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(54) LOCK CYLINDER WITH AN IMPROVED SECURITY

SCHLIESSZYLINDER MIT VERBESSERTER SICHERHEIT

CYLINDRE DE SERRURE DOTÉ D'UNE SÉCURITÉ AMÉLIORÉE

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Description

Technical Field of the Invention

[0001] The present invention relates to a lock cylinder for use with a flat key, with a movable counter-abutment as a second security means.

Background of the Invention

[0002] Conventional lock cylinders use pins of varying lengths to prevent the lock cylinder from opening without the correct key. Lock cylinder has a set of housings aligned in a vertical axis; and each housing containing a pin spring, a body pin, and a rotor pin partly project into a keyway of the rotor; the pins being urged by the spring towards the keyway and ensuring, in the absence of the flat key, blocking of the rotor with respect to the cylinder body. When the user inserts the correct key into the keyway, the rotor pins are pressed below the notches of the key's profile, and the pins are aligned for rotation of the rotor.

[0003] If an unauthorized person tries to align the pins with a tool to a rotation position of the rotor, he may rotate the rotor and brings the lock cylinder in an open state. In addition, the fact that key duplication can be performed by unauthorized persons causes insufficient security for the end-user.

[0004] A prior art publication in the technical field of the present invention may be referred to as US2016145896 (A1) among others, the document disclosing a locking system comprises a lock cylinder which has a cylinder housing, a cylinder core rotatably supported in the cylinder housing, and having a keyway, and has a plurality of tumblers which partly project into the keyway, and an abutment section which is formed at the key shaft between the key bow and the shaft profile.

[0005] Documents DE 100 31 972 A1 and EP 3 498 944 A1 disclose examples of lock cylinders for use with a flat key, whereby an abutment section on the key shaft cooperates with a counter abutment, which is movable between:

- a lock position in which a further rotation of the rotor can be blocked by means of a corresponding body pin, and
- a release position in which it corresponds to the body pin so that a further rotation of the rotor is allowed.

Summary of the Invention

[0006] In order to avoid the drawbacks of the existing lock cylinders, the primary object of the present invention is to provide an alternative lock cylinder for a flat key in which the pins play their traditional role with improved security.

[0007] The present invention proposes a lock cylinder for use with a flat key having an abutment section on a key shaft, comprising: a cylinder body having a central longitudinal axis; a rotor having a keyway for receiving the key, rotatable within the cylinder body; a set of housings aligned in a vertical axis relative to the central longitudinal axis; and each housing containing a pin spring, a body pin, and a rotor pin partly project into the keyway; the pins being urged by the spring towards the keyway and ensuring, in the absence of the flat key, blocking of the rotor with respect to the cylinder body. The lock cylinder further comprises: a spring-biased movable counter-abutment guided in a hollowed portion formed on the rotor wherein the counter-abutment is movable between a release position in which a corresponding body pin can pass and continue its rotation via the counter-abutment and a lock position in which the corresponding body pin reaches the hollowed portion where the further rotation of the rotor is blocked. Further according to the invention, the movable counter-abutment is arranged and configured such that, when the suitable flat key is not inserted, the counter-abutment stays in the lock position under the spring force, while on an introduction of the key into the keyway, the abutment section pushes the movable counter-abutment to the released position to correspond to the body pin for allowing the rotation of the rotor. Contrary to the state of the art, the invention provides a spring biased counter-abutment, which stays in the lock position under the spring force when the suitable flat key is not inserted.

[0008] With this arrangement, it is aimed to make the use of lock picks or the like difficult. The arrangement has a deterrent feature against malicious acts intended to be done in a short time.

[0009] In a possible embodiment, the hollowed portion of the rotor has at least one guiding slot in which a leg of the counter-abutment is guided. Thus, the movement of the counter-abutment is properly aligned.

[0010] In a possible embodiment, the guiding slot extends on the longitudinal axis of the rotor with an enlarged engagement portion wherein one of the body pins engages with said engagement portion of the guiding slot and blocks the rotation of the rotor when the counter-abutment is in the lock position.

[0011] In a possible embodiment, the counter-abutment and the engagement portion of the guiding slot are arranged and configured such that, on an introduction of the key into the keyway, the counter-abutment is guided onto the engagement portion for corresponding to one of the body pins thereby aligning said body pin with others.

[0012] In a possible embodiment, the rotor is provided with two similarly shaped guiding slots on the rotor with a predetermined distance from each other, and the counter-abutment has two similarly shaped legs, where each leg is guided on said guiding slots, respectively. Thus, the invention provides the same security according to all kinds of opening directions.

[0013] In a possible embodiment, the hollowed portion has at least one elongated cavity in which an arm of the

counter-abutment is linearly guided.

[0014] In a possible embodiment, the counter-abutment is biased with a spring in the hollowed portion wherein the spring is placed between the counter-abutment and a planar abutment surface formed on the rotor. This arrangement provides secure housing for the springs and hides the springs from any unauthorized access.

[0015] In a possible embodiment, the counter-abutment has an arc-shaped upper surface that corresponds to the body pin when the rotor is rotated and moves one of the body pins to align with the other body pins.

[0016] In a possible embodiment, the cylinder body has a first cylinder half and a second cylinder half, and the rotor is placed within the first cylinder half. Thus, any side of the lock cylinder can be used.

[0017] In a possible embodiment, the key actuated counter-abutment is guided on a distal end of the rotor relative to the inlet of the keyway. Thus, the unauthorized person cannot reach and trigger the counter-abutment.

[0018] The present invention also proposes a locking system for use in a door, comprising:

a lock cylinder according to the invention; and a flat key for use with a rotor of the lock cylinder, the flat key including a key shaft having longitudinal grooves extending a majority of the length of the key shaft wherein the flat key has an abutment section on the key shaft for moving the counter-abutment in between a release position and a lock position on the rotor. Since the production methods of most parts used in the invention are easier and conventional, a more cost-effective and safer lock cylinder is provided to the end-user.

[0019] In a possible embodiment, the abutment section of the flat key is a raised portion that extends perpendicularly from the key shaft relative to the longitudinal axis of the flat key. Thus, extra security is obtained with the combination of the flat key.

[0020] Besides, if an unauthored person tries to align the pins with a picklock to rotate the rotor, he may use a tool such as a picklock or a jimmy. In the conventional lock cylinders, the keyway of the rotor has an open traverse upper end for insertion of the key shaft. The picklock or the like is simply inserted into the keyway of the rotor and turned clockwise with medium torque. As the picklock is pushed into the lock, each of the pins is slowly forced down with up and down movement until they stop, thus binding the body pins behind the shear line of the lock cylinder. When the final pick is pushed down, the shear plane is clear and the lock cylinder opens. Advantageously, the proposed counter-abutment partly closes the open traverse upper end of the keyway, therefore, the unauthorized person using picklock will not be able to make up and down movement. This also gives additional security to the lock cylinder.

Brief Description of the Figures

[0021] Accompanying drawings are given solely for the purpose of exemplifying a lock cylinder whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 shows a front exploded view of the lock cylinder for use with a key, according to an embodiment of the present invention.

