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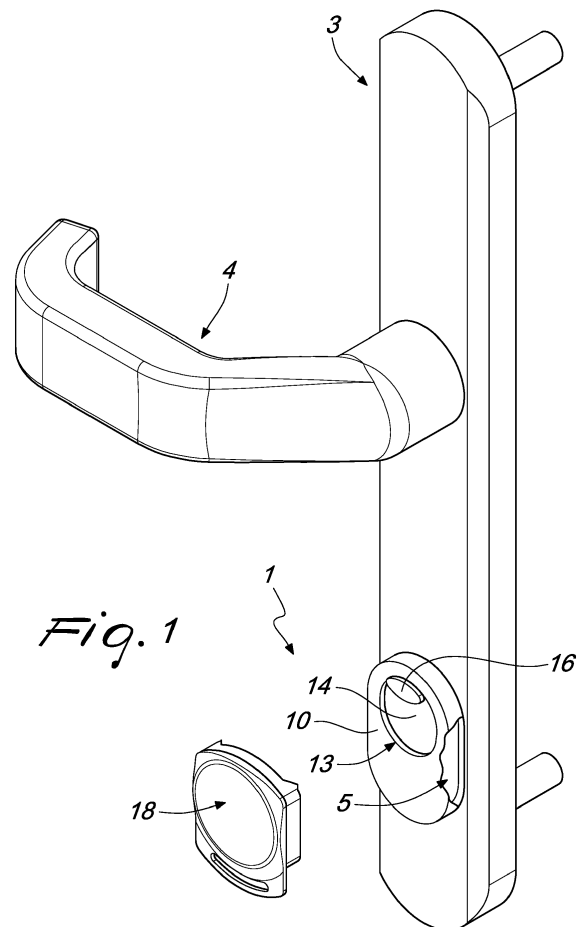
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(54) **PROTECTION DEVICE, PARTICULARLY FOR A LOCK OF A DOOR OR DOOR WING**

(57) A protection device (1), particularly for a lock (2) of a door or door wing with which a flat plate (3) is associated frontally which is provided with a handle (4) and on which an oval access opening (5) for a cylinder (6) is provided, comprising a covering element (10), which is shaped complementarily to the oval opening (5) and is internally hollow, is provided with a circular front access window (13) for the cylinder (6) and with which a slider (14) is associated internally and slidingly, the slider (14) being provided externally with a temporary grip tab (16) for a magnetic key (18) and accommodating internally a combination element (19) with two or more cams (21a, 21b), which is adapted to allow/block temporarily the sliding of the slider (14) with respect to the covering element (10) in order to conceal temporarily the front window (13).



Description

[0001] The present invention relates to a protection device, particularly for a lock of a door or door wing, for example a door for access to a home, or a gate, or a door of an armored cabinet.

[0002] Locks are currently known which are suitable for example to allow the closing and reopening of a door or gate and comprise an adapted cylinder that can be actuated by means of an appropriate key which can be inserted in a keyhole provided axially with respect to said cylinder.

[0003] These cylinders of the known type are typically made of brass and therefore do not have a high mechanical strength, thus lending themselves to being broken into easily by drilling and/or breaking and/or jerking.

[0004] In order to protect these cylinders of the known type against possible break-ins, it is common to fix to the lock, in such a position as to cover the cylinder, an adapted covering element constituted by a boss having a substantially circular plan shape which has, at the keyhole of the cylinder, a circular hole in which a keyhole protection disk is rotatably associated in which there is a slot adapted to allow the insertion of the key.

[0005] The boss therefore constitutes a protection for the cylinder and at the same time allows the insertion and rotation of the key in the keyhole of said cylinder.

[0006] However, these bosses of the known type have a drawback: even after their application, the cylinder is in fact partially accessible through the slot of the keyhole protection disk and is therefore still exposed to possible tampering or vandalism, such as for example the introduction through said slot of glue or other substances which might damage the cylinder.

[0007] As a partial solution to this drawback, Italian patent 1342717, filed as patent application no. TV2003A000115 dated August 7, 2003, is known which discloses a protection device for the cylinder of a lock which comprises a plate, having an approximately rectangular plan shape, which can be fixed to a door so as to cover the lock and is provided, proximate to one of its ends, with an adapted opening for access to the cylinder of said lock.

[0008] Two adapted seats having a circular plan shape are provided on the front surface of the plate, which is directed away from the lock, and two substantially cylindrical cams are accommodated rotatably within said seats, two recesses having a semicircular profile being provided radially on the lateral surface of said cams; adapted first magnets are inserted in said cams.

[0009] On the lateral surface of said seats there are, along two axes which are transverse with respect to the plate, two through ducts, within which adapted locking pins are accommodated slidingly which have such dimensions as to be partially insertable in the recesses provided in the cams; said pins are propelled toward the outside of the respective ducts so as to protrude transversely from the lateral surfaces of the plate by virtue of

the action of adapted springs inserted in said ducts.

[0010] A covering element is associated slidingly with the plate and can slide longitudinally thereto so as to conceal selectively, with one of its ends, the opening for access to the lock.

[0011] Said covering element is approximately C-shape, in a transverse cross-section, so as to form a substantially rectangular base which is arranged, during use, so as to face the front surface of the plate; two arms protrude from the longitudinal ends of said base, wrap around the lateral surfaces of the plate, and are coupled slidingly to them.

[0012] Two adapted grooves are provided on the surface of said arms that is directed toward the longitudinal surfaces of the plate, and in the condition in which the covering element completely conceals the lock access opening, the pins that protrude transversely from the lateral surfaces of the plate enter said grooves, so as to lock the mutual sliding between said plate and the covering element.

[0013] The release of the covering element is obtained by arranging in a complementarily shaped slot provided on the base thereof an adapted magnetic key, which contains adapted second magnets which are adapted to couple to this first magnets that are present in the cams, in order to cause the rotation of said cams to the condition in which the recesses provided therein face the channels that contain the pins.

[0014] In this condition, a traction of the covering element in the direction away from the lock access opening causes the exit of the pins from the cavities provided in the arms of said covering element and the simultaneous partial insertion of said pins in the recesses of the cams; in this manner, the sliding of the covering element with respect to the plate is released, thus allowing access to the lock.

[0015] Once the magnetic key has been removed and the covering element has been repositioned so as to conceal the lock access opening, the mutual interaction between the first magnets of the two cams causes a rotation thereof such as to misalign the recesses with respect to the ducts that contain the pins; the covering element is thus again locked in the closed condition.

[0016] Even this known type of device, however, has drawbacks: in disk combination systems, due to the mechanical plays among the various components and to the different sound that the disks produce upon contact with them depending on their mutual position, it is possible, after various listening attempts, to identify the open position of all the disks and therefore open the lock.

