



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.01.2009 Bulletin 2009/03

(51) Int Cl.:
E05C 3/04 (2006.01) **E05B 17/20** (2006.01)
E05B 63/12 (2006.01)

(21) Application number: **08252399.4**

(22) Date of filing: **12.07.2008**

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

(72) Inventors:
• **Wellman, David Anthony**
Aldridge, West Midlands WS9 0JW (GB)
• **Harrison, Peter James**
Darlaston, West Midlands WS10 7QT (GB)

(30) Priority: **12.07.2007 GB 0713529**

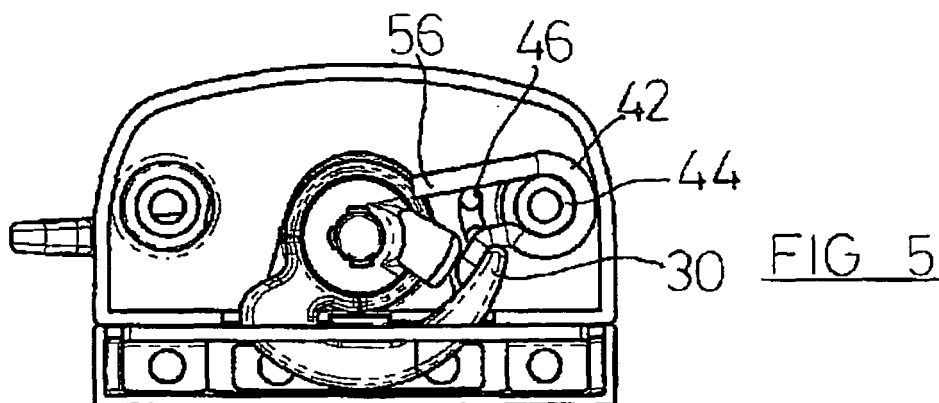
(74) Representative: **Gee, Steven William**
D.W. & S.W. Gee
1 South Lynn Gardens
London Road
GB-Shipston on Stour, Wacks. CV36 4ER (GB)

(71) Applicant: **J. Banks & Co. Ltd.**
Tipton
West Midlands DY4 9LE (GB)

(54) **Locking device**

(57) This invention relates to a locking device, and in particular to a locking device for a vertical sliding sash window. The locking device (10) comprises a locking member (14) and a keeper (16). The locking member is mounted for rotation in a housing (12). The locking member has a curved locking element (24), the curved locking element being adapted to project from the housing and

into a slot (32) of the keeper. The slot has a tab (34) which can be engaged by the curved locking element. The locking member has a leading end (30) and the locking device has a key-operated lock (52). The locking device is characterised by a movable retainer (42) having an active condition in which it retains the leading end of the curved locking element.



Description

FIELD OF THE INVENTION

[0001] This invention relates to a locking device, and in particular to a locking device for a vertical sliding sash window.

[0002] Directional and orientational terms such as "top", "bottom", "upper" etc. refer to the locking device in its normal orientation of use as shown in Fig. 1.

BACKGROUND OF THE INVENTION

[0003] Vertical sliding sash windows comprising two or more window panels, at least one of which can slide in a substantially vertical direction in use to open and close the window, have been in long term and widespread use. A locking device is typically fitted in order to prevent unauthorised access through the window. The locking device for a vertical sliding sash window typically comprises a locking member mounted to one of the window panels which can engage a keeper mounted to the other (or another) of the window panels. When the window is closed the locking member can be moved to engage the keeper and prevent relative sliding movement of the window panels and thereby secure the window in the closed position.

[0004] A known locking device for a vertical sliding sash window is made and sold by the present Applicant, under the name "Cam-Lok".

[0005] Another known locking device for a vertical sliding sash window is disclosed in GB Patent Application 2 424 033 of Caldwell Hardware (UK) Limited.

[0006] In both of these prior art devices the locking member is mounted within a housing and can undergo limited rotation. The locking member has a curved locking element which can project from the housing and engage the keeper, the curved locking element being almost concentric with the axis of rotation. The lack of concentricity causes the keeper to be pulled towards the housing as the locking member is rotated into (further) engagement with the keeper. The keepers of both of these devices have a slot designed to accept the locking member, the slot having a projecting tab. The curved locking element can move around the back of the tab in the locking condition so as to hold the locking member and keeper together.

