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(54) **SUPPORT FOR INSTALLING OPENING AND CLOSING DEVICES IN LOCK CYLINDERS**

(57) The invention comprises a fixing system and at least one front plate (1a) that includes an opening (3) configured to fit an end section of the lock cylinder (2) into same; wherein the fixing system is configured to immobilize the front plate (1a) to the end section of the cylinder (2) by means of a threaded clamping element (5) which is coupled in a threaded central hole (8) located in the front plate (1a) that communicates with its opening (3), and at least two anchoring elements (6, 6') integral with the front plate (1a) which are in contact with the end section of the cylinder (2). When the clamping element (5) is rotated in the direction of clamping rotation, the front plate (1a) is fixed to the cylinder (2) by means of a coupling clamped onto elements (5) and (6, 6').

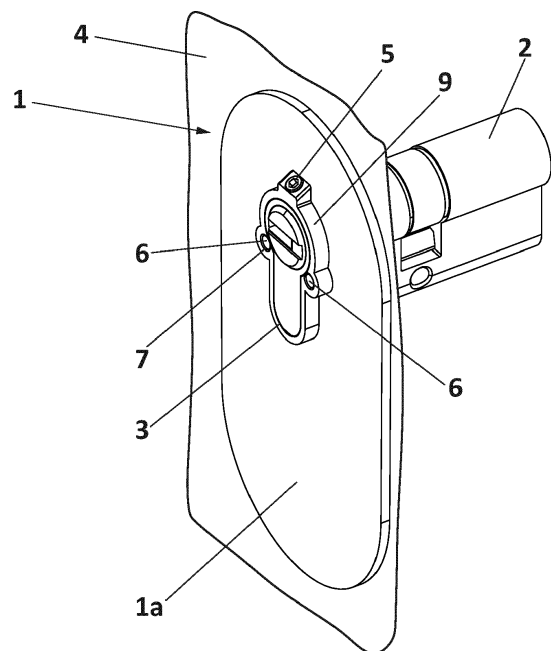


FIG. 1

Description

Object of the invention

[0001] The present invention relates to a support for installing opening and closing devices in door lock cylinders, wherein the support is fixed to the lock cylinder by means of a single element that provides a simple fixing of the support, which is both firm and secure. The support of the invention has a simple structure and is easy to install on the door lock cylinder; wherein said support is configured to house the corresponding opening and closing device linked to the lock cylinder.

Technical problem to be solved and background of the invention

[0002] Due to the continuous technological development that is currently taking place, automation has reached numerous places, including homes and offices. For this reason there is a continuous increase in the implementation of home automation applications in buildings to be able to control the existing installations and elements in homes and offices.

[0003] One of the elements of these home automation installations are smart locks that allow the doors to be opened and closed, without the need to use a key from outside the room, by means of a remote control or mobile device, emitting a signal based on different technologies such as Bluetooth, radio frequency or telephone signal.

[0004] To do this, there are opening and closing devices that are installed inside the room, linked to existing cylinders, and that allow the opening and closing of said doors by means of a remote control or mobile device. These installations allow the manual opening and closing of the door (using a key or knob, for example, that acts on the existing lock), or the opening and closing of doors can also be carried out by means of an electronic signal that acts on said opening and closing device.

[0005] These opening and closing devices are installed on the inside of the room, so that the part of the lock that is on the outside of the room is not modified, functioning and having the appearance of a normal lock, but it can be opened with a conventional key or through an electronic signal.

[0006] Currently there are different opening and closing devices to be installed in locks and thus be able to convert the lock into a smart lock. However, one of the drawbacks that arises in these installations lies in the prior assembly of a support on the lock; wherein the opening and closing device will subsequently be installed on said support.

[0007] Some supports on the market need to be installed directly on the surface of the door, which implies having to drill a hole in it to introduce connecting elements between the parts, an operation that can be very complicated, and may not even be possible to carry out due to the nature of the materials, robustness, certifications,

loss of security, aesthetics, etc.

[0008] Other supports, however, can be installed on securing systems that are placed on the lock cylinder, placing themselves on the protruding section of the lock cylinder that protrudes from the surface of the door.

[0009] However, for the correct installation of these securing systems it is necessary for the lock cylinder to protrude from the surface of the door (or the plate escutcheon and/or rosette) a certain minimum distance, which is not always possible.