[0017] Italian patent no. 01288200 is also known which discloses a safety device for the protection of the outer side of a closure system of doors or casings for entry, which comprises a fixed base element which is arranged and shaped so as to surround a cylinder of a lock, i.e., the hole for the key of the closure system.

[0018] A longitudinal seat, with two parallel sides, is provided frontally to the base element, and a movable

body is slidably associated therein which can be moved between an active position, in which said movable body is arranged in front of the cylinder, i.e., in front of the lock keyhole, hiding it, and a passive condition, in which said movable body is spaced from the cylinder, i.e., from the lock hole, in order to allow access to the latter.

[0019] Furthermore, the device comprises a coded system for the locking/release of the movable body in the active position, which is constituted by coded rotating knobs, which are mounted on the movable body and each of which supports a locking/release disk, which is arranged on the internal face of the movable body, between the sides of the front seat of the base element; a hollow is provided, for each one of the disks, on said sides and is shaped partially complementarily, in plan view, with respect to the respective disk and is arranged so that when the movable body is in the active position each disk is arranged proximate to one of said hollows.

[0020] The disks further each have a lateral flattened region which can be arranged selectively, as a consequence of the rotation of the disk, at the respective hollow or not; with the movable body in the active position, when the flattened region of a disk is not at the hollow, said disk protrudes transversely from the movable body with its curved part, which thus arranges itself within the contiguous hollow, preventing the sliding of the movable body with respect to the base element and thus keeping said movable body in the active position.

[0021] By rotating appropriately the coded knobs it is possible to rotate the disks until the flattened region that is present in all of them is at the respective hollow; in this condition, the disks do not protrude transversely from the movable body, which is no longer coupled to the base element, and thus can be made to slide to the passive position.

[0022] Release of the movable body is therefore possible only if the correct combination is known which allows to rotate conveniently the coded knobs, and the locking/release disks with them.

[0023] Even this device of the known type, however, has drawbacks: it is in fact known that in disc combination systems, due to the mechanical plays that occur among the various components, and due to different sound that the disks produce in contact with them depending on their mutual position, it is possible, after several listening attempts, to identify the open position of all the disks and therefore open the lock.

[0024] Furthermore, in this device of the known type the position of the coded knobs that allows to obtain the release of the movable body is not defined uniquely, since in order to obtain the release of the movable body it is sufficient for all the disks to be arranged with their flattened region partially contained in the hollow and directed away from the lock cylinder or hole for the key of the closure system; in this condition, which can be obtained with the coded knobs in various positions, by applying traction to the movable body in the direction for opening, the flattened region of the various disks in fact abuts

against the edge of the respective hollow, causing the rotation of the respective disk to the condition in which the curved portion thereof exits completely from the hollow, thus freeing the sliding of the movable body.

5 **[0025]** Furthermore, this device of the known type has an additional drawback: as also noted previously, when the movable body is in the passive position the coded knobs are necessarily arranged so as to identify the opening combination; to prevent someone, in this condition, 10 from reading this combination it is therefore necessary, after each use, to return the movable body to the passive condition and rotate the coded knobs in order to obtain the locking of said movable body, and this may be awkward.

15 **[0026]** Finally, this solution is subject to possible jamming if ill-intentioned individuals pour glue or other substances onto the rotating coded knobs, thus making it impossible to access the lock.

[0027] Italian application VE2007A000070 dated October 3, 2007 is also known which claims a protection 20 device, particularly for a lock of a door or door wing, which comprises a covering element that is associated slidably with a plate that can be fixed to said door or door wing and can be arranged selectively so as to close an opening, for access to said lock, which is provided in said 25 plate, at least two pins being associated transversely with said plate and cooperating with cams which are associated rotatably within said plate and are adapted to block temporarily the sliding of said covering element with respect to said plate, characterized in that said cams interact with a magnet-based combination element which is 30 adapted to modify the angular position of said cams in order to allow or prevent the temporary release between said pins and said covering element.

35 **[0028]** Even this solution has drawbacks, since the burglar might still perceive the position of the cams by listening to their movement and reach the pin release condition.

[0029] Italian patent application PN2014A000012 is also known which claims a device for protecting a lock 40 which comprises a base body that is essentially cylindrical, can be associated with said lock and is provided with a first axial opening for the insertion of a cylinder of said lock, said first axial opening being arranged so as to be eccentric with respect to the center of said base body, a combination assembly which comprises magnetic 45 means, a slider which can slide with respect to said base body between a locking position, in which said slider covers said first opening to prevent access, in use, to said cylinder, and a release position, in which said slider allows to access said first opening, the transition between said locking position and said release position and vice versa being actuable by means of a magnetic actuator 50 provided with a combination that is adapted to cooperate with said magnetic means of said combination assembly, characterized in that said slider is interposed between said base body and a protective boss, which can be coupled to said base body and is provided with a second

through opening which is arranged eccentrically with respect to the center of said boss so that during use it is aligned with said first opening.

[0030] Even this solution has drawbacks: it cannot be used, due to its structural configuration, for locks applied to a door or door wing with which a flat plate of the known type is frontally associated which is provided with a handle and on which an oval access opening for a cylinder that belongs to the lock is provided.

[0031] Such a known type of flat plate is identified by the trademark Baton model T9032-P, in which there is, at the oval opening, a small plate provided with a keyhole protection disk for the insertion of the key in the cylinder.

[0032] This known type of plate does not allow, on its own, to achieve true safety and therefore lends itself to be broken into easily.

[0033] Furthermore, even considering the solution according to application PN2014A000012, the magnetic actuator must be rested on the slider in order to achieve the release of adapted pins and subsequently must be lowered, together with the slider, in order to allow access to the cylinder.

[0034] The adjacent arrangement between the magnetic actuator and the slider and the corresponding movement between them is not optimum, since it is possible to achieve either the incorrect placement between the two or accidental separation, even partial, between them during the joint movement and therefore thwart the release attempt.

[0035] The aim of the present invention is therefore to solve the described technical problems, eliminating the drawbacks of the cited background art and thus providing an invention that allows to protect effectively access to a lock if it is associated with a flat plate provided with a handle and on which an oval access opening for a cylinder is provided.

[0036] Within this aim, an object of the invention is to provide a device that allows to activate and deactivate the protection rapidly, easily and safely, avoiding possible malfunctions or accidental separations of the magnetic key during its activation.

[0037] A further object is to provide a device in which its functionality is maintained even if ill-intentioned individuals pour adhesives or other materials onto said invention.

[0038] Another object is to provide a device that is structurally simple and has modest manufacturing costs.

