(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 070 235 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.09.2016 Bulletin 2016/38

(51) Int Cl.:
E05B 19/00 *(2006.01)* *E05B 47/00* *(2006.01)*

(21) Application number: **15159439.7**

(22) Date of filing: **17.03.2015**

(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

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(54) KEY STORING DEVICE

(57) The present invention relates to a key storing device (1) for being arranged at a door (3), said key storing device (1) comprising a movable member (5), a stationary member (9), and a latching arrangement (19) for locking the movable member (5) to the stationary member (9) to prevent unauthorized access to a key storage space (11) within the key storing device (1).

The latching arrangement (19) comprises a locking latch (21) which is normally biased to a latching position, in which it prevents opening of the key storing device (1), and a guiding surface (49) which is configured to, upon movement of at least a part of said movable member (5) from an outer position to an inner position, interact with an abutment (51) and direct the locking latch (21) from said latching position to a non-latching position, wherein said key storing device (1) further comprises a holding device (31) which is operable by a key system (53) and arranged to hold the locking latch (21) in a non-latching position, thereby enabling opening of the key storing device (1) to provide access to a key (15) stored in the key storage space (11).

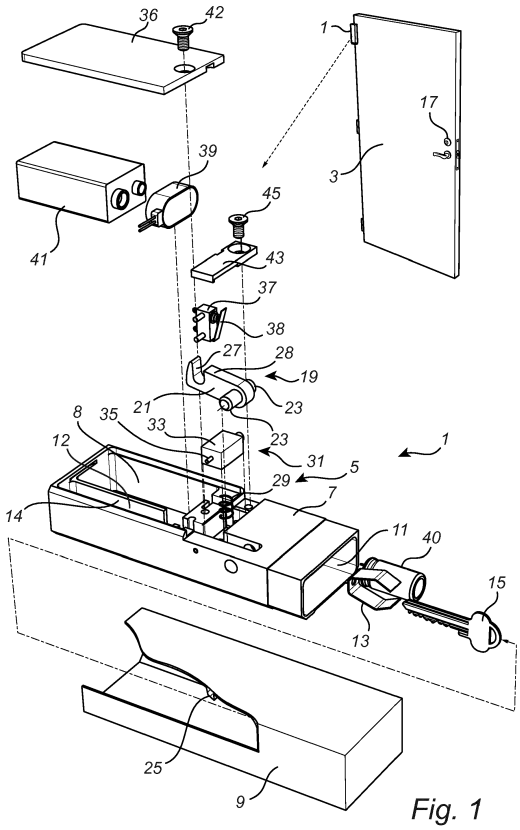

Fig. 1

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Description

Field of the Invention

[0001] The present invention relates to a key storing device for being arranged at a door, said key storing device comprising a movable member, a stationary member and a latching arrangement for locking the movable member to the stationary member to prevent unauthorized access to a key storage space within the key storing device.

Background of the Invention

[0002] Typically, such a key storing device is used to store a key at a locked door which may be unlocked by the key. Anyone who has access to the key storing device thereby gets access to the door. Hence, a person having access to the key storing device may unlock the key storing device, obtain the key and then use the key to unlock the door.

[0003] The key storing device is for instance useful for home help service companies since it allows adding new clients without having to change the original door lock at the door of the client, but instead the door can be provided with the key storing device. Thereby the client may keep their original key.

[0004] US 4,651,544 discloses a key storing device which comprises a key compartment and is operated by an electrical combination or by a key to open access to a key stored in the key compartment.

[0005] A drawback of this key storing device is that it may be considered unreliable.

Summary of the Invention

[0006] It is an object of the present invention to overcome the above described drawback, and to provide an improved key storing device.

[0007] This and other objects that will be apparent from the following summary and description are achieved by a key storing device according to the appended claims.

[0008] According to one aspect of the present disclosure there is provided a key storing device for being arranged at a door, said key storing device comprising a movable member, a stationary member and a latching arrangement for locking the movable member to the stationary member to prevent unauthorized access to a key storage space within the key storing device, wherein said latching arrangement comprises a locking latch which is normally biased to a latching position, in which it prevents opening of the key storing device, and a guiding surface which is configured to, upon movement of at least a part of said movable member from an outer position to an inner position, interact with an abutment and direct the locking latch from said latching position to a non-latching position, wherein said key storing device further comprises a holding device which is operable by a key system and arranged to hold the locking latch in an non-latching position, thereby enabling opening of the key storing device to provide access to a key stored in the key storage space.

[0009] The key storing device may thus assume a key storing device locked state, in which the latching arrangement prevents extraction of the movable member relative the stationary member, and a key storing device unlocked state in which the latching arrangement allows extraction of the movable member relative the stationary member.

[0010] The latching arrangement is configured to move the locking latch from the latching position to a non-latching position upon movement of the movable member from an outer position to an inner position with respect to the stationary member, i.e. when the movable member is pushed. The guiding surface is arranged to, upon movement of the movable member from the outer position to the inner position, interact with the abutment and force the locking latch from the latching position to a non-latching position. Movement of the locking latch to a non-latching position is thus controlled by movement of the movable member. The movement of the movable member may be carried out by hand, which enables a mechanical latching arrangement which is very robust and reliable and which does not need power supply from a power source. Although the locking latch itself is robust a very low force may be needed to hold the locking latch in a non-latching position. Hence, the holding device, which is arranged to hold the locking latch in a non-latching position, may be small and cost-efficient. Furthermore, the holding device needs to be active only upon opening and closing of the key storing device, i.e. during short time intervals.

[0011] Hence, this key storage device has the advantage that it may provide a very robust locking mechanism yet requiring low power consumption. Furthermore, it enables a small and cost-efficient electric holding device, such as, e.g., a solenoid or a motor, to be used.

[0012] The latching mechanism of the key storing device may thus be mechanical and movement of the locking latch from the latching position to a non-latching position may be carried out by hand.

[0013] The holding device may be arranged to hold the locking latch in a first non-latching position, to which it is moved upon said movement of the movable member from the outer position to the inner position, or in a second non-latching position.

[0014] According to one embodiment the holding device is arranged to hold the locking device in said second non-latching position, which has the advantage that a holding member, such as, e.g., a solenoid lock pin, of the holding device does not need to come into contact with the locking latch during operation of the holding device.

[0015] The holding device is thus configured for holding the locking latch in a key storing device unlocked position, in which a key stored within the key storing device is accessible.

[0016] According to one embodiment said holding device comprises an electric or digital locking device.

[0017] According to one embodiment said holding device comprises an electric actuator arranged to actuate a holding member of the holding device, which holding member is movable between a retracted position and an extended position in which it holds said locking latch in a non-latching position.

[0018] According to one embodiment said electric actuator is a solenoid.

