



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**05.07.2017 Bulletin 2017/27**

(51) Int Cl.:  
**E05B 65/10 (2006.01)**

(21) Application number: **15203001.1**

(22) Date of filing: **29.12.2015**

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

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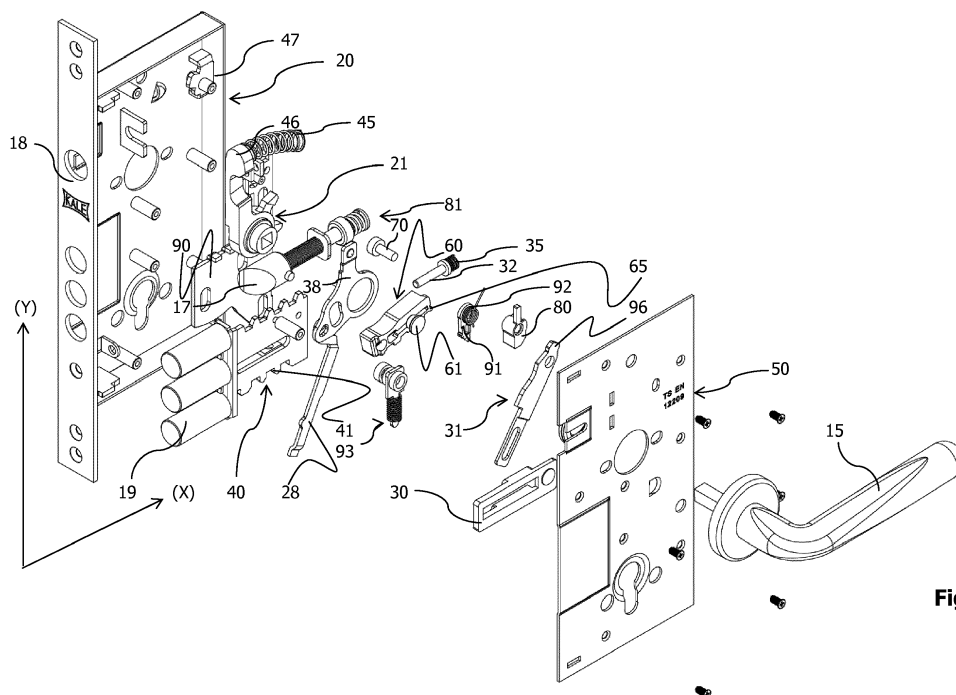
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(54) **A LOCK FOR EMERGENCY EXIT**

(57) The present invention proposes a lock (10) for emergency exit comprising a body (20), a cylinder lock (16) located in the body (20), a bolt member (40) having at least one locking bolt (19), a plate (90), a latch bolt assembly (81) having a latch bolt (17), a spindle hub (21) for transferring movement received from the handle (15). Said lock further comprises a spindle hub spring (45) suitable to be compressed by rotation of the spindle hub (21), an elevating tab (25) protruding from the spindle hub (21), a plate pin (32) which may engage with the

elevating tab (25) by rotating the spindle hub (21) in clockwise direction, and which is associated with the plate (90) and capable of elevating the plate (90) upon the release of force exerted on the spindle hub spring (45), a bolt intermediate member (31) associated with the bolt member (40), and a bolt pusher apparatus (60) for applying pressure on the bolt intermediate member (31) such that it enables retraction of the locking bolts (19) into the body (20) when the plate (90) is elevated.



**Fig. 3**

## Description

### Technical Field of the Invention

[0001] The present invention relates to a lock, and more particularly to a lock enabling a rapid exit in case of an emergency.

### Background of the Invention

[0002] As is known, there are currently several types of locks with emergency function on the market. In order to open a door in case of emergency, locking bolts are retracted just by turning the handle. A prior art publication in the technical field of the present invention may be referred to as DE202004007383 among others, the document disclosing a lock with a rapid unlocking mechanism having a front plate mounted on a frame, a drive rod displaceably mounted in the frame, a latch retractably mounted on the front plate and fixed on the first end of the drive rod, and a releasing mechanism having a first end retractably mounted in the front plate and a second end having a number of lock grooves. It is also disclosed that, in case of emergency, the plate is lifted by pressing on the handle downwards within the door, in which case the locking bolt is automatically retracted. Since the compressing spring is biased while the locking bolts are being slid, it is necessary for the user to perform an action against the compression spring for every locking action. Furthermore, in such lock mechanisms, slightly turning the handle results in unlocking of the lock, which cause accidental opening of door and creates security flaws in case of insensible use.

[0003] In the prior art, the locks with emergency function allow the locking bolt to be brought into a closed position in one round by turning the key, thereby causing use of a lock mechanism with a low safety limit. Due to the fact that said option of locking and opening with a handle is uncontrollable, pressing on the handle, in each case, causes unlocking of the locking bolts and thus results in security weakness. This limits flexibility of the user.

[0004] It is undesirable that those persons unaware of emergency exit function or children press to the door handle and cause the locking bolts to be directly retracted, thereby bringing the lock to an unlocked position. There is a need for a lock for emergency exit function with increased safety avoiding precluding such accidental opening.

### Object of the Invention

[0005] A main object of the present invention is to provide a lock with emergency function which allows a rapid unlocking of a door in case of emergency while avoiding an easy unlocking of the door as a result of insensible use.

[0006] Another object of the invention is to provide a lock for emergency exit wherein the system is activated,

at the final movement of the lock handle, to unlock the lock so that it remains inactivated during the movement of the handle until a certain level is reached and wherein security problems arising from insensible use are eliminated.

[0007] Yet another object of the present invention is to provide a lock for emergency exit with increased safety, which has a three-round locking feature in addition to an emergency exit function.

### Summary of the Invention

[0008] The present invention proposes a lock for emergency exit comprising a body, a cylinder lock located in the body, a bolt member having at least one locking bolt, a plate, a latch bolt assembly having a latch bolt, a spindle hub for transferring movement received from the handle. Said lock further comprises a spindle hub spring suitable to be compressed by rotation of the spindle hub, an elevating tab protruding from the spindle hub, a plate pin which may engage with the elevating tab by rotating the spindle hub in clockwise direction, and which is associated with the plate and capable of elevating the plate upon the release of force exerted on the spindle hub spring, a bolt intermediate member associated with the bolt member, and a bolt pusher apparatus for applying pressure on the bolt intermediate member such that it enables retraction of the locking bolts into the body when the plate is elevated.

