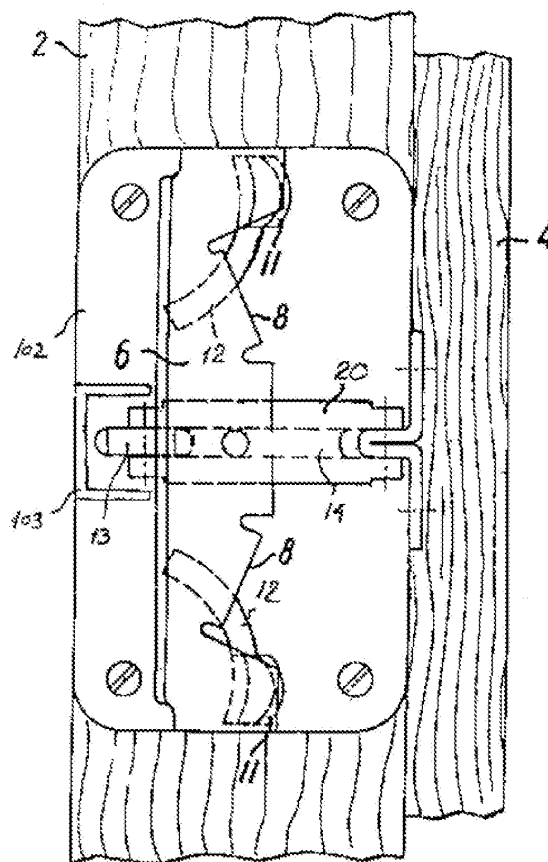


Fig.6

Description

[0001] The present invention relates to a locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate fixed to a main frame member opposite one of said pair of sash members and a casing fixed to said one sash member opposite the strike plate, a locking mechanism arranged in said casing being operable by an operator member accessible from the inside of the window via at least one actuator slide displaceable in guide means in the casing between a first end position defining the unlocked position and a second end position defining the locked position.

[0002] A locking assembly of the above-mentioned type is disclosed in DK-C-114 046. An actuator slide protruding through the casing connects the operator member with the locking mechanism, said actuator slide having a first, unlocked position, a second, locked position and a third, intermediate position where the window is slightly open to achieve ventilation. Also protruding through slots in the casing are two pawl members. When closing the window the pawl members come into engagement with the fixed strike plate whereby they are forced to the sides and the actuator slide is pressed into its second position. For the purpose of ventilation, the actuator slide is pulled half way back towards the first position by use of the operator member without the pawl members being displaced.

[0003] The above-described locking assembly works very well, but there is a risk that unauthorized access to the inside of the building may be obtained by introducing a flat, stiff object from the outside of the window into the slit between the sash and frame then pushing the actuator slide to its first, unlocked position.

[0004] Means for preventing such unwarranted opening have been described in the international patent application WO 99/51832 as well as in the applicant's Danish patent application no. PA 2001 00601.

[0005] WO 99/51832 discloses an insert member projecting from the frame towards the sash thus filling the majority of the space between the two and making it more difficult to reach the actuator slide. However, the primary purpose of the insert member is to reduce the height of the ventilation passage. The insert member therefore extends along the entire length of the frame member and has a recess to make room for the locking mechanism thus giving the weakest protection in the area where it is most needed.

[0006] In the applicant's Danish patent application no. PA 2001 00601 means with the primary purpose of preventing intrusion are arranged as a part of the locking assembly preventing the movement of the pawl members that takes place when the actuator slide is moved to its first, unlocked position. However, these means have to be activated manually and that may easily be forgotten.

[0007] It is therefore the object of the present invention to provide a locking mechanism that has means for preventing intrusion, said means being effective primarily in the area around the actuator slide and working without a preceding activation.

[0008] The object is achieved with a locking assembly according to the invention, where at least a part of shielding means that are fixed in relation to the casing is arranged between the actuator slide and the outside of the window.

[0009] In a preferred embodiment of the invention the shielding means is an integral part of the casing. Thereby no extra parts have to be added to the locking assembly and the adding of the shielding means does therefore not complicate the mounting of the locking assembly.

[0010] If the manufacture of the casing is made unnecessarily complicated by the forming of the shielding means, the shielding means may instead consist of one or more separate parts that are fastened to the casing in a releasable manner.