[0019] According to one embodiment said electric actuator is a motor and more preferably a rotary motor.

[0020] According to one embodiment said electric actuator is a micro motor.

[0021] According to one embodiment said motor comprises a semicircular holding member which is connected to a motor output shaft.

[0022] According to one embodiment said electric actuator is arranged to be activated by wireless communication via Bluetooth, RFID, NFC, WiFi, Zigbee or Z-Wave.

[0023] According to one embodiment said electric actuator is arranged to be operated with the aid of a tag, a card or a mobile phone.

[0024] According to one embodiment the key storing device further comprises a switch for controlling said holding device, the switch being arranged to be activated upon said movement of the movable member from an outer position to an inner position.

[0025] According to one embodiment said locking latch is connected to the movable member and the stationary member comprises a locking portion arranged to interact with the locking latch and hold the locking latch in said latching position.

[0026] According to one embodiment said locking portion is a locking boss extending from an interior surface of the stationary member.

[0027] According to one embodiment said locking portion comprises said guiding surface.

[0028] According to one embodiment at least a portion the guiding surface is oblique or curved.

[0029] According to one embodiment the locking latch is pivotally arranged for pivotal movement between said latching position and at least a first non-latching position.

[0030] According to one embodiment the locking latch is linearly displaceable between said latching position and at least one non-latching position.

[0031] The holding device may be arranged to hold the locking latch in a first non-latching position or in a second non-latching position.

[0032] The holding device may thus hold the locking latch in a first non-latching position, i.e. the non-latching position to which is directed by the guiding surface upon movement of the movable member to an inner position, or in a second non-latching position.

[0033] A key stored in the key storage device may be held by the movable member or by the stationary member.

[0034] According to one embodiment the key storing device is door mounted.

[0035] According to one embodiment said movable member is a drawer and said stationary member is a housing.

[0036] According to one embodiment the movable member is pivotally connected to the stationary member.

[0037] According to one embodiment the key storing device is a key box.

[0038] These and other aspects of the invention will be apparent from and elucidated with reference to the claims and the embodiments described hereinafter.

Brief description of the drawings

[0039] The invention will now be described in more detail with reference to the appended schematic drawings in which:

Fig. 1 shows, in an exploded perspective view, a key storing device according to an embodiment of the present disclosure.

Figs. 2a-d show the key storing device shown in Fig. 1 in a partly sectioned perspective view and illustrate the function thereof.

Figs. 3a-c show the key storing device shown in Fig. 1 in a sectioned view and illustrate the function thereof.

Fig. 4 shows, in a sectioned view, a key storing device according to a second embodiment of the present disclosure.

Description of preferred embodiments

[0040] Fig. 1 shows a key storing device 1 according to a first embodiment of the present invention arranged at a door 3. The key storing device 1 comprises a movable member, in the form of a drawer 5 having a main body 7, and a stationary member, in the form of a tubular housing 9, which is attached to the door 3.

[0041] The drawer 5 comprises a key storage space 11 with a key holder 13. The key holder 13, which is adapted to hold a key 15 configured for opening of a door lock 17 of the door 3, is attached to the main body 7 and arranged within the key storage space 11.

[0042] The key storing device 1 further comprises a latching arrangement 19 for locking the drawer 5 to the housing 9 to prevent unauthorized access to the key 15 stored within the key storage space 11. The latching arrangement 19 comprises a locking latch 21, which is pivotally connected to the main body 7 of the drawer 5 by means of a pair of pins 23, and a locking boss 25 secured to the housing 9 and extending from an interior surface 10 thereof. The locking latch 21 has a recess 27 which is configured to receive said locking boss 25 in a latching position, illustrated in Fig. 3a, and a locking portion 28 arranged to engage the locking boss 25 in the latching position. A spring 29 is arranged to bias the locking latch

21 to the latching position. The locking latch 21 is thus normally spring-loaded to the latching position. In the latching position the locking boss 25 is received in the recess 27 of the locking latch 21, which locks the drawer 5 to the housing 9, as will described hereinafter with reference to Figs. 2a-d and 3a-c. The latching arrangement 19 thus comprises a male latching element, in the form of a locking boss 25, and a female latching element in the form of a recess 27.

[0043] The key storing device 1 further comprises a holding device 31 for holding the locking latch 21 in a non-latching position, illustrated in Fig. 3b. In this embodiment the holding device 31 comprises a linear electric actuator, in the form of a solenoid 33. The solenoid 33 has a holding member in the form of a solenoid lock pin 35. The holding device 33 is operable by a key system and arranged to hold the locking latch 21 in a non-latching position, thereby enabling opening of the key storing device 1 to provide access to the key 15 stored therein.

[0044] The key storing device 1 further comprises a switch 37, a control unit, (not shown), a capacitor 40 and a power supply, in the form of a battery 41, each of which is electrically connected to the battery 41 by means of a battery connector 39. The control unit, which comprises a circuit board capable of communicating wirelessly with a key system, is connected to the switch 37 and is arranged for controlling the holding device 31 when the switch 37 is activated. The capacitor 40 is charged by the battery 41 and is capable of delivering a relatively large amount of energy quickly. The capacitor 40 is thus capable of delivering enough energy to move the solenoid lock pin 35 between a retracted position and an extended position.

[0045] The switch 37, which comprises a contact arm 38 in the form of a flat spring, is arranged to be activated by the locking boss 25 of the latching arrangement 19 upon movement of the drawer 5 from an outer position to an inner position, as will described hereinafter with reference to Figs. 2a-d and 3a-c. In this embodiment a bistable micro switch is used.

[0046] The battery 35 is covered by a first cover plate 36 which is fastened to the main body 7 by a screw 42. The solenoid 33 is mounted to the main body 7 by means of a second cover plate 43 which is fastened thereto by a screw 45.

[0047] As shown in Fig. 1 the main body 7 defines a battery compartment 8 for accommodating the battery 41 and a control unit compartment 12, which is separated from the battery compartment 8 by a wall 14, for accommodating the control unit (not shown).

[0048] A movement limiting device, in the form of a blocking pin 57, which is attached to the main body 7, is arranged to limit movement of the locking latch 21. The spring-loaded latch 21 may thus rest against the blocking pin 57.

[0049] With reference to Figs. 2a-d and Figs. 3a-c the function of the key storing device 1 will be described hereinafter.

[0050] Each of Fig. 2a and Fig. 3a illustrates the key storing device 1 in a locked state. When the key storing device 1 assumes the locked state the locking latch 21 is biased to the latching position by the spring 29. In the latching position the locking boss 25 is received in the recess 27 of the locking latch 21 and engages the locking portion 28 of the locking latch 21, thereby preventing extraction of the drawer 5 from the housing 9. In the locked state unauthorized access to the key 15 stored in the key storage space 11 is thus prevented.

