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(54) ECCENTRIC LOCKING MECHANISM FOR AN ELECTRONIC CYLINDER LOCK AND ELECTRONIC CYLINDER LOCK PROVIDED WITH SAID LOCKING MECHANISM

(57) The present invention relates to an eccentric locking mechanism for an electronic lock, comprising: a stator body (1) with an inner core (1a); a borehole (2) that houses a locking pin (3) and a spring (4); a rotor insert (5) housed in the core (1a), and with a first region (5a) for engaging with a transmission mechanism between the rotor and rotor insert and with a second region (5b) provided with recesses (6) in contact with the pin (3); a bushing (7) attached to an eccentric (10), which is arranged externally to the rotor insert (5) and provided with locking openings (8); and coupling means (9a, 9b; 9c, 9d) for coupling the rotor insert (5) to the bushing (7) during activation of the lock.

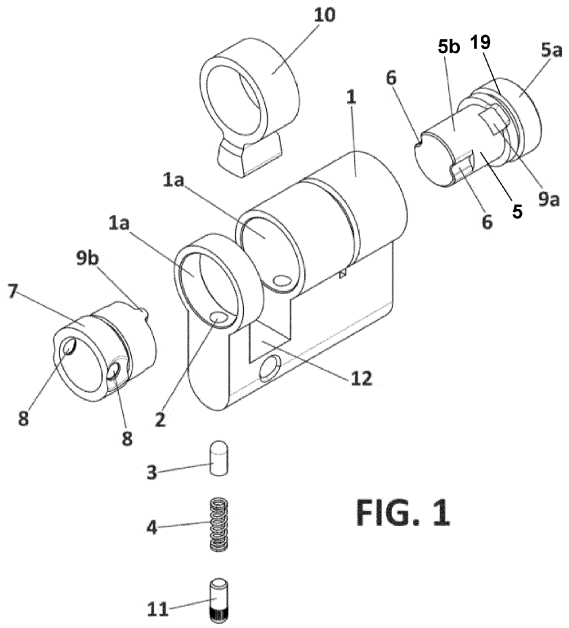

FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The present invention belongs to the technical field of electronic locks.

[0002] More particularly, this invention relates to a locking mechanism intended for use in electronic cylinder locks in which the closure system is provided with an eccentric.

BACKGROUND OF THE INVENTION

[0003] Electronic cylinder locks have many advantages over conventional, purely mechanical locks.

[0004] In mechanical cylinders, the eccentric is integrally attached to the rotor when the rotor is interlocked by the pins when the key is removed; the eccentric, being integrally attached to the rotor, is also interlocked. This, however, does not happen in electronic cylinders, and certain activation or locking functions of closures or systems are limited.

[0005] The common way to use electronic cylinder locks of this type is by installing them inside a door, in such a way that the eccentric is located inside the door and is not accessible from the outside, such that it cannot be manipulated.

[0006] Moreover, the actuating mechanism of the electronic cylinder lock, in its resting position, is not connected to the eccentric, therefore it does not transmit any movement to the same. When the lock is activated, the actuating mechanism engages with the eccentric. Once engaged, the eccentric can rotate and move in the desired way, allowing opening or closing. Once the operation is finished (in other words, once the door has been opened or closed), the electronic cylinder returns to its resting condition, disengaging itself.

[0007] It is important to note that in electronic locks of this type, the eccentric, in the resting condition, is not locked and can be moved without any impediment. Now, since the eccentric is inside the door, it cannot be accessed and therefore the lock is secure.

[0008] However, given the aforementioned advantages, it would be useful to increase the versatility of electronic locks of this type so that they can be used in a greater number of applications.

[0009] To do so, it would be necessary to develop a locking mechanism for the eccentric thereof, which would avoid potential security and operational problems.

[0010] Some examples of use would be:

- Tube-type safe deposit boxes inserted into a wall.
- Key safe boxes superimposed on a wall.
- Switch or relay boxes with a continuous push function, where the eccentric must remain in a specific fixed position once the closure occurs.
- Cabinets or lockers with simple fittings in which the eccentric itself is the latch.

[0011] However, if already known electronic cylinder locks were used in said compartments, the eccentric would be easily accessible. As seen above, given that the eccentric is not locked in the resting condition, it could be moved without any impediment, which would seriously compromise the security of the aforementioned devices.

[0012] Likewise, the locking mechanism of the eccentric should be adapted to the reduced length of the cylinder in this type of locks. The most commonly used cylinder in these locks is the European profile half cylinder, whose length is half that of a conventional cylinder, which is a major impediment when designing the locking mechanism.

DESCRIPTION OF THE INVENTION

[0013] The present invention aims to address all of the limitations, disadvantages and drawbacks of electronic cylinder locks from the prior art described above.

[0014] To do so, a first object of the invention relates to an eccentric locking mechanism for an electronic cylinder lock, characterised in that it comprises:

a) a stator body provided with an inner core;
b) a borehole in contact with the inner core and in which a locking pin loaded by a spring is housed;
c) a rotor insert housed, at least partially, in the inner core, the rotor insert being provided with a first region intended to engage with a transmission mechanism between the rotor and rotor insert during the activation of the electronic lock and a second region provided with recesses and which is intended to contact the locking pin;
d) a bushing integrally attached to an eccentric and housed, at least partially, in the inner core; the bushing being arranged coaxially to the rotor insert and externally to the same, the bushing also being provided with openings intended to house the locking pin; and
e) coupling means, intended to couple the rotor insert to the bushing during the activation of the electronic lock.

[0015] The operating procedure of the eccentric locking mechanism according to the present invention comprises the following steps:

1. Initially, in the locked situation, the locking pin, due to the action of the spring, passes through one of the openings in the bushing until it reaches one of the recesses of the rotor insert aligned with said opening in the bushing. In this way, the bushing is locked by the locking pin. The eccentric in turn, as it is integrally attached to the bushing, is also locked (since if the bushing cannot move, neither can the eccentric and vice versa);
2. Subsequently, when the electronic lock is activated, the first region of the rotor insert engages with a

transmission mechanism between the rotor and rotor insert. In this way, the rotor insert begins to turn inside the bushing and, thanks to the shape of its recesses, pushes the locking pin into the borehole. Thus, when the rotor insert moves through a predetermined unlocking angle (α), one of the recesses in the rotor insert pushes the locking pin until it is placed on the inner edge of the bushing. On the other hand, the total angle that the rotor insert moves through from the initial locking position until said rotor insert is coupled to the bushing (thanks to the action of the coupling means) is at least the unlocking angle (α). The unlocking angle α is therefore a predetermined angle comprised between 0° and 165° and is related to the specific configuration of the recesses and the specific configuration of the coupling means. Preferably, the arrangement of the recesses in the rotor insert and the arrangement of the openings in the bushing is such that, when the rotor insert rotates at least the unlocking angle α and couples to the bushing in a coupling position, the following recess of the rotor insert (i.e., the recess of the rotor insert that, taking into account the direction of rotation, will next come into contact with the locking pin), is aligned with the following locking opening in the bushing (i.e., the opening in the bushing that, taking into account the direction of rotation, will next come into contact with the locking pin);

3. The rotor insert continues its rotation and, since it is coupled to the bushing, it drags it, subjecting it to a rotational movement. Said rotation movement causes the wall of the opening, wherein the locking pin was interlocked and where in this situation, thanks to the thrust of the rotor insert, the locking pin is aligned with the inner edge of the bushing, exerts pressure towards the inside of the borehole on said locking pin during rotation, until the locking pin completely comes out of said opening. Once out of the opening, the bushing is released. When the bushing is released from the locking pin, it rotates in the direction of rotation induced by the rotor insert. This rotation of the bushing in turn causes the eccentric to also turn (since it is integrally attached to the bushing), opening or, alternatively, closing the lock; and

4. At the end of the rotation of the bushing, the following locking opening is aligned with the locking pin. In this way, as was the case in the first step described above, due to the action of the spring, the locking pin passes through said opening in the bushing until it reaches the corresponding recess of the rotor insert. In this way, the bushing and, by extension, the eccentric of the electronic cylinder lock are locked again.