Fig 2 shows a perspective exploded view of the lock cylinder for use with a key, according to an embodiment of the present invention.

Fig 3 shows a front view of a key and a counter-abutment for a rotor of the lock

cylinder according to an embodiment of the present invention.

Fig. 4 shows a perspective view of a key having an abutment section for use with the lock cylinder according to an embodiment of the present invention.

Fig. 5 shows a perspective view of a rotor of the lock cylinder according to an embodiment of the present invention.

Fig. 6a shows a cross-sectional view of the key and the lock cylinder before the key is inserted into the keyway of the lock cylinder, according to an embodiment of the present invention.

Fig 6b shows a cross-sectional view of the key which is inserted into the keyway of the lock cylinder wherein the counter-abutment is brought to a release position from a lock position, according to an embodiment of the present invention.

Fig. 7a shows a front view of the rotor of the lock cylinder according to an embodiment of the present invention.

Fig. 7b shows a perspective cross-sectional view of the rotor taken along line C-C of Fig. 7a;

Fig. 7c shows another perspective cross-sectional view of the rotor taken along line C-C of Fig. 7a;

Fig 8a shows a perspective view of a rotor of the lock cylinder with a counter-abutment in a lock position according to an embodiment of the present invention.

Fig 8b shows a perspective view of a rotor of the lock cylinder wherein a key inserted into a keyway of the rotor and a spring-biased movable counter-abut-

ment is brought into a release position, according to an embodiment of the present invention.

Fig 9a shows a front view of the lock cylinder with an inserted key, according to an embodiment of the present invention.

Fig. 9b shows a cross-sectional view of the lock cylinder taken along line A-A of Fig. 9a.

Fig 10a shows a front view of the lock cylinder without an inserted key and a rotor of the lock cylinder is rotated, according to an embodiment of the present invention.

Fig. 10b shows a cross-sectional view of the lock cylinder taken along line F-F of Fig. 10a, wherein one of the body pins of the lock cylinder extends to a guiding slot on a rotor of the lock cylinder, thus preventing the rotation of the rotor as a second security means.

Detailed Description of the Invention

[0022] The present invention proposes a lock cylinder (10) for use with a flat key (40) having an abutment section (41) on a key shaft (42), comprising: a cylinder body (30) having a central longitudinal axis (X); a rotor (20) having a keyway (11) for receiving the flat key (40), rotatable within the cylinder body (30); a set of housings aligned in a vertical axis (Y) relative to the central longitudinal axis (X); and each housing containing a pin spring (33), a body pin (31), and a rotor pin (32) partly project into the keyway (11); the pins being urged by the spring towards the keyway (11) and ensuring, in the absence of the flat key (40), blocking of the rotor (20) with respect to the cylinder body (30). The lock cylinder (10) further comprises: a spring-biased movable counter-abutment (14) guided in a hollowed portion (16) formed on the rotor (20) wherein the counter-abutment (14) is movable between a release position and a lock position in the hollowed portion (16). Advantageously, the movable counter-abutment (14) is arranged and configured such that, on an introduction of the key (40) into the keyway (11), the abutment section (41) pushes the movable counter-abutment (14) to the released position to correspond to one of the body pins (31) for allowing the rotation of the rotor (20).

[0023] The counter abutment (14) is arranged to be pushed by the abutment section (41) of the flat key (40). The counter-abutment (14) is movable between a release position in which the counter-abutment (14) authorizes rotation of the rotor (20) and a lock position in which the counter-abutment (14) prevents the rotation of the rotor (20).

[0024] Said hollowed portion (16) is formed on the rotor and a volume is created in which the spring-biased movable counter-abutment (14) is guided. The hollowed portion (16) of the rotor (20) has at least one guiding slot (13) in which a leg (18) of the counter-abutment (14) is guided. Referring to fig. 2, in a preferred embodiment, the rotor (20) is provided with two similarly shaped guiding slots (13) on the rotor (20) with a predetermined distance from each other and the counter-abutment (14) has two similar shaped legs (18), where each leg (18) is guided on said guiding slots (13), respectively. As can be seen in fig. 5 clearly, said guiding slots (13) are formed on the hollowed portion (16). Moreover, the guiding slot (13) extends on the longitudinal axis of the rotor (20) with an enlarged engagement portion (13a) wherein one of the body pins (31) engages with the engagement portion (13a) of the guiding slot (13) and blocks the rotation of the rotor (20) when the counter-abutment (14) is in the lock position (see Fig. 10b). The body pins (31) disclosed in the invention are conventional pins for use in the lock cylinder (10) with a tapered end portion. The rotor (20) is arranged with vicinity formed by the hollowed portion (16) into which one of the body pins (31) engages for preventing rotation of the rotor (20). Advantageously, the counter-abutment (14) and the engagement portion (13a) of the guiding slot (13) are arranged and configured such that, on an introduction of the key (40) into the keyway (11), the counter-abutment (14) is guided onto the engagement portion (13a) for corresponding to one of the body pins (31) thereby aligning said body pin (31) with others.

[0025] The hollowed portion (16) has at least one elongated cavity (22) in which an arm (17) of the counter-abutment (14) is linearly guided. Referring to 8a and 8b, the hollowed portion (16) has two similarly shaped elongated cavities (22) for guiding two arms (17) of the counter-abutment (14). The elongated cavity (22) has a rectangular cross-section and can vary with respect to the shape of the arm (17).

[0026] The counter-abutment (14) is a separate one-piece with at least one arm (17), at least one leg (18), a pushing surface (21) to be pushed by the abutment section of the key, and an arc-shaped upper surface for corresponding to the body pin (31). Referring to fig. 7a and 7b, the movable counter-abutment (14) are always biased with a spring (15) in the hollowed portion (16) wherein the spring (15) is placed between the counter-abutment (14) and a planar abutment surface (23) formed on the rotor (20). Preferably, two springs (15) can be used for pushing against the legs (18) of the counter-abutment (14). Each leg (18) has a spring protrusion (24) for holding the spring (15) properly in its housing. One end of the spring (15) pushes the leg (18) and the other end of the spring (15) abuts the planar abutment surface (23) of the rotor (20). The planar abutment surface (23) is an extension of an upper-end section (12) of the hollowed portion (16). The springs (15) are placed under the guide slots (13), respectively, in order to prevent any external intervention.

[0027] According to the present invention, the counter-abutment (14) is movable between a release position and

a lock position in the hollowed portion (16). When the suitable key (40) is not inserted, as seen in fig. 8a, the counter-abutment (14) stays in the lock position under the spring force. In this state, as a second security means, even if the all body pins (31) and rotor pins (32) are aligned with a tool and the rotor (20) is rotated, one of the body pins (31) will engage with the corresponding the engagement portion (13a) of the guiding slot (13), as seen in fig. 10b. When the authorized user inserts the corresponding key (20), the counter-abutment (14) is pushed to the release position wherein the counter-abutment (14) closes the engagement portion (13a) of the guiding slot (13) and said body pin (31) rotates over the counter-abutment (14). Said counter-abutment (14) has an arc-shaped upper surface (25) that corresponds to the body pin (31) when the rotor (20) is rotated and aligns the body pin (31) with other body pins (31). Said arc-shaped upper surface (25) are partly similar to the upper periphery of the rotor (20).