[0011] In another preferred embodiment of the invention the shielding means is part of an insert in the guide means. Inserts may be used for the purpose of hindering noise and wear otherwise caused by metal-to-metal contact between the actuator slide and the casing. Adding the shielding means in this way does therefore not mean the adding of extra parts either and the abovementioned advantages of making the shielding means part of an existing part are retained.

[0012] An improvement of the protection against intrusion can be reached by letting the shielding means consist of more than one part, preferably a part of the casing as well as a part of an insert in the guide means.

[0013] In many cases it is advantageous that different parts of the shielding means consists of different materials. For instance soft material may be used where the use of a harder one would cause unwanted noise.

[0014] The invention will now be described in detail with reference to the accompanying drawing, in which

fig. 1 is a perspective view of a prior art locking assembly;

fig. 2 is a perspective view of the locking assembly of fig. 1 seen from another angle;

fig. 3 is a perspective view of the locking assembly of fig. 1 mounted in a ventilating window and shown in a locked position of the window;

fig. 4 is a perspective view corresponding to the view of fig. 3 with the window in an unlocked position;

fig. 5 is a sectional view of the upper part of a ventilating window incorporating a first embodiment of the locking assembly of the invention;

fig. 6 is a schematic plane view of the locking assembly shown in fig. 5;

fig. 7 is a schematic plane view of a second embodiment of the locking assembly of the invention; and fig. 8 is a sketch of the casing and an insert for use therewith.

[0015] Figs. 1 and 2 show perspective views of a prior art locking assembly. In figs. 3 and 4 the locking assembly is mounted in a ventilating window. As is best seen from figs. 1 and 2, a casing 102 encases a locking mechanism and comprises fastening holes 55 for mounting the locking assembly to a top sash member 2 (cf. figs. 3 and 4) of a window sash. Pawls 11 and actuator slide 13 extend through first and second slots 12 and 14, respectively, in the casing and fastening pins 30 are used for fastening the locking mechanism in the casing 102. Slots 12, 14 in the casing serve as first and second guide means, respectively. The actuator slide 13 is preferably mounted with a friction plate 50 and an operator arm 20 mounted with a hinge pin 25 to the part of the actuator slide 13 that extends through the casing 102. The operator arm 20 is to be mounted to an operator member 4 (cf. figs. 3 and 4) by means of an operator hinge 10 with fastening holes. The locking mechanism shown in fig. 2 comprises first arms 60 with cutouts 65, second arms 62 connected in one piece to the pawls 11, first spring wires 64, second spring wires 66, the actuator slide 13 and first, second and third arm hinges 70, 72, 74. Said actuator slide 13 is moveable between three resting positions; a first, unlocked position in which the window is open or can be opened without activating the locking assembly (figs. 1, 2 and 4), a second, locked position in which the window is locked in a closed position (not shown) and a third, intermediate position where the window is slightly open to achieve ventilation (fig. 3).

[0016] As may be seen from fig. 2, the actuator slide 13 and the pawls 11 are interconnected via the locking mechanism, which comprises a system of the second and the first spring-loaded arms 60, 62 and the first and the second spring wires 64, 66, which force actuator slide 13 to move stepwise between said three positions while the pawls 11 only move between a locked pawl position and an unlocked pawl position. In figs. 1, 2 and 4 the pawls 11 are shown in the unlocked pawl position. The locking mechanism operates symmetrically around the slot 14 and the actuator slide 13. The first arms 60 of the locking mechanism are connected to the actuator slide 13 via the first arm hinge 70 and to the second arms 62 via the second arm hinge 72. The second arms 62 of the locking mechanism are fastened to the casing 102 via the third arm hinge 74. The first spring wires 64 are mounted to the casing 102 via fastening pin heads 31 and fastened to the second arm hinges 72, and the second spring wires 66 are mounted on the first arms 60 and fastened to the first arm hinge 70.

[0017] In the second, locked position the actuator slide 13 and the pawls 11 are positioned at the other ends of slots 14 and 12, respectively, compared to the position in figs. 1 and 2. The actuator slide 13 is held in the first, unlocked position by the second spring wires 66 and a first dead point of the locking mechanism. The actuator slide 13 is moved from the second, locked position to the third, intermediate position by moving the actuator slide 13 through said first dead point towards the opposite end

of the slot 14. In the embodiment shown the first dead point is implemented as a combination of the second spring wires 66 mounted in the cutout 65 of the first arms 60 and the form of the first arms 60 and the first arm hinges 70. The position of the pawls 11 is not affected by moving the actuator slide 13 between the second, locked position and the third, intermediate position.