[0051] The latching arrangement 19 is configured to move the locking latch 21 from the latching position to a non-latching position upon movement of the drawer 5 from an outer position to an inner position with respect to the housing 9. To this end, the latching arrangement 19 comprises a guiding surface, in the form of an oblique surface 49, as best illustrated in Fig. 3a. The guiding surface 49, which in this embodiment is formed by the locking boss 25, is arranged to interact with the locking latch 21 and is configured to, upon movement of the drawer 5 from the outer drawer position to the inner drawer position, direct the locking latch 21 from the latching position to a first non-latching position, illustrated in Fig. 2b and 3b.

[0052] Upon opening of the key storing box 1 the drawer 5 is pushed from an outer position, illustrated in Fig. 3a, to an inner position, illustrated in Fig. 3b, as illustrated by arrow A in Fig. 2b and 3b. Upon this first opening step the guiding surface 49 of the locking boss 25 interacts with and forces the locking latch 21 to move to the first non-latching position.

[0053] Upon movement of the drawer 5 from the outer drawer position to the inner drawer position the guiding surface 49 interacts with an abutment portion 51 formed by the recess 27 of the locking latch 21 and forces the locking latch 21 from the latching position (Fig. 3a) to a first non-latching position (Fig. 3b), as illustrated by arrow B in Fig. 3b. The guiding surface 49 thus causes the locking latch 21, which is pivotally connected to the main body 7 of the drawer 5 by the pair of pins 23, to pivot around an axis 24, as illustrated by arrow C in Fig. 2b. Movement of the locking latch 21 to the first non-latching position is thus controlled by movement of the drawer 5 via the locking boss 25.

[0054] Also, the guiding surface 49 is arranged to, upon movement of the drawer 5 from the outer position to the inner position, direct the flat spring 38 of the switch 37 to activate the switch 37, as illustrated by arrow D in Fig. 3b, which in turn activates the control unit of the key storing device 1. When the control unit is activated the solenoid 33 is operable by an appropriate key system comprising, e.g., a mobile phone, as illustrated in Fig. 2c.

[0055] When the drawer 5 has been pushed to the inner position, i.e. when the locking latch 21 is situated in the first non-latching position, the drawer 5 assumes a holding device operating state (Fig. 3b), in which the solenoid lock pin 35 may be operated without influence of the locking latch 21. Hence, the solenoid lock pin 35 may then

be operated to an extended position without an external force acting thereon. In the extended position there is thus a gap, shown in Fig. 3b, between the solenoid lock pin 35 and a holding portion 55 of the locking latch 21. When the drawer 5 assumes the holding device operating state, i.e. the state illustrated in Fig. 2b, the locking latch 21 is held in the first non-latching position by the locking boss 25.

[0056] The key storing device 1 is operable by wireless communication via Bluetooth, RFID, NFC, WiFi, Zigbee or Z-Wave. Such wireless communication may be controlled with the aid of a tag, a card or a mobile phone. The solenoid 33 may thus be operated using a tag, a card or a mobile phone. In this embodiment the solenoid 33 is operated wirelessly by a mobile phone 53, as illustrated in Fig. 2c.

[0057] When the solenoid 33 is operated, the solenoid lock pin 35 is moved, as illustrated by arrow E in Fig. 2c. The solenoid lock pin 35 is moved to an extended position in which it prevents the spring-loaded locking latch 21 to return to the latching position.

[0058] When the locking latch 21 has been moved to the first non-latching position and the solenoid lock pin 35 has been operated to the extended position, the drawer 5 can be extracted from the housing 9, as illustrated by arrow F in Fig. 2d, to open access to the key 15 stored within the key storing device 1.

[0059] When the drawer 5 is removed from the housing 9 the locking latch 21 is spring-biased against the solenoid lock pin 35. In the extended position, the solenoid lock pin 35 is thus received in the recess 27 of the locking latch 21 and engages the holding portion 55 of the locking latch 21, thereby holding the spring-loaded locking latch 21 in a second non-latching position, illustrated in Fig. 3c and 2d.

[0060] In this way an authorized person having access to the key storing device 1 may unlock the key storing device 1, obtain the key 15 and then use the key 15 to unlock the door 3.

[0061] When the drawer 5 is extracted from the housing 9 the switch 37 is deactivated since the locking boss 25 no longer urges the flat spring 38 into a switch activated position. The solenoid lock pin 35 is thus held in the extended position, as illustrated in Fig. 2d, until the solenoid 33 is operated by the appropriate key system as the key storing device 1 is closed.

[0062] After use the key 15 may be placed in the key storing space 11 and, then, the key storing device 1 may be locked by a person having access to the key storing device 1.

[0063] Upon locking the key storing device 1 the drawer 5 is pushed into the housing 9 to the holding device operating state illustrated in Fig. 3b. Upon this movement the locking boss 25 urges the flat spring 38 to activate the switch 37. In the holding device operating position the spring-loaded latch 21 is held in the first non-latching position by the locking boss 25. When the switch 37 is activated the holding device 31 is operable as described hereinbefore. Then, the solenoid lock pin 35 may be retracted to a retracted position.

[0064] When the locking latch 21 is released from the first non-latching position, i.e. when the solenoid lock pin 35 is retracted, the locking latch 21 will be moved into engagement with the locking boss 25, under the urging of the spring 29, to firmly latch the locking latch 21 in the latching position, thereby locking the drawer 5 to the housing 9. Then, the key storing device 1 is locked and unauthorized access to a key 15 stored in the key storing device 1 is prevented.

[0065] Hereinafter a key storing device according to a second embodiment will be described with reference to Fig. 4. Many features disclosed in the first embodiment are also present in the second embodiment with similar reference numerals identifying similar or same features. Having mentioned this, the description will focus on explaining the differing features of the second embodiment.

[0066] The key storing device 101 according to the second embodiment differs from the one described hereinbefore with reference to Figs. 1, 2a-d and 3a-c in that the latching arrangement 119 comprises a locking latch 121 that is arranged for axial movement instead of pivotal movement. Hence, the latching arrangement 119 of the second embodiment comprises a locking latch 121 that is movable in an axial direction, as illustrated by arrow G in Fig. 4. A guiding device (not shown) attached to the main body 7 of the drawer 5 is arranged to guide the locking latch 121 between a latching position, illustrated in Fig. 4, and non-latching positions. The locking latch 121 is biased to the latching position by a spring 29. A block pin 57 is arranged to limit axial movement of the latch 121. In the latching position the locking boss 25 is received in a recess 27 of the locking latch 121, which locks the drawer 5 to the housing 9. The key storing device 101 is opened and closed in a similar manner as the one described hereinbefore with reference to Figs. 1, 2a-d and 3a-c. When the drawer 5 is pushed the guiding surface 49 of the locking boss 25 interacts with the guiding portion 51 of the locking latch 121 and forces the locking latch 121 to a first non-latching position under the guidance of the guiding device (not shown).