[0039] This aim and these objects, as well as others which will become better apparent hereinafter, are achieved by a protection device, particularly for a lock of a door or door wing with which a flat plate is associated frontally which is provided with a handle and on which an oval access opening for a cylinder is provided, characterized in that it comprises a covering element, which is shaped complementarily to said oval opening and is internally hollow, is provided with a circular front access window for said cylinder and with which a slider is associated internally and slidingly, said slider being provided

externally with a temporary grip tab for a magnetic key and accommodating internally a combination element with two or more cams, which is adapted to allow/block temporarily the sliding of said slider with respect to said covering element in order to conceal temporarily said front window.

[0040] Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular but not exclusive embodiment, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a front perspective view of the protection device applied to a lock of a door or door wing with which a flat plate is frontally associated which is provided with a handle and on which an oval access opening for a cylinder is provided;

Figure 2 is a front perspective view of the device and of the magnetic key;

Figure 3 is a rear perspective view of the magnetic key and of the covering element, which due to visualization requirements lacks the slider;

Figures 4 and 5 are respectively rear and front exploded perspective views of the device according to the preceding figures;

Figures 6 and 7 are rear views of the device in the conditions for locking and release of the magnetic combination element;

Figures 8 and 9 are rear and front views of the device in the condition in which the magnetic combination element has been released;

Figure 10 is a lateral exploded perspective view of the device, of the cylinder and of the key;

Figure 11 is a partially sectional view of the connection of the device to the magnetic key.

[0041] In the exemplary embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0042] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0043] With reference to the accompanying figures, the reference numeral 1 designates a protection device 1, particularly for a lock 2 of a door or door wing such as, for example, the access door to a home, a gate, the door of an armored cabinet, the door of a safe (not shown).

[0044] A flat plate 3 is associated frontally with the door or door wing and is provided with a handle 4; on said plate there is an oval access opening 5 for a cylinder 6 provided frontally with a diametrical opening 7 that accommodates the insertion of the shank 8 of a key 9.

[0045] The protection device 1 comprises a covering element 10, which is shaped complementarily to the oval opening 5, is internally hollow and can be inserted from

the inside toward the outside of the flat plate 3 so as to protrude beyond the front surface of the flat plate 3, its position being defined by the presence of an abutment ridge 11 that protrudes radially from its rear end 12 accommodated within the flat plate 3.

[0046] The covering element 10 has a circular front window 13, for access to the cylinder 2; a slider 14 is associated internally and slidingly therewith and is substantially cylindrical, with a diameter that is substantially equal to the diameter of the front window 13, and from which there protrudes, frontally and transversely proximate to its perimetric edge 15, in a region that is adjacent to and lies below the handle 4, a tab 16 with such dimensions as to protrude beyond the front window 11.

[0047] The tab 16 interacts selectively with a complementarily shaped temporary grip element, such as a seat 17 provided at a magnetic key 18.

[0048] Once the magnetic key 18 has been coupled to the slider 14 and thus the seat 17 has been positioned at the tab 16, the user can achieve the vertical movement of the slider 14 so as to render the front window 13 usable or not for subsequent insertion of the shank 8 of the key 9 within the opening 7 of the lock 2.

[0049] The slider 14 accommodates internally a combination element 19 with two or more magnets 20a, 20b, which can move integrally with the slider 14 itself and is adapted to allow/block temporarily the sliding of the slider 14 with respect to the covering element 10, in order to conceal temporarily the front window 13.

[0050] The combination element 19 is of the type shown for example in Italian patent no. 1342717 or in Italian patent application PN2014A000012 and is therefore composed preferably of two or more cams 21a, 21b, each of which accommodates magnetic means constituted by two or more pairs of magnets 20a, 20b, each pair having magnets of an opposite polarity, which however is opposite with respect to the polarity of the other pair; the rotation of the cams 21a, 21b allows or blocks the sliding of the slider 14 by means of appropriate locking means 22a, 22b which are controlled by the cams 21a, 21b.

[0051] The number of the cams provided in the slider 14 can vary as a function of specific requirements, such as the requirement of increasing the possible combinations as a consequence of the use of a chosen magnetic key 32.

[0052] At the position in which the slider 14 is in the upper locking position in order to close the front window 13, the locking means 22a, 22b engage abutment means which are constituted by first grooves 23a, 23b provided on the mutually facing internal lateral surfaces 24a, 24b of the covering element 10, so as to stably lock the slider 14 in these positions.

[0053] At the position in which the slider 14 is in the lower release position in order to access the front window 13, the locking means 22a, 22b engage in additional abutment means constituted by second slots 23c, 23d provided on the mutually facing internal lateral surfaces 24a,

24b of the covering element 10, so as to stably lock the slider 14 in these positions.

[0054] For this purpose, the slider 14 is provided with a pair of seats 25a, 25b, which are essentially circular, are arranged so as to be mutually staggered, and are respectively adapted to accommodate rotatably the cams 21a, 21b.

[0055] In any case, the configuration of the magnets must be such that, in the extreme locking and release positions of the slider 14, a magnet contained in the cam 21a faces the magnet of opposite polarity contained in the cam 21b.

[0056] A notch 26a, 26b is provided on the circumference of each cam 21 a, 21b.

[0057] A pair of washers 27a, 27b is provided advantageously in order to maintain and cover the cams 21a, 21b in the respective seats 25a, 25b.

[0058] Ducts 28a, 28b are provided on the respective sides within the thickness of the slider 14 and are arranged so as to be mutually axially offset and connected respectively to the seats 25a; 25b approximately at the respective transverse axes.

[0059] The ducts 28a, 28b are adapted to accommodate slidingly the means 22a, 22b for locking the sliding of the slider 14, which are constituted by T-shaped pins 29a, 29b, the sliding of which occurs in contrast with elastic means such as springs 30a, 30b in abutment against adapted abutments 31a, 31b in the ducts 28a, 28b.

[0060] There is a lid 32 for the rear closure of the covering element 10 which allows to enclose inside it the various components, facilitating the sliding of the slider 14.

[0061] Advantageously, on the edge 33 of the slider 14 there is, proximate to the tab 16, a transverse recess 34 that is adapted to facilitate the positioning of the shank 8 of the key 9.

[0062] The operation of the protection device is as follows: in the condition in which the door is closed with the protection device activated, and therefore with the slider 14 that covers from the inside the front window 13 in order to prevent access to the lock 2, the magnetic means 20a, 20b are arranged so that a magnet contained in the cam 21 a faces the magnet of opposite polarity that is contained in the cam 21b.

[0063] With this arrangement, the spring 30a pushes the head of the pin 29a into engagement with the groove 23a, while the opposite end of the pin 29a presses against the cylindrical wall of the cam 21b.

