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(54) Lock mechanism

(57) There is described a deadlock assembly for use in conjunction with a cylinder lock, the deadlock assembly comprising a sliding stop moveable upon removal of the cylinder lock barrel from a first dormmt position to a second locking position.

There is also described a method of securing a latch of a door lock in a locked position which comprise the use of such a deadlock.

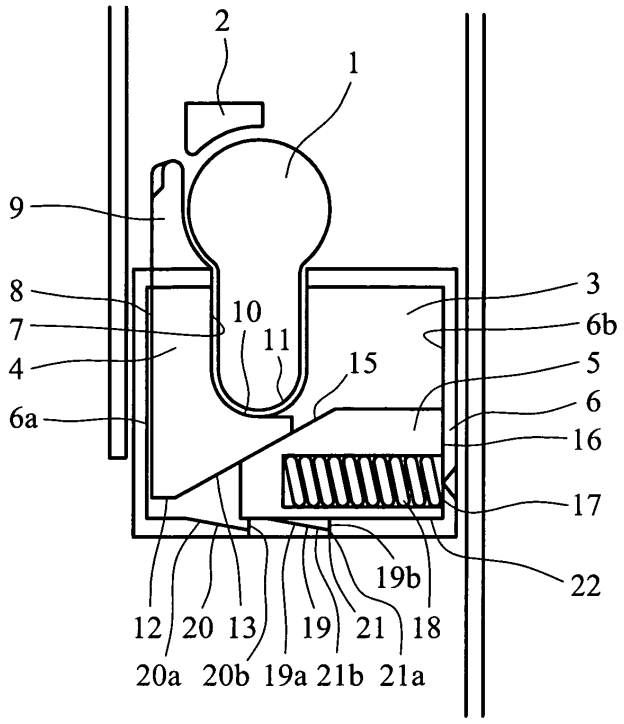

FIG. 1A

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Description

[0001] The present invention relates to a novel lock mechanism and to the use of such a mechanism in preventing an intruder gaining entry to premises.

[0002] It is known that millions of homes across the United Kingdom are at risk because of a design weakness in conventionally used door cylinder locks.

[0003] A cylinder lock is often used in aluminium and UPVC doors. Such a lock operates by the action of a cam in the cylinder which rotates when the key is inserted and turned.

The cam acts on a latch to lock/unlock the door. A conventional cylinder lock barrel has an area of weakness where the lock is provided with a recessed portion facilitating the rotation of the cam.

[0004] Many locks operate security systems such as hook-locks and deadbolts which have helped cut burglaries in recent years. However, it is a common problem that an intruder will simply snap a cylinder lock barrel in two, remove it from the lock housing and then be able to access the latch and operate it with his fingers or a tool such as a screwdriver. This method of entry is being increasingly used by intruders in recent years and this new burglary technique now threatens to undermine even the recent developments in security systems.

[0005] Attempts have been made to develop a new cylinder lock which is designed so that the cylinder lock barrel will still snap cleanly when attached, but remain within the lock housing to prevent the door being opened. However, the cost of such a cylinder is expected to be significantly higher than that of a conventional cylinder lock.

[0006] Other attempts have been made to strengthen the handle faceplates of a lock to prevent the cylinder being attacked or damaged, though such protection may have significant limitations.

[0007] We have now surprisingly found a novel dead lock mechanism which overcomes or mitigates the disadvantages of known prior art systems.

[0008] Thus, according to a first aspect of the invention we provide a deadlock assembly for use in conjunction with a cylinder lock, the deadlock assembly comprising a sliding stop moveable upon removal of the cylinder lock barrel from a first dormant position to a second locking position.

[0009] More particularly, upon removal of the cylinder lock barrel, the sliding stop is moveable from a dormant position into a position in which it prevents movement of the latch or keep of the lock mechanism. Preferentially, the sliding stop is urged into a position wherein it abuts the latch or blocks the projected path of movement of the latch when an attempt is made to unlock the latch.

[0010] Thus, in the dormant position the sliding stop may be urged towards a locking position such that it is urged against the cylinder lock barrel, wherein the cylinder lock barrel acts as a restraint on the sliding stop. Subsequent removal of the cylinder lock barrel, e.g. by an intruder, removes the restraint and enables the sliding stop to be urged into a locking position against or adjacent the latch. Therefore, it is desirable that the surface of the sliding stop that lies adjacent the surface of the cylinder lock barrel is substantially moulded to a shape that corresponds to the surface of the cylinder lock barrel.