[0016] The described locking situations of the eccentric correspond to the opening and closing positions of the lock, the eccentric always remaining locked when the lock is closed.

[0017] Likewise, the locking mechanism according to the present invention can be used both in locks opening to the right and to the left.

[0018] Preferably, in the locking mechanism of the present invention, the arrangement and shape of the recesses in the rotor insert is such that, when the rotor insert rotates the unlocking angle (α), the locking pin is positioned at the height of the inner edge of the bushing. Likewise, when the rotor insert rotates at least the unlocking angle (α), said rotor insert couples to the bushing in a coupling position, the following recess of the rotor insert also being aligned with the following opening in the bushing.

[0019] In a particular embodiment of the locking mechanism of the invention, the bushing is provided with two openings spaced 90° apart, the rotor insert also being provided with two recesses spaced apart by an angle greater than or equal to 90° + (α), where (α) is the unlocking angle. In this particular case, the rotor insert and bushing are positioned during the manufacturing process based on whether the lock opens to the right or to the left.

[0020] In another embodiment of the invention, the bushing is provided with two openings spaced 180° apart, the rotor insert also being provided with two recesses spaced apart by an angle greater than or equal to 180° + (α), (α) being the unlocking angle. This particular embodiment of the invention has the advantage that the locking mechanism can be used both with a lock that opens to the right and another that opens to the left (if the opening is to the right, closing occurs when the eccentric is located at 270°, and if, on the other hand, the opening is to the left, it will be the other way around, meaning the closing occurs when the eccentric is located at 90°). In this way a more universal solution is obtained.

[0021] The openings in the bushing preferably have chamfered and/or rounded walls. This particular shape of the walls of the openings makes it easier for the locking pin to completely come out of the corresponding opening once the bushing has been coupled to the rotor insert and the locking pin has been aligned with the inner edge of the bushing.

[0022] In an embodiment of the invention, the coupling means comprise a window provided in the rotor insert and a lug provided in the bushing. In this embodiment, the coupling positions are reached when one of the lateral edges of the window of the rotor insert comes into contact with the corresponding lateral end of the lug, provided in the bushing. Furthermore, in this embodiment, the width of the window (i.e., the distance between the lateral edges thereof) depends on the unlocking angle (α). The length of the rotor insert window is such that, when the rotor insert rotates at least the unlocking angle α and the coupling position of the rotor insert with the bushing is reached, one of the recesses of the rotor insert is aligned with one of the openings in the bushing.

[0023] In another additional embodiment of the invention, the coupling means comprise a window provided in the bushing and a lug provided in the rotor insert. In this

embodiment, the coupling positions are reached when one of the lateral ends of the lug of the rotor insert comes into contact with the corresponding lateral edge of the bushing window. Therefore, in this embodiment, the width of the window also depends on the unlocking angle α. Preferably, the length of the bushing window is such that, when the rotor insert rotates at least the unlocking angle α and the coupling position of the rotor insert with the bushing is reached, one of the recesses of the rotor insert is aligned with one of the openings in the bushing.

[0024] In a preferred embodiment of the invention, the eccentric is provided with an anchoring pin loaded with a coil spring and, moreover, the bushing is provided with holes intended to house said anchoring pin of the eccentric. Thanks to this particular configuration of the mechanism of the invention, it is possible to place the eccentric in different positions and choose, during the lock installation operation by the user, the position in which the closure is best secured (it does not always have to close at 90° or 270°).

[0025] A second object of the invention relates to an electronic cylinder lock, characterised in that it is provided with a locking mechanism according to the first aspect of the invention.

BRIEF DESCRIPTION OF THE FIGURES

[0026] What follows is a very brief description of a series of drawings that aid in better understanding the invention, which are expressly related to an embodiment of said invention and are presented by way of non-limiting examples of the same.

Figure 1 is an ordered exploded perspective view of a first embodiment of a locking mechanism according to the present invention;

Figure 2 is a perspective view that shows in detail how the bushing and the rotor insert are coupled in the locking mechanism of Fig. 1;

Figures 3A to 3D are cross-sectional views that illustrate the operation of a second embodiment of a locking mechanism according to the present invention;

Figures 4A to 4D are perspective views that illustrate the operation of the locking mechanism of Figs. 3A to 3D;

Figures 5A to 5D are cross-sectional views that illustrate the locks of a locking mechanism according to the present invention; and

Figures 6A to 6D are different views (exploded, perspective, side elevation and cross-sectional) that show a third embodiment of a locking mechanism according to the present invention which allows the locking positions of the eccentric to be adjusted.

NUMERICAL REFERENCES OF THE FIGURES

[0027]

(1) Stator body of the locking mechanism;
(1a) Inner core;
(2) Borehole for housing the locking pin;
(3) Locking pin;
(4) Spring that loads the locking pin;
(5) Rotor insert of the locking mechanism;
(5a) First region of the rotor insert (engaging region);
(5b) Second region of the rotor insert (region of contact with the locking pin);
(6) Recesses (of the second region of the rotor insert);
(7) Bushing of the locking mechanism;
(7a) Notch (to house a clip for axial attachment of the bushing);
(8) Locking openings;
(9a) Window in the rotor insert (forms part of the coupling means);
(9b) Lug on the bushing (forms part of the coupling means);
(9c) Lug on the rotor insert (forms part of the coupling means);
(9d) Window in the bushing (forms part of the coupling means);
(10) Eccentric;
(11) Closing plug of the borehole;
(12) Mortise of the stator body (for the passage of the eccentric);
(13) Anchoring pin (of the eccentric);
(14) Coil spring (of the eccentric);
(15) Holes for housing the anchoring pin (provided in the bushing);
(16) Indicator of the angles that the holes are at;
(17) Groove of the eccentric;
(18) Indentation of the anchoring pin;
(19) Slot (to house a clip for axial attachment of the rotor insert);
(20) Clip for axial attachment of the bushing;
(21) Clip for axial attachment of the rotor insert;
(α) Unlocking angle.

PREFERRED EMBODIMENTS

[0028] A description of various preferred cases of uses for the invention is made below.

[0029] Throughout the present description, as well as in the attached figures, the elements with equal or similar functions will be designated with the same numerical references.

[0030] Figure 1 shows a first eccentric locking mechanism according to the present invention.

[0031] As can be seen in said figure, the locking mechanism comprises a stator body (1), which has a hollow cylindrical inner portion or inner core (1a). The stator body (1) is provided with a borehole (2) inside which the locking pin (3), the spring (4) and a closing plug (11) are housed. Moreover, in this particular embodiment of the invention, the stator body (1) is provided with a mortise (12) that allows the passage of an eccentric (10) in its rotation.

[0032] A rotor insert (5) provided with a first region (5a) (intended to engage with a transmission mechanism between the rotor and rotor insert during the activation of the electronic lock) and a second region (5b) provided with recesses (6) and which is intended to contact the locking pin (3) runs through the inner core (1a).

[0033] A bushing (7) is also inserted in the inner core (1a) coaxially with the rotor insert (5) and externally to the same. The bushing is also provided with openings (8) intended to house the locking pin (3). In this particular embodiment of the invention, the openings (8) have chamfered and/or rounded walls.