[0018] In the third, intermediate position the actuator slide 13 is positioned between the ends of slot 14 as may be seen in fig. 3, without having moved the second arms 62 of the locking mechanism.

[0019] The actuator slide 13 is held in the third, intermediate position by the first dead point and a second dead point established by the first spring wires 66. In the second, locked position and third intermediate position of the actuator slide 13 the first spring wires 64 hold the pawls 11 in a locked position at the opposite ends of the slots 12 compared to the position of the pawls 11 in figs. 1 and 2.

[0020] Moving the actuator slide 13 from the third, intermediate position to the first, unlocked position, said second dead point is passed and the arms 60, 62 of the locking mechanism are positioned as shown in fig. 2. In the first, unlocked position of the actuator slide 13 the first spring wires 64 hold the pawls 11 in the unlocked pawl position. The embodiment in fig. 2 shows said second dead point implemented by the first spring wires 64 operating on the second arm hinges 72. The pawls 11 are operating in conjunction with the second arm hinges 72 and are implemented as an integrated part of the second arms 62 of the operating mechanism.

[0021] As described above when the window is closed, the movement of the pawls 11 is transmitted to the actuator slide 13 via the locking mechanism and the actuator slide 13 is pulled back from the first, unlocked position shown in fig. 2 to the third, intermediate position.

[0022] In the third, intermediate position the actuator slide 13 can be moved to the first, unlocked position as described above or moved to the second, locked position by passing the first dead point of the operating mechanism.

[0023] In figs. 3 and 4 the casing 102 of the locking hinge is shown in a mounted position secured to the sash member 2 by means of screws 55a inserted through fastening holes 55 and by the fastening pins 31 which extend from the casing (cf. fig. 2). The operator arm 20 is secured to the operator member 4 of the window by means of screws 10a through fastening holes of the operator hinge 10. In fig. 4 the actuator slide 13 is shown in the first, unlocked position in which the window is open or can be opened without activating the locking assembly; in fig. 3 the actuator slide is shown in the third, intermediate position in which the window is locked but slightly open to achieve ventilation.

[0024] To reduce operating noise and ease operation of the locking assembly the locking mechanism may be lubricated.

[0025] In figs. 5 and 6 a first embodiment of a locking

assembly according to the invention is shown mounted in a ventilation window. The locking assembly is mounted in the ventilation window in a position conventional for the prior art locking assembly of Figs. 1 and 2. Elements of the embodiment of figs. 5 and 6 similar to the prior art locking assembly of figs. 1 and 2 have been given similar reference numerals. An operator member 4 is located on the inside of the window in connection with a top sash member 2. When pulling on the operator member 4 to open the window, an actuator slide 13 that protrudes through a slot 14 in the casing 102 of the locking assembly is moved towards the inside of the window (to the right in fig. 5), the operator member 4 and actuator slide 13 being connected via operator arm 20. Simultaneously, pawls 11 that are connected to the actuator slide 13 via a system of link joint arms inside the casing 102 are being shifted from the positions shown in fig. 6 to positions at the other ends of slots 12 in the casing 102. When closing the window, the pawls 11 come into contact with abutment members 8 projecting from a strike plate 6 that is fixed to the top frame member 1 as shown in fig. 5 whereby they are pushed back into the positions shown in fig. 6. To achieve ventilation with only a limited loss of heat the window may be opened slightly by placing the actuator slide 13 in an intermediate position. To prevent an intruder from opening the window from the outside, according to the invention the casing 102 of the locking assembly of the invention is provided with upwards projecting shielding means 103 that renders access to the actuator slide 13 and other moveable parts of the locking assembly virtually impossible. In the embodiment of fig. 6 the shielding means 103 are primarily meant to hinder access to the actuator slide 13 when in its locked position, closest to the outside of the window. It may be possible to gain access to the actuator slide 13 when in its intermediate ventilating position, but any tools that a potential intruder would use would have to be extremely slim, as it would have to fit in the very narrow space between the casing 102 and the strike plate 6. However, it may be preferable to extend the shielding means 103 along the sides of the slot 14 so that the actuator slide 13 is also covered when in its intermediate position. Alternatively, the shielding means 103 may cover that entire side of the casing 102 that runs parallel to the length axis of the sash member 2 and faces the outside of the window.