[0011] In a preferred aspect of the invention the sliding stop is provided with a non-return mechanism, such that once urged into latch locking position it is hindered or prevented from being returned to the dormant position, e.g. by an intruder. Thus, the non-return mechanism may comprise any conventionally known means, such as a latch, or alternatively, a block. When the non-return mechanism comprises a block it may be a block that is moved into position behind the sliding stop once the sliding stop is moved from the dormant to the locking position.

[0012] In an especially preferred aspect of the invention the non-return block may act to combine the action of blocking with urging the sliding stop from a dormant to a locking position. Thus the non-return block may also be a drive block, e.g. in the form of a plunger.

[0013] We have found that it is especially advantageous if the non-return block is positioned such that it is moveable in a direction perpendicular or substantially perpendicular to the direction of movement of the sliding stop. Such positioning means that attempts by an intruder to return the sliding stop form a locking position to its dormant position will not result in movement of the non-return block.

[0014] Therefore, the deadlock may be positioned in a housing. Furthermore, in an especially preferred aspect of the invention one of the non-return block and the corresponding housing surface is provided with a male member and the other with a corresponding female member, such that once the sliding stop is in the locked position the male and female members cooperate to prevent the return movement of the plunger.

[0015] In an alternative and preferred embodiment of the present invention the deadlock assembly is provided with a locating member which enables the deadlock to be held remote from the cylinder lock barrel. This is particularly advantageous as it avoids snagging or the cam of the cylinder lock barrel against the deadlock and, in particular the sliding stop. Thus, in a preferred embodiment, the locating member comprises at least one lug adapted to engage with the sliding stop. Preferably, the sliding stop is provided with an aperture which substantially corresponds to the lug. Preferably the lug is an integral part of a backplate.

[0016] The remote positioning of the deadlock may be aided by the use of an extended housing, i.e. such that, in use, it extends away from the cylinder lock barrel.

[0017] According to a further aspect of the present invention the deadlock may include a second latch in close association with the keep. It is especially desirable that such an assembly will include a barbed second latch. Preferentially the second latch is pivotally mounted, such

that when the keep is urged to a locking position the barbed second latch is also engaged in a locking position.

[0018] In use deadlock will be activated upon removal, e.g. by an intruder, of a cylinder lock barrel, thus locking the latch of the lock in place such that opening of the lock and the entry of the intruder is prevented.

[0019] The lock of the present invention is advantageous in that, *inter alia,* it may optionally be retrofitted. Thus, in an aspect of the present invention the lock is provided on its own, e.g. for retrofitting. However, in an alternative aspect of the invention, the invention provides a novel composite cylinder lock comprising a conventional cylinder lock in conjunction with a deadlock as hereinbefore described. Furthermore, the barbed latch assembly as hereinbefore described is additionally advantageous in that in the event that the lock is forced, for example, by removal of the lock barrel, the barbed latch will prevent removal of the keep and/or the barbed latch.

[0020] Thus, according to a further aspect of the invention we provide a locking system comprising a deadlock as hereinbefore described in conjunction with a conventional cylinder lock.

[0021] In a yet further aspect of the invention we provide a method of securing a latch or keep of a door lock in a locked position which comprise the use deadlock comprising a sliding stop moveable upon removal of the cylinder lock barrel from a first dormant position to a second locking position as hereinbefore described.

[0022] The deadlock of the invention may be made using conventional materials known *per se.* The sliding stop and the plunger may be made of the same or different material. The materials may optionally be a composite material. Preferably the sliding stop and the plunger are made of the same material and shall be robust and have suitable gliding properties. Thus plastics materials are especially suitable, such as engineering plastics. Examples of such engineering plastics include polycarbonates, polysulphides, polyimides, and polybutylene terephthalate. Other examples include materials such as UHMWPE. An especially preferred material is acetal (polyoxymethylene).

[0023] The invention will now be described by way of example only and with reference to the accompanying drawings in which Figure 1A is a schematic representation of the deadlock according to the invention in the dormant position with a cylinder lock barrel in place;

[0024] Figure 1B is a schematic representation of the deadlock according to the invention in the locked position with a cylinder removed;

[0025] Figure 2A is a schematic representation of an additional preferred embodiment of the invention in which an additional plastics housing is provided, the lock illustrated is in the unlocked position;

[0026] Figure 2B is a perspective representation of the assembly of Figure 2A in the locked position;

[0027] Figure 2C is a perspective representation of the assembly of Figure 2A when the cylinder lock barrel is removed and the deadlock is triggered;

[0028] Figure 3A is a schematic representation of a door lock of the invention comprising a barbed latch in the unlocked position; and

[0029] Figure 3B is a schematic representation of a door lock of the invention comprising a barbed latch in the locked position.