[0067] It will be appreciated that numerous variants of the embodiments described above are possible within the scope of the appended claims.

[0068] Hereinbefore is has been described that the locking latch has a female locking element, in the form of a recess, adapted for receiving a male locking element in the form of a locking boss. It is however appreciated that the locking latch instead may have a male locking element, in the form of a locking boss, which is arranged to interact with a female locking element in the form of a recess.

[0069] Hereinbefore is has been described that the guiding surface form a part of a locking boss of the stationary member. It is however appreciated that the guiding surface may form part of the locking latch. Then, the locking boss of the stationary member may form the abut-

ment.

[0070] The embodiments described hereinbefore comprise a movable member, in the form of a drawer, and a stationary member in the form of a housing. It is however appreciated that in an alternative embodiment the housing is movable and the drawer is stationary.

[0071] Furthermore, in the embodiments described hereinbefore the locking latch of the latching arrangement is connected to a main body of the movable member. It is however appreciated that the locking latch instead may be connected to the stationary member. Then, a portion of the movable member may form the abutment interacting with the guiding surface to move the locking latch to a non-latching position upon movement of the movable member.

[0072] Hereinbefore is has been described that the movable member is axially displaceable with respect to the stationary member and that the movable member may be released from the stationary member. It is however appreciated that such axial displacement may be limited or that the movable member may be pivotally connected to the stationary member.

[0073] The embodiments described hereinbefore comprise a holding device in the form of a solenoid. It is however appreciated that another electric actuator, such as, e.g., a rotary motor may be used. According to one embodiment the key storing device comprises a holding device in the form of a rotary motor having a semicircular holding member which is connected to the motor output shaft and rotates therewith.

Claims

1. Key storing device (1) for being arranged at a door (3), said key storing device (1) comprising
a movable member (5),
a stationary member (9) and
a latching arrangement (19) for locking the movable member (5) to the stationary member (9) to prevent unauthorized access to a key storage space (11) within the key storing device (1),
characterized in that
said latching arrangement (19) comprises
a locking latch (21) which is normally biased to a latching position, in which it prevents opening of the key storing device (1), and
a guiding surface (49) which is configured to, upon movement of at least a part of said movable member (5) from an outer position to an inner position, interact with an abutment (51) and direct the locking latch (21) from said latching position to a non-latching position, wherein
said key storing device (1) further comprises a holding device (31) which is operable by a key system (53) and arranged to hold the locking latch (21) in a non-latching position, thereby enabling opening of the key storing device (1) to provide access to a key (15) stored in the key storage space (11).

2. Key storing device (1) according to claim 1, wherein said holding device (31) comprises an electric or digital locking device.

3. Key storing device (1) according to claim 2, wherein said holding device comprises an electric actuator (31) arranged to actuate a holding member (33) of the holding device (31), which holding member (33) is movable between a retracted position and an extended position in which it holds said locking latch (21) in a non-latching position.

4. Key storing device (1) according to claim 3, wherein said electric actuator is a solenoid.

5. Key storing device according to claim 3, wherein said electric actuator is a motor.

6. Key storing device (1) according to claim 3, wherein said electric actuator (31) is arranged to be activated by wireless communication via Bluetooth, RFID, NFC, WiFi, Zigbee or Z-Wave.

7. Key storing device (1) according to claim 3, wherein said electric actuator (31) is arranged to be operated with the aid of a tag, a card or a mobile phone (53).

8. Key storing device (1) according to any of the preceding claims, wherein the key storing device (1) further comprises a switch (37) for controlling said holding device (31), the switch (37) being arranged to be activated upon said movement of the movable member (5) from an outer position to an inner position.

9. Key storing device (1) according to any of the preceding claims, wherein said locking latch (21) is connected to the movable member (5) and said stationary member (9) comprises a locking portion (25) arranged to interact with the locking latch (21) and hold the locking latch (21) in said latching position.

10. Key storing device (1) according to claim 9, wherein said locking portion is a locking boss (25) extending from an interior surface (10) of the stationary member (9).

11. Key storing device (1) according to any of the claims 9-10, wherein said locking portion (25) comprises said guiding surface (49).

12. Key storing device (1) according to any of the preceding claims, wherein at least a portion the guiding surface (49) is oblique or curved.

13. Key storing device (1) according to any of the preceding claims, wherein the locking latch (21) is piv-

otally arranged for pivotal movement between said latching position and a non-latching position.

14. Key storing device (101) according to any of the claims 1-12, wherein the locking latch (121) is linearly displaceable between said latching position and a non-latching position.

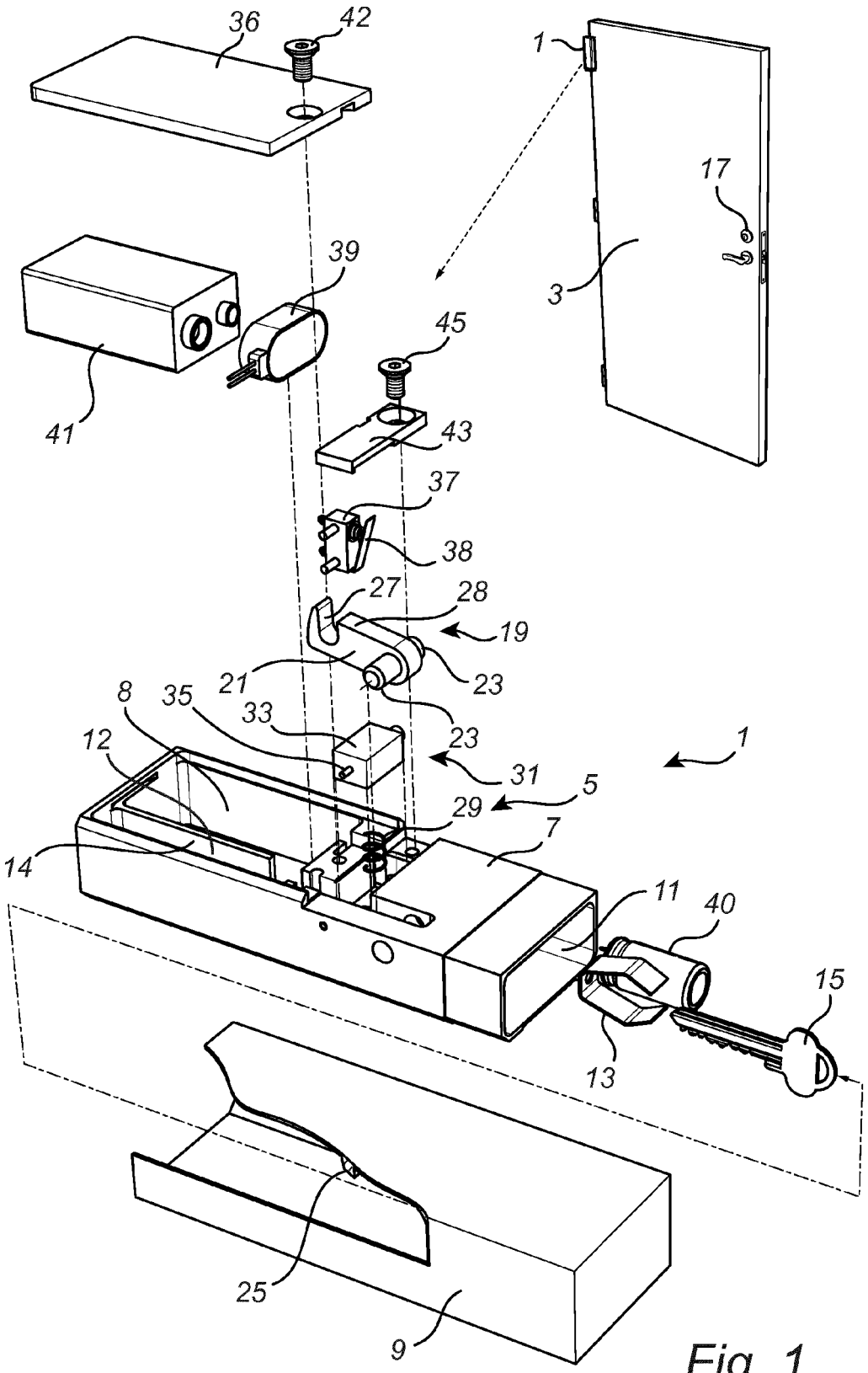
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Fig. 1