[0026] The protection of the actuator slide 13 may also be achieved with a bridge-like structure 104 covering the actuator slide 13 at the outer end of the guiding slot 14, as shown in a second embodiment of the locking assembly according to the invention in fig. 7, or covering the entire length of the slot. The bridge 104 will prevent intruders from using instruments that are wider than its internal width and if smaller tools are used it will take a considerable precision to reach the actuator slide 13. The bridge 104 may be formed by welding or screwing an extra piece of metal onto the casing or by punching or pressing, thus creating the guiding slot 14 by displacing material instead of cutting it away.

[0027] It has been found that metal-to-metal contact between the actuator slide 13 and the casing 102 may cause unwanted noise and a substantial wear on the locking assembly. To prevent these drawbacks the slot 14 can be made wider and provided with a plastic insert 101 so that the effective width of the slot is approximately the same as before. An example of this is shown in fig. 8. Here the slot 14 has been extended to reach and penetrate the side 105 of the casing 102, which is substantially perpendicular to the surface of the sash member 2 on which it is mounted as may be seen in figs. 3 and 4. This allows the insert 101 to be slid into place as illustrated with the arrow in fig. 8. Both the cut-out 106 in the side of the casing and the insert has a dovetail shaped cross-section, which prevents the insert from coming loose during handling of the window in connection with the mounting thereof. Though depicted in a very simple form, the insert 101 may be provided with upstanding parts that may serve as shielding means. As an example, the abovementioned bridge structure 104 may be formed as an integral part of the plastic insert. In other embodiments the insert might, however, also be provided with flange-like projections along its entire length or the like. The shielding means could also be provided as separate elements that can be added to the insert as a click-on or in other suitable ways.

[0028] The shielding means 103, 104 may also be formed as a combination of the embodiments described above. For instance the bridge structure 104 formed on the plastic insert may be used together with the projecting metal part on the edge of the casing 102. Thus, the shielding means 103 may consist of one or more parts made from one or more materials.

Claims

1. A locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6), a locking mechanism arranged in said casing (102) being operable by an operator member (4) accessible from the inside of the window via at least one actuator slide (13) displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position, **characterized in** shielding means (103) that are fixed in relation to the casing (102) where at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window.
2. A locking assembly for a window as claimed in claim

1, **characterized in that** the shielding means (103) is an integral part of the casing (102).

3. A locking assembly for a window as claimed in claim 1, **characterized in that** the shielding means (103) consist of one or more separate parts that are fastened to the casing (102) in a releasable manner. 5
4. A locking assembly for a window as claimed in claim 1, **characterized in that** the shielding means (104) are part of an insert (101) in the guide means (14). 10
5. A locking assembly for a window as claimed in claim 1, **characterized in that** the shielding means (103) consist of more than one part, preferably a part of the casing (102) as well as a part of an insert (101) in the guide means (14). 15
6. A locking assembly for a window as claimed in claim 4, **characterized** in that different parts of the shielding means (103) consists of different materials. 20

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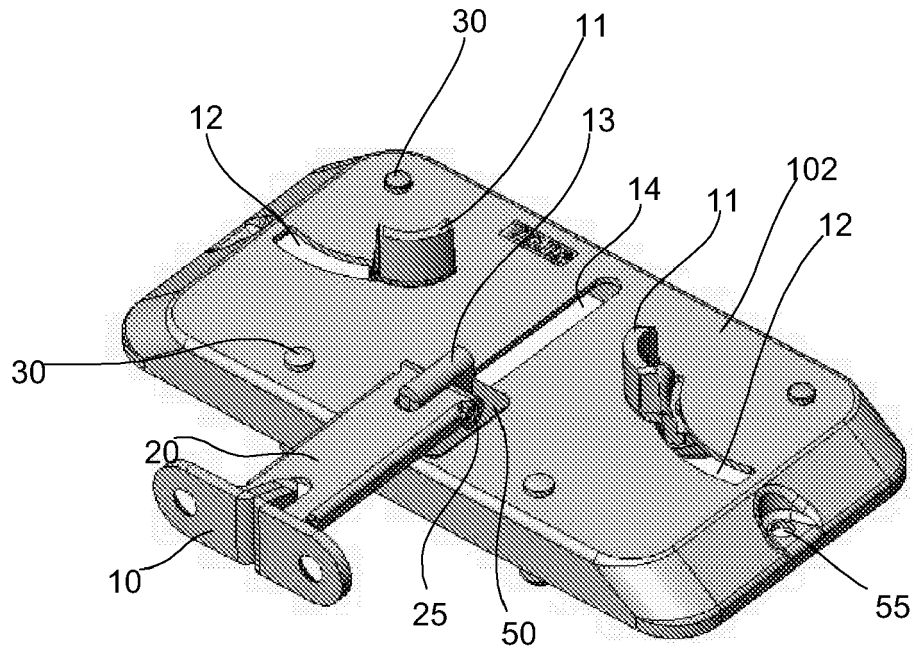