[0007] Both of these prior devices are lockable, in that a key-operated lock is provided which can prevent unauthorised rotation of the locking member from its engaged condition (in which the locking member projects from the housing and engages the keeper) to its disengaged condition (in which the locking member is retracted into the housing and does not engage the keeper).

[0008] Also, in both of these devices the locking member is a rotatable plate, the curved locking element of the locking member comprising a rail along the edge of the plate. The curved locking element extends beyond the

plate to form the leading end of the locking member which is mounted in cantilever.

[0009] The presence of the plate limits the size of the tab which can project into the slot in the keeper, as the plate lies alongside the tab in the engaged condition of the devices. It is therefore not possible to enhance the security by increasing the size of the tab without reducing the thickness of the plate (and thereby weakening the locking member), and similarly it is not possible to increase the strength of the locking member by making the plate thicker without reducing the size of the tab(s) and making it easier to force the engaged locking member out of the keeper.

[0010] The windows of a building are known to be considered vulnerable by housebreakers and unauthorised intruders, and are often the route by which unauthorised access is sought to be obtained to a building. Many different types of locking devices are available for the different window types, and the locking devices for vertical sliding sash windows have two major disadvantages to overcome.

[0011] Firstly, because two adjacent window panels must necessarily slide relative to each other, there must be a sufficiently large gap between them to permit relatively free sliding movement, and that gap can often present a point of access for a housebreaking tool. Specifically, an intending intruder will often insert a tool between the two window panels and seek to force the locking member out of the keeper. To do this the intruder only has to force the curved locking element past the tab, and the relatively large gap between the window panels often allows the insertion of a sufficiently robust tool to achieve this. The locking device for a vertical sliding sash window must therefore be able to withstand attack from more substantial and useful tools than can normally be used with other types of window.

[0012] Secondly, the locking device is normally mounted upon the surface of the window panel, and in the most common case of a two-panel window the locking device will be fitted at substantially the centre of the window. The locking device is therefore clearly visible to most occupants of the building, and the locking device must therefore be aesthetically pleasing and at the same time not too obtrusive, as well as functionally robust.

[0013] Locking devices for windows are the subject of official standards in many countries. In the UK the official standard is BS 7950. Many of the locking devices which are presently available for vertical sliding sash windows fail to meet this standard.

[0014] There is therefore a need to provide a locking device which will meet this standard, and this need is becoming more significant as vertical sliding sash windows take an increasing proportion of the window market because of their pleasing appearance.

SUMMARY OF THE INVENTION

[0015] According to the invention there is provided a

locking device comprising a locking member and a keeper, the locking member being mounted for rotation in a housing, the locking member having a curved locking element, the curved locking element being able to project beyond the housing and into a slot of the keeper, the slot having a tab which can be engaged by the curved locking element, the locking member having a leading end, the locking device having a key-operated lock, characterised by a movable retainer having an active condition in which the retainer engages and retains the leading end of the curved locking element.

[0016] Thus, the inventors have realised that during rotation of the locking member from its disengaged condition to its engaged condition the leading end of the locking member is caused to move out of the housing and then back into the housing as it undergoes its arcuate movement. The inventors take advantage of the return of the leading end into the housing to provide a retainer which can engage the leading end and secure the locking member against unauthorised rotation away from the engaged condition.

[0017] Preferably, the retainer is driven to its active condition by the key-operated lock.

[0018] Desirably, a part of the retainer can be located in an opening in the leading end of the locking member. Desirably also, the retainer is a metallic rod. Usefully, the retainer is pivotably mounted upon a boss, the retainer pivoting between its active condition and an inactive condition.

[0019] Preferably, the tab extends across the full width of the slot. This is possible with the present invention as the locking member does not need to be in the form of a plate with a rail providing the curved locking element and can comprise substantially the curved locking element alone. Without the plate being required to enter the slot the tab can extend across the slot so as to reduce the likelihood that the locking member can be forced past the tab by an intending intruder, and thereby to increase the security of the locking device.