[0064] At the same time, the spring 30b pushes the head of the pin 29b into engagement with the groove 23b, while the opposite end of the pin 29b presses against the cylindrical wall of the cam 21a.

[0065] In this manner the sliding of the slider 14 blocks access to the cylinder 2.

[0066] In order to obtain the release of the slider 14, and therefore allow access to the cylinder in order to insert the key, it is necessary to rest the magnetic actuator 18 by arranging the seat 17 at the tab 16; by doing so,

the magnetic actuator 18 is engaged with the slider 14.

[0067] By doing so, the specific magnetic combination provided on the magnetic actuator 18 causes the misalignment of the magnetic means and therefore forces the rotation in the chosen direction of the cams 21a, 21b until the notches 26a, 26b are arranged at, and in alignment with, the pivots 29a, 29b, which are no longer subjected to the springs 30a, 30b.

[0068] As shown in Figure 7, when the magnetic actuator 18 is drawn downward, the slider 14 is also moved and therefore disengagement between the heads of the pins 29a, 29b with respect to the first grooves 23a, 23b is achieved and therefore the downward sliding of the slider 14 is provided along adapted guiding walls which are present internally and laterally to the slider 14, which in turn gradually frees access to the front window 13.

[0069] At the end of the stroke, the magnetic actuator 18 is removed and the slider 14 reaches the release position, as shown in Figure 8; removal of the magnetic actuator 18 causes the reverse rotation of the cams 21a, 21b, which return to the initial position and force the ends of the pins 29a, 29b to disengage from the respective notches 26a, 26b while their heads, under the action of the springs 30a, 30b, engage in the second grooves 23c, 23d.

[0070] In this manner, the slider 14 is locked in the stroke limit release position, freeing completely the front window 13 in order to allow, once the operation has been completed, to access the lock.

[0071] In order to return the protection device again to the locking position it is sufficient to repeat the operation in reverse, by resting the magnetic actuator 18 against the slider 14 and drawing it upward.

[0072] It has thus been observed that the invention has achieved the intended aim and objects, a device having been devised which allows to protect in an effective manner the access to a lock if it is associated with a flat plate which is provided with a handle and on which an oval access opening for a cylinder is provided.

[0073] Furthermore, the invention allows to activate and deactivate the protection rapidly, easily and safely, avoiding any malfunction or accidental separations of the magnetic key during its activation.

[0074] Finally, the use of a magnetic key thwarts any use of adhesives on the part of ill-intentioned individuals, since the key allows to render the lock accessible without the need to achieve movement of external parts of the protection device.

[0075] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to the specific requirements.

[0076] The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated.

[0077] The characteristics indicated as advantageous, convenient or the like may also be omitted or be replaced

with equivalents.

[0078] The disclosures in Italian Utility Model Application No. 202016000048547 (UA2016U103876) from which this application claims priority are incorporated herein by reference.

[0079] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A protection device (1), particularly for a lock (2) of a door or door wing with which a flat plate (3) is associated frontally which is provided with a handle (4) and on which an oval access opening (5) for a cylinder (6) is provided, **characterized in that** it comprises a covering element (10), which is shaped complementarily to said oval opening (5) and is internally hollow, is provided with a circular front access window (13) for said cylinder (6) and with which a slider (14) is associated internally and slidingly, said slider (14) being provided externally with a temporary grip tab (16) for a magnetic key (18) and accommodating internally a combination element (19) with two or more cams (21a, 21b), which is adapted to allow/block temporarily the sliding of said slider (14) with respect to said covering element (10) in order to conceal temporarily said front window (13).
2. The device according to claim 1, **characterized in that** said covering element (10) can be inserted from the inside outward of said flat plate (3) so as to protrude beyond the front surface of said flat plate (3), its position being defined by the presence of an abutment ridge (11) that protrudes radially from its rear end (12) accommodated within said flat plate (3).
3. The device according to claims 1 and 2, **characterized in that** said covering element (10) is provided with a circular front window (13) for access to said cylinder (2), said slider (14) being associated slidingly and internally therewith, having a substantially cylindrical shape with a diameter that is substantially equal to the diameter of said front window (13), from which there protrudes, frontally and transversely proximate to its perimetric edge (15) in a region that is adjacent to said handle (4) and lies below it, a tab (16) having such dimensions as to protrude beyond the front window (11).
4. The device according to claims 1 and 3, **characterized in that** said tab (16) interacts selectively with a complementarily shaped temporary grip element,

such as a seat (17) provided at a magnetic key (18).

5. The device according to claims 1 and 4, **characterized in that** once said magnetic key (18) has been coupled to said slider (14) and said seat (17) has been positioned at said tab (16), this causes the combined vertical movement of said magnetic key (18) and of said slider (14), so as to make said front window usable or not (13) for the subsequent insertion of said key (9) within said lock (2).
6. The device according to claims 1 and 5, **characterized in that** said slider (14) accommodates internally a combination element (19), with two or more cams (21a, 21b) provided with magnets (20a, 20b), which can move integrally with said slider (14) and is adapted to allow/block temporarily the sliding of said slider (14) with respect to said covering element (10) in order to conceal said front window (13) temporarily.
7. The device according to one or more of the preceding claims, **characterized in that** it comprises a lid (32) for rear closure of said covering element (10).
8. The device according to claims 1 and 7, **characterized in that** on the edge (33) of said slider (14) there is, proximate to said tab (16), a transverse recess (34) that is adapted to facilitate the positioning of said shank (8) of said key (9).
9. The device according to claims 1 and 8, **characterized in that** said slider (14) there are two or more cams (21a, 21b), which acts as seats for said two or more magnets (20a, 20b).