[0030] The invention illustrated in the drawing operates such that if the cylinder lock barrel is removed the spring biased plunger urges the sliding stop into a position that discretely blocks any movement of the latch.

[0031] Referring to Figure 1A, a conventional door lock comprises a cylinder lock barrel (1) and a cylinder lock latch (2). A deadlock (3) according to the invention comprises a sliding stop (4) and a plunger (5) in a housing (6).

[0032] The sliding stop (4) comprises a first surface (7) adjacent the cylinder lock barrel (1) and a second surface (8) adjacent and abutting the inner wall (6a) of the housing (6). The sliding stop (4) comprises a spigot (9) adjacent the latch (2) but lying out of the plane of the latch (2). The first surface (7) of the sliding stop (4) is shaped to reflect the shape of the cylinder lock barrel (1). The sliding stop (4) is provided with a shoulder (10) which abuts the base portion (11) of the cylinder lock barrel (1). The base (12) of the sliding stop (4) comprises a chamfered surface (13).

[0033] A plunger (5) is slidably mounted in the housing (6) and is provided with a chamfered surface (15) adjacent and corresponding to the sliding stop chamfered surface (13). The opposing surface (16) of the plunger (5) abuts the inner surface (6b) of the housing (6). The surface (16) of the plunger (5) is also provided with a hollow chamber (17) which houses a spring (18). In figure 1 the spring (18) is compressed.

[0034] The base of the housing (6) is provided with a first and second recess (19 and 20) adapted to cooperates with a tooth (21) in the slidable surface (22) of the plunger (5). Each of the recesses (19 and 20) comprises an inclined base (19a and 20a) and a shoulder (19b and 20b). The tooth (21) comprises a lip (21 a) and a tapered ridge (21b), such that, in figure 1, the base (19a) and shoulder (19b) cooperate with the lip (21 a) and a tapered ridge (21b) of the tooth (21).

[0035] Referring to Figure 1B, a conventional door lock comprises a cylinder lock barrel (1) which has been removed and a cylinder lock latch (2). Therefore, the base portion (11) of the cylinder lock barrel (1) is no longer present and is unable to prevent movement of the shoulder (10) of the sliding stop (4).

[0036] The spring (18) urges the plunger (5) to slide along the base (6c) of the housing (6) such that the tooth (21) slides out of the first recess (19) into the second recess (20). The lip (21a) of the tooth (21) engages with the shoulder (20b) of the recess (20) to prevent the plunger (5) from being moved in the event of downward pressure, e.g. by an intruder, on the shoulder (10) of the sliding stop (4).

[0037] Upon sliding the plunger (5), the chamfered surface (15) of the plunger (5) is urged against the corre-

sponding chamfered surface (13) of the sliding stop (4), thus urging the sliding stop (4) to slide away from the base (6c) of the housing (6). The spigot (9) of the sliding stop (4) moves into a position adjacent in the plane of the latch (2) and thus prevents movement and/or release of the latch (2), e.g. by an intruder.

[0038] Referring to Figure 2A a conventional door lock comprises a backplate (23), cylinder lock barrel (24) and a keep (25). The deadlock (26) according to the invention comprises a sliding stop (27) and a plunger (28) in a housing (29).

[0039] The sliding stop (27) and plunger (28) operate together in the same manner a described in Figures 1A and 1B.

[0040] The backplate (23) is provided with a first and second lug (30 and 31) along its edge (32). The arm (33) of the sliding stop (27) is provided with an aperture (34) which substantially corresponds with the first lug (30) such that the sliding stop (27) is slidably mounted on the first lug (30). The position of the lug (30) is such that the sliding stop (27) is held remote from the cylinder lock barrel (24).

[0041] The housing (29) is also provided with an aperture (35) which substantially corresponds with the first lug (30). The housing (29) is also provided with an arm (36) which locates against and extends beyond the sliding stop (27). A peripheral end (37) of the arm (36) is provided with a shoulder (38) which abuts against the second lug (31), thus the housing (29) is retained in position even if the sliding stop (27) moves.

[0042] The arm (33) of the sliding stop (27) is provided at its end (39) with a lip (40). The lip (40) is adapted to engage with a corresponding groove (41) on the side (42) of the keep (25). This prevents the arm (33) from being inadvertently dislodged and the assembly being triggered.