[0020] Desirably, the keeper comprises a first part and a second part, the first part including the tab and the second part comprising a cover element. Usefully, the first part and the second part are made of different materials, the first part being made of a material providing the required strength for the tab, the second part being made of a material suited to provide the aesthetically pleasing form. Preferably, the first part and the second part together define the slot.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Fig.1 shows a representation of the device fitted to a vertical sliding sash window;

Fig.2 shows a top view of the locking device according to the invention;

Fig.3 shows a bottom view of the locking device, with the locking member out of engagement with the keeper;

Fig.4 shows a view similar to Fig.3 but with the locking member engaging the keeper,

Fig.5 shows a view similar to Fig.3 but with the locking member locked in engagement with the keeper;

Fig.6 shows an exploded view of the keeper; and

Fig.7 shows a view of the assembled keeper.

DETAILED DESCRIPTION

[0022] The locking device 10 is adapted for fitment to a vertical sliding sash window. The locking device 10 comprises a housing 12 for the locking member 14 (Fig. 3) and a keeper 16. The keeper 16 is fitted to the frame of one of the window panels 2 (in this case the bottom horizontal frame part 4 of the upper window panel 2), and the housing 12 is fitted to the frame of the other window panel 6 (in this case the top horizontal frame part 8 of the lower window panel 6). In known fashion, one or both of the window panels 2,6 are mounted for vertical sliding movement in channels (not shown), so that in use (when the locking device is in its disengaged condition) the window panels 2,6, and the respective keeper 16 and housing 12 can slide vertically relative to one another.

[0023] As above indicated, the locking device 10 will typically be clearly visible to the occupant of the building, and is therefore made aesthetically pleasing in front view. In particular, the visible parts of the housing 12 and keeper 14 are of cooperating form and matching surface finish. (In Fig.1 the frame parts 4,8 are shown in dotted outline and the mounting flange 18 would not be visible when the window is closed).

[0024] The housing 12 has an opening through which projects a boss 20 (Fig.3). To the top of the housing 12 the boss 20 carries an operating handle 22, and to the bottom of the housing 12 the boss 20 carries the locking member 14. In this way, the operating handle 20 and the locking member 14 are mounted to move together, and in particular to rotate together upon or around the boss 20.

[0025] The locking member 14 is therefore mounted for rotation relative to the housing 12. As shown in Figs. 3,4 and 5 the locking member 14 can be rotated (by way of the operating handle 22) between the disengaged condition of Fig.3 (in which the curved locking element is wholly within the housing), and the engaged condition in Figs. 4 and 5 (in which a large part of the curved locking element 24 projects beyond the housing 14 and into the keeper 16).

[0026] The locking member 14 has a curved locking element 24 which is substantially concentric with the rotational axis of the locking member 14, i.e. with the central axis of the boss 20. Ideally, however, the inner surface 26 of the curved locking element 24 converges towards the rotational axis from its leading end 30. This convergence provides a "camming" action for the locking device, in known fashion. In addition, the curved locking element 24 can taper in the vertical plane so as to provide a camming action also in the vertical direction if required.

[0027] The keeper 16 is shown in more detail in Figs. 6 and 7. The keeper has a slot 32 and a tab 34 which spans the slot 32. It will be understood that as the operating handle 22 is rotated from the disengaged condition shown in Fig.3 to the engaged condition shown in Fig.4, the leading end 30 of the locking member 14 is caused to project from the housing 12 and to enter the slot 32 to one side of the tab 34, pass around the tab 34 and pass back through the slot 32 to the other side of the tab 34, finally re-entering the housing 12. Accordingly, in the engaged condition shown in Fig.4 the locking member passes around the tab 34 and thereby secures the housing 12 and keeper 16 together.

[0028] It will be observed that the tab 34 is curved slightly so as to match the curvature of the inner surface 26 of the curved locking element 24, and also that the inner surface 26 has a small flattened region 36 which engages the tab 34 in the engaged condition of the locking member 14.