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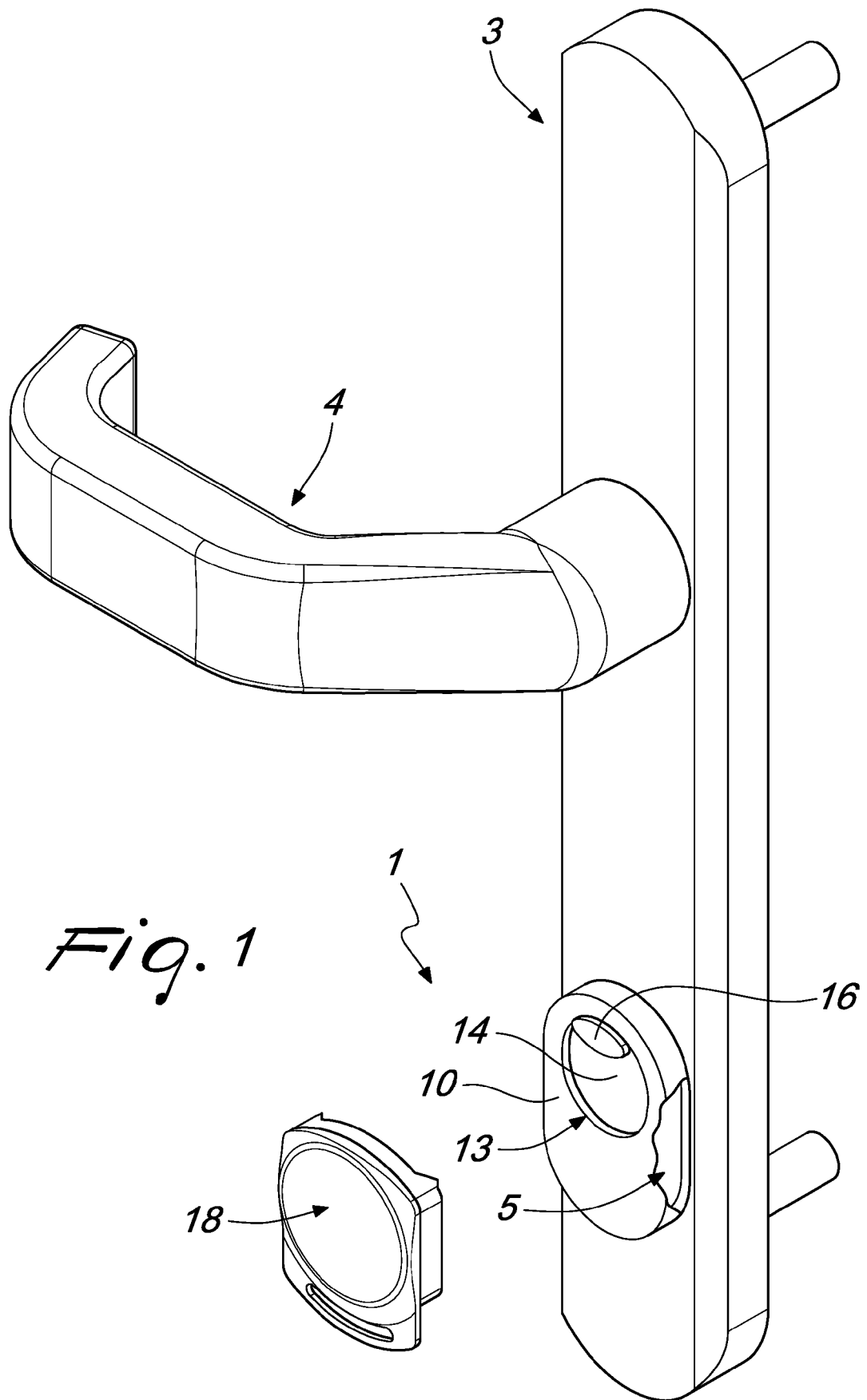
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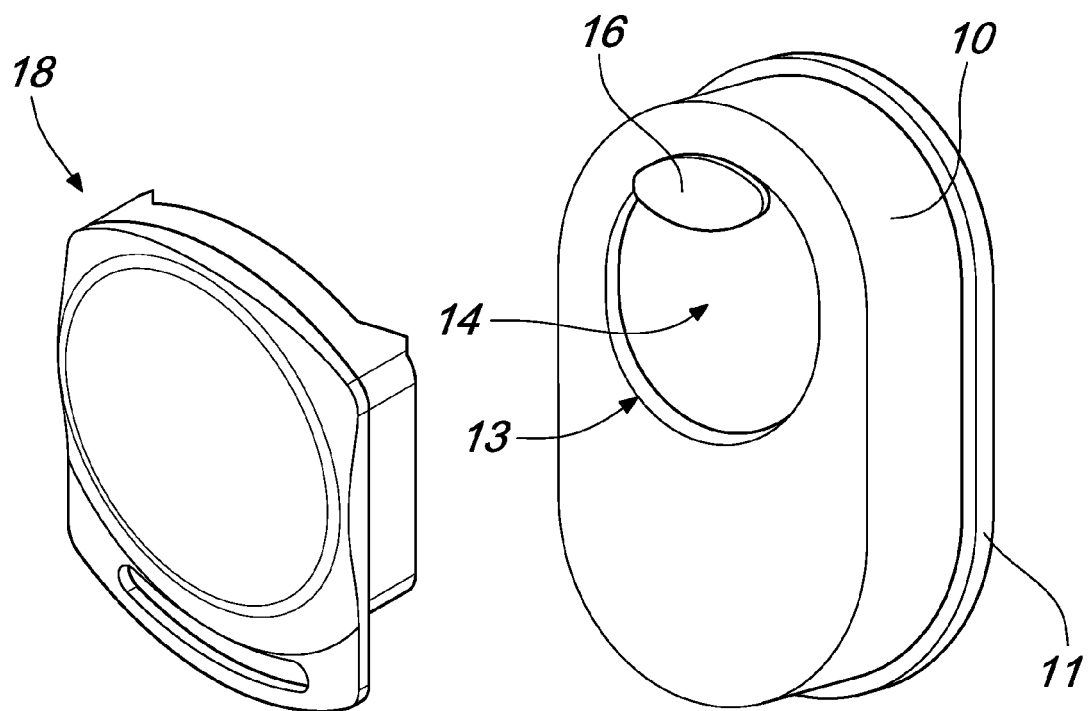