[0034] Likewise, the coupling means, responsible for coupling the rotor insert (5) to the bushing (7) during the activation of the electronic lock, comprise a lug (9b) provided in the bushing (7) and a window (9a) made in the rotor insert (5). Figure 2 shows in greater detail how the rotor insert (5) and the bushing (7) are coupled once one of the lateral edges of the window (9a) of the rotor insert (5) comes into contact with one of the lateral ends of the lug (9b) of the bushing (7). Likewise, Figure 2 shows more clearly how, in this embodiment of the invention, the bushing (7) is provided with a notch (7a) to house a clip for axial attachment of the bushing (20) to the stator body (1). On the other hand, the rotor insert (5) is provided with a slot (19) to house a clip for axial attachment of the rotor insert (21) to the stator body (1).

[0035] A second embodiment of the locking mechanism of the present invention is shown in Figures 3A-3D and 4A-4D. Said mechanism is very similar to the one illustrated in Figure 1, but the coupling means vary slightly: here the window (9d) is made in the bushing (7), whereas the lug (9c) is provided in the rotor insert (5). Likewise, in said Figures 3A-3D and 4A-4D the eccentric (10), the attachment clips and the spring (4) have been removed to be able to see how the other elements move during the operation of the locking mechanism.

[0036] Figures 3A and 4A show an initial locked position of the mechanism of the invention. In it, the locking pin (3), due to the action of the spring (4), has passed through one of the openings (8) in the bushing (7) reaching a corresponding recess (6) of the rotor insert (5) aligned with said opening (8). In this way, the bushing (7) is locked by the locking pin (3).

[0037] Figures 3B and 4B represent the moments immediately after the activation of the electronic lock. At that time, the rotor insert (5) engages with a transmission mechanism between the rotor and rotor insert of the lock and begins to turn inside the bushing (7) and, thanks to the shape of its recesses (6), pushes the locking pin (3) into the borehole (2). The rotor insert (5) turns a total unlocking angle (α) until the locking pin (3) is at the same height as the inner edge of the bushing (7). The rotor insert (5) is coupled to the bushing (7) when it has rotated at least the total unlocking angle (α), and the situation may arise where it is necessary to rotate an angle greater than the total unlocking angle (α) so that coupling between the rotor insert (5) and the bushing (7) occurs. In the coupling position, one of the lateral ends of the lug (9c) of the rotor insert (5) comes into contact with a lateral edge of the window (9d) provided in the bushing (7). In the coupling position, the following recess (6) of the rotor insert (5) located on the right in Figures 3B and 4B (i.e., the recess (6) that, taking into account the direction of rotation, will next come into contact with the locking pin (3)), is aligned with the following opening (8) in the bushing (7).

[0038] Figures 3C and 4C represent a subsequent step in which the rotor insert (5) continues its rotation coupled to the bushing (7). Thanks to the drag of the rotor insert (5) and the fact that the locking pin (3) is aligned with the inner edge of the bushing (7), the wall of the opening (8) in the bushing (7), in which the locking pin (3) was interlocked thanks to its shape, exerts pressure on said locking pin (3) during rotation, pushing it inside the borehole (2) against the action of the spring (4) until the locking pin (3) completely comes out of said opening (8). Once out of the opening (8), the bushing (7), being released from the locking pin (3), is free to rotate in the direction of rotation induced by the rotor insert (5).

[0039] Figures 3D and 4D show the final step, in which the bushing (7) continues to rotate until it reaches a position in which the following opening (8) is aligned with the locking pin (3). In this way, as in the first step described, the bushing (7) (and by extension, the eccentric (10) of the electronic lock) are locked again.

[0040] The described locking situations of the eccentric (10) correspond to the opening and closing positions of the lock, the eccentric always remaining locked when the lock is closed.

[0041] Likewise, thanks to the configuration of the rotor insert (5) and the bushing (7), this locking mechanism can be used in locks that open to both the right and the left.

[0042] In the locking mechanism of the present invention, the arrangement of the recesses (6) in the rotor insert (5) and the arrangement of the openings (8) in the bushing (7) is such that, when the rotor insert (5) rotates at least the unlocking angle $\alpha°$ and couples to the bushing (7) in a coupling position, the following recess (6) of the rotor insert (5) is aligned with the following opening (8) in the bushing (7).

[0043] In the first embodiment of the invention, shown in Figures 1, 2 and 5A-5D, the rotor insert (5) is provided with two recesses (6) spaced apart by an angle greater than or equal to 180° + α, the bushing (7) also being provided with two openings (8) spaced 180° apart. This first embodiment of the invention has the advantage that the locking mechanism can be used both with a lock that opens to the right and another that opens to the left (if the opening is to the right, closing occurs when the eccentric is located at 270°, and if, on the other hand, the opening is to the left, it will be the other way around, meaning the closing occurs when the eccentric is located at 90°). In this way a universal solution is obtained.

[0044] In the second embodiment of the locking mechanism of the invention, shown in Figures 3A-3D and 4A-

4D, the rotor insert (5) is provided with two recesses (6) spaced apart by an angle greater than or equal to 90° + α, the bushing (7) also being provided with two openings (8) spaced 90° apart. In this particular case, the positioning of the rotor insert (5) and bushing (7) is carried out at the factory depending on whether the lock opens to the right or to the left.

[0045] Figures 5A to 5D are cross-sectional views of a locking mechanism according to the present invention, wherein the eccentric (10) has been represented so as to show the eccentric locking process by means of a locking mechanism according to the present invention. The arrows located on the rotor insert (5) represent the direction of rotation.

[0046] Figures 5A to 5D will explain different operating options provided by the first embodiment of the locking mechanism object of the present invention.

[0047] Thus, in the initial position shown in Fig. 5A, the eccentric (10) is locked in the 270° position (i.e., pointing to the left) by the locking pin (3). The lug (9b) does not act because the coupling between the rotor insert (5) and the bushing (7) has not yet taken place.

[0048] In Figure 5B, the rotor insert (5) has already engaged with the rotor of the lock and has rotated the unlocking angle α° in the anticlockwise direction, slightly displacing, thanks to the shape of the recess (6), the locking pin (3) until it is positioned on the inner edge of the bushing (7).

[0049] Figure 5C shows that by continuing the 90° anticlockwise rotation of the rotor insert (5), it engages with the bushing (7), causing it to turn and displacing the locking pin (3) towards the inside of the borehole (2) thanks to the chamfered and/or rounded walls of the opening (8). As it is integrally attached to the bushing (7), the eccentric (10) turns until it is hidden in the mortise (12) of the stator body (1), reaching the open position.

[0050] These three figures describe an operation of the lock wherein the eccentric is locked in its closing position at 270° (shown in Figure 5A), whereas in the opening position (shown in Figure 5C), the eccentric is not locked, but as it is inside the mortise (12) of the cylinder, it is not accessible and therefore the security thereof is not reduced. If one wants to change the opening direction of the door, we would start from a closing position in which the eccentric is locked at 90° (Figure 5D) and by means of a clockwise rotation, opening would occur by placing the eccentric in the position of Figure 5C.

[0051] Sometimes it may be of interest for the lock to have two closing positions, wherein the locking of the eccentric (10) is secured both at 270° and at 90°. In this situation, starting from Figure 5C, the rotor insert (5) continues to rotate.

[0052] Figure 5D shows how, if the user wants to leave the eccentric (10) also locked at 90° (i.e., pointing to the right), from the position illustrated in Figure 5C he or she can continue rotating the rotor insert (5) coupled to the bushing (7) another 90° in the anticlockwise direction until the locking pin (3) enters a new opening (8) so that it locks the eccentric (10) at 90°.

[0053] This position of the eccentric (10) locked in Figure 5D, after having carried out the movements of the previous Figures 5A to 5C, can be a new closing position of the lock or an opening position where it is of interest to have the eccentric (10) locked.