[0029] Though not shown in the drawings, adjacent to the leading end 30 the locking member 14 has an opening which can accommodate a part 40 of the retainer 42. In this embodiment the opening is an aperture through the leading end 30 of the locking member 14, but in other embodiments the opening is a recess or blind hole in the leading end. The retainer 42 is a formed metal rod and is mounted upon a boss 44 of the housing 12. The housing 12 also carries a stop 46 for the retainer 42, and a raised button 50 providing a detent for the retainer 42.

[0030] The boss 20 of the housing 12 also mounts a key-operated lock 52. The key-operated lock 52 is connected to an actuator 54 which can engage the retainer 42. The key-operated lock normally rotates with the operating handle 22, so that the actuator 54 normally rotates with the locking member 14. Accordingly, unless the lock 52 is actuated the actuator 54 will rotate with the locking member 14 between the disengaged and engaged conditions shown in Figs. 3 and 4 respectively.

[0031] When it is desired to lock the locking device 10 in the engaged condition, i.e. to lock the keeper 16 to the housing 12, the correct key is inserted into the lock 52 and the key rotated relative to the operating handle 22. This causes the actuator 54 to rotate relative to the locking member 14, and specifically to rotate in a clockwise direction from the position shown in Fig. 4 to the position shown in Fig.5. During this movement, the actuator 54 engages the retainer 42 adjacent to the part 40 and drives the retainer 42 to rotate anticlockwise as drawn, past the

button 50, and to drive the part 40 into the aperture in locking member 14, as shown in Fig.5.

[0032] In the engaged and locked condition of Fig.5 one end of the locking member 14 is secured to the housing 12 by way of the retainer 42, whilst the other end of the locking member is secured to the housing 12 by way of its mounting upon the boss 20. The locking member 14 is therefore secured to both sides of the tab 34. This permits the locking member 14 to avoid the requirement for the strengthening plate present in the prior art devices, and thereby permits the tab 34 to span the full width of the slot 32 (though it will be understood that the strengthening plate can be used in other embodiments if desired).

[0033] When it is desired to unlock the locking device 10 the key is rotated in the opposite direction which drives the actuator to move anticlockwise as drawn in Fig.5 to its position shown in Fig.4. It will be seen that the retainer 42 has a leg 56 which is engageable by the actuator 52, anticlockwise rotation of the actuator 52 driving the retainer 42 to pivot clockwise as drawn, past the button 50, and thereby releasing the part 40 from the aperture in the locking member 14. Thereafter, the operating handle 22 can be rotated to move the locking member to its disengaged condition.

[0034] It is a particular advantage of the present invention that the lock 52 can be carried by the boss 20 for the operating handle 22, as this minimises the volume of the housing, avoids the need for a mechanical link to be made between the lock and the locking member, and provides an aesthetically pleasing housing. The provision of a lock upon the boss of the operating handle has not generally been preferred as an intending intruder can seek to disable the lock by applying force to a locked operating handle. With the present invention, however, it is not possible to remove the part 40 of the retainer 42 from the aperture in the locking member 14 without correct operation of the lock, and force transmitted to the operating handle, even if that is sufficient to break the operating handle or the internal lock components, will not release the retainer, nor therefore release the locking member.