Fig. 2

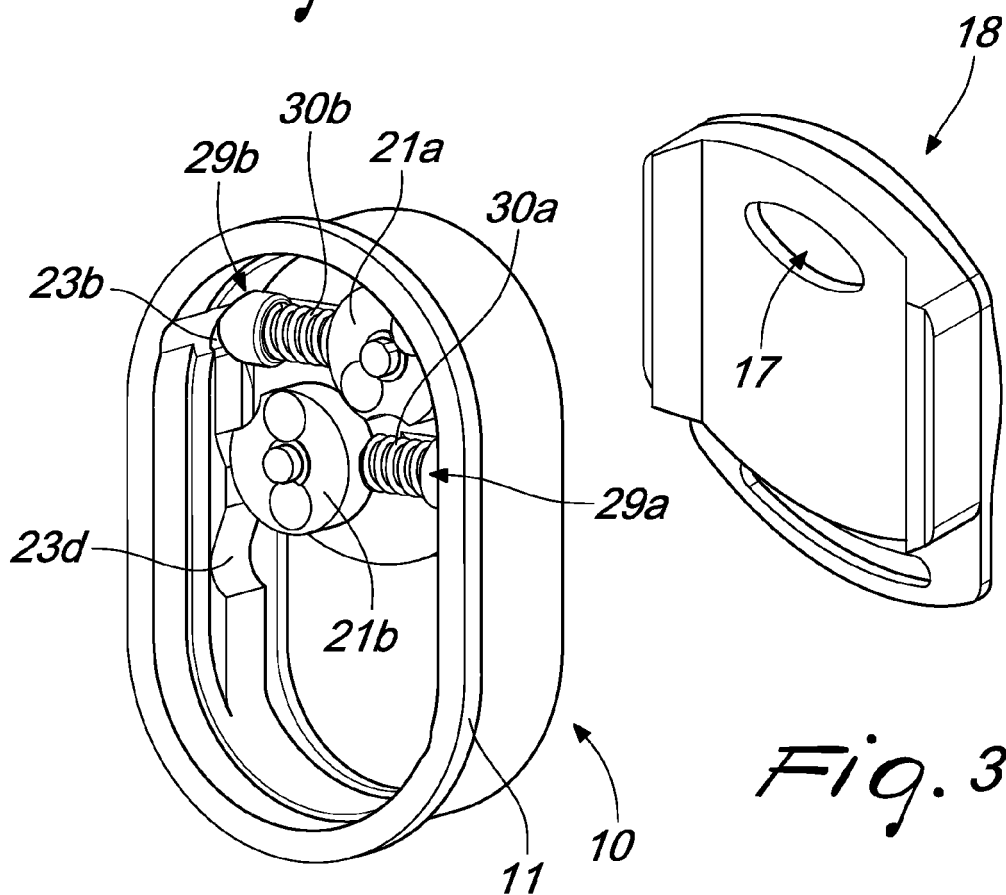
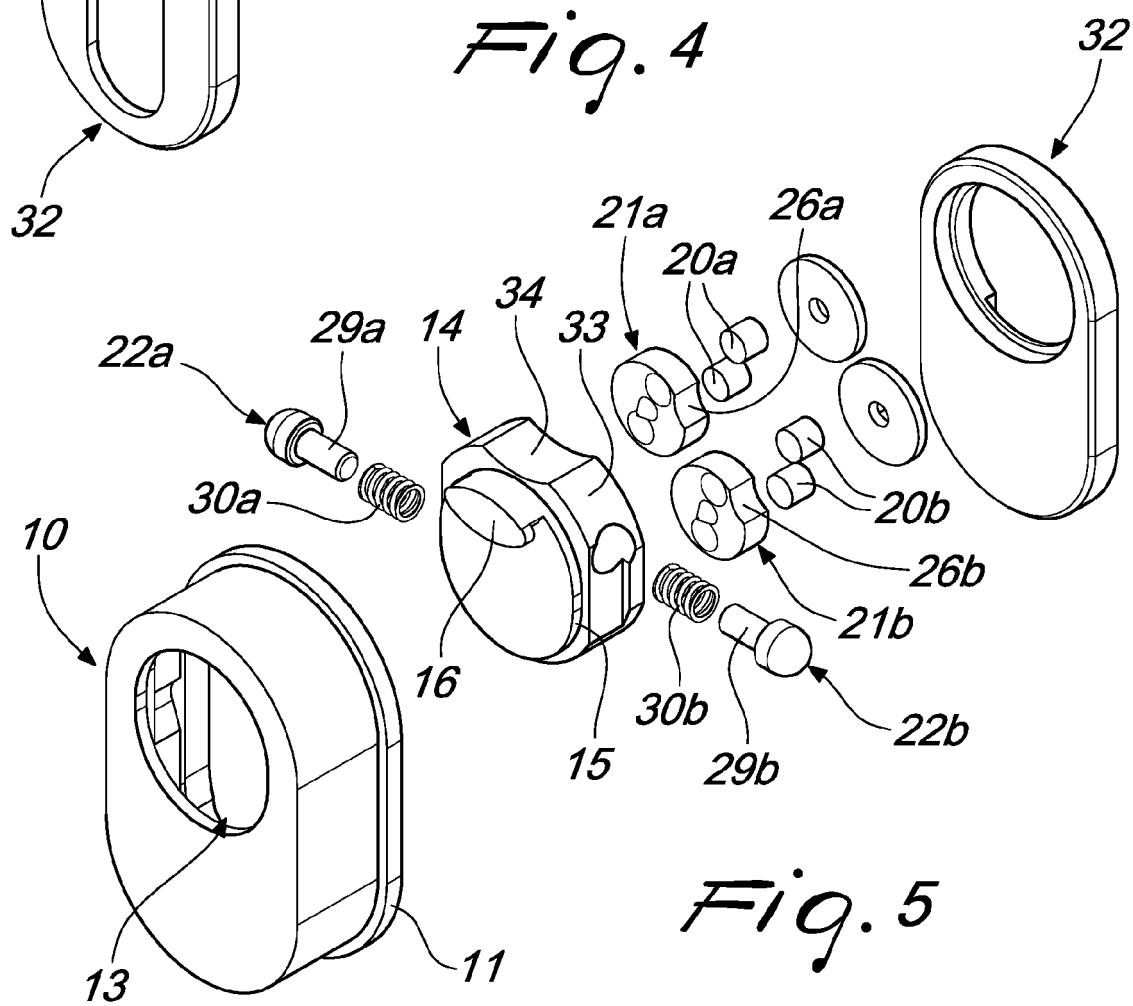
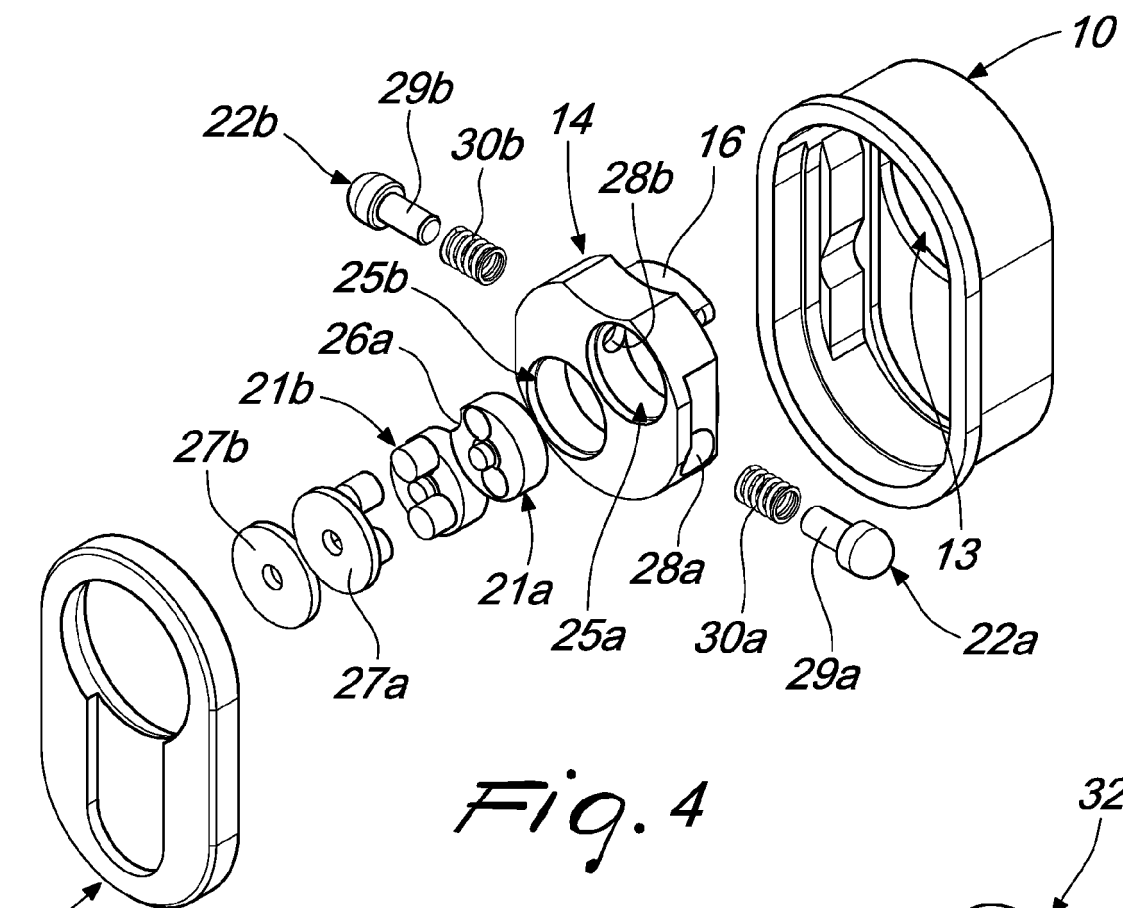