[0010] There are also supports on the market which do not require altering the state of the door or the hardware to be installed and require a minimum protruding space between the lock cylinder and the surface of the door (or the plate escutcheon and/or rosette) like the one disclosed in the Spanish patent with publication number ES2725973B2.

[0011] The drawback of supports of this type is that they have many clamping elements, which directly translates into a more complex and expensive installation, with the need for a longer time to install it. Furthermore, all these elements take up excessive space, which leads to reducing the space needed to mount the transmission elements, which are necessary, between the support and the opening and closing device to be installed.

Description of the invention

[0012] In order to achieve the objectives and avoid the drawbacks in the previous sections, the invention proposes a support for installing opening and closing devices in lock cylinders which comprises at least one front plate that includes an opening configured to fit a section end of the lock cylinder into same. The support of the invention also comprises a fixing system configured to immobilize the front plate to the end section of the cylinder. The fixing system comprises at least one threaded clamping element which is coupled in a threaded central hole located in the front plate that communicates with its opening, and at least two elements anchoring elements integral with the front plate which are in contact with the end section of the cylinder. With this described arrangement, once the front plate is positioned on the cylinder, the clamping element is rotated in the direction of clamping rotation, whereby the front plate tends to move in one direction as a consequence of the force exerted by the clamping element on the cylinder, while the anchoring elements, integral with the front plate, apply clamping pressure on the cylinder.

[0013] In one embodiment of the invention, the anchoring elements are arranged symmetrically with respect to the clamping element.

[0014] The anchoring elements are elements with projections on their outer lateral surface; wherein said anchoring elements are coupled in laterally open collateral holes that communicate with the opening of the front plate.

[0015] In a particular embodiment of the invention, the

anchoring elements are elements with male threads that are coupled in collateral holes with female threads; wherein the anchoring elements and the collateral holes are arranged in directions perpendicular to the support plate and parallel to the lock cylinder.

[0016] In another embodiment of the invention, the anchoring elements form an integral part of the front plate; wherein said anchoring elements are pointed portions that limit part of the contour of the opening of the front plate.

[0017] In one embodiment of the invention, the front plate includes a perimeter projection around its opening and protruding outwardly with respect to one of the two opposite faces of the front plate.

[0018] In line with the previous paragraph, the central hole and the collateral holes are located on the perimeter projection, also reaching the front plate itself.

[0019] The support of the invention solves the problems mentioned above, further optimizing the solution set out in Spanish patent ES2725973B2, that is, the support of the present invention can be used without altering the state of the door or the hardware, and also achieves a firm and secure fixing with the cylinder using a single clamping element, simplifying the support both structurally and in its assembly.

[0020] Likewise, it should be noted that the use of fewer clamping parts leaves more space for the rest of the necessary transmission elements.

[0021] To help better understand this specification, and as an integral part thereof, a series of figures is attached, in which the object of the invention is depicted in an illustrative and non-limiting manner.

Brief description of the figures

[0022]

Figure 1 shows a perspective view of the support for installing opening and closing devices in lock cylinders, object of the invention.

Figure 2 shows a view of a front plate that forms part of the support of the invention, wherein the support is fixed to the lock cylinder by means of the front plate.

Figure 3 shows a cross-sectional view according to section A-A of Figure 2.

Figure 4 shows a perspective view of a lock cylinder to which the front plate of the support of the invention is fixed.

Figure 5 shows a view of the front plate with another embodiment different from that shown in the previous figures.

Description of an exemplary embodiment of the invention

[0023] Considering the numbering adopted in the figures, the support (1) for installing opening and closing devices in lock cylinders (2) comprises a front plate (1a)

on which the opening and closing device, not shown in the figures, is installed.

[0024] The front plate (1a) of the support (1) of the invention includes an opening (3) designed to fit an end section of the cylinder (2) of the lock already installed in a door (4) into same; wherein said front plate (1a) rests on one of its faces on one of the front surfaces of said door (4). The front plate (1a) is immobilized to the end section of the lock cylinder (2) by means of a fixing system that is described later.

[0025] In the embodiment of the invention shown in the figures, the end section of the lock cylinder (2) protrudes from the respective front surface of the door (4), which is normally the front surface that corresponds to the interior of a room, such as a home.

[0026] The fixing system to immobilize the front plate (1a) to the end section of the lock cylinder (2) comprises at least one vertical clamping element (5), preferably a grub screw, arranged to be clamped against the lock cylinder (2), and at least two anchoring elements (6) arranged symmetrically with respect to the vertical plane of the clamping element (5).