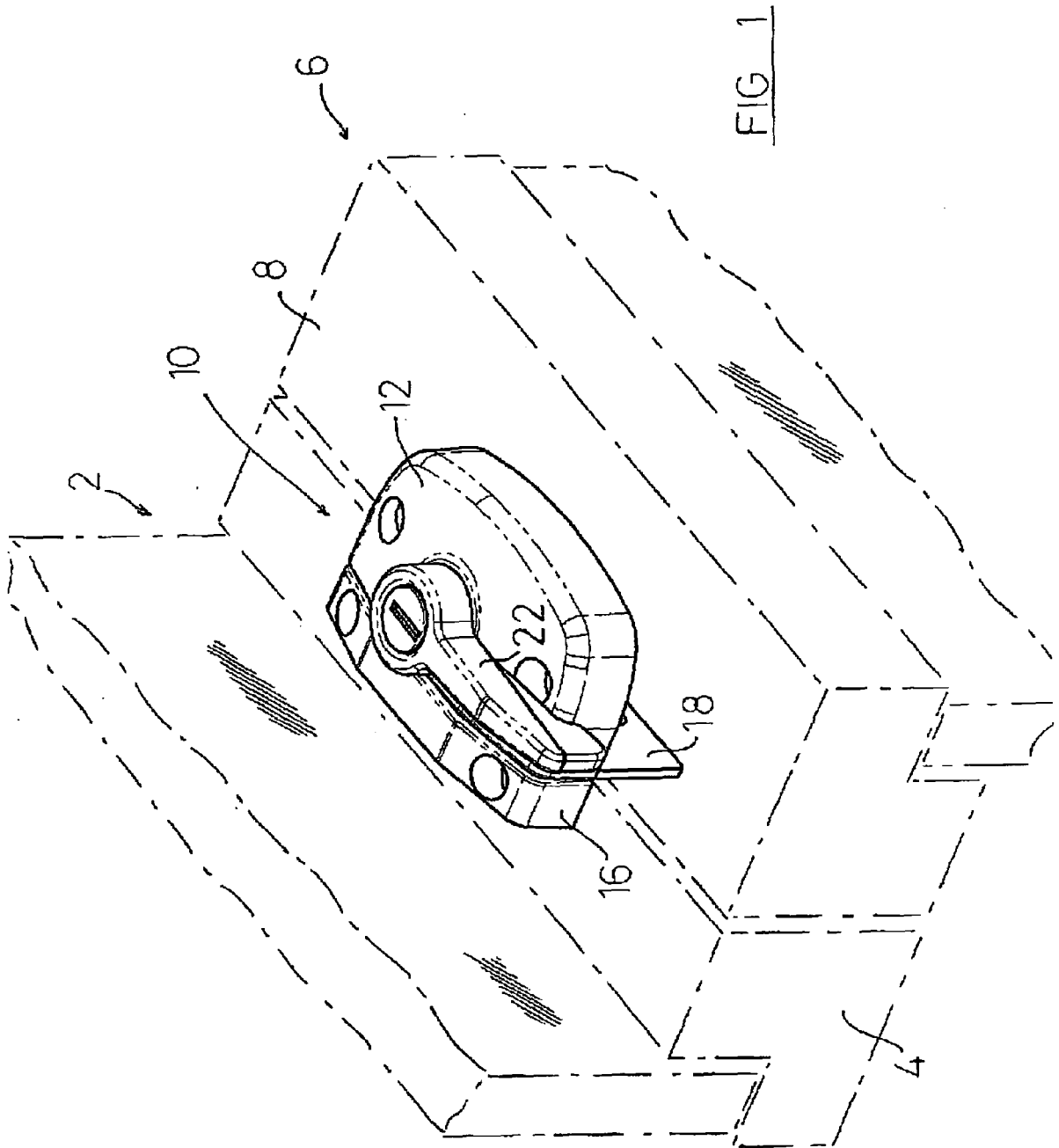
[0035] The preferred form of keeper 16 is shown in Figs. 6 and 7. The keeper 16 comprises a first part 60 and a second part 62, which parts are connected together in the assembled keeper. Making the keeper 16 in two parts allows the most suitable materials to be used for each part. In particular, the first part 60 which includes the tab 34 must be sufficiently strong to withstand the forces expected to be applied by an intending intruder. The first part 60 is ideally a steel pressing. The second part 62 is the only part which is visible when the keeper is mounted upon a window panel and the window is closed (Fig.1), and requires much less mechanical strength than the first part 60. The second part 62 can therefore be made of a less rigid material such as a die-cast metal, and have a form and surface finish to match the housing 12.

[0036] The second part 62 has two mounting holes 64 therethrough for receiving fixing screws or the like (not

shown), and the first part 60 has two aligned holes 66 (only one of which is partially visible in Fig.6). The second part 62 also has two formed lugs 70 which can be located into aligned holes 72 in the first part 60. In the assembled keeper of Fig.7, the lugs 70 have been deformed into rivets to secure the two parts 60,62 together. When the keeper 16 is mounted to the window the rivets are supplemented by the fixings passing through the holes 64 and 66, so that there are four fastenings holding the two parts 60, 62 together and the keeper 16 is substantially rigid.