Fig. 1

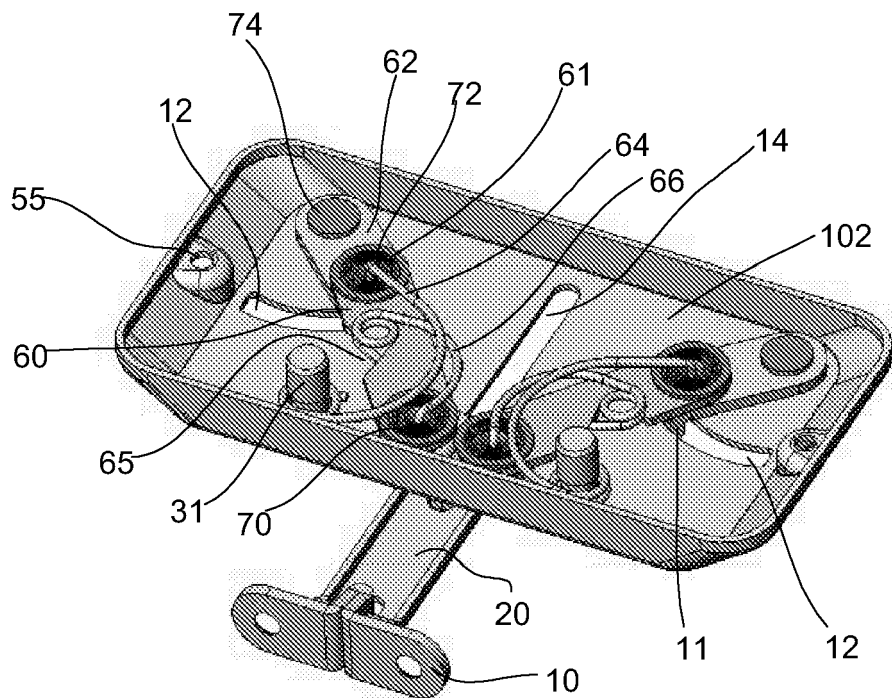


Fig. 2

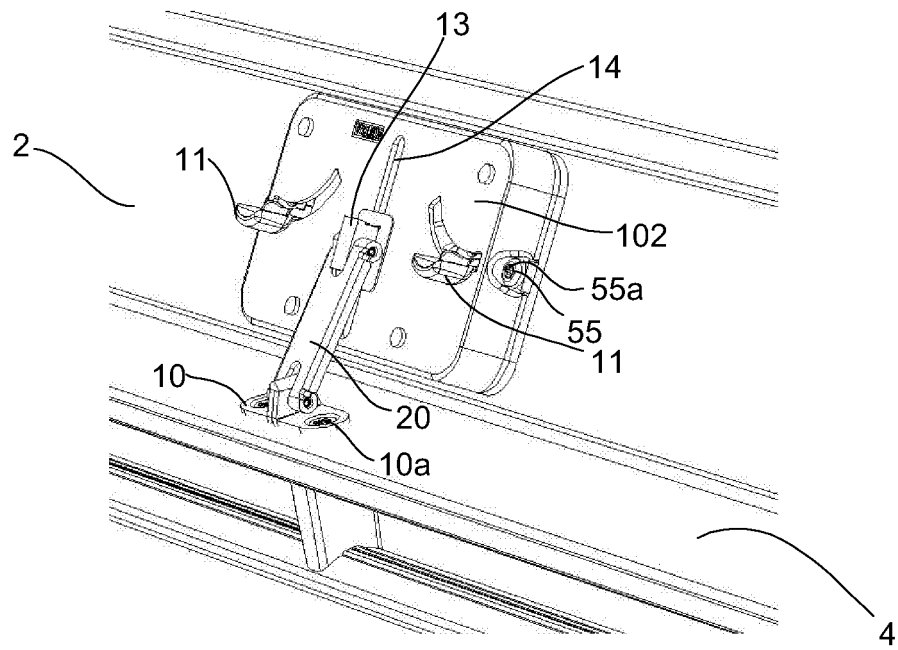


Fig. 3

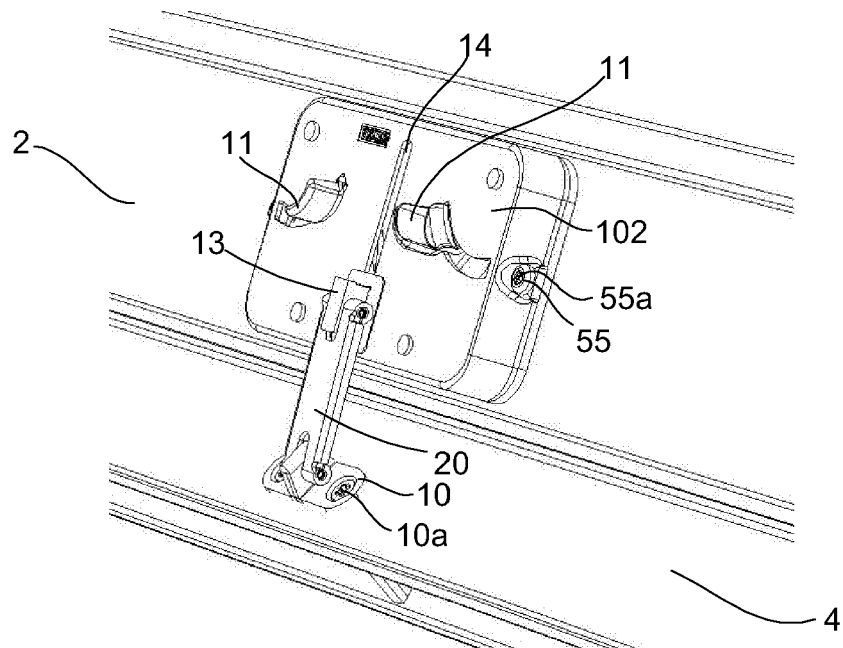


Fig. 4

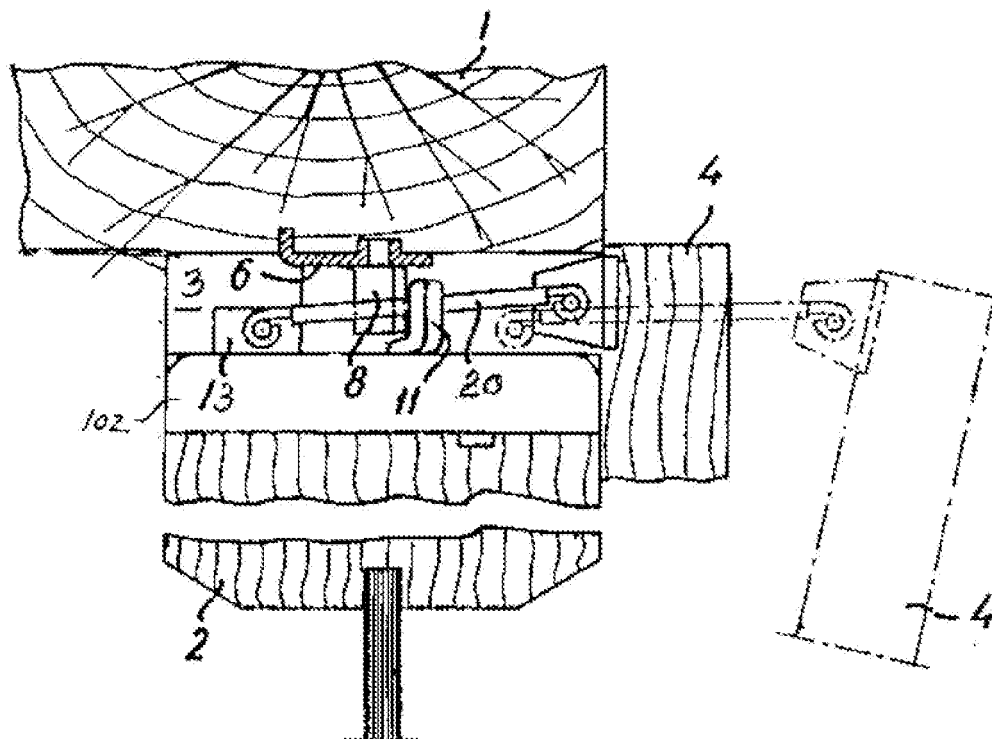


Fig.5

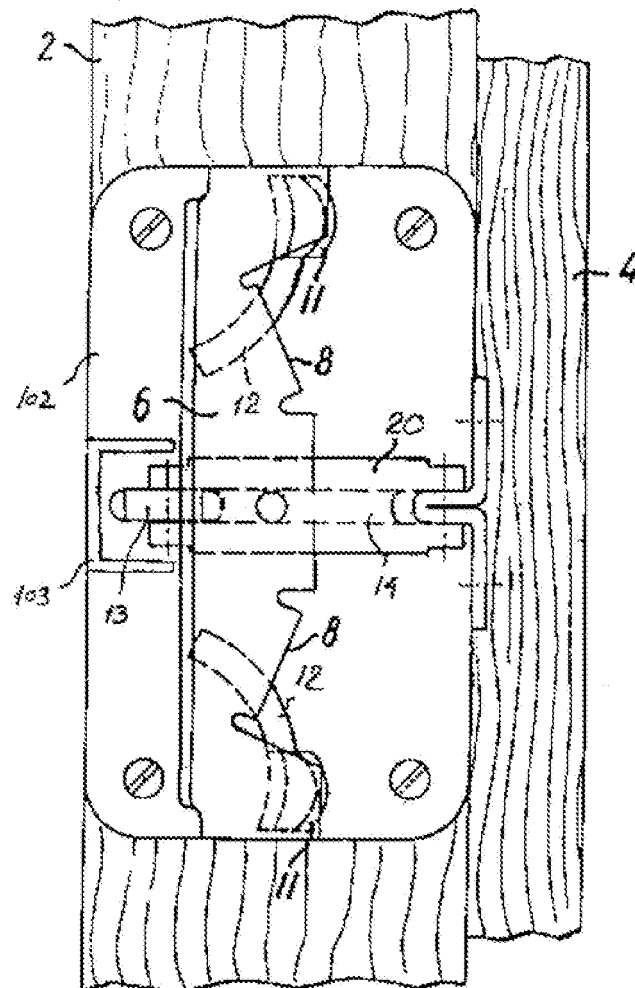


Fig.6

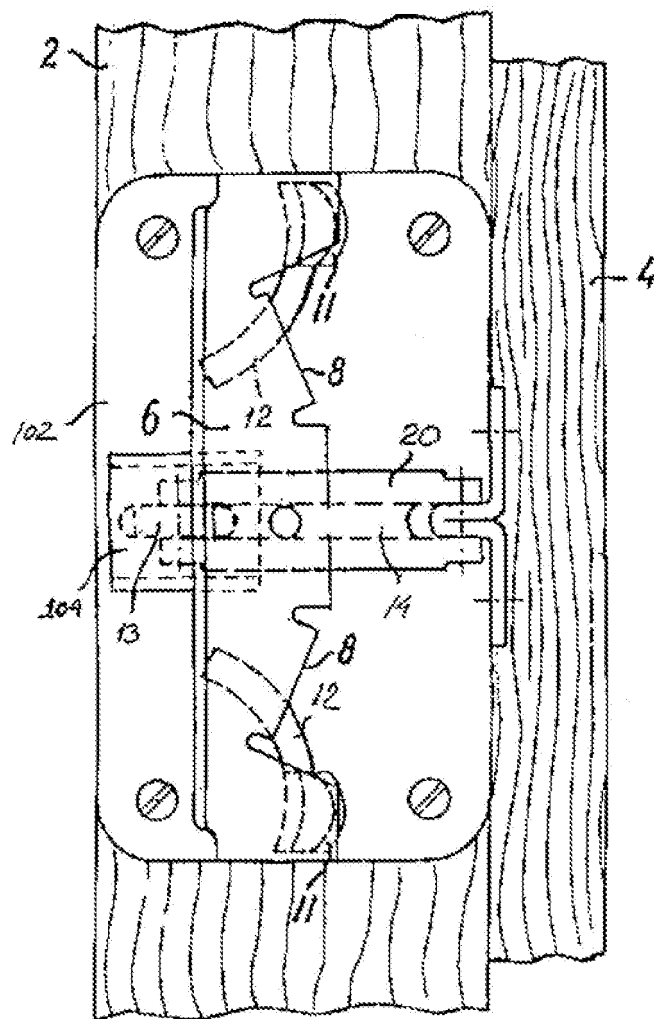


Fig. 7

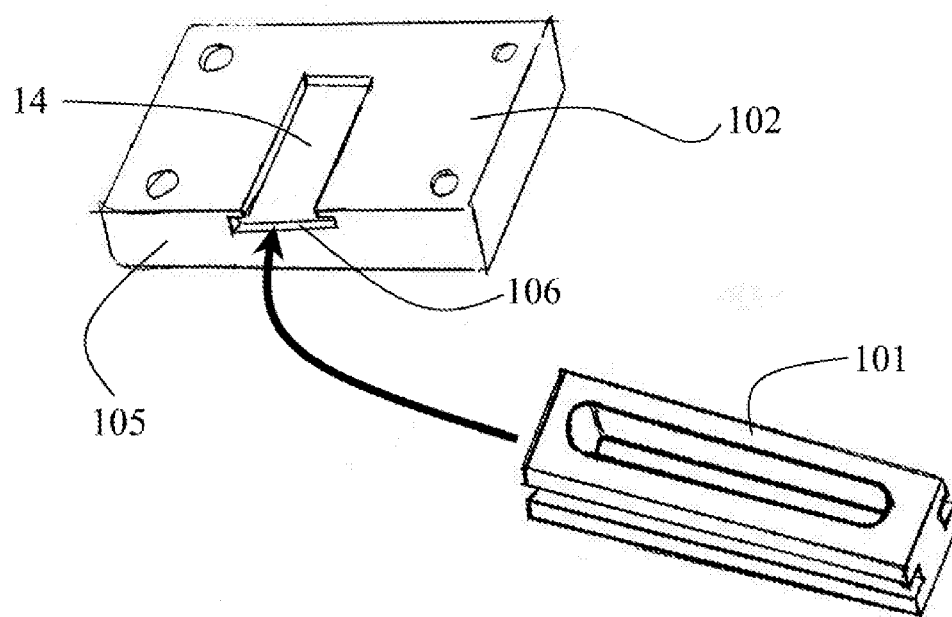


Fig.8



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 1047

DOCUMENTS CONSIDERED TO BE RELEVANT			
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X	EP 0 969 178 A (VELUX IND AS [DK]) 5 January 2000 (2000-01-05)	1,5	INV. E05C3/08 E05D5/14 E04D13/03
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A	* claim 1; figures 3,4 *	2-4,6	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05C E05D E06B E05B E04D
Place of search		Date of completion of the search	Examiner
Munich		22 October 2007	Kofoed, Peter
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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EPO FORM 1503 03/82 (P04C01)

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claim: 1+2

A locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6), a locking mechanism arranged in said casing (102) being operable by an Operator member (4) accessible from the inside of the window via at least one actuator slide (13) displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position, w h e r e i n shielding means (103) that are fixed in relation to the casing (102) where at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window;
wherein the shielding means (103) is an integral part of the casing (102).

2. claim: 1+3

A locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6), a locking mechanism arranged in said casing (102) being operable by an Operator member (4) accessible from the inside of the window via at least one actuator slide (13) displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position, w h e r e i n shielding means (103) that are fixed in relation to the casing (102) where at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window;
wherein the shielding means (103) consist of one or more separate parts that are fastened to the casing (102) in a releasable manner.

3. claim: 1+4+6



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

A locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6), a locking mechanism arranged in said casing (102) being operable by an Operator member (4) accessible from the inside of the window via at least one actuator slide (13) displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position, w h e r e i n shielding means (103) that are fixed in relation to the casing (102) where at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window;
wherein the shielding means (104) are part of an insert (101) in the guide means (14); and
wherein different parts of the shielding means (103) consists of different materials.

4. claim: 1+5

A locking assembly for a ventilating window having a sash arranged to be openable with respect to a main frame by pivotal movement about an axis parallel to a pair of opposed sash members, said locking assembly comprising a strike plate (6) fixed to a main frame member (1) opposite one of said pair of sash members (2) and a casing (102) fixed to said one sash member (2) opposite the strike plate (6), a locking mechanism arranged in said casing (102) being operable by an Operator member (4) accessible from the inside of the window via at least one actuator slide (13) displaceable in guide means (14) in the casing between a first end position defining the unlocked position and a second end position defining the locking position, w h e r e i n shielding means (103) that are fixed in relation to the casing (102) where at least a part of said shielding means (103) is arranged between the actuator slide (13) and the outside of the window;
wherein the shielding means (103) consist of more than one part, preferably a part of the casing (102) as well as a part of an insert (101) in the guide means (14).

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

EP 07 11 1047

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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22-10-2007

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