Fig. 3



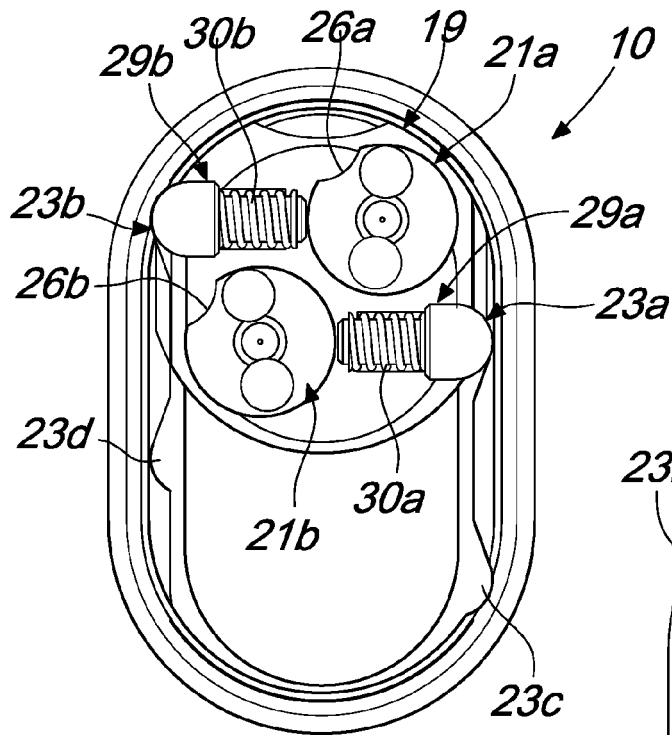


Fig. 6

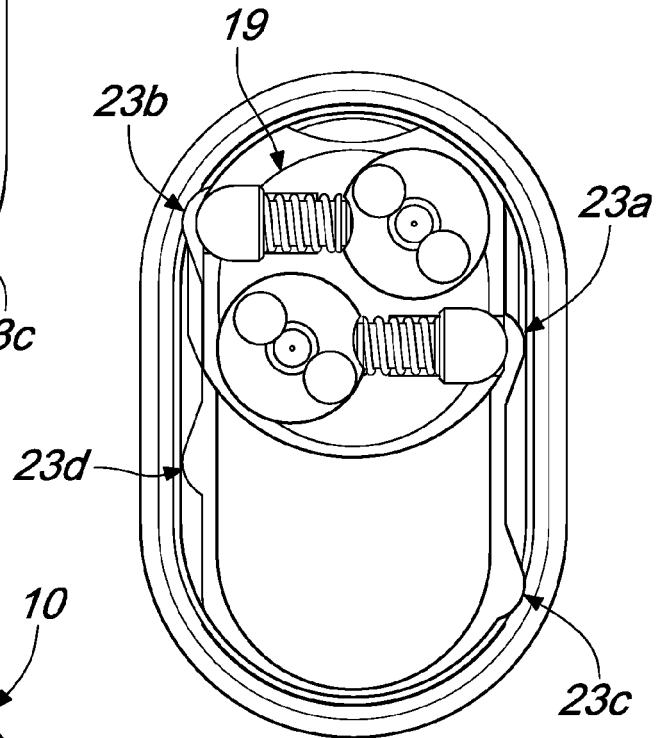


Fig. 7

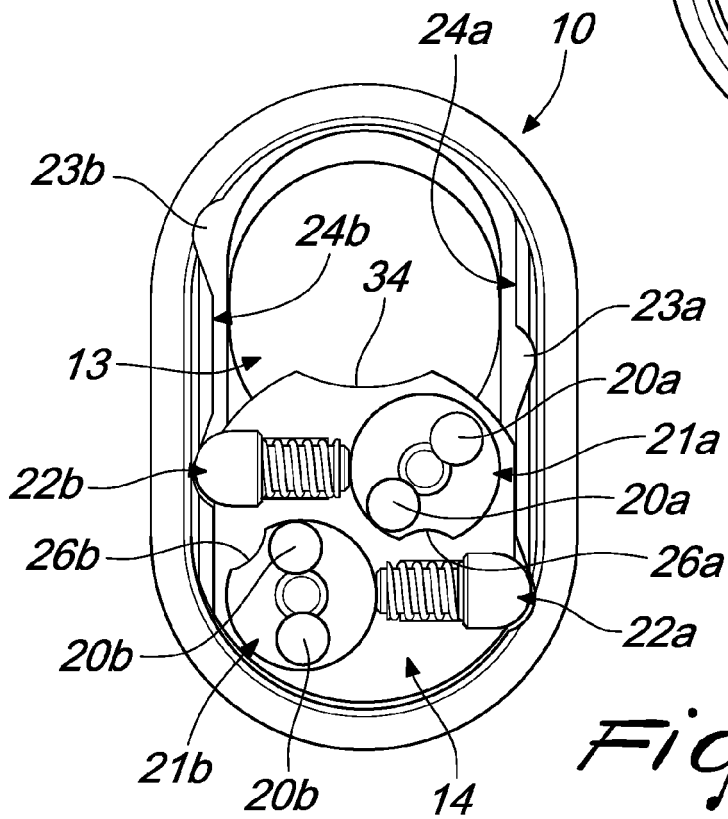


Fig. 8

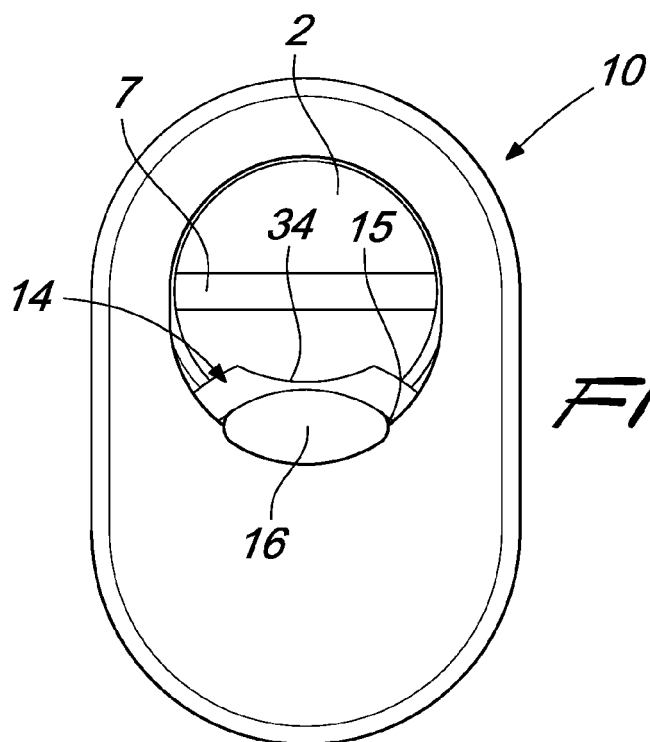