[0054] Finally, Figures 6A to 6D show an additional embodiment of a locking mechanism according to the present invention which allows the locking positions of the eccentric (10) to be adjusted, wherein the eccentric (10) is provided with an anchoring pin (13) loaded by a coil spring (14) and furthermore the bushing (7) is provided with holes (15) intended to house said anchoring pin (13). In the particular case shown here, the holes (15) of the bushing (7) are provided every 30°. Moreover, an indicator (16) can be provided, which can be for example a sticker, that illustrates the position of the different angles that the holes are at (marked as 30°, 60°, 90°, and so on).

[0055] The locking mechanism according to Figures 6A to 6D has the advantage that it allows the eccentric (10) to be placed in different positions (in this case, there is a different hole (15) every 30°) and to choose, during the lock installation operation by the user, the position in which the closure is best secured. To do this, a groove (17) is provided, through which the user can insert a screwdriver or other similar tool into the indentation (18) of the anchoring pin (13) and pull it upwards until it is removed from the hole (15) in which it was fitted, to release the eccentric (10) and place it in the desired position.

[0056] The invention should not be limited to the particular embodiment described herein. Persons skilled in the art can develop other embodiments in view of the description made herein. Accordingly, the scope of the invention is defined by the following claims.

Claims

1. An eccentric locking mechanism for an electronic cylinder lock, **characterised in that** it comprises:

   a) a stator body (1) provided with an inner core (1a);
   b) a borehole (2) in contact with the inner core (1a) and in which a locking pin (3) loaded by a spring (4) is housed;
   c) a rotor insert (5) housed, at least partially, in the inner core (1a), the rotor insert (5) being provided with a first region (5a) intended to engage with a transmission mechanism between the rotor and rotor insert (5) during the activation of the electronic lock and a second region (5b) provided with recesses (6) and which is intended to contact the locking pin (3);
   d) a bushing (7) integrally attached to an eccentric (10) and housed, at least partially, in the inner

core (1a); the bushing (7) being arranged coaxially to the rotor insert (5) and externally to the same, the bushing (7) also being provided with openings (8) intended to house the locking pin (3); and

e) coupling means (9a, 9b; 9c, 9d), intended to couple the rotor insert (5) to the bushing (7) during the activation of the electronic lock.

2. The locking mechanism according to claim 1, wherein the openings (8) in the bushing (7) have chamfered walls, rounded walls or a combination thereof.

3. The locking mechanism according to any of the preceding claims, wherein the recesses (6) in the rotor insert (5) are arranged such that, when the rotor insert (5) rotates a predetermined unlocking angle (α), one of the recesses (6) pushes the locking pin (3) until it is at the same height as the inner edge of the bushing (7).

4. The locking mechanism according to any of the preceding claims, wherein the coupling means (9a, 9b) comprise a window (9a) provided in the rotor insert (5) and a lug (9b) provided in the bushing (7).

5. The locking mechanism according to claim 4, wherein the extension of the window (9a) provided in the rotor insert (5) is defined by the fact that, in the coupling positions of the rotor insert (5) with the bushing (7), one of the recesses (6) of the rotor insert (5) is aligned with one of the openings (8) in the bushing (7).

6. The locking mechanism according to any of claims 1 to 3, wherein the coupling means (9c, 9d) comprise a window (9d) provided in the bushing (7) and a lug (9c) provided in the rotor insert (5).

7. The locking mechanism according to claim 6, wherein the extension of the window (9d) provided in the bushing (7) is defined by the fact that, in the coupling positions of the rotor insert (5) with the bushing (7), one of the recesses (6) of the rotor insert (5) is aligned with one of the openings (8) in the bushing (7).

8. The locking mechanism according to any of the preceding claims, wherein the recesses (6) in the rotor insert (5) and the openings (8) in the bushing (7) are arranged such that, when the rotor insert (5) rotates an angle greater than or equal to the predetermined unlocking angle (α), said rotor insert (5) couples to the bushing (7) in a coupling position, the following recess (6) of the rotor insert also being aligned with the following opening (8) in the bushing (7).

9. The locking mechanism according to claim 8, wherein the bushing (7) is provided with two openings (8) spaced 90° apart, the rotor insert (5) also being provided with two recesses (6) spaced apart by an angle greater than or equal to 90° + (α), (α) being the unlocking angle.

10. The locking mechanism according to claim 8, wherein the bushing (7) is provided with two openings (8) spaced 180° apart, the rotor insert (5) also being provided with two recesses (6) spaced apart by an angle greater than or equal to 180° + (α), (α) being the unlocking angle.

11. The locking mechanism according to any of the preceding claims, wherein the eccentric (10) is provided with an anchoring pin (13) loaded by a coil spring (14) and furthermore the bushing (7) is provided with holes (15) intended to house said anchoring pin (13).

12. The locking mechanism according to claim 11, wherein the eccentric (10) is provided with a groove (17) and the anchoring pin (13) is provided with an indentation (18).

13. An electronic cylinder lock, **characterised in that** it is provided with a locking mechanism according to any of the preceding claims.