Claims

1. A locking device (10) comprising a locking member (14) and a keeper (16), the locking member being mounted for rotation in a housing (12), the locking member having a curved locking element (24), the curved locking element being adapted to project from the housing and into a slot (32) of the keeper, the slot having a tab (34) which can be engaged by the curved locking element, the locking member having a leading end (30), the locking device having a key-operated lock (52), **characterised by** a movable retainer (42) having an active condition in which it retains the leading end of the curved locking element
2. A locking device (10) according to Claim 1 in which the retainer (42) is driven to its active condition by the key-operated lock (52).
3. A locking device (10) according to Claim 1 or Claim 2 in which a part (40) of the retainer (42) is adapted to locate in an opening in the leading end (30) of the locking member (14).
4. A locking device (10) according to any one of Claims 1-3 in which the retainer (42) is a metallic rod.
5. A locking device (10) according to any one of Claims 1-4 in which the retainer (42) is pivotably mounted upon a boss (44), the retainer pivoting between its active condition and an inactive condition.
6. A locking device (10) according to Claim 5 in which the housing has a detent (50) adapted to hold the retainer (42) in its inactive condition.
7. A locking device (10) according to any one of Claims 1-6 in which an actuator (54) is connected to the key-operated lock (52), the actuator being adapted to engage the retainer.
8. A locking device (10) according to any one of Claims 1-7 in which the tab (34) extends across the full width of the slot (32).
9. A locking device (10) according to any one of Claims 1-8 in which the keeper (16) comprises a first part (60) and a second part (62), the first part including the tab (34) and the second part comprising a cover element.
10. A locking device (10) according to Claim 9 in which the first part (60) and the second part (62) are made of different materials
11. A locking device (10) according to Claim 9 or Claim 10 in which the first part (60) and the second part (62) together define the slot (32).