[0027] The two anchoring elements (6) are coupled in collateral holes (7) of the front plate (1a), while at the same time they are in contact with the end section of the lock cylinder (2). The anchoring elements (6) are coupled in laterally open collateral holes (7) that communicate with the opening (3) of the front plate (1a). Additionally, the anchoring elements (6) include projections on their outer lateral surface that emerge inside the opening (3), in such a way that they interfere with the profile of the lock cylinder (2) when the clamping element (5) is clamped.

[0028] In one embodiment of the invention, the anchoring elements (6) are elements with male threads (grub screws) that are coupled in the collateral holes (7) with female threads. The collateral holes (7) are arranged in directions perpendicular to the support plate (1a) and parallel to the lock cylinder (2).

[0029] On the other hand, the clamping element (5), formed by the grub screw, is coupled in a threaded central hole (8) of the front plate (1a) that opens into its opening (3), so that when the front plate (1a) is mounted on the end section of the cylinder (2), and with the two anchoring elements (6) mounted on the front plate (1a), the grub screw (5) is rotated in the clamping direction, whereby the front plate (1a) tends to move upwardly with the tendency to drive the clamping element (5) and the projections of the anchoring elements (6) onto the end section of the lock cylinder (2).

[0030] In this simple way, it is possible to immobilize the front plate (1a) of the support (1) of the invention on the lock cylinder (2) by clamping it.

[0031] Thus, when the front plate (1a) is clamped onto the end section of the lock cylinder (2) using the clamping element (5) with a downward vertical movement, exerting a force towards the cylinder (2), said front plate (1a) tends to move in the opposite direction, that is, in an upward

vertical direction. The anchoring elements (6) are thereby mechanically embedded on the lock cylinder (2), thus obtaining an immovable fixing of the front plate (1a) on the lock cylinder (2).

[0032] The technical effect described in the previous paragraph is shown more clearly in Figure 2 with the inclusion of an upper arrow that points downward, signifying the force exerted by the clamping element (5) on the lock cylinder (2), while the two lower arrows pointing upward signify the reaction of the front plate (1a) which tends to move upward with the tendency of the anchoring elements (6) to be driven onto the cylinder (2).

[0033] As previously mentioned, in one embodiment of the invention the anchoring elements (6) are threaded elements (for example, grub screws) arranged parallel to the lock cylinder (2). The threads of said grub screws are located perpendicular to the generatrix of the cylinder (2), becoming embedded therein as the front plate (1a) tends to rise due to the clamping of the clamping element (5).

[0034] The front plate (1a) depicted in Figure 5 shows anchoring elements (6') that form an integral part of the front plate (1a) itself. The anchoring elements (6') are two pointed portions tending to be driven onto the end section of the lock cylinder (2) when the clamping element (5) is rotated in the same way as described above.

[0035] In this embodiment of the invention shown in Figure 5, the pointed portions that make up the anchoring elements (6') limit part of the contour of the opening (3) of the front plate (1a).

[0036] In all the embodiments of the invention, the front plate (1a) of the support (1) of the invention includes a perimeter projection (9) around its opening (3) and protruding outwardly with respect to one of the two faces of said front plate (1a), so that the central hole (8) and the two collateral holes (7) are located on said perimeter projection (9), also reaching the thickness of the front plate itself (1a).

[0037] Likewise, the pointed anchoring elements (6') form part of said perimeter projection (9), although in this particular case, the front plate (1a) could include a protruding portion to replace the perimeter projection (9) as shown in Figure 5, wherein the central hole (8) would be located in said protruding portion.

Claims

1. A support for installing opening and closing devices on lock cylinders, wherein the support comprises:

- at least one front plate (1a), which in turn comprises an opening (3) configured to fit an end section of a lock cylinder (2) into the opening (3);
- a fixing system configured to immobilize the front plate (1a) to the end section of the lock cylinder (2);

wherein the fixing system comprises at least one threaded clamping element (5) which is coupled in a threaded central hole (8) located in the front plate (1a) that communicates with the opening (3), and at least two anchoring elements (6, 6') integral with the front plate (1a) which are in contact with the end section of the lock cylinder (2); wherein when the clamping element (5) is rotated in the direction of clamping rotation, the front plate (1a) tends to move in one direction as a result of the force exerted by the clamping element (5) on the lock cylinder (2), while the anchoring elements (6, 6'), integral with the front plate (1a), apply clamping pressure on the lock cylinder (2).