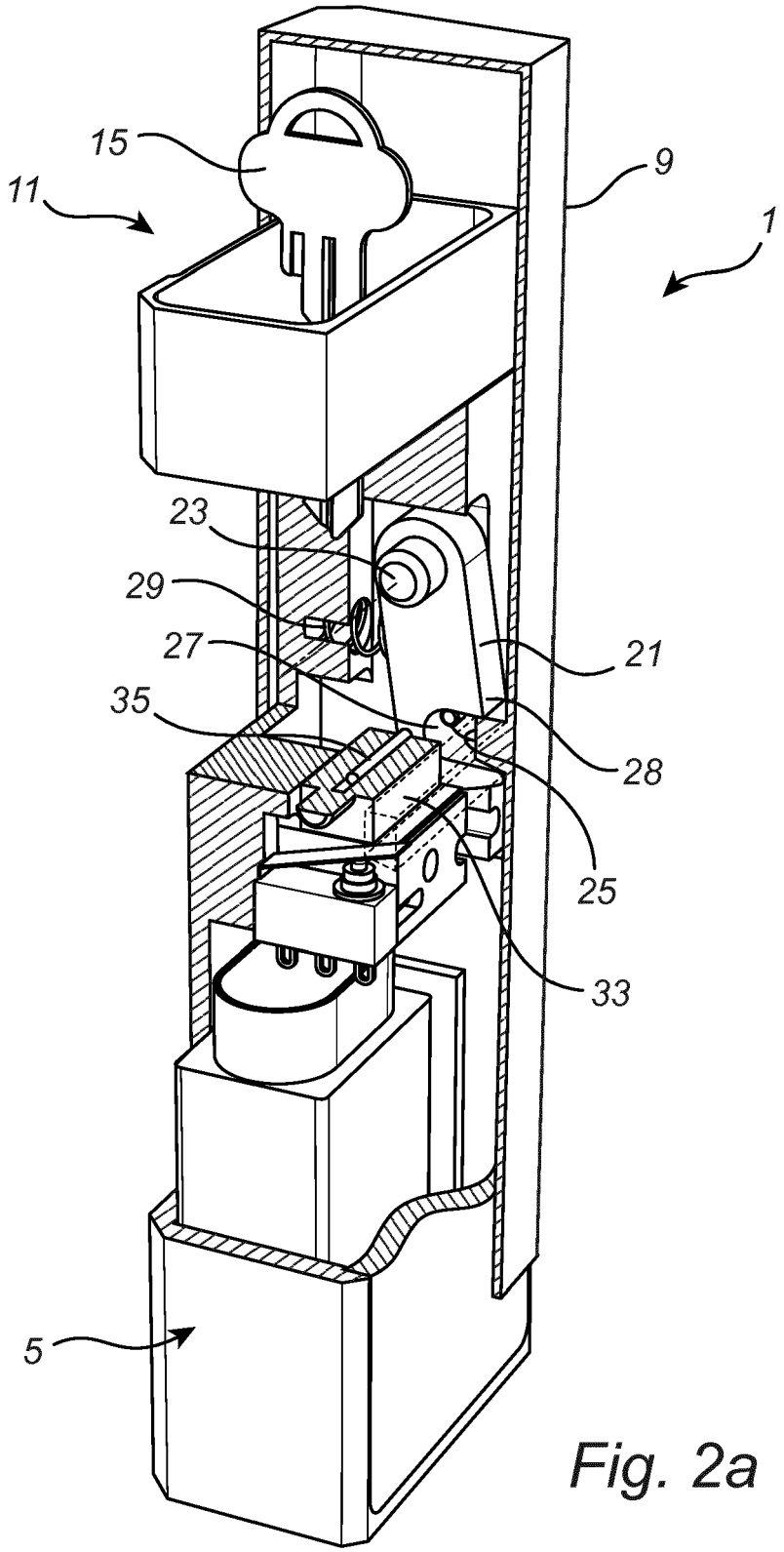

Fig. 2a

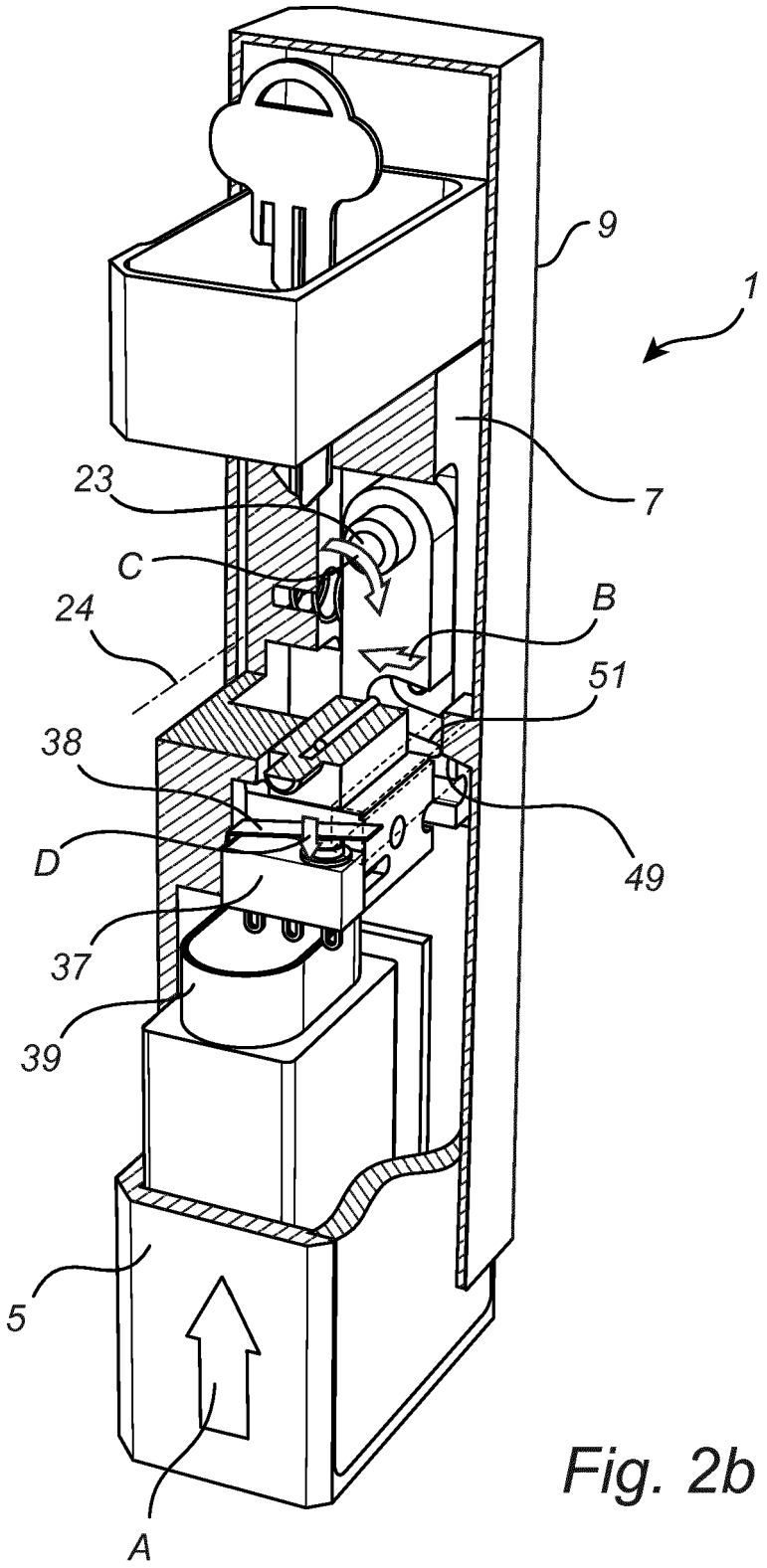

Fig. 2b

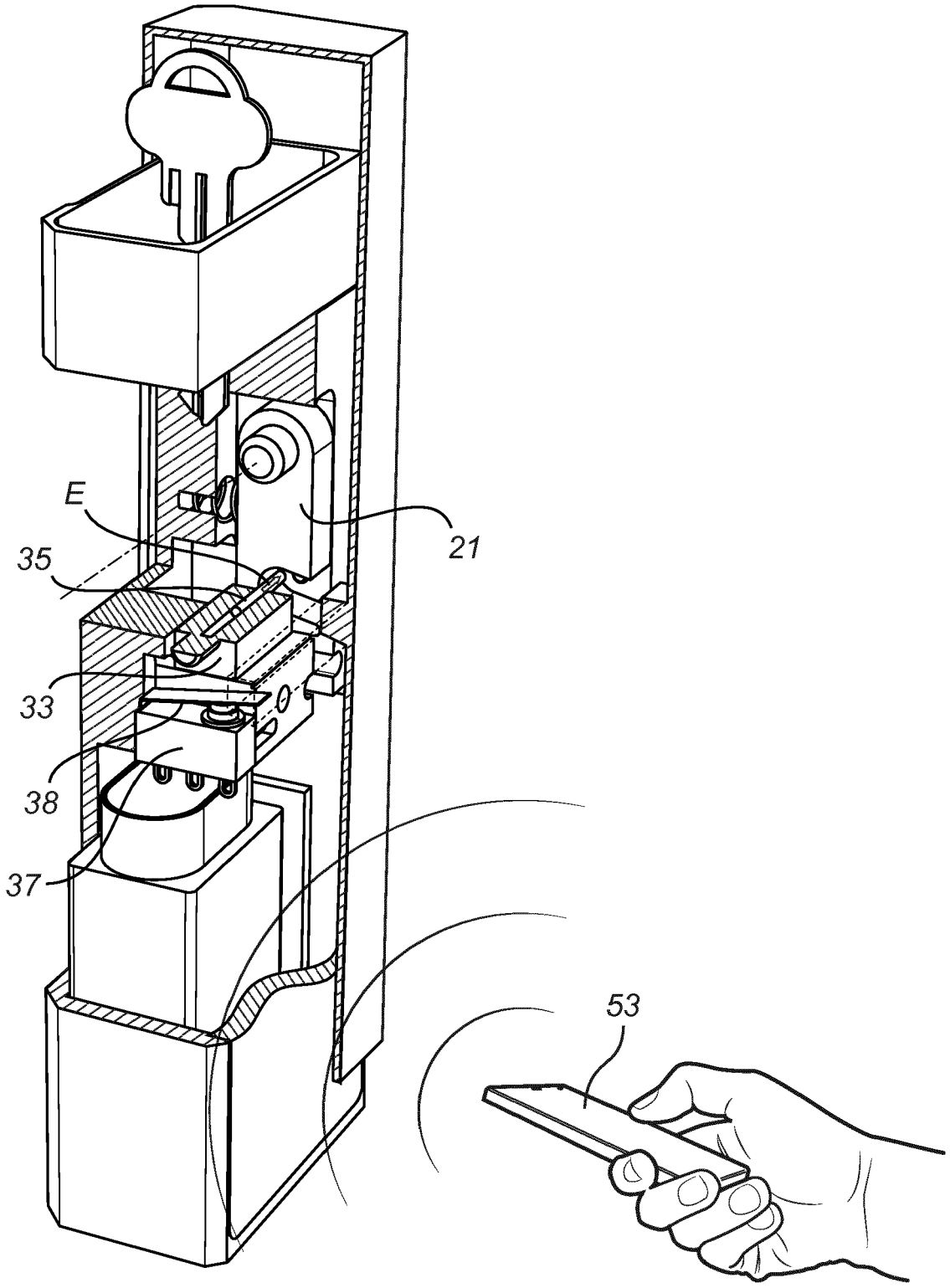

Fig. 2c