[0028] Said counter-abutment (14) is key actuated and is guided on a distal end of the rotor (20) relative to the inlet of the keyway (11). So unauthorized person may not reach and trigger the counter-abutment (14). Referring to fig. 6a, the counter-abutment (14) is in the first position and has a predetermined first distance which is shown as "L1" in fig. 6a. L1 refers to the distance in between the upper-end section (12) and the counter-abutment (14). Accordingly, when the suitable flat key (40) is inserted into the rotor (20), the abutment section (41) of the flat key (40) pushes the counter-abutment (14) and brings it into the second position with a predetermined second distance which is shown as "L2" in fig. 6b. L2 refers to the distance in between the upper-end section (12) and the counter-abutment (14). Said "L2" is shorter than the "L1" and can be arranged to the corresponding body (31).

[0029] The present invention also proposes a locking system, comprising: a lock cylinder (10) as explained above, and a flat key (40) for use with a rotor (20) of the lock cylinder (10). Said flat key (40) has a key shaft (42) having longitudinal grooves extending a majority of the length of the key shaft (42). Moreover, the flat key (40) has an abutment section (41) on the key shaft (42) for moving the counter-abutment (14) in between a release position and a lock position on the rotor (20). The abutment section (41) of the flat key (40) can be a raised portion that extends perpendicularly from the key shaft (42) relative to the longitudinal axis of the flat key (40).

[0030] According to the present invention, the pins work in a traditional way and one of the body pins (31) functions as a second security means. Depending on the position of the engagement portion (13a) of the guiding slot (13), one of the body pins (31) is selected for engagement. For instance, referring to the fig. 10b, fifth-row body pin (31) matches with the engagement portion (13a). The number of the body pin (31) and the order of the matching body pin(s) (31) may vary.

[0031] The cylinder body (30) according to the present invention mainly has a first cylinder half (34a) and a second cylinder half (34b), and the rotor (20) is placed within the first cylinder half (34a). According to the present invention, a conventional type of lock cylinder can be used.

Reference List:

[0032]

10. Lock cylinder
    - 11. Keyway
    - 12. Upper-end section
    - 13. Guiding slot
    - 13a. Engagement portion
    - 14. Counter abutment
    - 15. Spring
    - 16. Hollowed portion
    - 17. Arm
    - 18. Leg

20. Rotor
    - 21. Pushing surface
    - 22. Elongated cavity
    - 23. Abutment surface
    - 24. Spring protrusion
    - 25. Arc-shaped upper surface

30. Cylinder body
    - 31. Body pin
    - 32. Rotor pin
    - 33. Pin spring
    - 34a. First cylinder half
    - 34b. Second cylinder half

40. Flat key
    - 41. Abutment section
    - 42. Key shaft

L1. First length

L2. Second length

Claims

1. A lock cylinder (10) for use with a flat key (40) having an abutment section (41) on a key shaft (42), comprising:

a cylinder body (30) having a central longitudinal axis (X);
a rotor (20) having a keyway (11) for receiving the key (40), rotatable within the cylinder body (30);
a set of housings aligned in a vertical axis (Y) relative to the central longitudinal axis (X); and each housing containing a pin spring (33), a body pin (31), and a rotor pin (32) partly project into the keyway (11); the pins being urged by

the spring towards the keyway (11) and ensuring, in the absence of the flat key (40), blocking of the rotor (20) with respect to the cylinder body (30), **wherein** the lock cylinder (10) further comprises:
a spring-biased movable counter-abutment (14) guided in a hollowed portion (16) formed on the rotor (20) wherein the counter-abutment (14) is movable between a release position in which a corresponding body pin (31) can pass and continue its rotation via the counter-abutment (14) and a lock position in which the corresponding body pin (31) reaches the hollowed portion (16) where the further rotation of the rotor (20) is blocked, and **wherein** the movable counter-abutment (14) is arranged and configured such that, when the suitable flat key (40) is not inserted, the counter-abutment (14) stays in the lock position under the spring force, while on an introduction of the flat key (40) into the keyway (11), the abutment section (41) pushes the movable counter-abutment (14) to the release position to correspond to the body pin (31) for allowing the rotation of the rotor (20).

2. The lock cylinder (10) according to claim 1, wherein the hollowed portion (16) of the rotor (20) has at least one guiding slot (13) in which a leg (18) of the counter-abutment (14) is guided.

3. The lock cylinder (10) according to claim 2, wherein the guiding slot (13) extends on the longitudinal axis of the rotor (20) with an enlarged engagement portion (13a) wherein one of the body pins (31) engages with said engagement portion (13a) of the guiding slot (13) and blocks the rotation of the rotor (20) when the counter-abutment (14) is in the lock position.

4. The lock cylinder (10) according to claim 3, wherein the counter-abutment (14) and the engagement portion (13a) of the guiding slot (13) are arranged and configured such that, on an introduction of the key (40) into the keyway (11), the counter-abutment (14) is guided onto the engagement portion (13a) for corresponding to one of the body pins (31) thereby aligning said body pin (31) with others.

5. The lock cylinder (10) according to anyone of claims 2 to 4, wherein the rotor (20) is provided with two similarly shaped guiding slots (13) on the rotor (20) with a predetermined distance from each other and the counter-abutment (14) has two similar shaped legs (18), where each leg (18) is guided on said guiding slots (13), respectively.

6. The lock cylinder (10) according to any one of the preceding claims, wherein the hollowed portion (16) has at least one elongated cavity (22) in which an arm (17) of the counter-abutment (14) is linearly guided.

7. The lock cylinder (10) according to any one of the preceding claims, wherein the counter-abutment (14) is biased with a spring (15) in the hollowed portion (16) wherein the spring (15) is placed between the counter-abutment (14) and a planar abutment surface (23) formed on the rotor (20).

8. The lock cylinder (10) according to any one of the preceding claims, wherein the counter-abutment (14) has an arc-shaped upper surface (25) that corresponds to the body pin (31) when the rotor (20) is rotated and moves one of the body pins (31) to align with the other body pins (31).

9. The lock cylinder (10) according to any one of the preceding claims, wherein the cylinder body (11) has a first cylinder half (34a) and a second cylinder half (34b), and the rotor (20) is placed within the first cylinder half (34a).

10. The lock cylinder (10) according to any one of the preceding claims, wherein the key actuated counter-abutment (14) is guided on a distal end of the rotor (20) relative to the inlet of the keyway (11).

11. A locking system for use in a door, comprising:

- a lock cylinder (10) according to any one of the preceding claims; and
- a flat key (40) for use with a rotor (20) of the lock cylinder (10), the flat key (40) including a key shaft (42) having longitudinal grooves extending a majority of the length of the key shaft (42) wherein the flat key (40) has an abutment section (41) on the key shaft (42) for moving the counter-abutment (14) in between a release position and a lock position on the rotor (20).