### Brief Description of the Figures

[0009] The lock for emergency exit according to the present invention is illustrated in the accompanying drawings for better understanding, which drawings are merely provided to illustrate the invention and should not be construed as limiting thereof.

Figure 1 is a perspective view of the lock according to the present invention.

Figure 2 is a perspective view of the inner mechanism of the lock according to the present invention, where the lock cover is removed.

Figure 3 is an exploded view of the lock according to the present invention.

Figure 4 is an exploded view of the lock according to the present invention, where some components are removed.

Figure 5a is a top view of the lock according to the present invention, where the locking bolts are not slid.

Figure 5b is a top view of the lock according to the present invention, where the locking bolts are

brought to the first round.

Figure 5c is a top view of the lock according to the present invention, where the locking bolts are brought to the second round.

Figure 5d is a top view of a position of the lock according to the present invention, where the locking bolts are brought to the third round.

Figure 5e is a top view of the lock according to the present invention, where the locking bolts are set in the third round and the handle is pressed to allow the plate pin to step up on the elevating tab.

Figure 5f is a top view of the lock according to the present invention, where the locking bolts are set in the third round and pressure on the handle is released to allow the elevating tab to elevate the plate pin and the plate by means of the spring force.

Figure 6 is a top view of lock according to the present invention, where the locking bolts are retracted.

### Detailed Description of the Invention

**[0010]** The invention will now be explained in detail with reference to the enclosed drawings, and the reference list used in the drawings is as follows;

- 10. Lock
- 15. Handle
- 16. Cylinder lock
- 17. Latch bolt
- 18. Faceplate
- 19. Locking bolt
- 20. Body
- 21. Spindle hub
- 25. Elevating tab
- 26. Spindle hub plate
- 28. Follower arm
- 29. Spindle hub tab
- 30. Support member
- 31. Bolt intermediate member
- 32. Plate pin
- 33. Spring
- 34. Plate pin housing
- 35. Plate pin spring
- 38. Follower
- 40. Bolt member
- 41. Bolt member teeth
- 45. Spindle hub spring
- 46. Spindle hub spring support
- 47. Spindle hub support
- 50. Lock cover
- 60. Bolt pusher apparatus
- 61. Spring pusher pin
- 65. Claw

- 70. Rotary member pin
- 80. Rotary member
- 81. Latch bolt assembly
- 90. Plate
- 5 91. Spring fastener
- 92. Fastener spring
- 93. Plate spring
- 94. Key
- 95. locking teeth
- 10 96. Upper protrusion
- X Horizontal axis of the lock
- Y Longitudinal axis of the lock

A lock (10) for emergency exit according to the present invention mainly comprises a body (20), a bolt member (40) located in said body (20) and including a plurality of locking bolts (19) at one end, a cylinder lock (16) for sliding and retracting the lock member (40), a latch bolt assembly (81) with a latch bolt (17), a plate (90) having at least one locking teeth (95) suitable for moving upwards and downwards along longitudinal axis of the lock (+Y, -Y), a spring-loaded spindle hub (21) to which the user will transfer movement by turning a handle (15) and a spindle hub spring (45), at least one elevating tab (25) and spindle hub tab (29) protruding from the said spindle hub (21), a plate pin (32) which is elevated upwards (+Y) by the elevating tab (25) and is associated with the plate (90), a rotary member (80) which is also associated with the plate pin (32) and a bolt pusher apparatus (60) for retracting the locking bolt (19) into the body (20) upon the release of the pressure created by the rotation of the handle (15). As is well known in the art, cylinder lock (16) is used to retract locking bolts (19), by suitable linkage with follower (38) or other mechanism.

**[0011]** In accordance with an embodiment of the invention, the lock (10) enables unlocking of door by rapidly retracting the locking bolts (19) into the body (20), which are in a locked position, in case of emergency situations such as fire, earthquake, gas leakage and the like, thanks to the emergency exit function. The bolt member (40) having a plurality of bolt member teeth (41) is actuated by means of a key (94) suitable for the cylinder lock (16).

**[0012]** Referring to the figure 3, a hollow spindle hub (21) interacts with the spindle hub spring (45) in such a way that it transfers the movement received from the handle (15) inside the body (20) upon the user turns the handle (15) downwards direction with respect longitudinal axis of the lock (Y). An end of the spindle hub spring (45) pushes against the spindle hub support (47) connected to the body (20) and the other end thereof presses on the spindle hub spring support (46). When the user turns the handle (15), the spindle hub spring support (46) protruding over the spindle hub (21) compresses the said spindle hub spring (45) against the spindle hub support (47). With reference to Figure 6, the spindle hub tab (29) which is the other tab protruding over the spindle hub (21) rests on the bolt pusher apparatus (60) in order enable it to move in the downwards direction with respect

to the longitudinal axis of the lock (-Y). As it is apparent from Figures 5a to 5e, when the user turns the handle (15), the spindle hub (21) is rotated together with the handle (15). By turning the handle (15), the elevating tab (25) rests on the plate pin (32) and moves under the plate pin (32) at the subsequent step whereas the other spindle hub tab (29) presses against the upper surface of the bolt pusher apparatus (60) to bring the bolt pusher apparatus (60) to the horizontal position of the lock. As seen from Figure 5e, when the handle (15) is pressed, the spindle hub tab (29) also presses against the pusher apparatus (60) so as to bring it to a position parallel to the lock horizontal plane (X). At this stage, a protruding claw (65) provided on the one edge of the bolt pusher apparatus (60) matches with a corresponding claw provided on the spring fastener (91) and locks to the bolt pusher apparatus (60) so that it remains in an horizontal position (X) with respect to the horizontal axis of the lock (X); and when the plate (90) is elevated as in figure 5f, the spring pusher pin (61) of the bolt pusher apparatus (60), which is already biased, strongly pushes the bolt intermediate member (31) in order to retract the locking bolts (19) inside the body (20). In other words, when the handle (15) is turned by the user, on one hand, the bolt pusher apparatus (60) is brought in a horizontal position and on the other hand, the plate pin (32) moves onto the elevating tab (25) at the final stage of the movement. In addition to that when the user releases the handle (15), the plate (90) is elevated upwards direction (+Y) by the elevating tab (25) so that locking tooth (95) of the plate is elevated and the bolt member (40) is released to move along the horizontal direction of the lock (+X, -X). The release of the spring pusher pin (61) compressed in the bolt pusher apparatus (60) causes to the bolt intermediate member (31) to be pushed and thus the locking bolts (19) are retracted into the body (20).