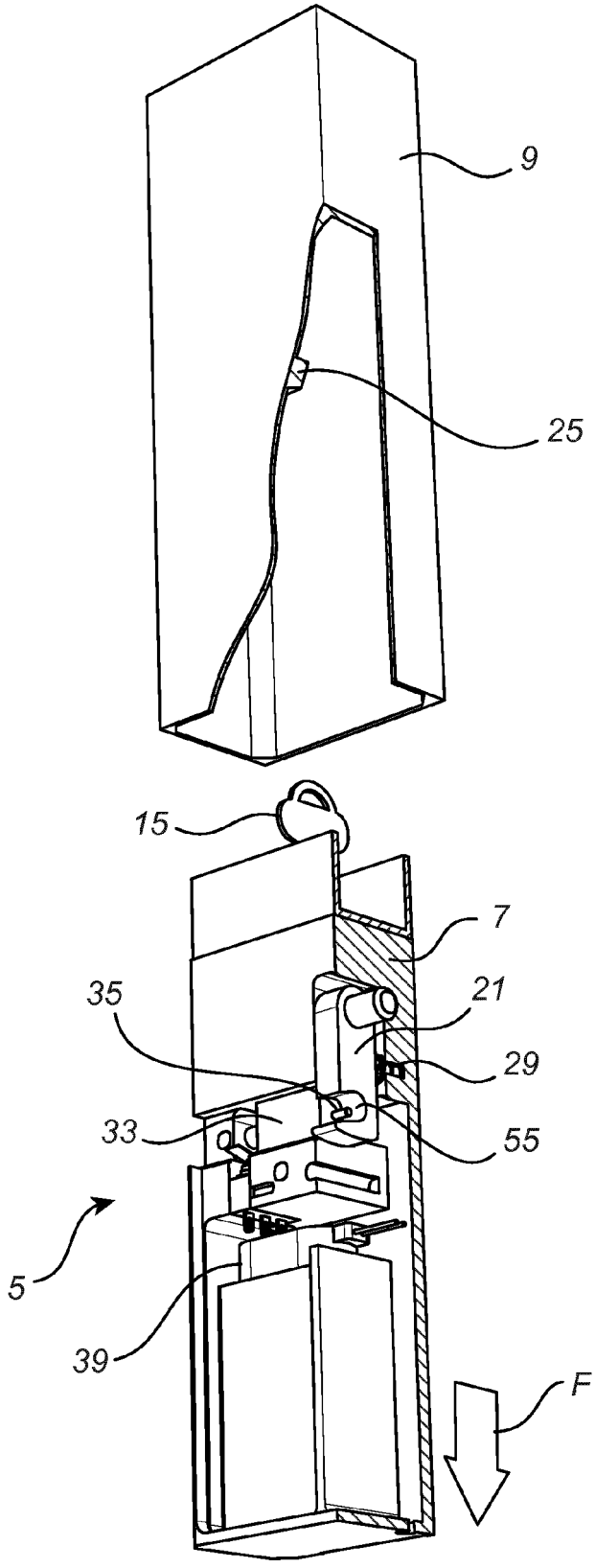

Fig. 2d

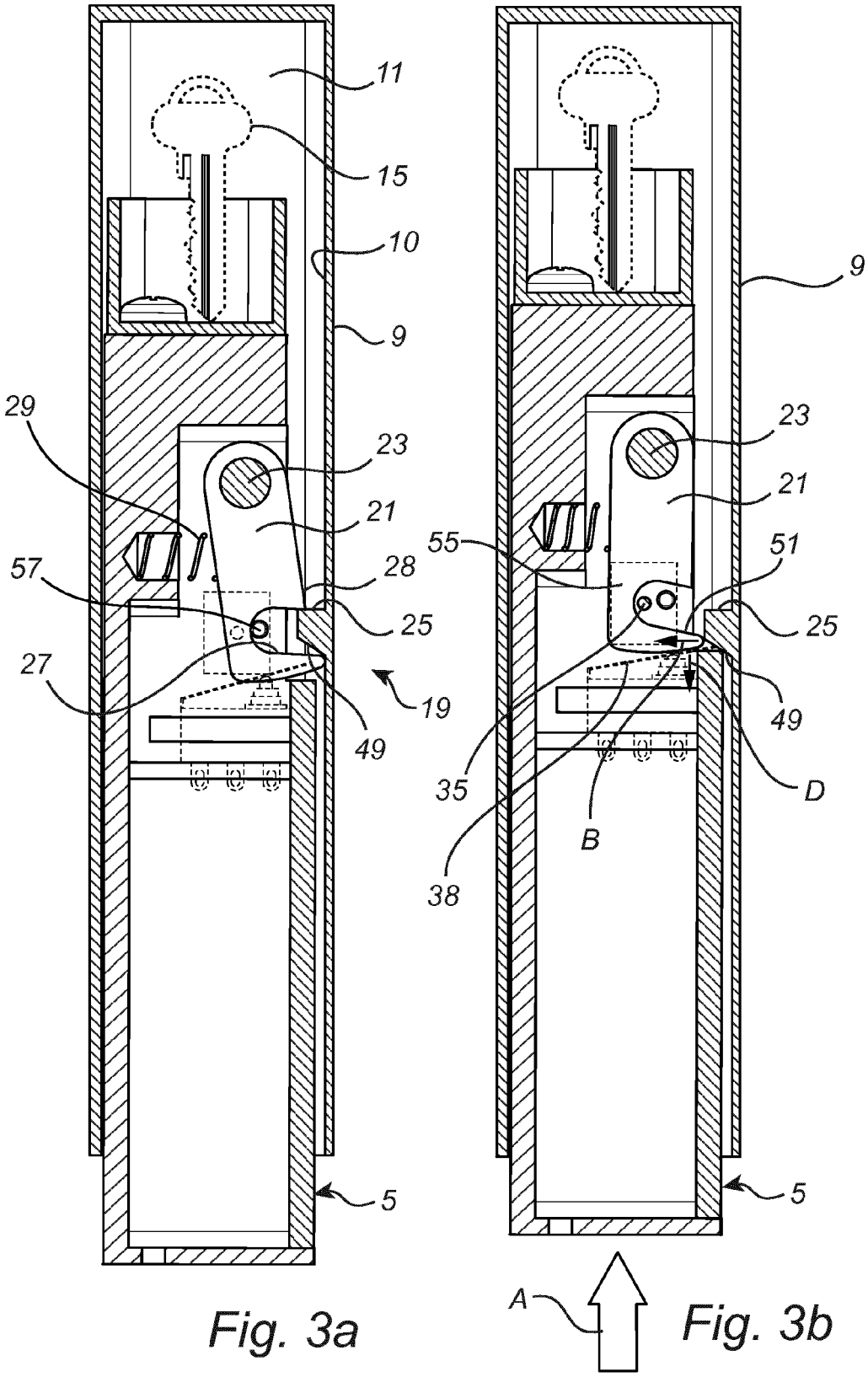

Fig. 3a

Fig. 3b

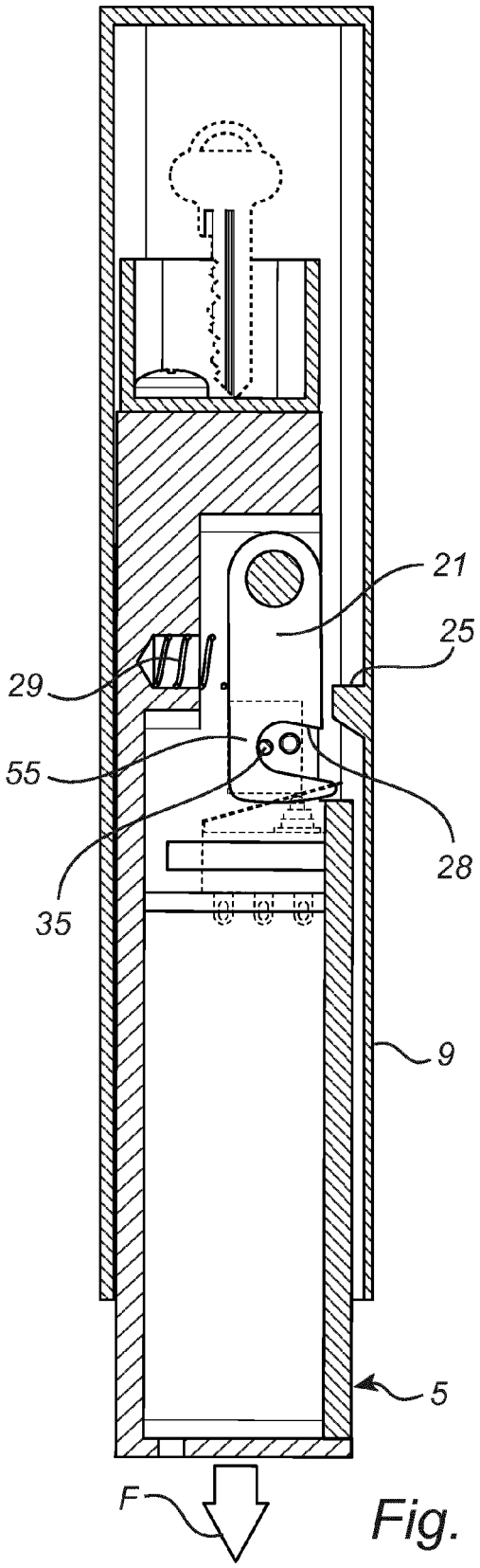

Fig. 3c