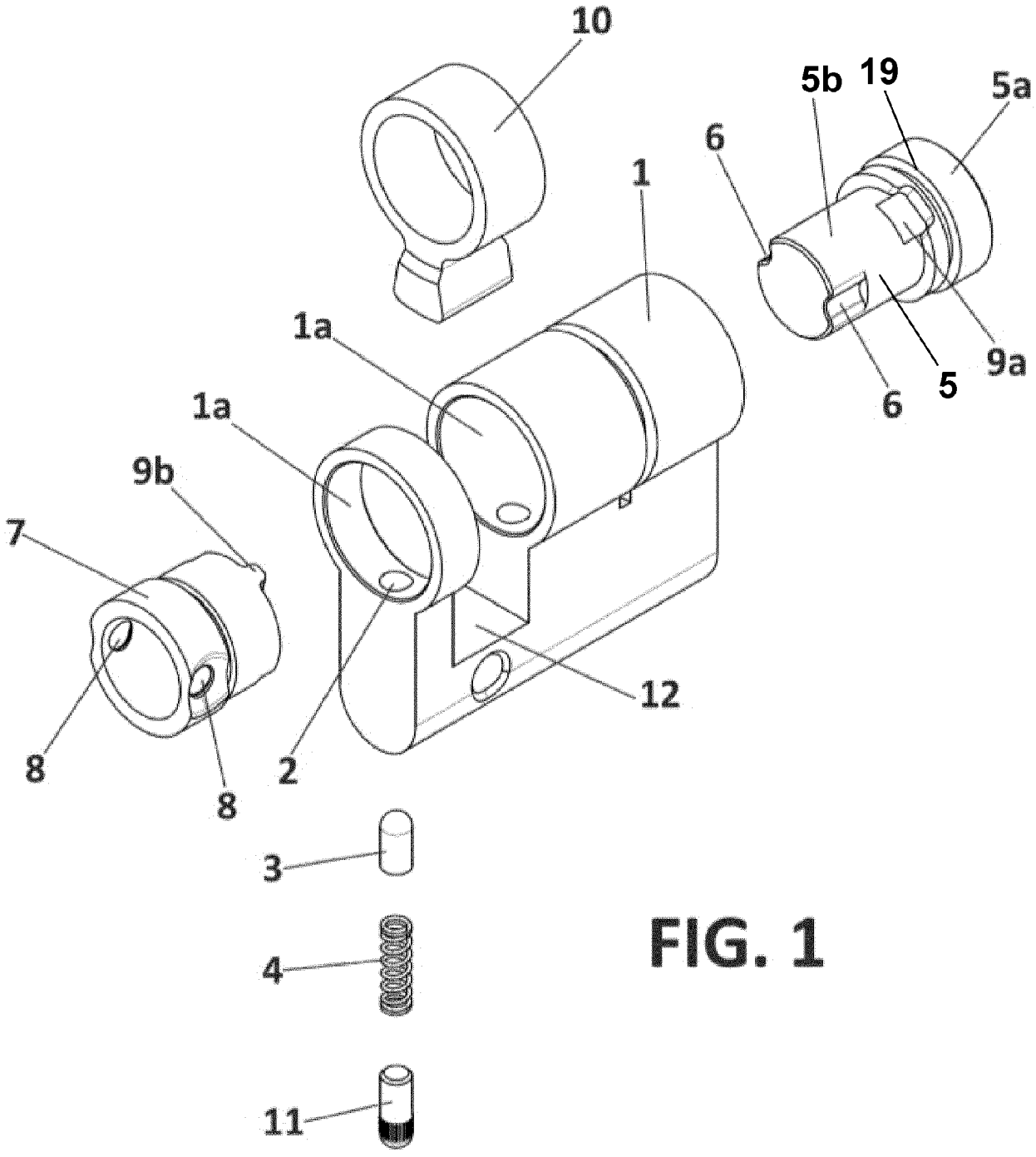

FIG. 1

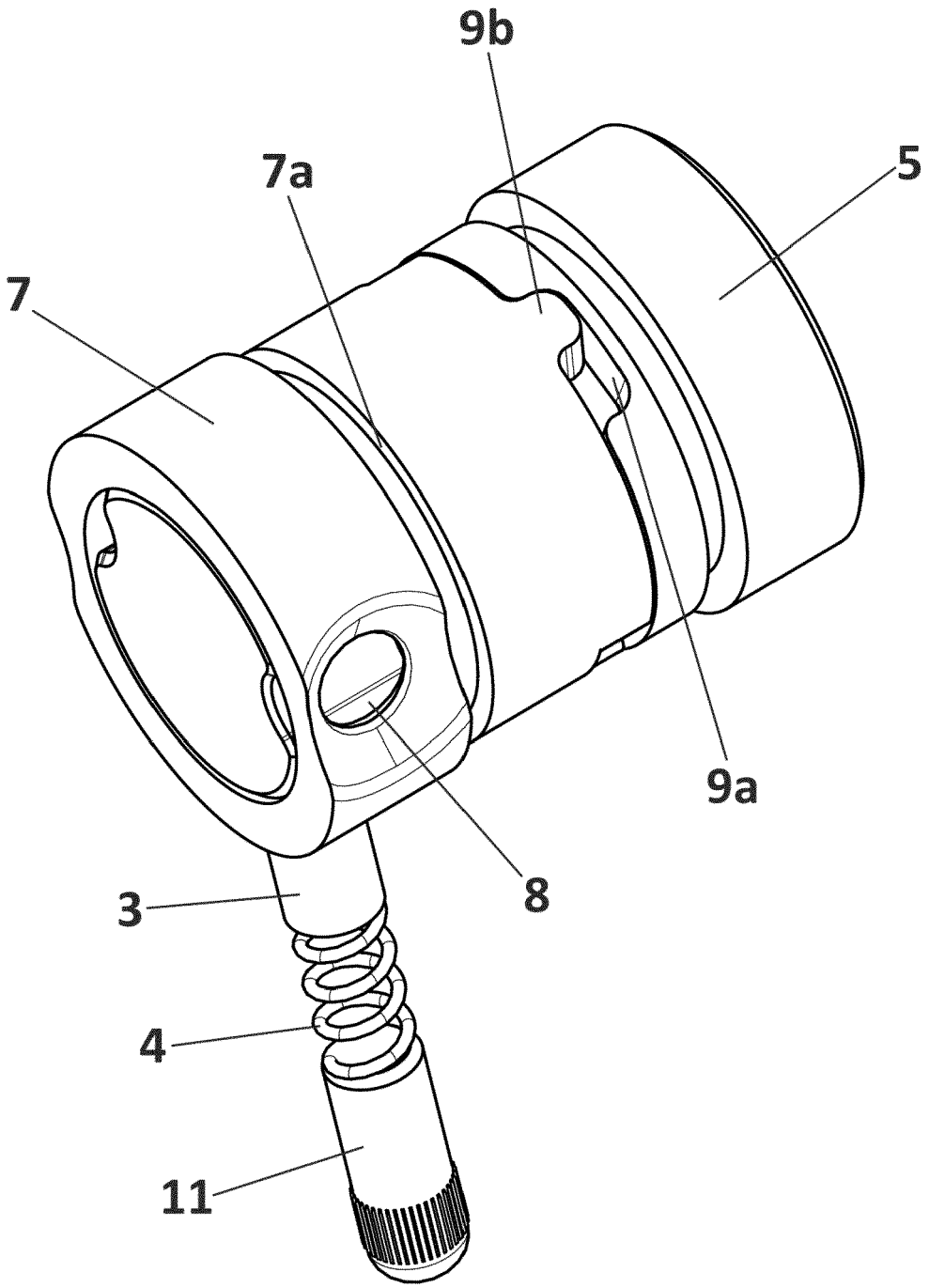

FIG. 2

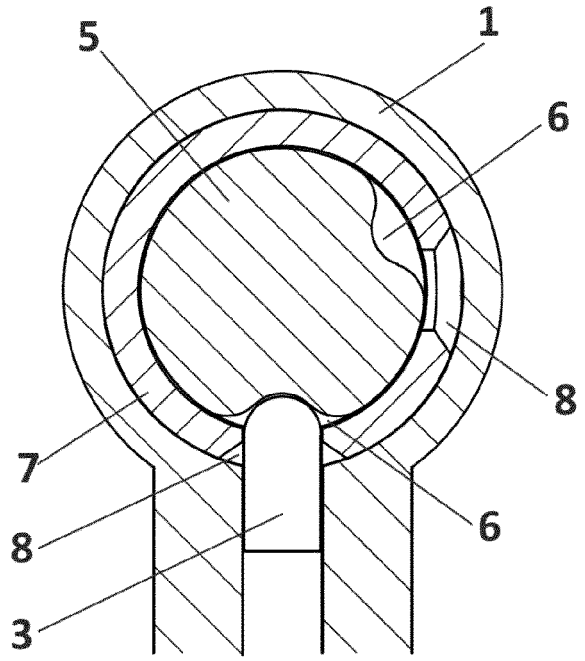

FIG. 3A

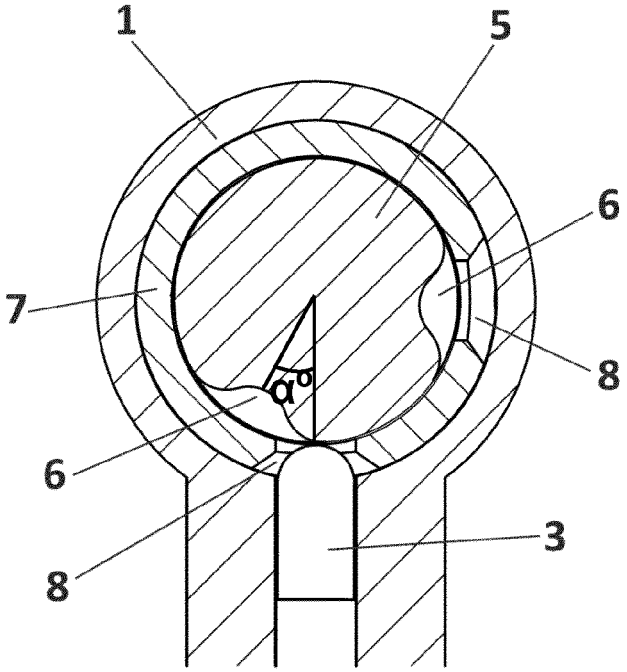

FIG. 3B

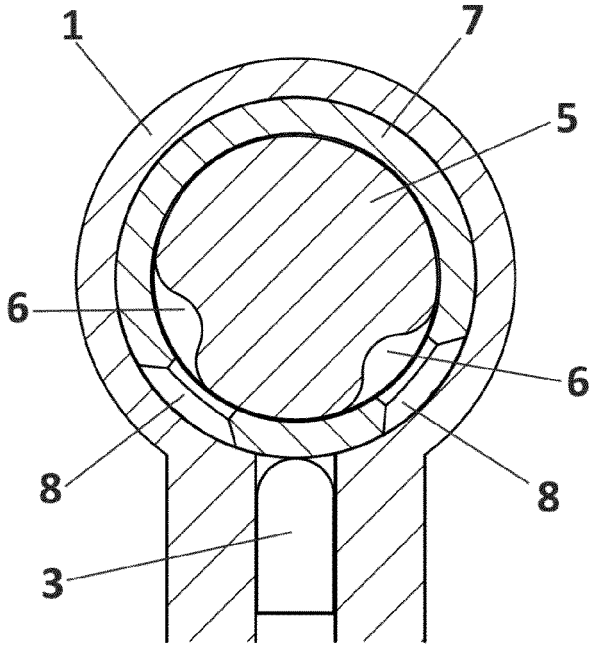

FIG. 3C

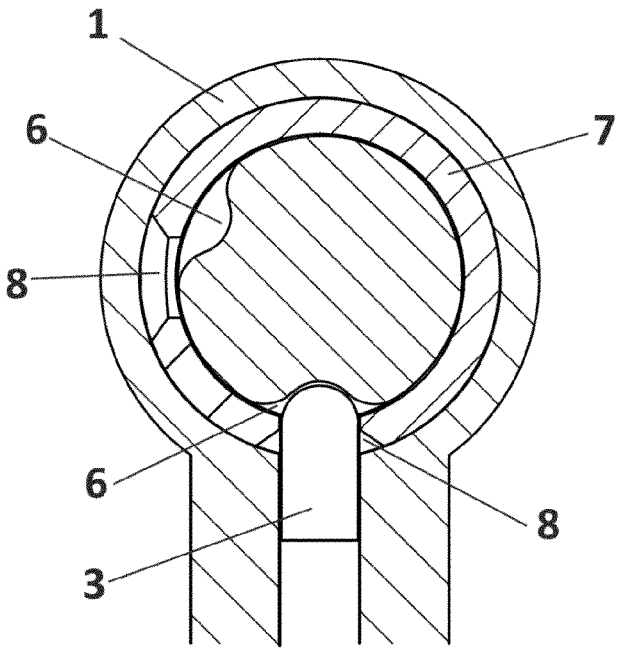

FIG. 3D

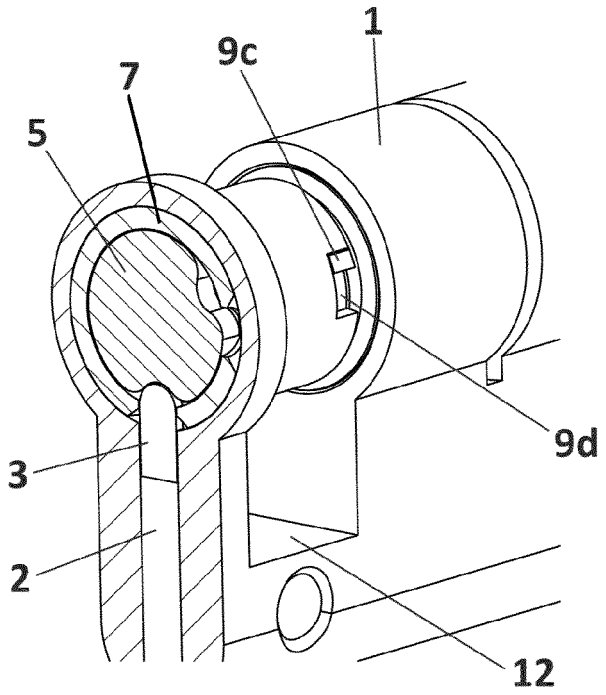

FIG. 4A