**[0013]** When the user releases the pressure exerted on the handle (15), as shown in figure 5f, the spindle hub spring (45) is released so that the spindle hub spring (45) pushes the spindle hub (21) in the direction opposite to that in which the spindle hub (21) is compressed in order to advance the elevating tab (25) provided on the spindle hub (21) in the direction +Y. In this way, the plate pin (32) on the elevating tab (25) and the plate (90) associated with the plate pin (32) are also elevated. As previously mentioned, an end of the apparatus claw (65) is in the form of a protrusion, which matches with an opposite respective housing in the spring fastener (91) when it is taken into an exact horizontal position with respect to the horizontal axis of the lock. The said spring fastener (91) is also associated with a fastener spring (92) and maintains the bolt intermediate member (31) under pressure.

**[0014]** In operation, the mechanism works as follows: assuming that the mechanism is in the locked state as illustrated in Figure 5d, i.e., the door is closed, the latch bolt is locked, in order to unlock and open the door, the handle has to be turned in a clockwise direction. When the handle is so turned, the spindle hub (21) will also

rotate in a clockwise direction whereupon elevating tab (25) and spindle hub tab (29) will also rotate in a clockwise direction. When the lock mechanism is in the state as illustrated in figure 5e the elevating tab (25) will about the plate pin (32) to force the plate upwardly. This will cause the plate locking teeth (95) of the plate to move upwardly, as seen in Figure 5f. When the plate (90) is moved upwardly, it will assume the position illustrated in Figure 5f so that at least one plate locking teeth (95) no longer will prevent bolt member (40) from being retracted into the body (20).

**[0015]** In accordance with an embodiment of the invention, referring to the Figure 2, the plate (90) is spring-loaded by a plate spring (93) which is preferably located at the right lower corner and it is maintained at the desired position by means of a spring provided therein. A plurality of plate locking teeth (95) provided on the plate (90) match with the bolt member teeth (41) on the bolt member. As it is apparent from Figure 5e, when the user lowers the handle (15) to the final stage, the plate pin (32) moves onto the elevating tab (25), wherein the elevation of the plate pin (32) which has passed through at least one plate pin housing (34) provided on the plate (90) also enables elevation of the plate (90). The locking bolts (19) engaged with the teeth provided on the plate (90) lose their function when the plate (90) is moved in the upward direction (+Y) and allows the locking bolts (19) to be retracted into the body (20), as shown in figure 6.

**[0016]** Referring to the fig 5.a, in a wrong or undesired use, if the handle is not fully pressed or rotated, the elevating tab (25) will not engage with the plate pin (32) as shown in fig. 5e. Engagement of the plate pin (32) with the elevating tab (25) is understood from a snap noise. As shown in Figure 5e, release of the handle (15) allows the plate (90) to be elevated with the pressure of the spindle hub spring (45) acting on the spindle hub (21). With reference to Figure 5f, after the said plate (90) is lifted in the upward direction (+Y), it is allowed to return back to the body (20) due to the spring force applied on the bolt intermediate member (31) to retract the bolt member (40) and associated locking bolts (19) in order to inactivate the lock (10).

**[0017]** Referring to the Figure 6, when the said locking bolts (19) are retracted, they strike to the rotary member (80) by means of an inclined upper protrusion (96) on the bolt intermediate member (31), so as to allow the rotary member (80) to remain inactivated, so the spring is prevented from being set in case of pointless actuation of the handle by the user and the plate pin (32) is prevented from moving onto the elevating tab (25). The tabs provided under the bolt intermediate member (31) strike on the spring fastener (91) while the locking bolts (19) are drawn back and inactivate it so that the tab on the bolt pusher apparatus (60) is released from the spring fastener tab. In this way, the bolt pusher apparatus (60) remains inactive in case of wrong or desired usage.

**[0018]** Figure 5a to 5f represents the positions assumed by the locking bolts (19) when they are retracted

into the lock in case of emergency and in which the lock is turned by three times. The plate pin (32) associated with the plate (90) is always pushed towards the spindle hub (21) by means of a plate pin spring (35) located at the rear side thereof, but the rotary member (80) connected to the plate inactivates the plate pin (32) or activates it based on the position of the bolt intermediate member (31). For example, in figure 6, the rotary member (80) that is associated with the plate pin (32), with the locking bolts (19) are retracted, enables the plate pin (32) to remain inactive against the movements received from the spindle hub (21) with the support of the bolt intermediate member (31). The upper protrusion (96) on the upper side of the bolt intermediate member (31) exerts pressure on the rotary member (80) while the locking bolts are retracted, and inactivates the rotary member (80), as seen in figure 6.

**[0019]** In figure 5a, the bolt pusher apparatus (60) having a channel such that a spring (33) and the spring pusher pin (61) are guided therein pushes the spring member (61) towards the bolt intermediate member (31) with the spring force when the bolt member (40) is released. In figure 5b, the bolt member (40) which is turned by one round compresses the spring (33) provided in the bolt pusher apparatus (60), as is seen. In figure 5f, the spring (33) which has reached to the final compression stage and the plate is elevated, so that bolt member (40) are pushed and retracted into the body by means of the spring pusher pin (61).

**[0020]** Said body (20) of the lock (10) is formed as a rectangular prism, a faceplate (18) extending as an elongated plate that is associated with a lateral edge of the body, a lock cover (50) to be closed on the body (20) and a retractable latch bolt (17) originating from the handle (15). In a preferred embodiment of the invention, replacement of the cylinder lock (16) with other suitable mechanism can be understood for the skilled person. In other words, it is possible to move the bolt member (40) with suitable different locking mechanisms.