12. The locking system according to claim 11, wherein the abutment section (41) of the flat key (40) is a raised portion that extends perpendicularly from the key shaft (42) relative to the longitudinal axis of the flat key (40).

Patentansprüche

1. Schließzylinder (10) zum Verwenden mit einem Flachschlüssel (40), der einen Anschlagabschnitt (41) an einem Schlüsselschaft (42) aufweist, aufweisend:

einen Zylinderkörper (30) mit einer zentralen Längsachse (X);
einen Drehzylinder (20) mit einer Schlüsselnut

(11) zur Aufnahme des Schlüssels (40), der in dem Zylinderkörper (30) drehbar ist;
einen Satz von Gehäusen, die in einer vertikalen Achse (Y) bezüglich der zentralen Längsachse (X) ausgerichtet sind; und wobei jedes Gehäuse eine Stiftfeder (33), einen Körperstift (31) und einen Drehzylinderstift (32) enthält, die teilweise in die Schlüsselnut (11) ragen; wobei die Stifte durch die Feder in Richtung der Schlüsselnut (11) gedrückt werden und in Abwesenheit des Flachschlüssels (40) ein Blockieren des Drehzylinders (20) in Bezug auf den Zylinderkörper (30) gewährleisten,

wobei der Schließzylinder (10) ferner aufweist:
ein federvorgespanntes, bewegliches Gegenlager (14), das in einem am Drehzylinder (20) ausgebildeten hohlen Abschnitt (16) geführt ist, wobei das Gegenlager (14) beweglich zwischen einer Freigabeposition, in der ein entsprechender Körperstift (31) passieren kann und seine Drehung über das Gegenlager (14) fortsetzen kann, und einer Sperrposition ist, in der der entsprechende Körperstift (31) den ausgehöhlten Abschnitt (16) erreicht, wobei die weitere Drehung des Drehzylinders (20) blockiert ist, und
wobei das bewegliche Gegenlager (14) so angeordnet und ausgebildet ist, dass, wenn der passende Flachschlüssel (40) nicht eingesteckt ist, das Gegenlager (14) unter der Federkraft in der Sperrstellung verbleibt, während bei einer Einführung des Flachschlüssels (40) in die Schlüsselnut (11) der Anschlagabschnitt (41) das beweglichen Gegenlager (14) in die Freigabestellung schiebt, um dem Körperstift (31) zu entsprechen, um die Drehung des Drehzylinders (20) zu ermöglichen.

2. Schließzylinder (10) nach Anspruch 1, wobei der ausgehöhlte Teil (16) des Drehzylinders (20) mindestens einen Führungsschlitz (13) aufweist, in dem ein Schenkel (18) des Gegenlagers (14) geführt wird.

3. Schließzylinder (10) nach Anspruch 2, wobei der Führungsschlitz (13) sich in der Längsachse des Drehzylinder (20) mit einem vergrößerten Eingriffsabschnitt (13a) erstreckt, wobei einer der Körperstifte (31) in den Eingriffsabschnitt (13a) des Führungsschlitzes (13) eingreift und die Drehung des Drehzylinders (20) blockiert, wenn sich das Gegenlager (14) in der Verriegelungsposition befindet.

4. Schließzylinder (10) nach Anspruch 3, wobei der Gegenlager (14) und der Eingriffsabschnitt (13a) des Führungsschlitzes (13) so angeordnet und ausgebildet sind, dass bei einem Einführen des Schlüssels (40) in die Schlüsselnut (11) das Gegenlager (14) auf den Eingriffsabschnitt (13a) geführt wird, um einem der Körperstifte (31) zu entsprechen, damit der Körperstift (31) mit den anderen sich ausrichtet.

5. Schließzylinder (10) nach irgendeinem der Ansprüche 2 bis 4, wobei der Drehzylinder (20) mit zwei ähnlich geformten Führungsschlitzen (13) auf dem Drehzylinder (20) versehen ist, die einen vorbestimmten Abstand voneinander haben, und das Gegenlager (14) zwei ähnlich geformte Schenkel (18) aufweist, wobei jeder Schenkel (18) an den jeweiligen Führungsschlitzen (13) geführt wird.

6. Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche, wobei der ausgehöhlte Abschnitt (16) mindestens einen länglichen Hohlraum (22) aufweist, in dem ein Arm (17) des Gegenlagers (14) linear geführt ist.

7. Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche, wobei das Gegenlager (14) mit einer Feder (15) in dem ausgehöhlten Abschnitt (16) vorgespannt ist, wobei die Feder (15) zwischen dem Gegenlager (14) und einer an dem Drehzylinder (20) ausgebildeten ebenen Anlagefläche (23) angeordnet ist.

8. Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche, wobei das Gegenlager (14) eine bogenförmige Oberseite (25) aufweist, die dem Körperstift (31) entspricht, wenn der Drehzylinder (20) gedreht wird und einen der Körperstifte (31) bewegt, um sich nach den anderen Körperstiften (31) auszurichtet.

9. Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche, wobei der Zylinderkörper (30) eine erste Zylinderhälfte (34a) und eine zweite Zylinderhälfte (34b) aufweist, und der Drehzylinder (20) innerhalb der ersten Zylinderhälfte (34a) angeordnet ist.

10. Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche, wobei das schlüsselbetätigte Gegenlager (14) an einem Distalende des Drehzylinders (20) bezüglich des Eingangs der Schlüsselnut (11) geführt ist.

11. Schließsystem zur Verwendung in einer Tür, aufweisend:

- einem Schließzylinder (10) nach irgendeinem der vorhergehenden Ansprüche;
und
- einem Flachschlüssel (40) zur Verwendung mit einem Drehzylinder (20) des Schließzylinders (10), wobei der Flachschlüssel (40) einen Schlüsselschaft (42) mit Längsnuten aufweist, die sich über einen Großteil der Länge des Schlüsselschafts (42) erstrecken, wobei der

Flachschlüssel (40) einen Anschlagabschnitt (41) an dem Schlüsselschaft (42) hat zum Bewegen des Gegenlagers (14) zwischen einer Freigabe- und einer Sperrposition an dem Drehzylinder (20).

12. Verriegelungssystem nach Anspruch 11, wobei der Anschlagabschnitt (41) des Flachschlüssels (40) ein erhabener Abschnitt ist, der sich senkrecht vom Schlüsselschaft (42) bezüglich der Längsachse des Flachschlüssels (40) erstreckt.