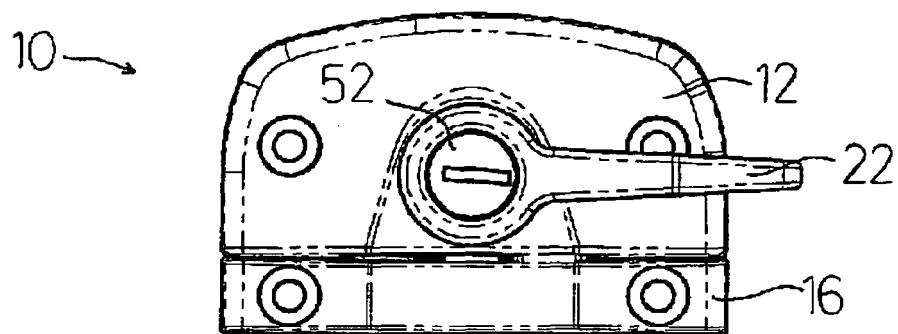


FIG 2

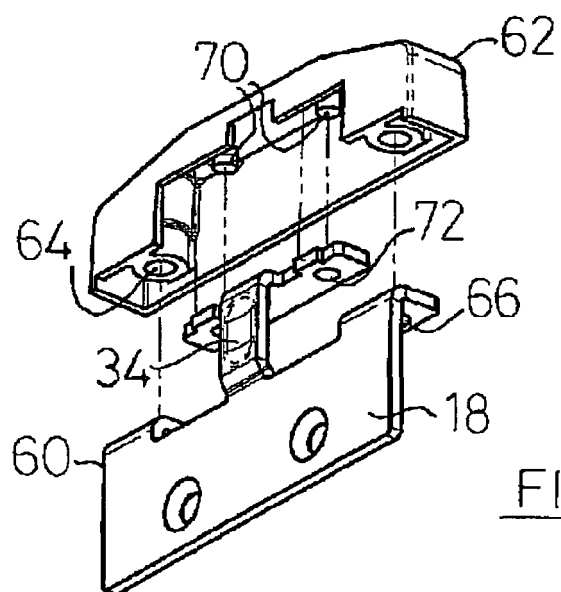


FIG 6

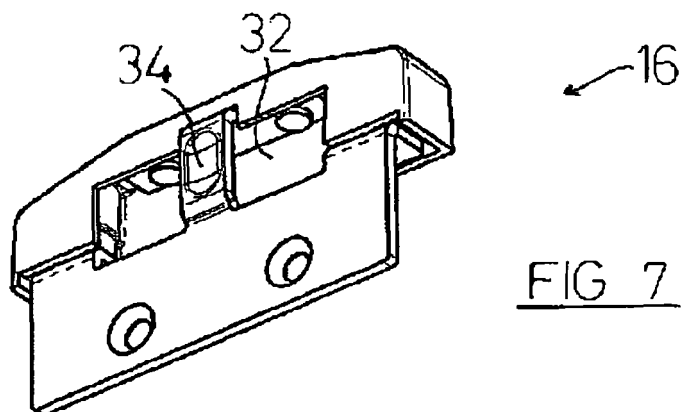


FIG 7

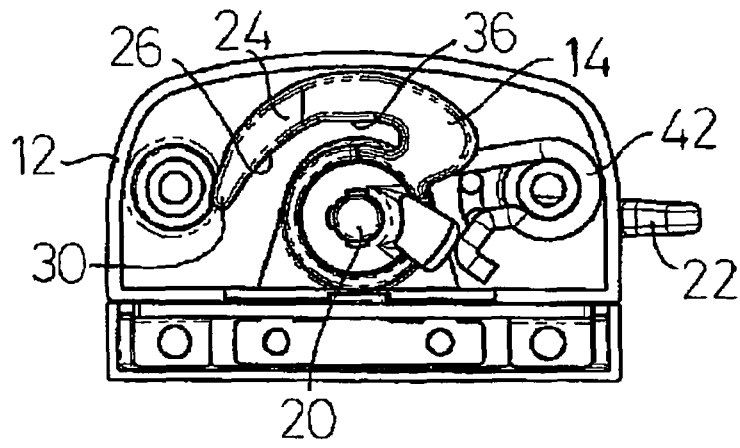


FIG 3

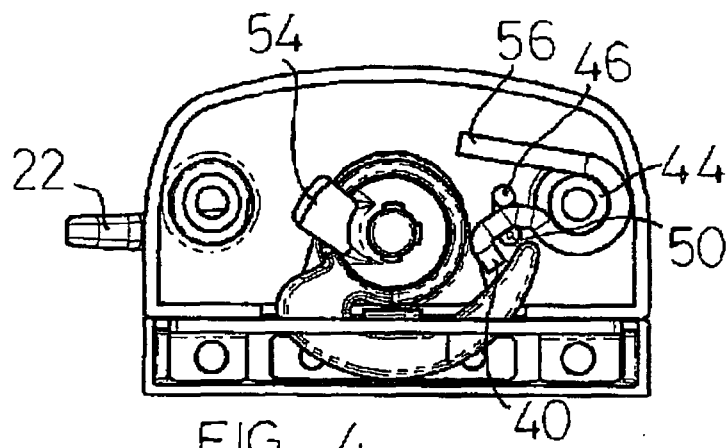


FIG 4

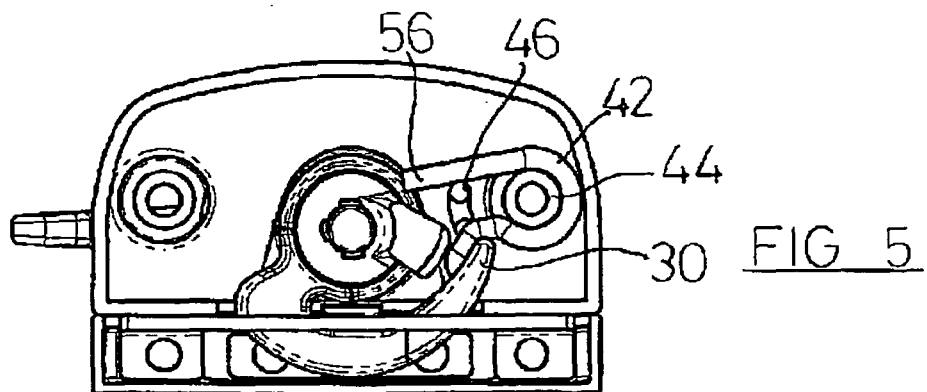


FIG 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2424033 A [0005]