**[0021]** With reference to figure 3, the latch bolt assembly (81) comprises a latch bolt (17) which protrudes beyond the faceplate (18) and which may be retracted with the movement of the handle (15), an arm in the form of a rod that extends behind the latch bolt (17) and at least one flexible member located on the arm. The latch bolt assembly (81) is placed over a U-shaped extension in the body (20) and comprises a follower (38) disposed on the spindle hub (21) which allow retraction of the latch bolt (17) with the movement received from the handle. A follower arm (28) extends over the follower (38) such that it remains on the bolt member. The follower arm that includes a gap in the middle thereof so as to match with the spindle hub (21) also comprises the follower arm (28) associated with the bolt member (40). After having retracted the locking bolts by means of the follower arm (28), the user turns the locking bolts once more, thereby allowing the latch bolt (17) to be retracted into the body (20).

**[0022]** A support member (30) having a slot in which a pin is guided and which is placed over the bolt member (30). The follower arm (28) is placed between the bolt member (30) and support member (30), as shown in fig. 5a to 5e. Other end of the support member is attached with bolt intermediate member (31).

**[0023]** Again with reference to figure 4, the rotary member (80) is associated with the plate (90) by means of a suitable rotary member pin (70). The rotary member (80) is rotated due to the pressure exerted by the said pin (70) which is passed through the gap inside the rotary member (80). The rotary member (80) is in contact with the bolt intermediate member (31), as it may be seen in figures 5a-5e. Referring to the fig. 5b, after the locking bolts (19) are released from the body (20) with at least one round, the pressure of the bolt intermediate member (31) on the rotary member (80) is relieved and the plate pin (32) comes out of its place. Then, when the spindle hub (21) is compressed by the user until the final stage, the said plate pin (32) moves onto the elevating tab (25) on the spindle hub.

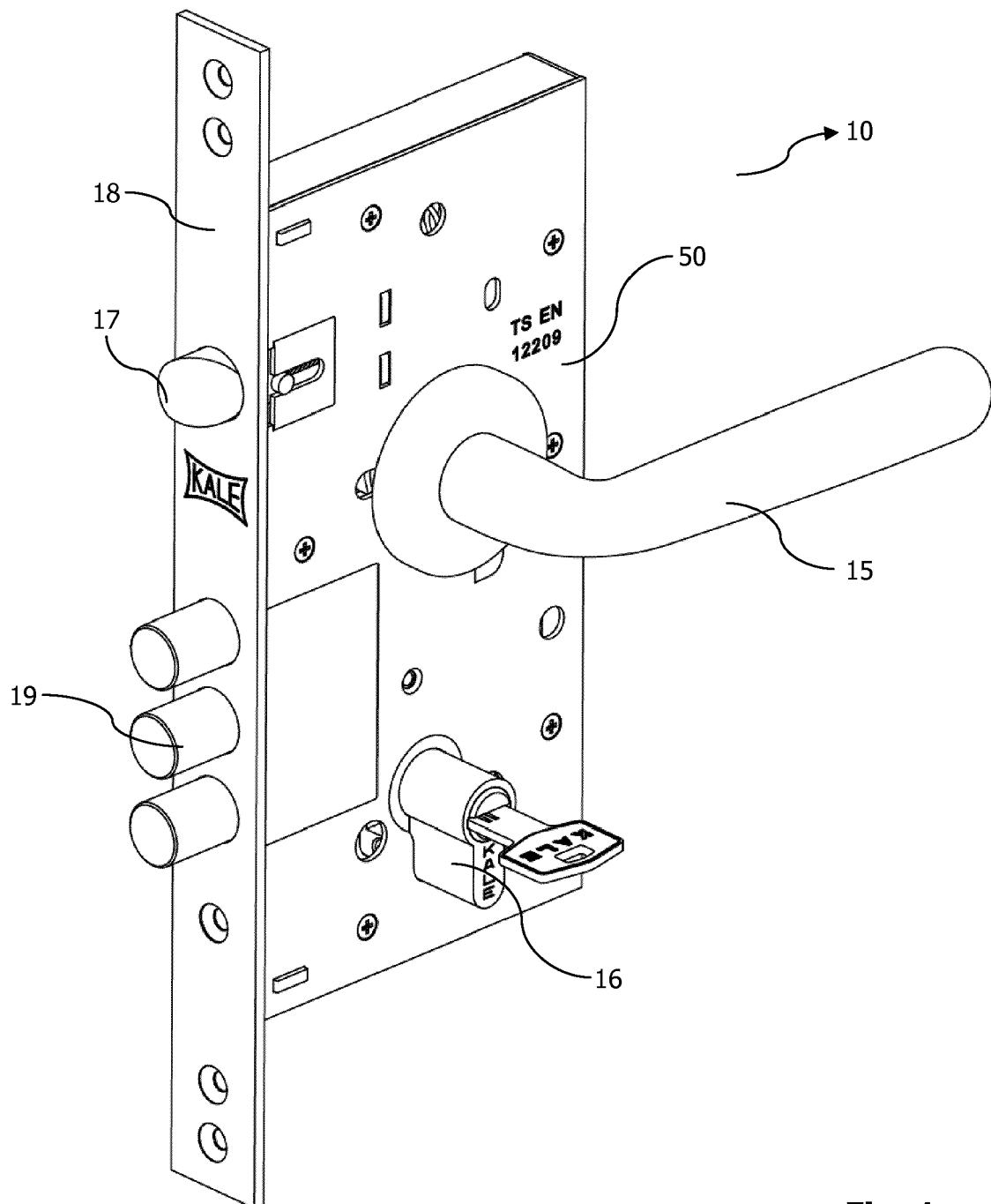
## Claims

1. A lock (10) comprising a body (20);  
a cylinder lock (16) located in the body (20);  
a bolt member (40) having at least one locking bolt (19);  
a plate (90);  
a latch bolt assembly (81) having a latch bolt (17);  
a spindle hub (21) for transferring movement received from a handle (15), **characterized in that** said lock (10) comprises:  
a spindle hub spring (45) suitable to be biased by rotation of the spindle hub (21);  
an elevating tab (25) protruding from the spindle hub (21);  
a plate pin (32) which is suitable to engage with the elevating tab (25) by rotating the spindle hub (21) in clockwise direction, and which is attached with the plate (90) and capable of elevating the plate (90) upon release of force exerted on the spindle hub spring (45);  
a bolt intermediate member (31) attached with the bolt member (40); and  
a bolt pusher apparatus (60) for applying pressure to the bolt intermediate member (31), which enables retraction of the locking bolts (19) into the body (20) when the plate (90) is elevated.
2. A lock (10) according to claim 1, **characterized in that** said lock (10) comprises a spring pusher pin (61) suitable to be guided in a channel provided in the bolt pusher apparatus (60).
3. A lock (10) according to claim 2, **characterized in**