Revendications

1. - Cylindre de serrure (10) destiné à être utilisé avec une clé plate (40) ayant une section de butée (41) sur une tige de clé (42), comprenant :

un corps de cylindre (30) ayant un axe longitudinal central (X) ;
un rotor (20) ayant une entrée de clé (11) destinée à recevoir la clé (40), apte à tourner à l'intérieur du corps de cylindre (30) ;
un ensemble de logements alignés selon un axe vertical (Y) par rapport à l'axe longitudinal central (X) ; et chaque logement contenant un ressort de goupille (33), une goupille de corps (31), et une goupille de rotor (32) faisant en partie saillie dans l'entrée de clé (11) ; les goupilles étant sollicitées par le ressort vers l'entrée de clé (11) et assurant, en l'absence de la clé plate (40), le blocage du rotor (20) par rapport au corps de cylindre (30), le cylindre de serrure (10) comprenant en outre :
une contre-butée mobile (14) à ressort, guidée dans une partie creuse (16) formée sur le rotor (20), la contre-butée (14) étant mobile entre une position de libération dans laquelle une goupille de corps (31) correspondante peut passer et poursuivre sa rotation à travers la contre-butée (14) et une position de verrouillage dans laquelle la goupille de corps (31) correspondante atteint la partie creuse (16) où la rotation supplémentaire du rotor (20) est empêchée, et la contre-butée mobile (14) étant agencée et configurée de telle sorte que, lorsque la clé plate (40) appropriée n'est pas introduire, la contre-butée (14) reste dans la position de verrouillage sous l'action de la force du ressort, tandis qu'à une introduction de la clé plate (40) dans l'entrée de clé (11), la section de butée (41) pousse la contre-butée mobile (14) jusqu'à la position de libération pour correspondre à la goupille de corps (31) afin de permettre la rotation du rotor (20).

2. - Cylindre de serrure (10) selon la revendication 1, dans lequel la partie creuse (16) du rotor (20) a au moins une fente de guidage (13) dans laquelle est guidée une patte (18) de la contre-butée (14).

3. - Cylindre de serrure (10) selon la revendication 2, dans lequel la fente de guidage (13) s'étend sur l'axe longitudinal du rotor (20) avec une partie d'engagement élargie (13a) dans laquelle l'une des goupilles de corps (31) s'engage avec ladite partie d'engagement (13a) de la fente de guidage (13) et bloque la rotation du rotor (20) lorsque la contre-butée (14) est dans la position de verrouillage.

4. - Cylindre de serrure (10) selon la revendication 3, dans lequel la contre-butée (14) et la partie d'engagement (13a) de la fente de guidage (13) sont agencées et configurées de telle sorte qu'à une introduction de la clé (40) dans l'entrée de clé (11), la contre-butée (14) est guidée sur la partie d'engagement (13a) pour correspondre à l'une des goupilles de corps (31), alignant ainsi ladite goupille de corps (31) avec d'autres.

5. - Cylindre de serrure (10) selon l'une des revendications 2 à 4, dans lequel le rotor (20) comporte deux fentes de guidage (13), de forme similaire, sur le rotor (20), à une distance prédéterminée l'une de l'autre, et la contre-butée (14) a deux pattes (18) de forme similaire, chaque patte (18) étant guidée sur lesdites fentes de guidage (13), respectivement.

6. - Cylindre de serrure (10) selon l'une quelconque des revendications précédentes, dans lequel la partie creuse (16) a au moins une cavité allongée (22) dans laquelle un bras (17) de la contre-butée (14) est guidé linéairement.

7. - Cylindre de serrure (10) selon l'une quelconque des revendications précédentes, dans lequel la contre-butée (14) est sollicitée par un ressort (15) dans la partie creuse (16), le ressort (15) étant placé entre la contre-butée (14) et une surface de butée plane (23) formée sur le rotor (20).

8. - Cylindre de serrure (10) selon l'une quelconque des revendications précédentes, dans lequel la contre-butée (14) a une surface supérieure (25) en forme d'arc, qui correspond à la goupille de corps (31) lorsque le rotor (20) est tourné et déplace l'une des goupilles de corps (31) pour l'aligner avec les autres goupilles de corps (31).

9. - Cylindre de serrure (10) selon l'une quelconque des revendications précédentes, dans lequel le corps de cylindre (11) a une première moitié de cylindre (34a) et une seconde moitié de cylindre (34b), et le rotor (20) est placé à l'intérieur de la première moitié de cylindre (34a).

10. - Cylindre de serrure (10) selon l'une quelconque des revendications précédentes, dans lequel la contre-butée (14) actionnée par clé est guidée sur une extrémité distale du rotor (20) par rapport à la bouche de l'entrée de clé (11).

11. - Système de verrouillage destinée à être utilisé dans une porte, comprenant :

- un cylindre de serrure (10) selon l'une quelconque des revendications précédentes ; et
- une clé plate (40) destinée à être utilisée avec un rotor (20) du cylindre de serrure (10), la clé plate (40) comprenant un tige de clé (42) ayant des rainures longitudinales s'étendant sur la majeure partie de la longueur de la tige de clé (42), la clé plate (40) ayant une section de butée (41) sur la tige de clé (42) pour déplacer la contre-butée (14) entre une position de libération et une position de verrouillage sur le rotor (20) .

12. - Système de verrouillage selon la revendication 11, dans lequel la section de butée (41) de la clé plate (40) est une partie surélevée qui s'étend perpendiculairement à partir de la tige de clé (42) par rapport à l'axe longitudinal de la clé plate (40).