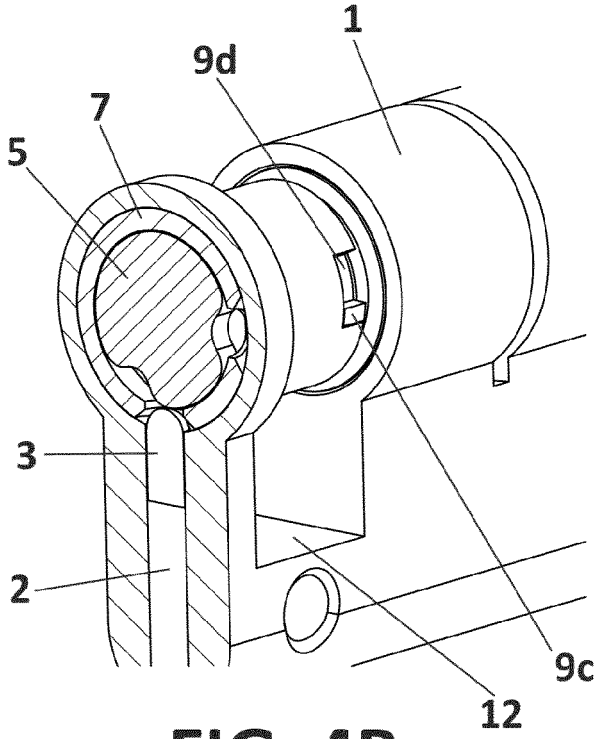

FIG. 4B

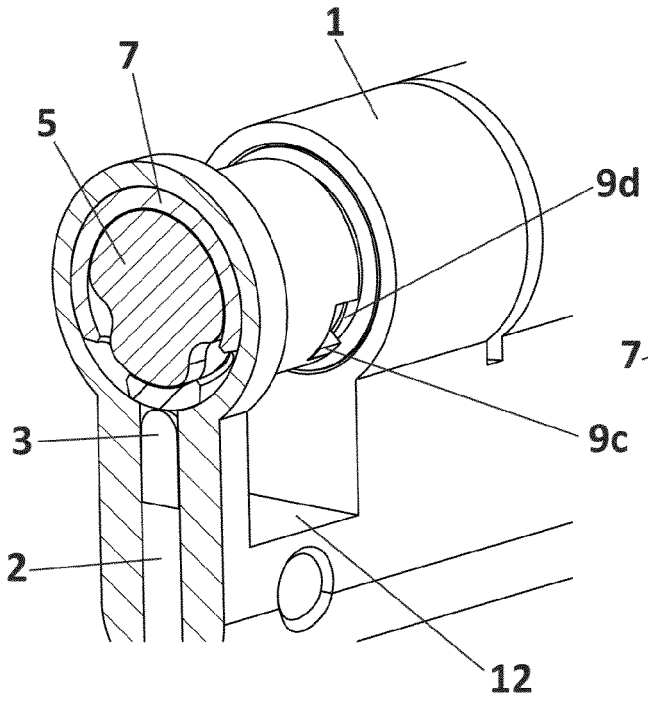

FIG. 4C

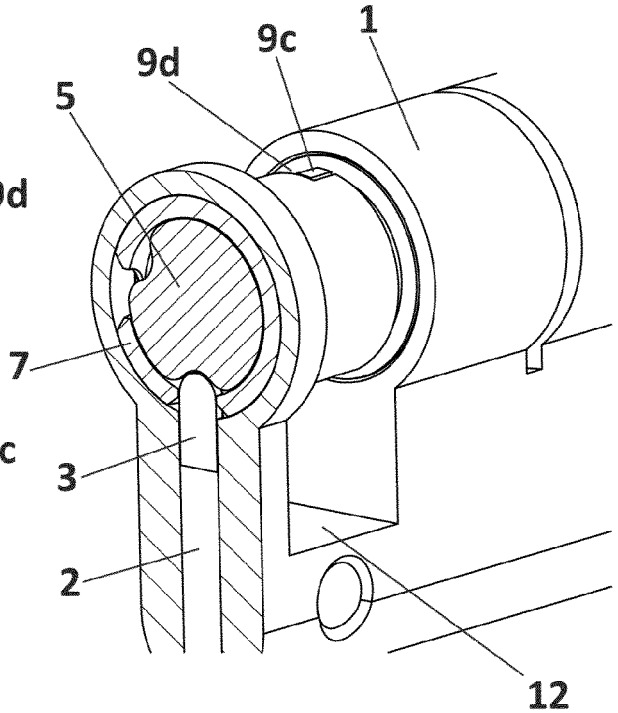

FIG. 4D

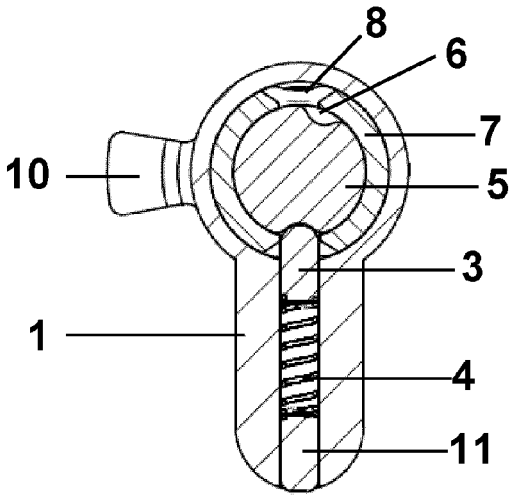

FIG. 5A

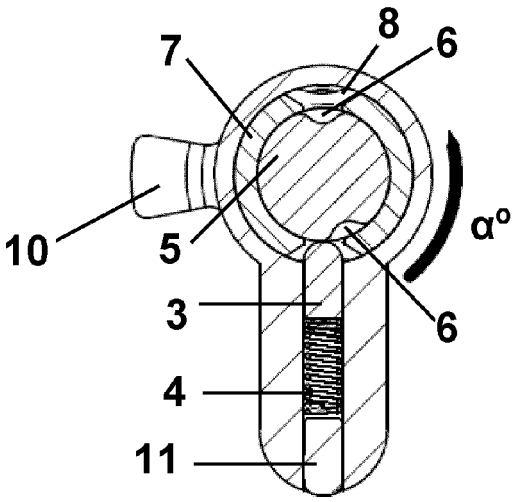

FIG. 5B

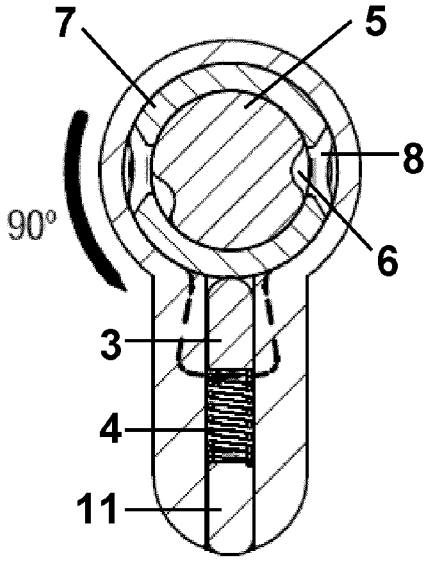

FIG. 5C

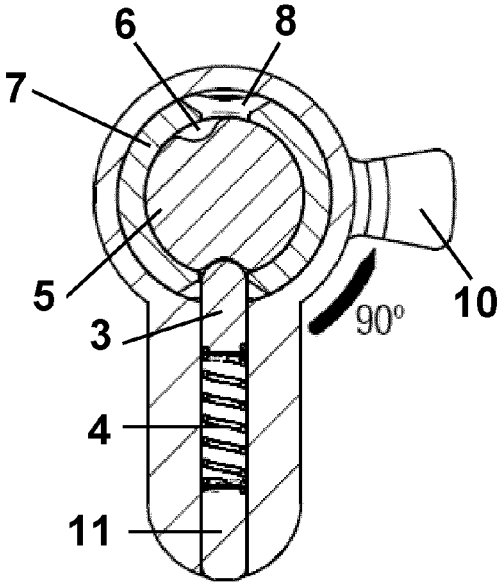

FIG. 5D