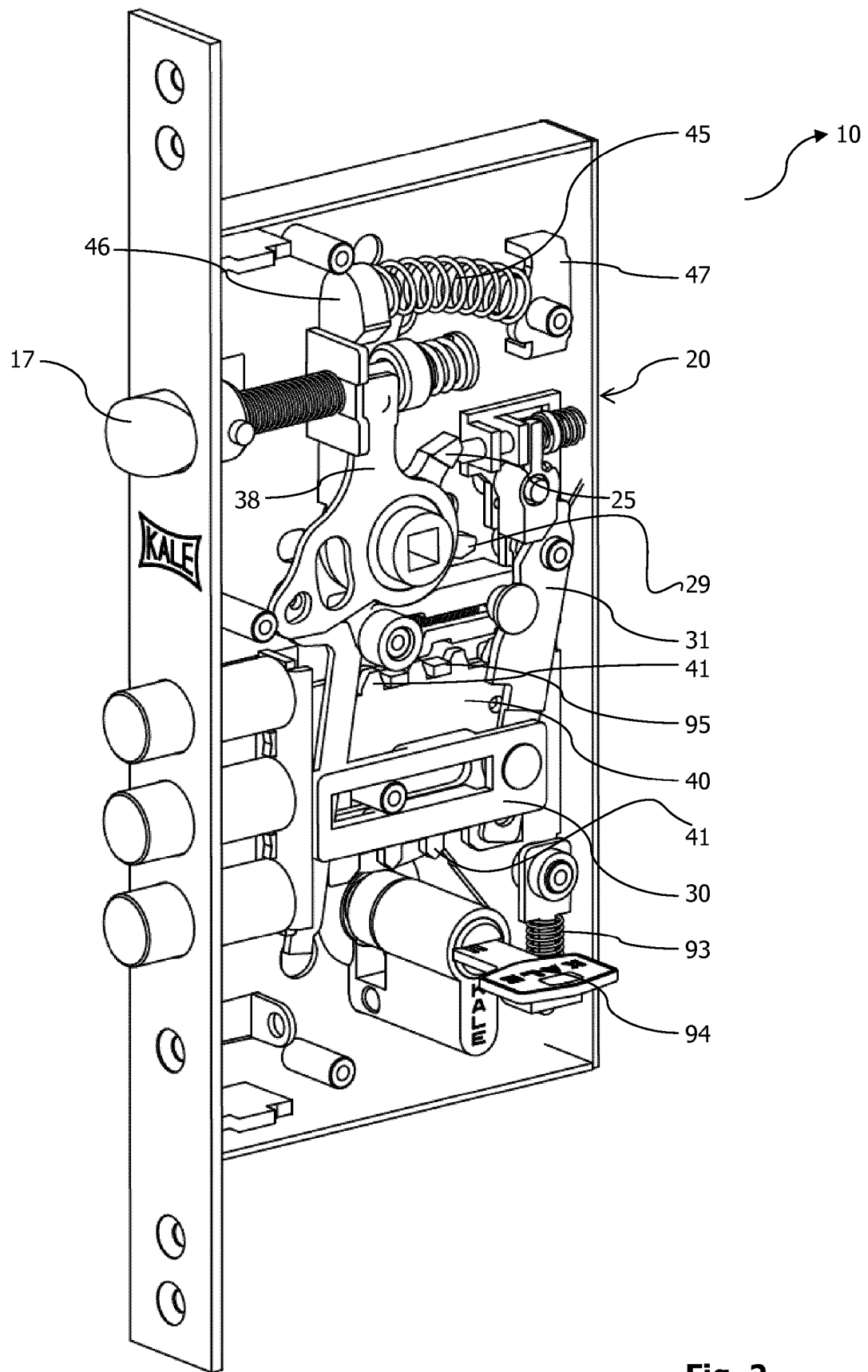
**that** the spring pusher pin (61) is biased by means of a spring (33).

4. A lock (10) according to claim 1, **characterized in that** said lock (10) comprises at least one spindle hub tab (29) protruding from spindle hub (21) which pushes the bolt pusher apparatus (60) when the spindle hub (21) is rotated. 5
5. A lock (10) according to claim 1, **characterized in that** said lock (10) comprises a plate pin spring (35) for pushing said plate pin (32) towards the spindle hub (21). 10
6. A lock (10) according to claim 1, **characterized in that** said lock (10) comprises a rotary member (80) to which the locking bolts (19) strike by means of an upper protrusion (96) on the bolt intermediate member (31), when the locking bolts (19) are retracted, in order to inactivate the rotary member (80). 15 20
7. A lock (10) according to claim 6, **characterized in that** said rotary member (80) is attached with the plate pin (32) and moves the plate pin (32) along lock horizontal axis (+X, -X) according to position of the bolt intermediate member (31). 25
8. A lock (10) according to claim 1, **characterized in that** the plate pin (32) is positioned in the plate (90) and moves the plate (90) in longitudinal axis of the lock (+Y, -Y) with the elevating tab (25). 30
9. A lock (10) according to claim 1, **characterized in that** the said spindle hub (21) comprises a spindle hub spring support (46) protruding from the spindle hub (21). 35
10. A lock (10) according to claim 1, **characterized in that** said spindle hub spring (45) is pressed against a spindle hub support (47) in the body (20). 40
11. A lock (10) according to claim 6, **characterized in that** said rotary member (80) is in a relation with the plate (90) by means of at least one rotary member pin (70). 45
12. A lock (10) according to claim 1, **characterized in that** said lock (10) comprises a follower (38) and a follower arm (28) enabling the latch bolt (17) to be retracted into the body (20) after the locking bolts (19) are retracted. 50
13. A lock (10) according to claim 1, **characterized in that** said bolt intermediate member (31) is in relation with the spring fastener (91) and the fastener spring (92). 55
14. A lock (10) according to claim 1, **characterized in**

**that** a claw (65) on the bolt pusher apparatus (60) matches with a corresponding claw on the spring fastener (91) when the bolt pusher apparatus (60) comes in a horizontal position with respect to lock horizontal axis (X).