[0043] Referring to Figure 2B, the deadlock assembly (26) is in the set position except that the keep (25) is in the locked position. Thus, the lip (40) of the sliding stop arm (33) is disengaged from the groove (41) and the sliding stop (27) is only prevented from being triggered by the presence of the cylinder lock barrel (24).

[0044] Referring to Figure 2C, the cylinder lock barrel (24) is absent and the deadlock (26) is triggered such that the cylinder lock barrel (24) is no longer able to prevent movement of the shoulder (42) of the sliding stop (27) when it is urged into position by the spring biased plunger (28).

[0045] Referring to Figures 3A and 3B, the deadlock assembly (26) includes an outer wall plate (29) and a keep (25) in the unlocked position. The keep (25) has a body (30), protruding arm (31) and shoulder (32). The arm (31) is provided with a spindle (33). The spindle (33) is located in a channel (34), the channel (34) being angled such that when the keep (25) is moved from an unlocked to a locked position and the keep (25) is urged towards the plate (29), the spindle (33) travels along the channel (34), raising the keep (25).

[0046] A second latch (35) is pivotally mounted about the keep (25) and rests in the shoulder (32) of the keep (25). The latch (35) is provided at is outer end (36) with a barb (37). The inner end (38) is provided with a shoulder (39). The surface (40) of the latch (35) between the shoulder (38) and the barb (37) is angled, such that in operation, when the keep (25) is operated, the shoulder (38) of the latch (35) is urged against the plate (29), when the shoulder (38) of the latch (35) substantially abuts the plate (29), the latch (35) is angled upwards, causing the barb (37)) to engage with the lock cavity (not shown).

[0047] Thus, retraction of the keep (25) by unlocking the door simply allows the latch (35) to retract. However, in the event that the lock is forced, for example, by removal of the lock barrel (24) the barbed latch (35) will prevent removal of the keep (25) and/or the latch (35).

Claims

1. A deadlock assembly for use in conjunction with a cylinder lock, the deadlock assembly comprising a sliding stop moveable upon removal of the cylinder lock barrel from a first dormant position to a second locking position.

2. A deadlock according to claim 1 wherein the cylinder lock barrel is provided with a latch as part of the lock mechanism.

3. A deadlock according to claim 2 wherein the sliding stop is moveable from a dormant position into a position in which it prevents movement of the latch of the lock mechanism.

4. A deadlock according to claim 1 wherein in the dormant position the sliding stop is urged towards a locking position such that it is urged against the cylinder lock barrel and wherein the cylinder lock barrel acts as a restraint on the sliding stop.

5. A deadlock according to claim 1 wherein the surface of the sliding stop that lies adjacent the surface of the cylinder lock barrel is substantially moulded to a shape that corresponds to the surface of the cylinder lock barrel.

6. A deadlock according to claim 1 wherein the deadlock assembly is provided with a locating member which enables the deadlock to be held remote from the cylinder lock barrel.

7. A deadlock according to claim 1 wherein the sliding stop is provided with a non-return mechanism.

8. A deadlock according to claim 1 wherein the deadlock includes a second latch in close association with the keep.

9. A deadlock according to claim 34 wherein the latch is a barbed latch.

10. A deadlock according to claim 34 wherein the second latch is pivotally mounted, such that when the keep is urged to a locking position the barbed latch is also engaged in a locking position.

11. A composite cylinder lock comprising a conventional cylinder lock barrel in conjunction with a deadlock according to claim 1.

12. A deadlock according to claim 1 in conjunction with a conventional cylinder lock.

13. A method of securing a latch of a door lock in a locked position which comprise the use deadlock comprising a sliding stop moveable upon removal of the cylinder lock barrel from a first dormant position to a second locking position:

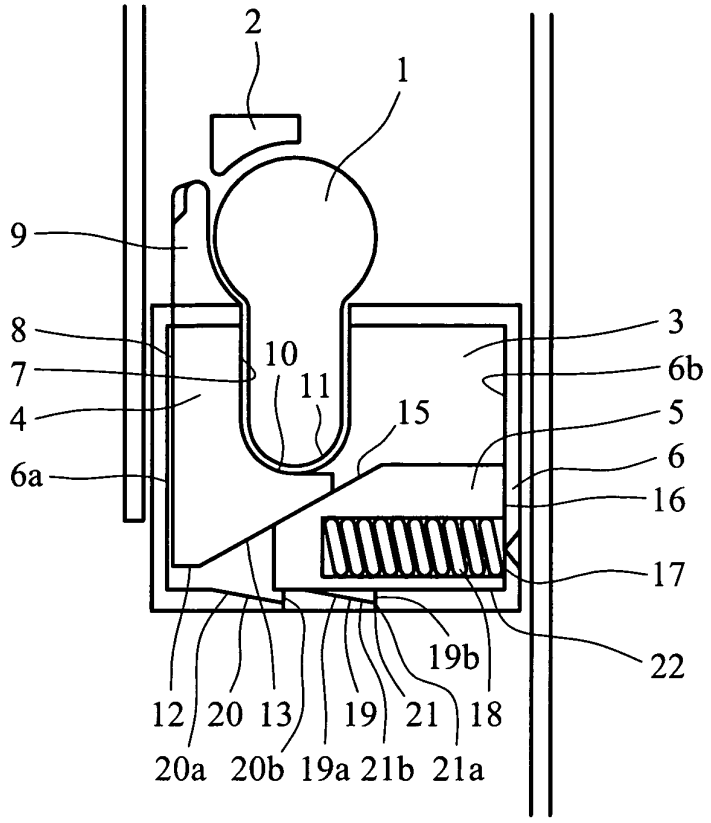
2
1
9
8
7
4
6a
10
11
15
3
6b
5
6
16
17
22
19b
12
20
13
19
21
18
20a
20b
19a
21b
21a

FIG. 1A

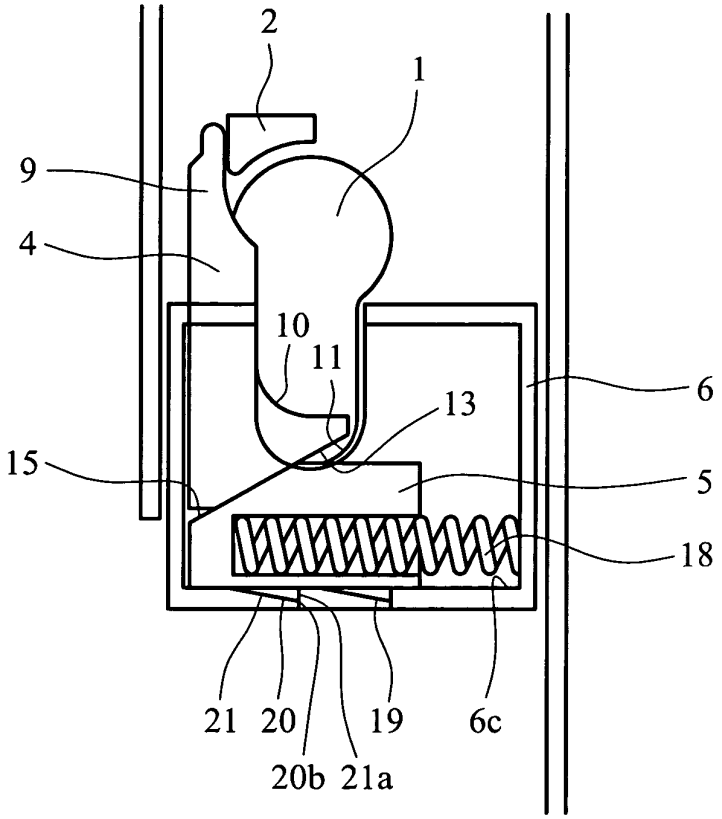
2
1
9
4
10
11
13
6
15
5
18
21
20
19
6c
20b
21a