Fig. 9

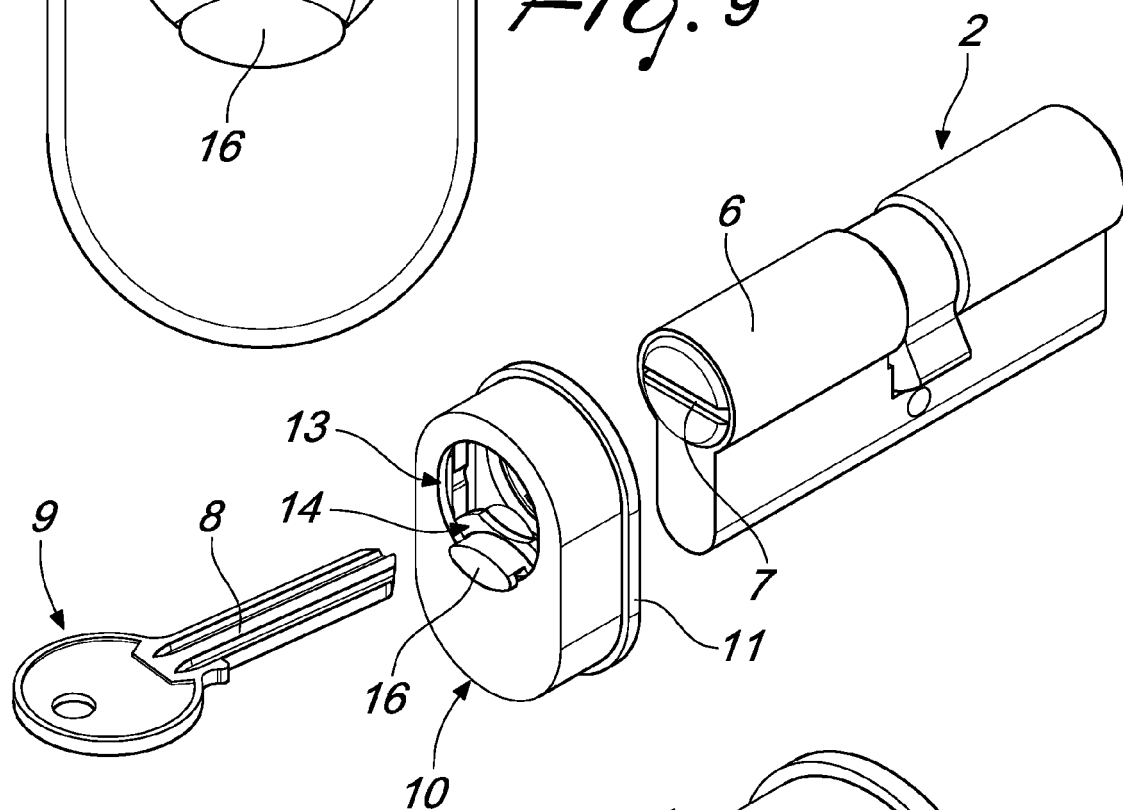


Fig. 10

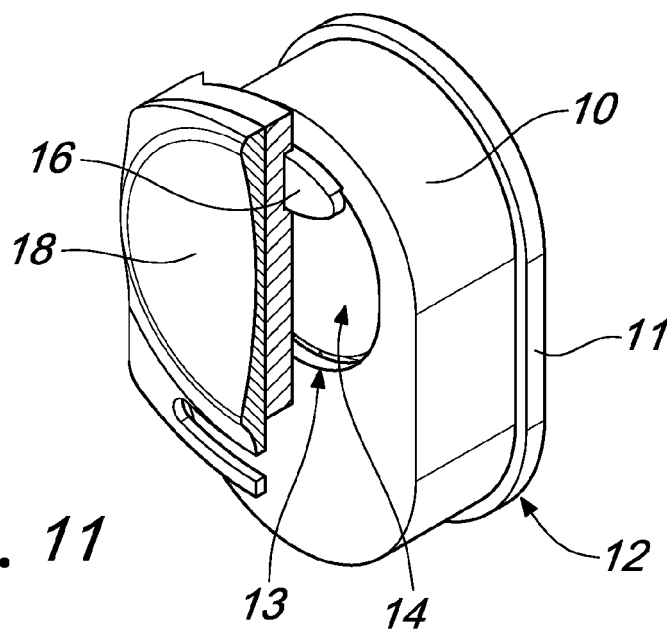


Fig. 11



EUROPEAN SEARCH REPORT

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