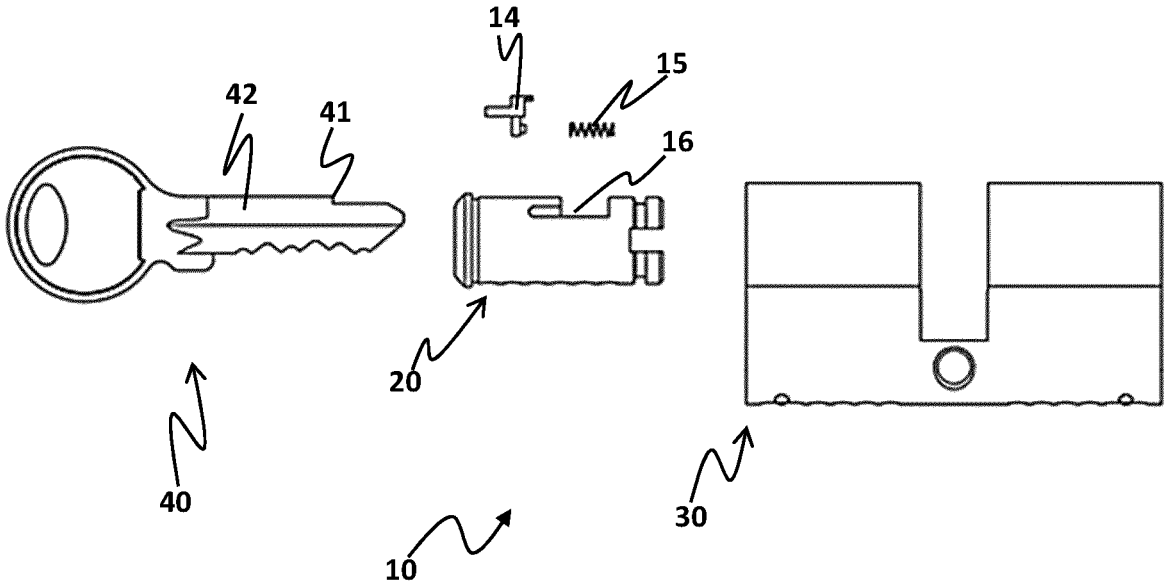

14
15
42
41
16
20
40
10
30

FIG. 1

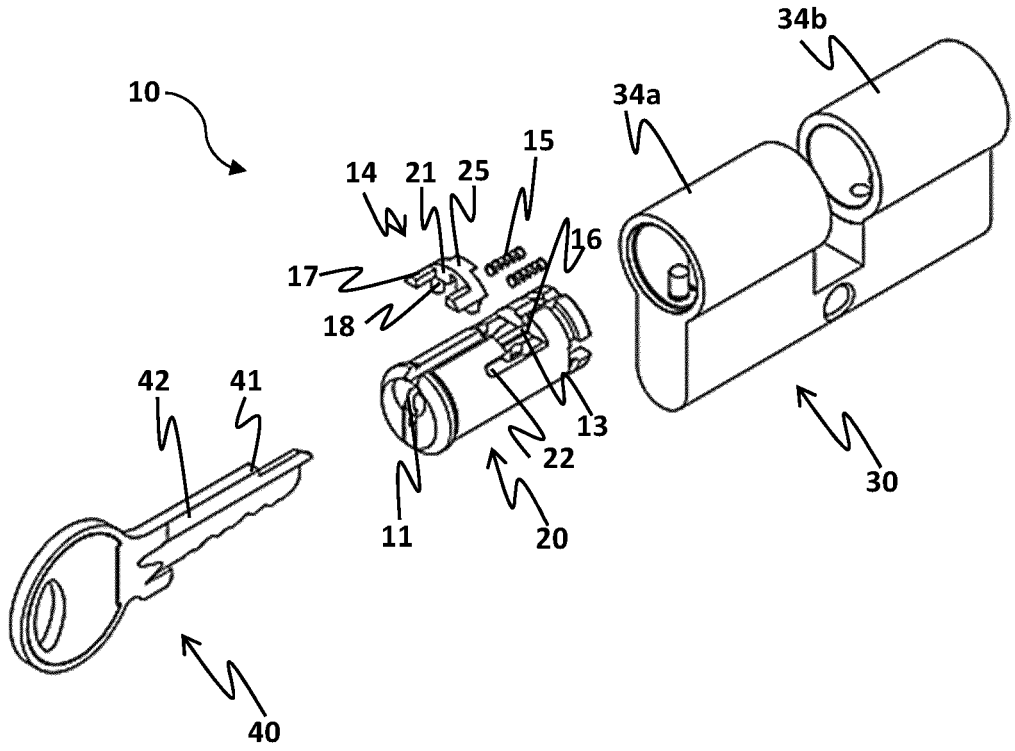

34b
10
34a
15
14
21
25
16
17
18
42
41
13
22
30
11
20
40

FIG. 2

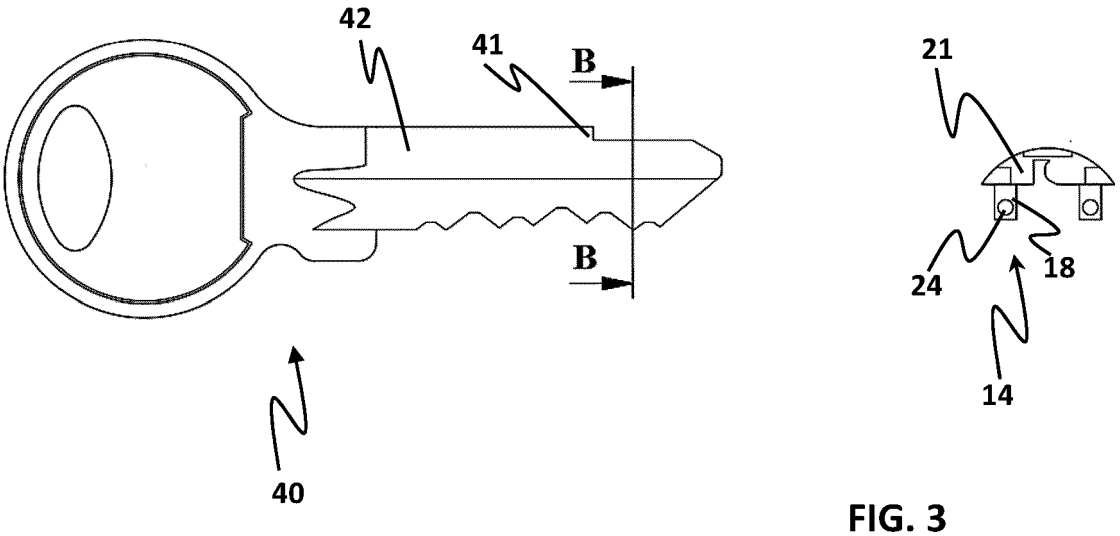


FIG. 3

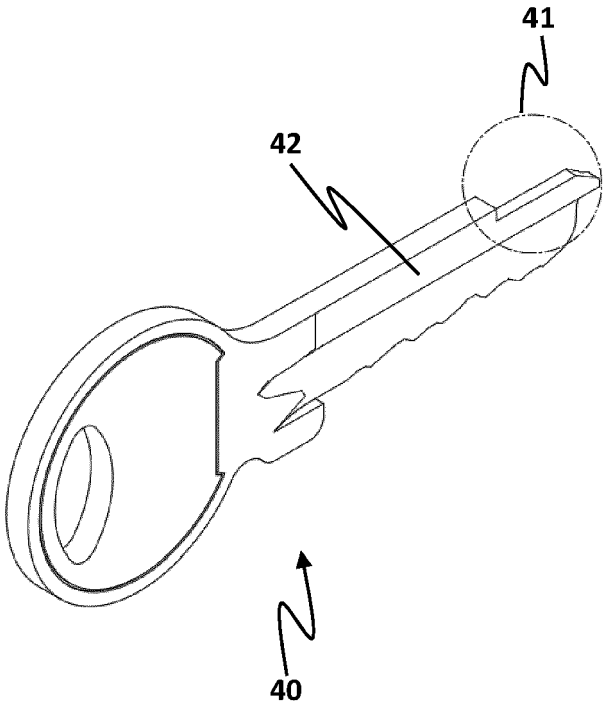


FIG. 4

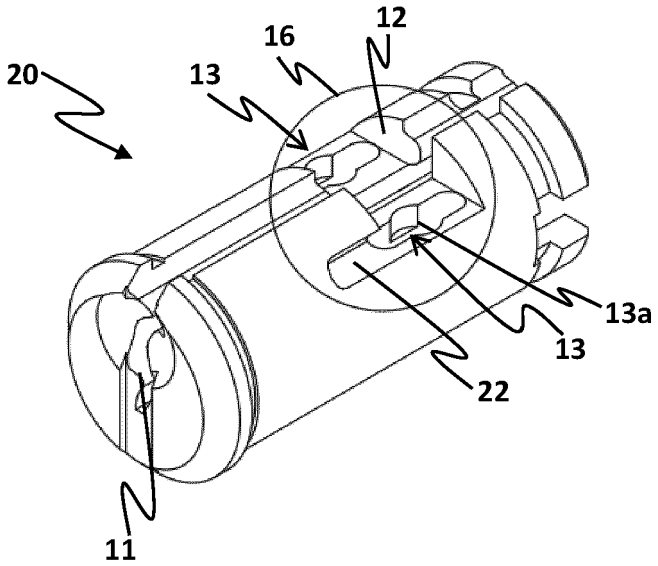