**Fig. 1**



**Fig. 2**



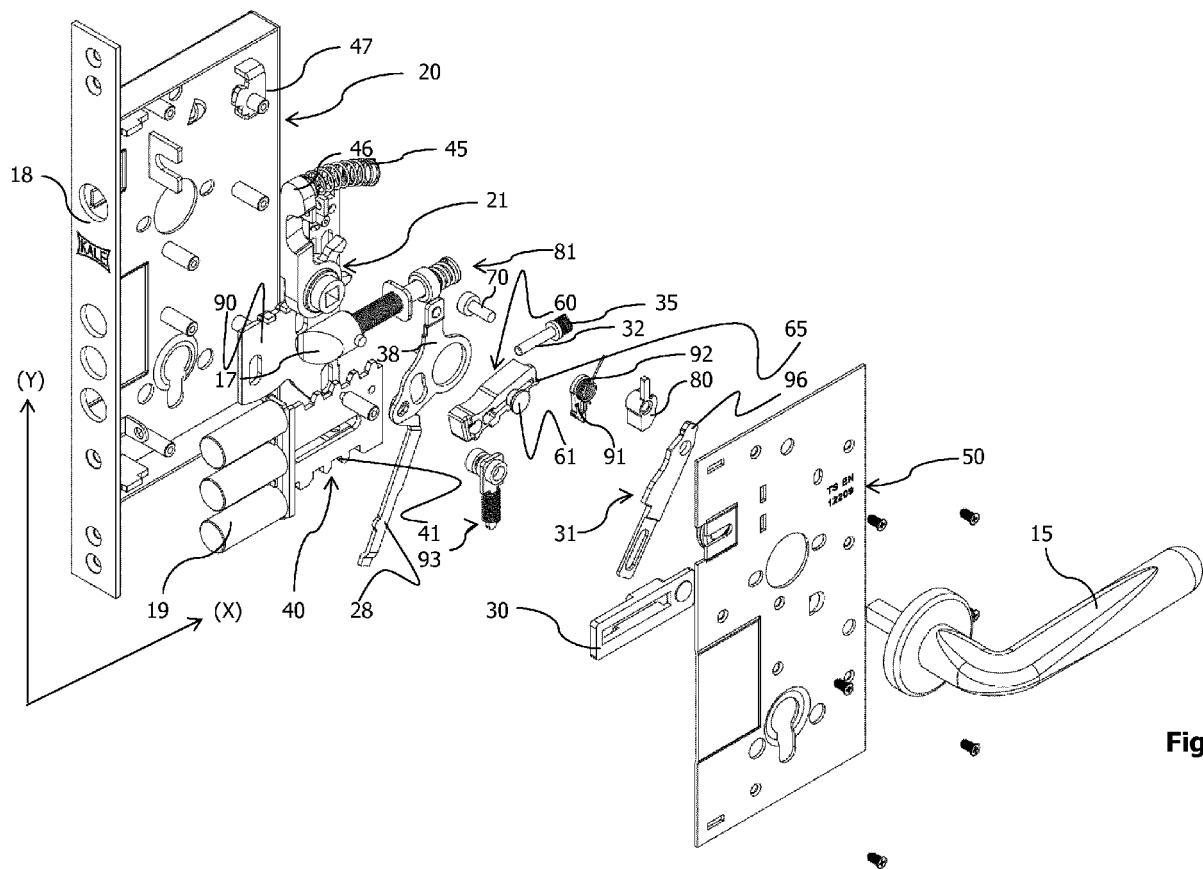
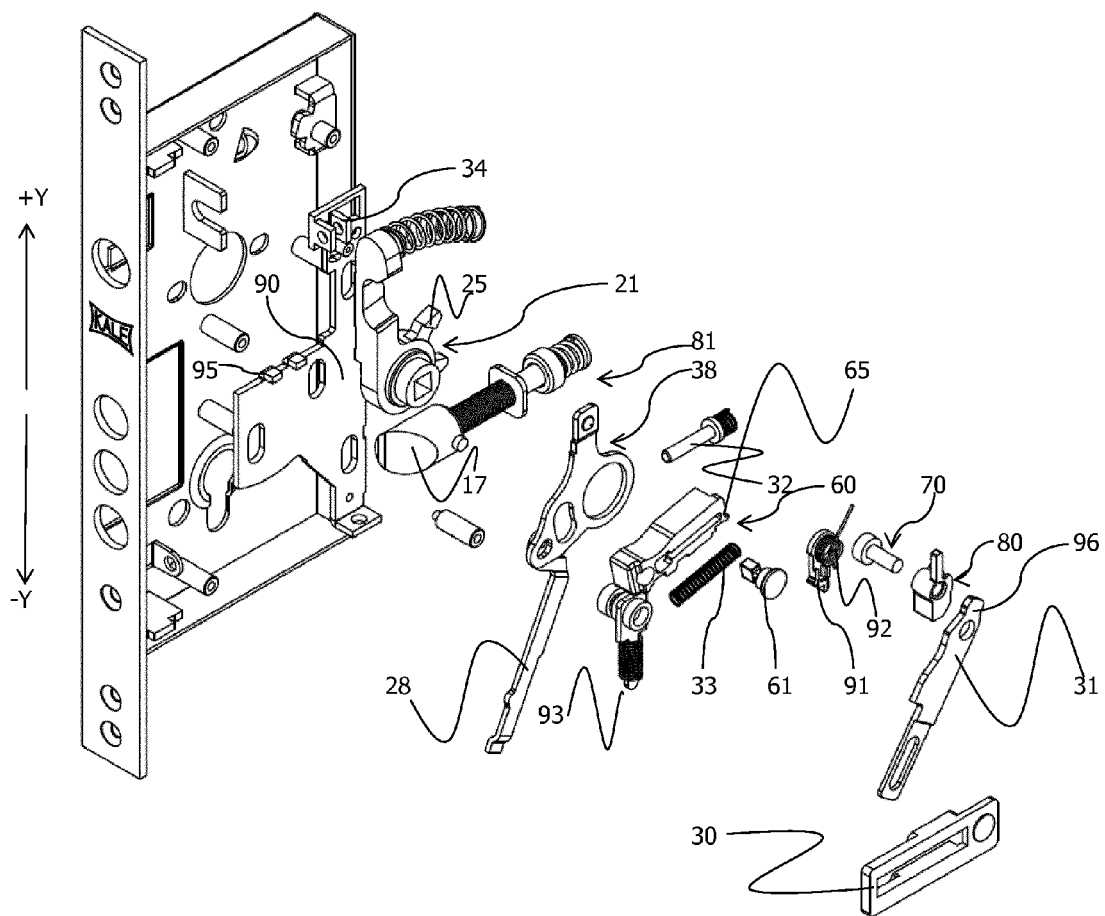