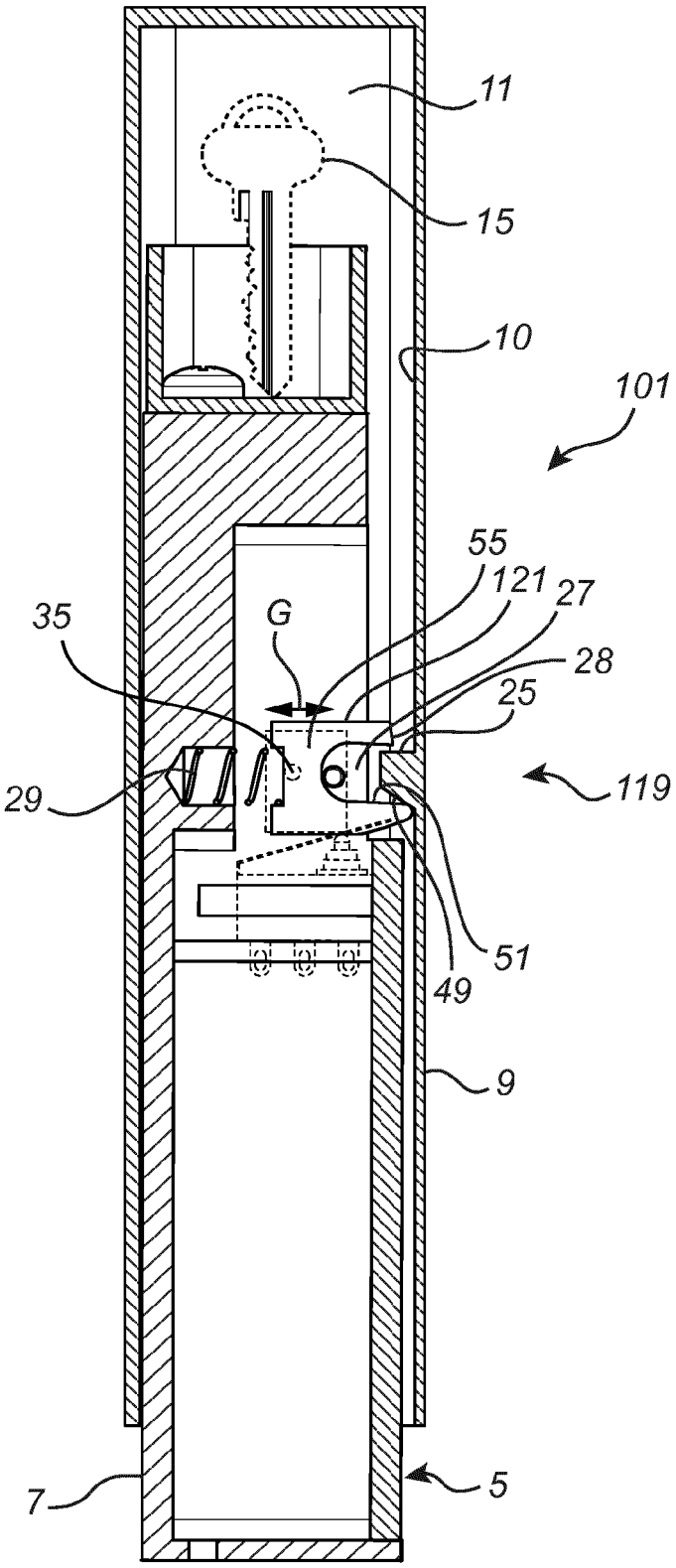

Fig. 4

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 15 15 9439

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	4 September 2015	Pérez Méndez, José F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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