FIG. 5

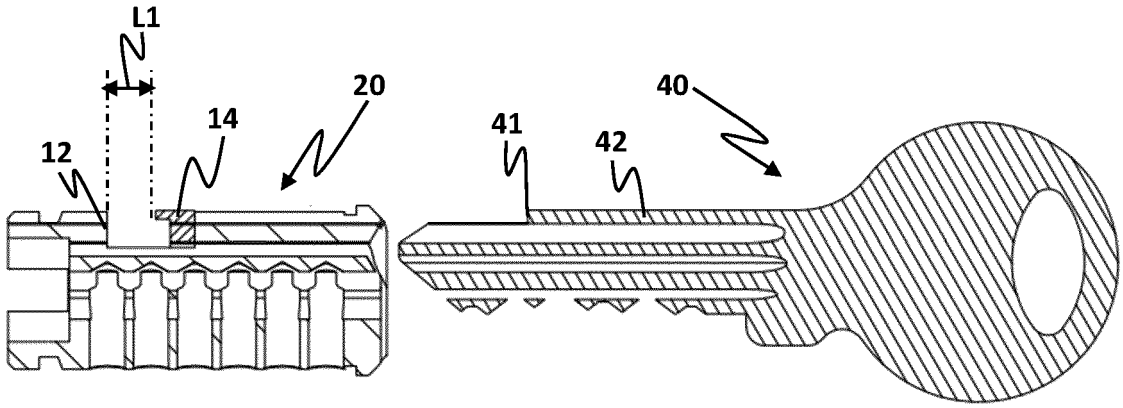


FIG. 6a

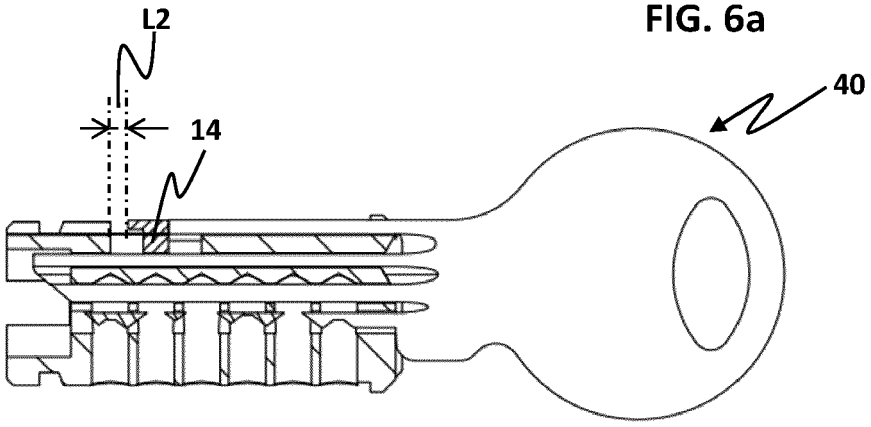


FIG. 6b

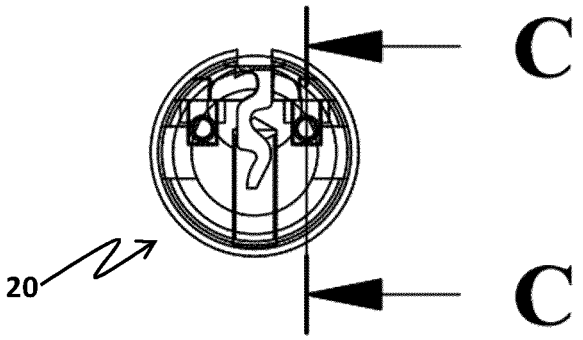


FIG. 7a

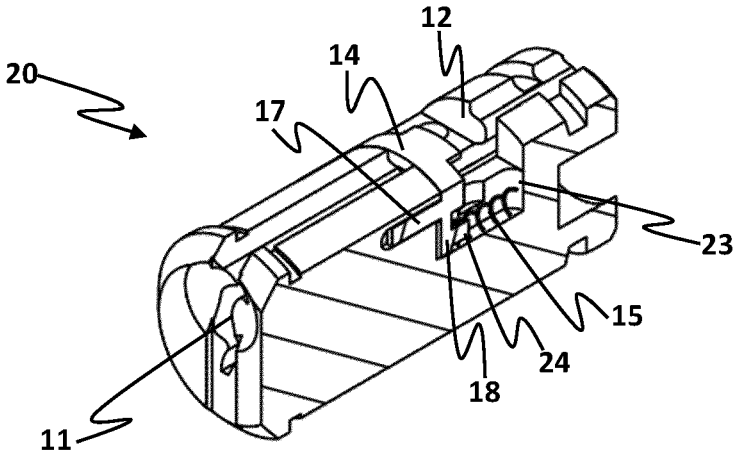


FIG. 7b

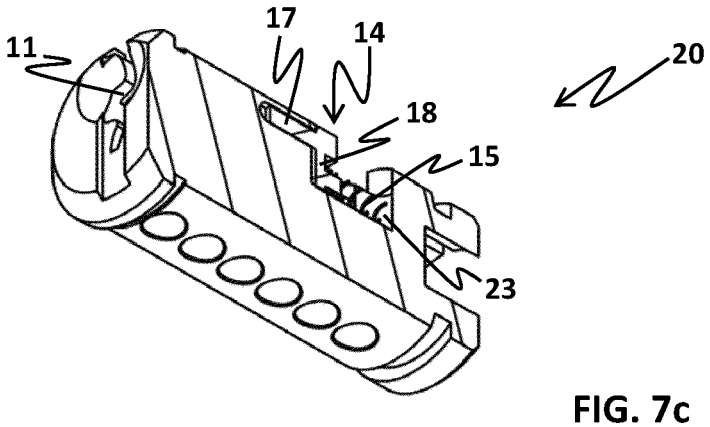


FIG. 7c

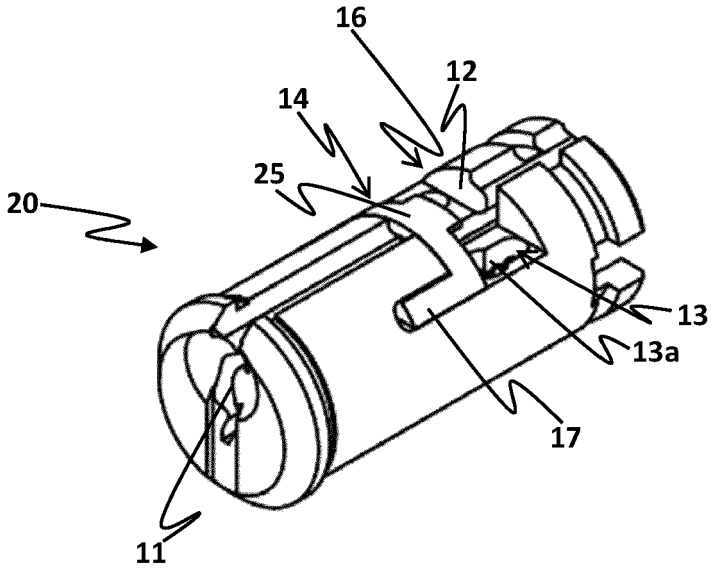


FIG. 8a