FIG. 1B

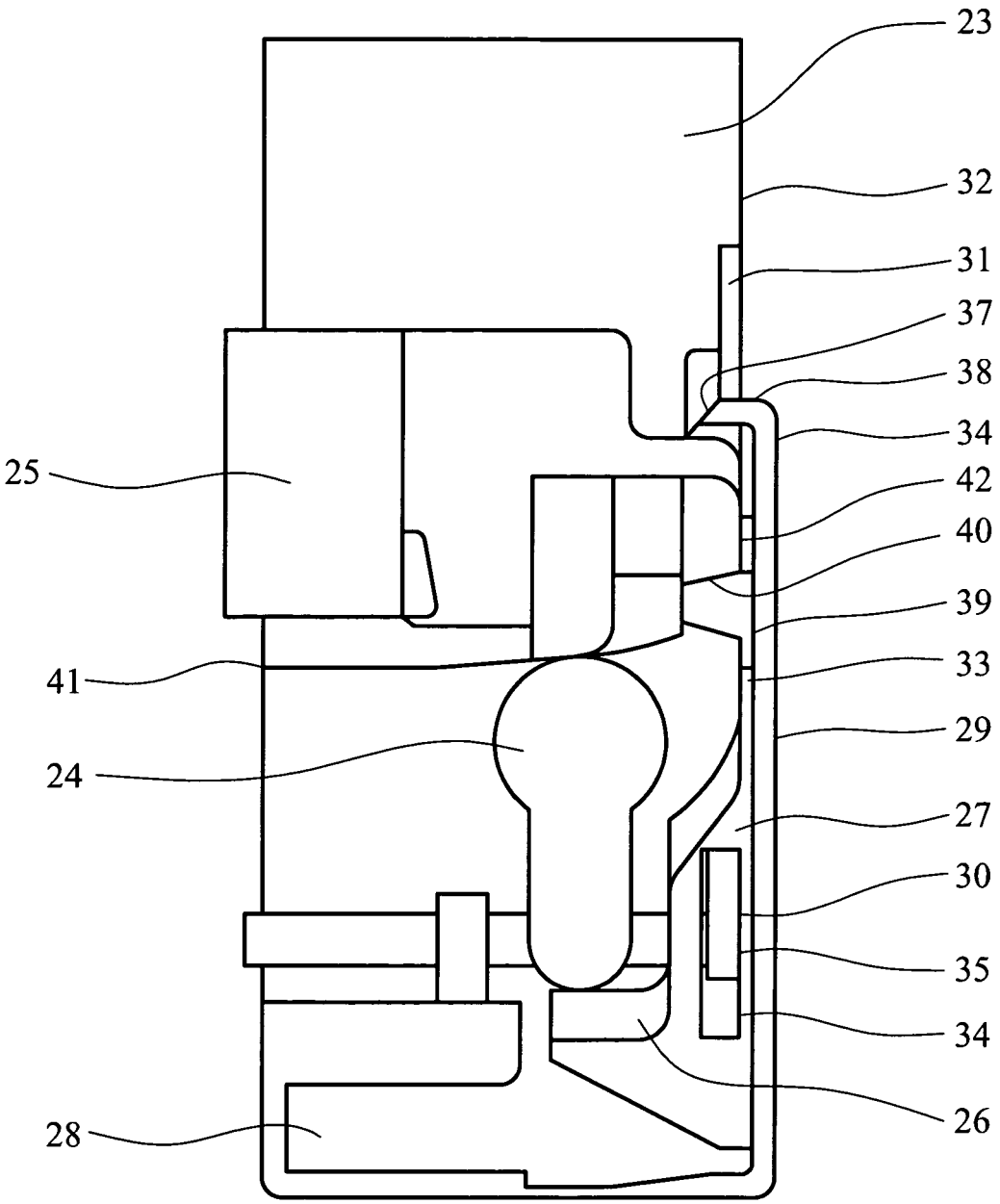

FIG. 2A

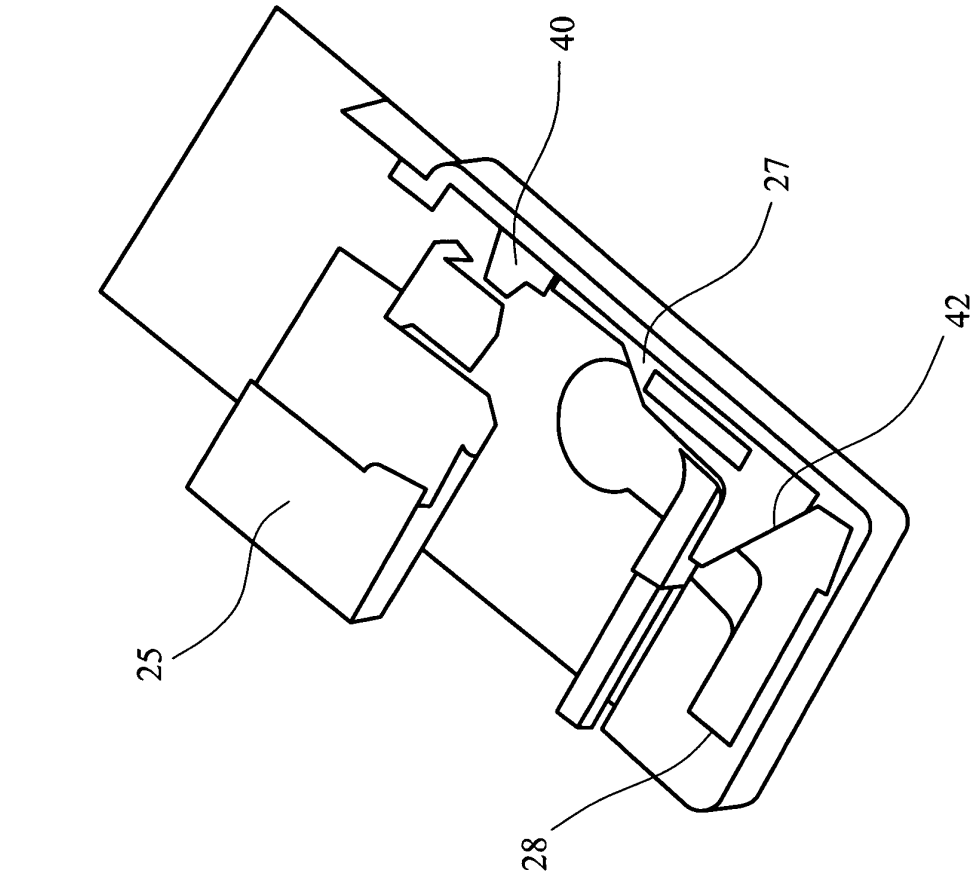

FIG. 2C

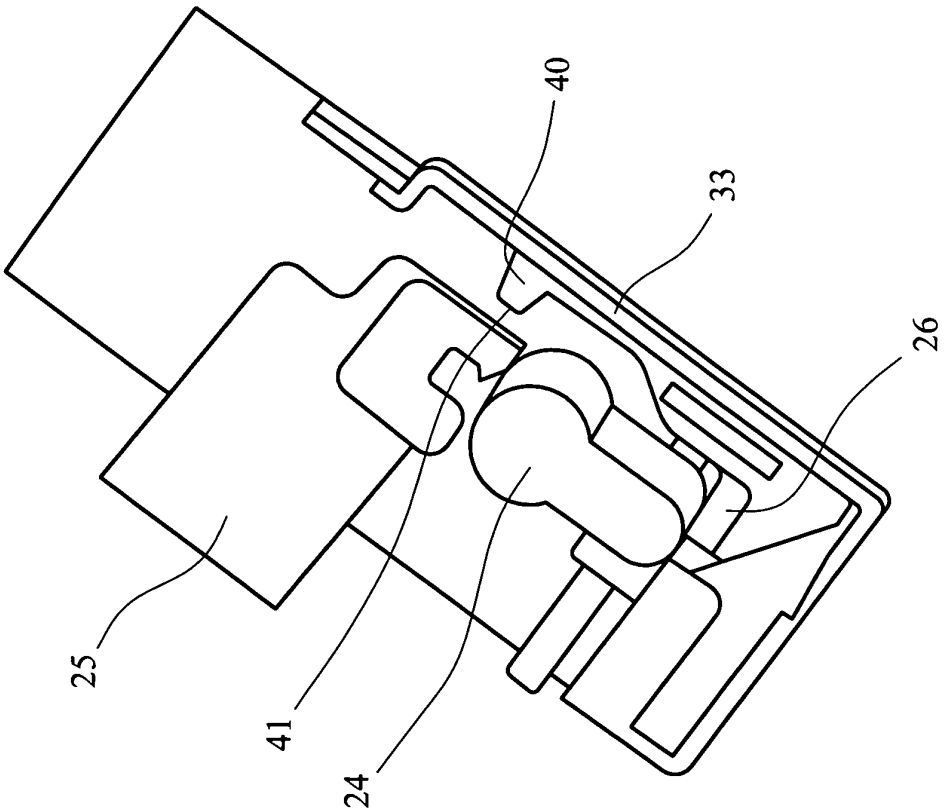

FIG. 2B

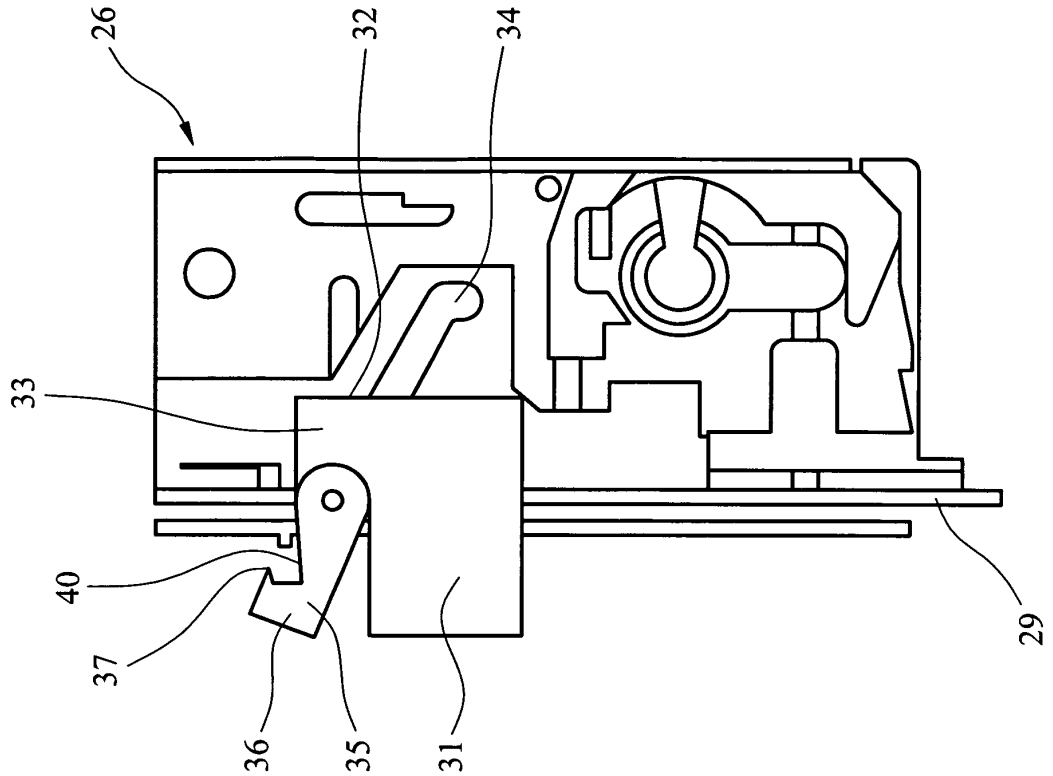

FIG. 3B

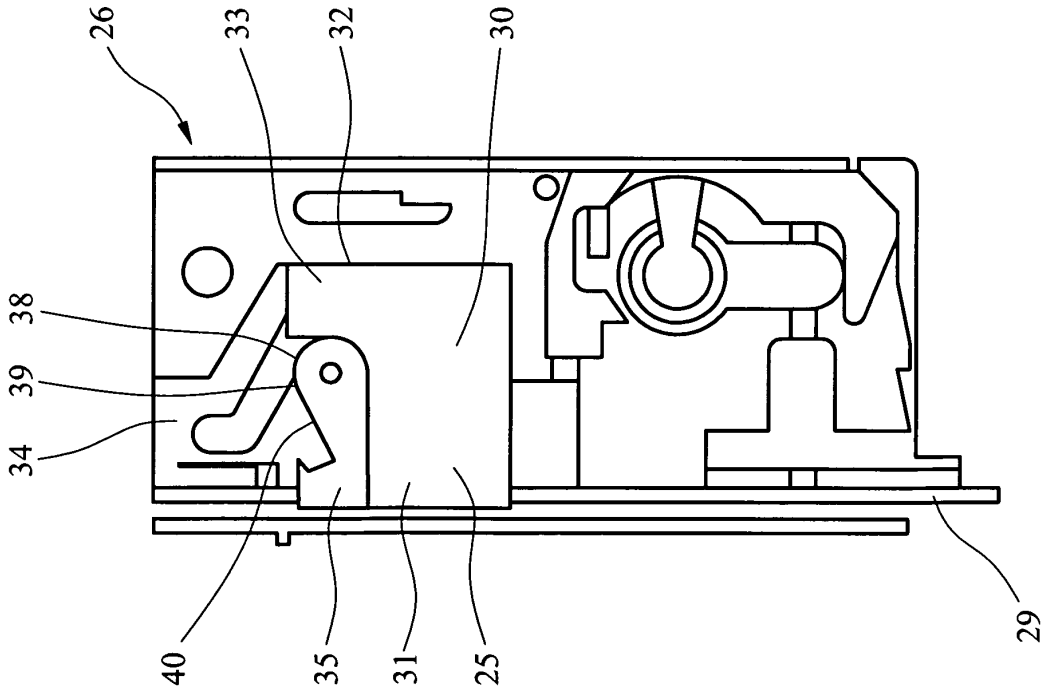

FIG. 3A

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EUROPEAN SEARCH REPORT

Application Number
EP 07 02 1906

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	DE 39 09 584 A1 (DROSTE DIETER FRHR VON [DE]; DROSTE LOTHAR FRHR VON DIPL PH [DE]) 27 September 1990 (1990-09-27) * column 3, line 21 - line 45; figures *	1-3,6, 11-13	INV. E05B17/20 E05B63/12
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 April 2008	Westin, Kenneth

CATEGORY OF CITED DOCUMENTS

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21-04-2008

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