Fig. 3



**Fig. 4**

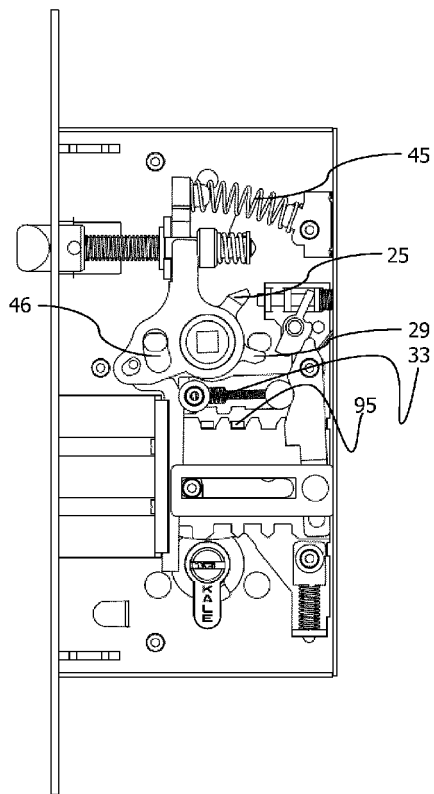


Fig 5a

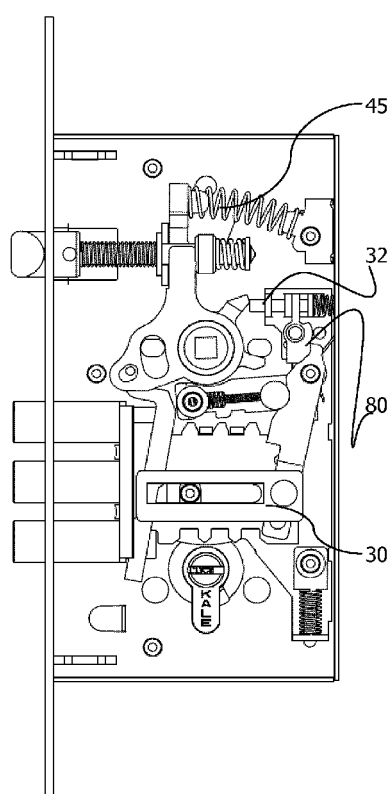


Fig. 5b

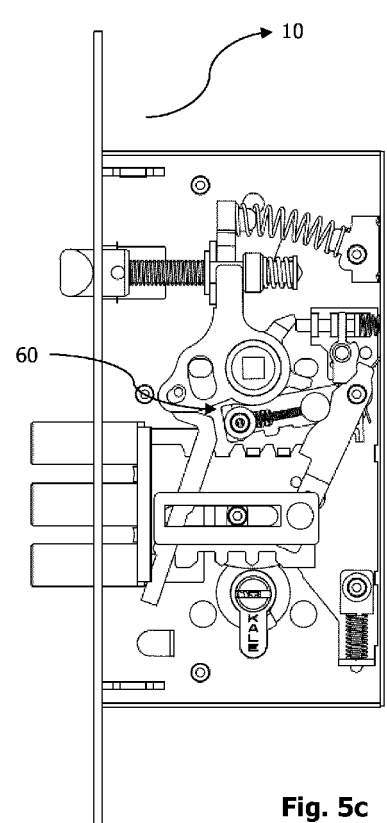


Fig. 5c

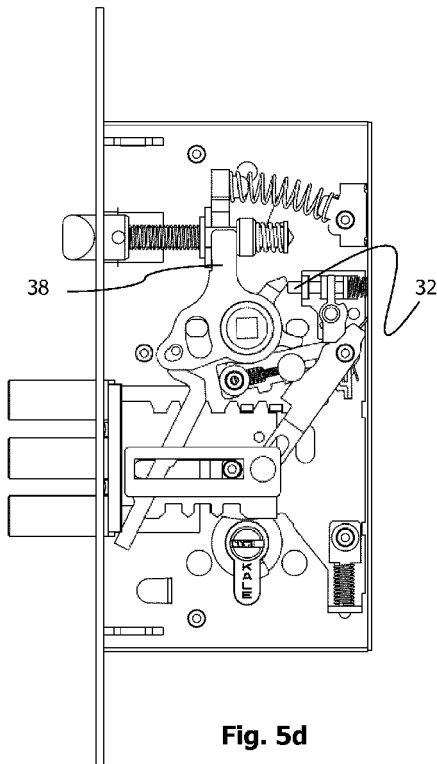


Fig. 5d

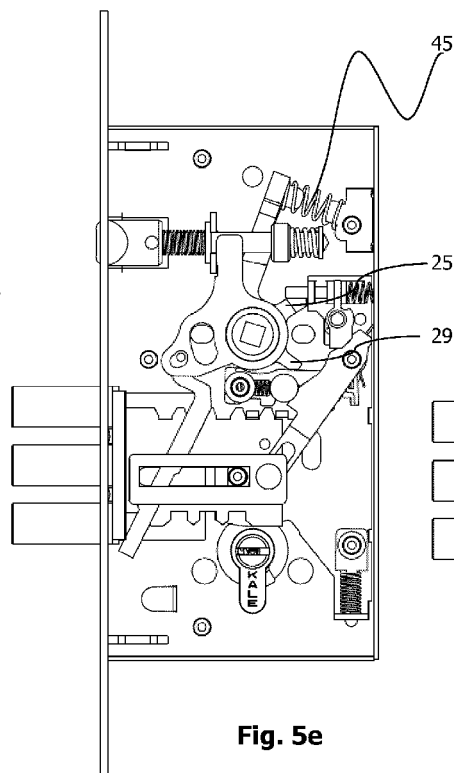


Fig. 5e

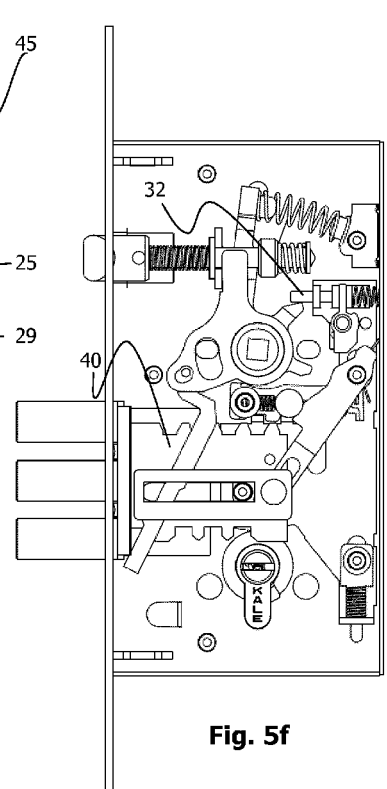
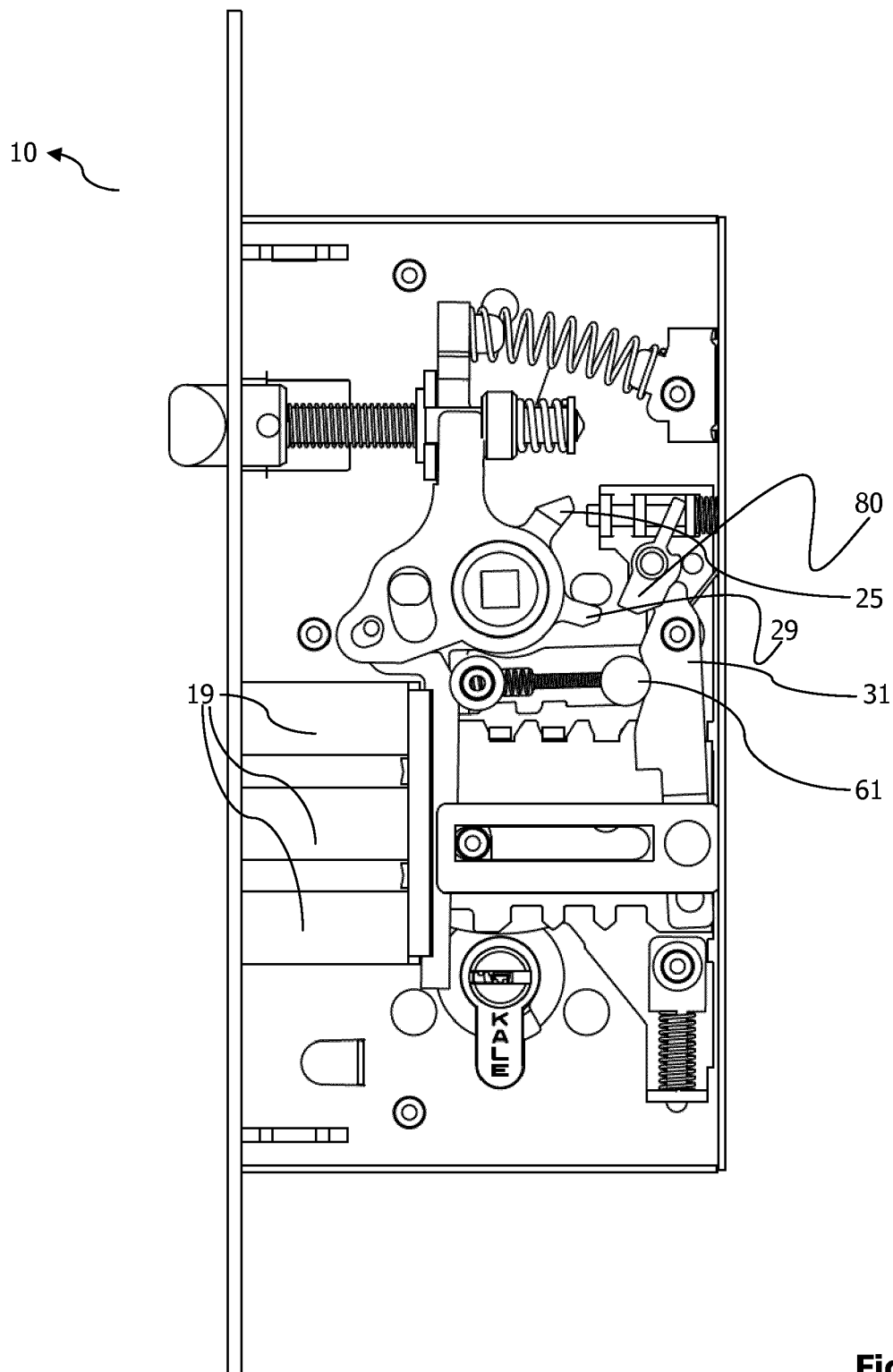


Fig. 5f



**Fig. 6**



## EUROPEAN SEARCH REPORT

Application Number  
EP 15 20 3001

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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)
A	EP 1 156 180 A2 (FLIETHER KARL GMBH & CO [DE]) 21 November 2001 (2001-11-21) * paragraph [0009] - paragraph [0021]; figures 1-4 *	1-14	INV. E05B65/10
A,D	DE 20 2004 007383 U1 (YANG) 5 August 2004 (2004-08-05) * paragraph [0013] - paragraph [0017]; figures 1-5 *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>11 July 2016</b>	Examiner <b>Goddar, Claudia</b>
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 03/02 (P04C01)

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

EP 15 20 3001

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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11-07-2016

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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