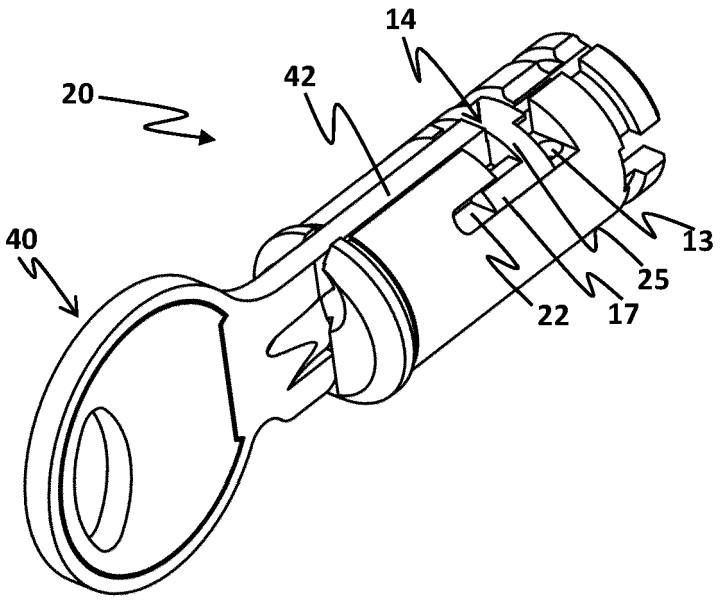


FIG. 8b

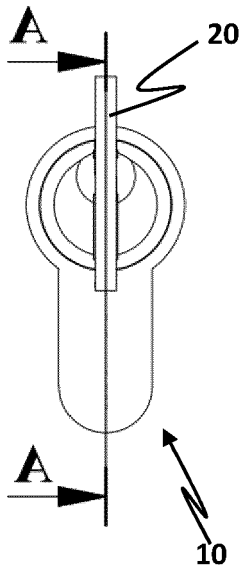


FIG. 9a

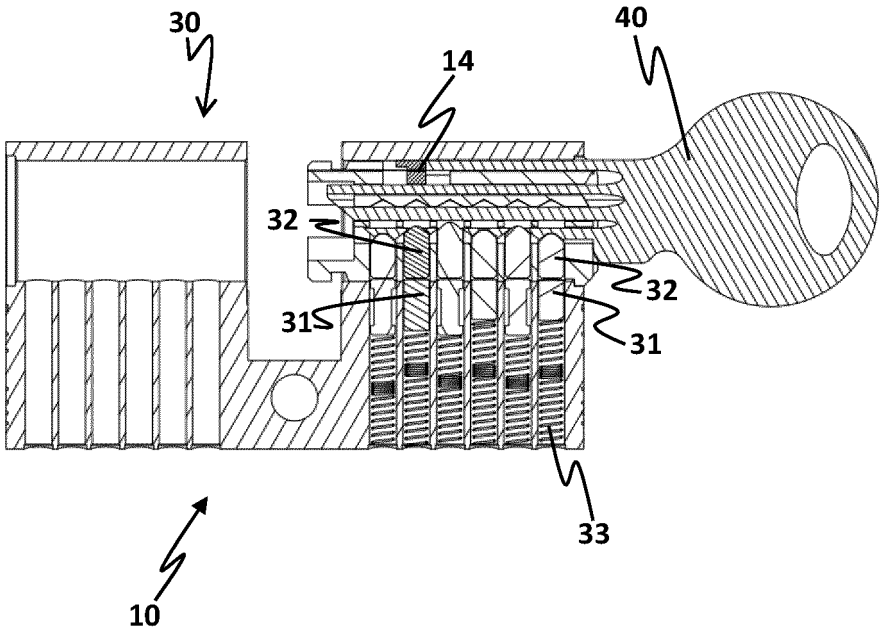


FIG. 9b

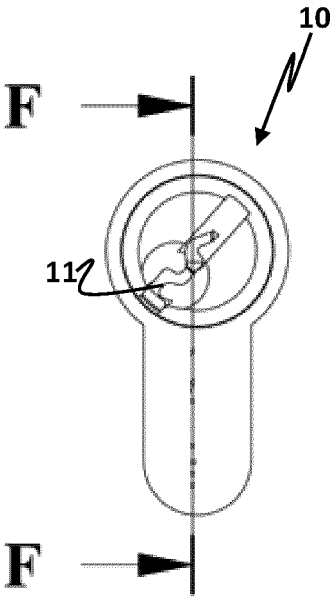


FIG. 10a

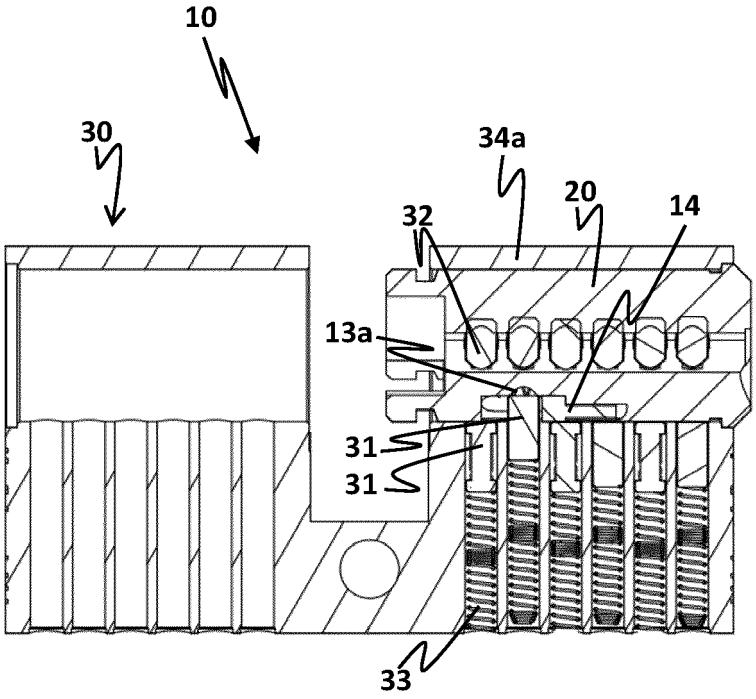


FIG. 10b

REFERENCES CITED IN THE DESCRIPTION

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