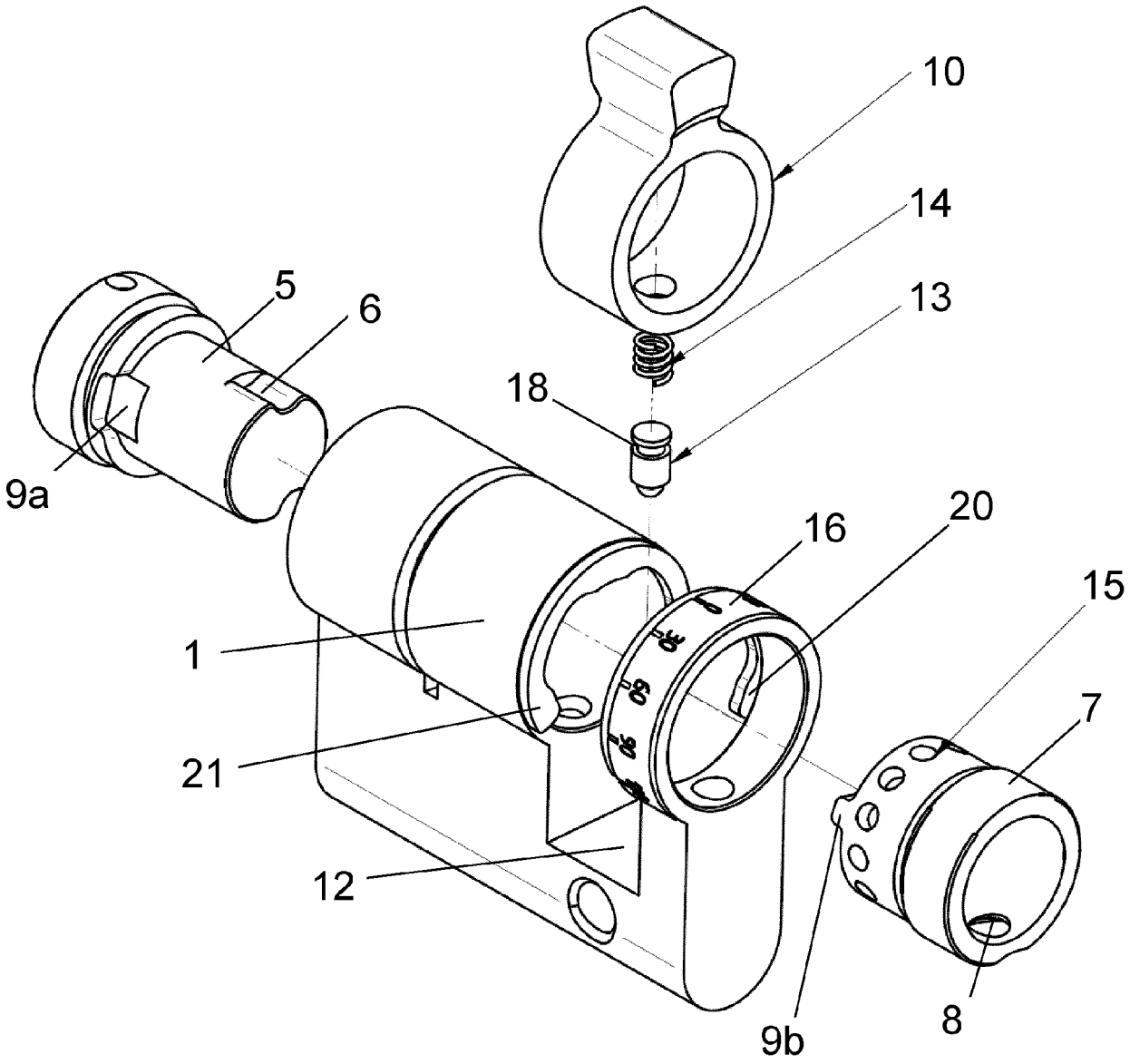

FIG. 6A

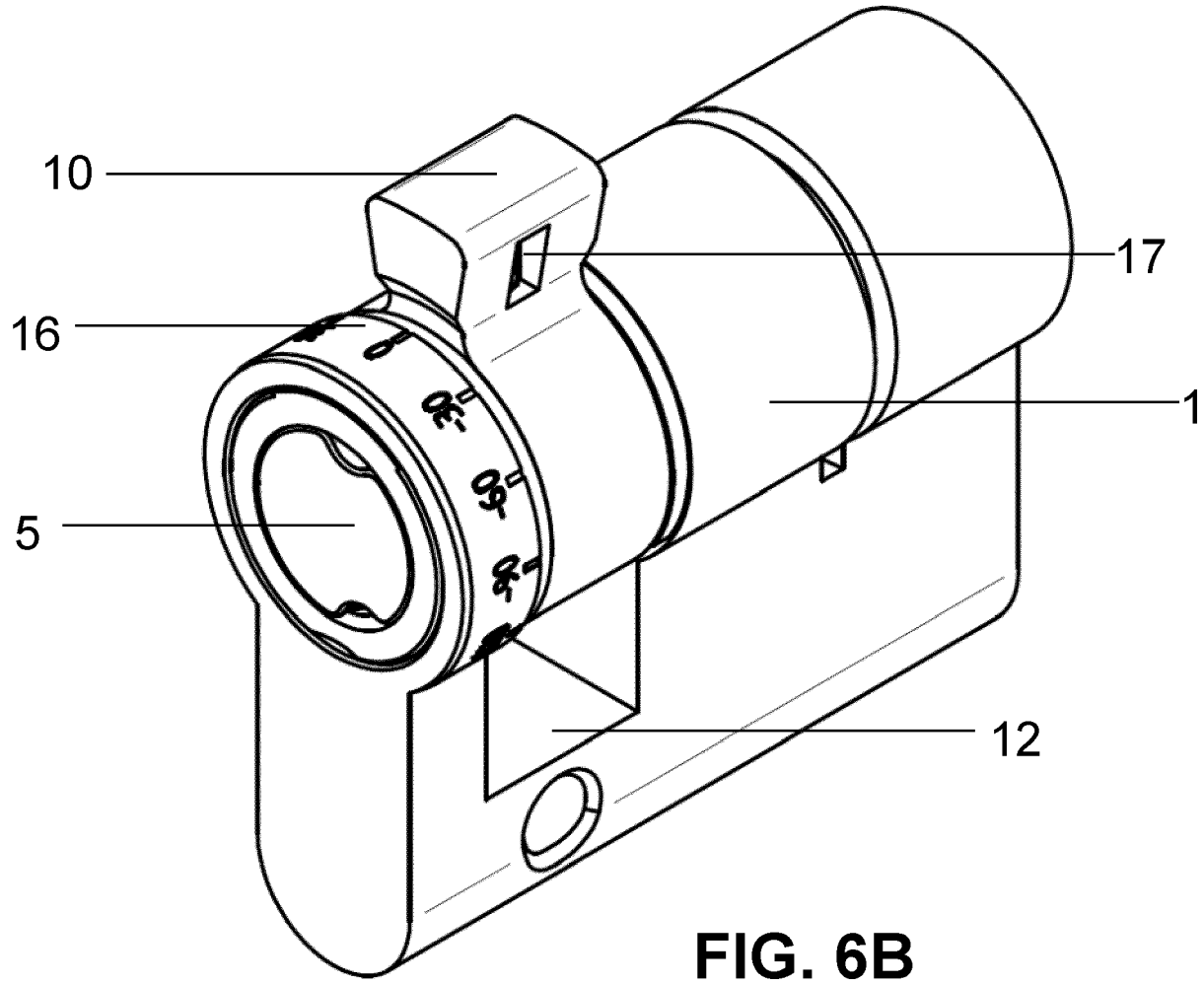

FIG. 6B

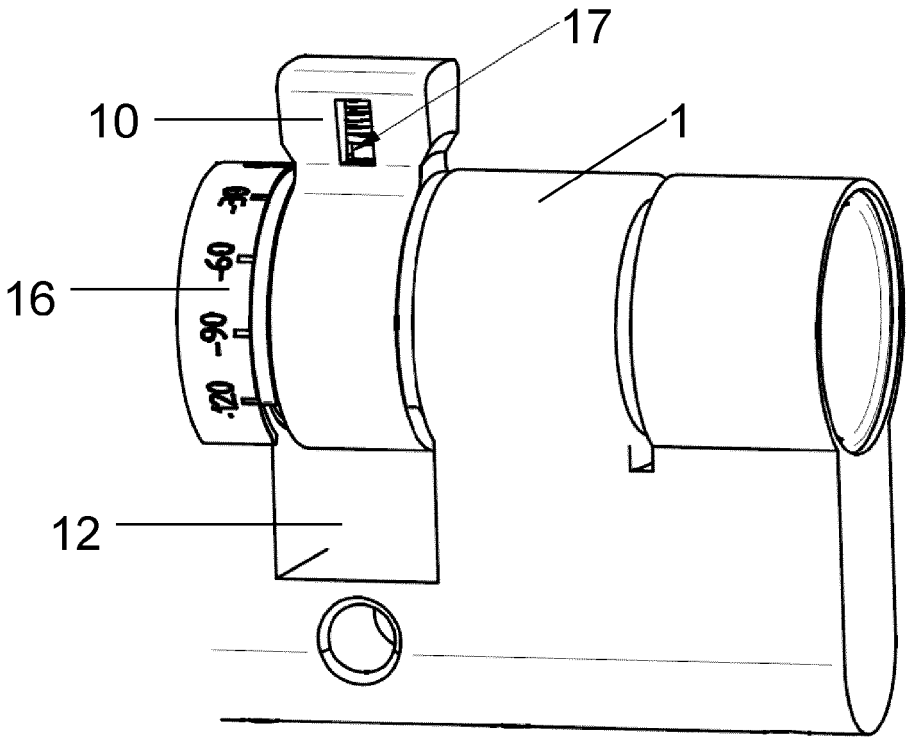

FIG. 6C

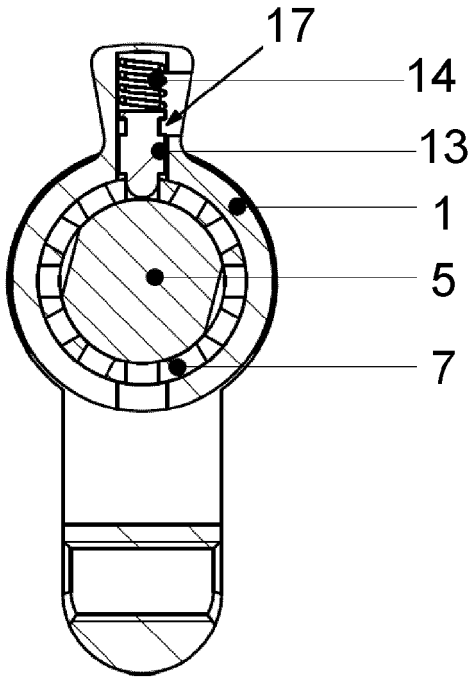

FIG. 6D

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EUROPEAN SEARCH REPORT

Application Number
EP 22 17 9859

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 96/07807 A1 (YALE SECURITY PROD LTD [GB]; ASTON WALTER JOHN [GB]) 14 March 1996 (1996-03-14) * the whole document *	1-13	INV. E05B17/04 E05B47/06 E05B9/04
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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	22 November 2022	Westin, Kenneth

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