2. The support for installing opening and closing devices on lock cylinders according to claim 1, **characterized in that** the anchoring elements (6, 6') are arranged symmetrically with respect to the clamping element (5).

3. The support for installing opening and closing devices on lock cylinders according to any one of the preceding claims, **characterized in that** the anchoring elements (6) are elements with projections on their outer lateral surface; wherein said anchoring elements (6) are coupled in laterally open collateral holes (7) that communicate with the opening (3) of the front plate (1a).

4. The support for installing opening and closing devices on lock cylinders according to claim 3, **characterized in that** the anchoring elements (6) are elements with male threads that are coupled in the collateral holes (7); wherein the anchoring elements (6) and the collateral holes (7) are arranged in directions perpendicular to the support plate (1a) and parallel to the generatrix of the lock cylinder (2).

5. The support for installing opening and closing devices on lock cylinders according to any one of the previous claims 1 or 2, **characterized in that** the anchoring elements (6') form an integral part of the front plate (1a); wherein said anchoring elements (6') are pointed portions that limit part of the contour of the opening (3) of the front plate (1a).

6. The support for installing opening and closing devices on lock cylinders according to any one of the preceding claims, **characterized in that** the front plate (1a) includes a perimeter projection (9) around the opening (3) of the front plate (1a) and protruding outwardly with respect to one of the two faces of the front plate (1a).

7. The support for installing opening and closing devices on lock cylinders according to preceding

claims 1, 3 and 6, **characterized in that** the central hole (8) and the collateral holes (7) are located on the perimeter projection (9), also reaching the front plate (1a) itself.

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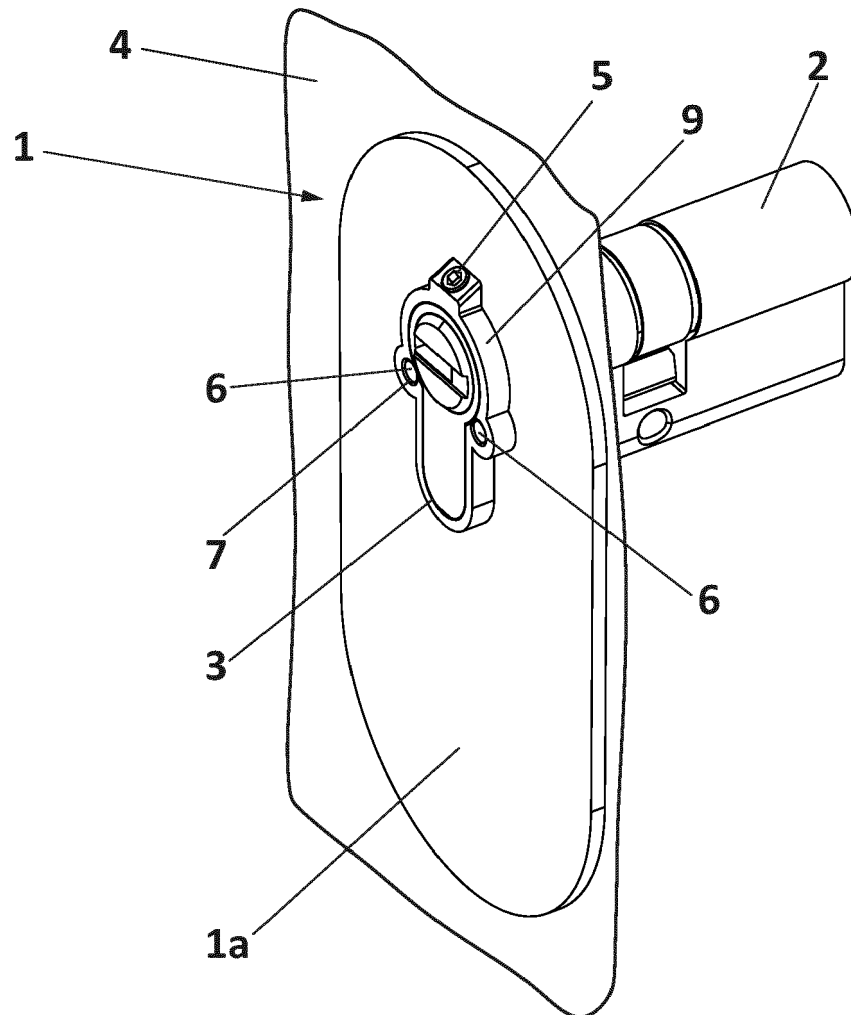
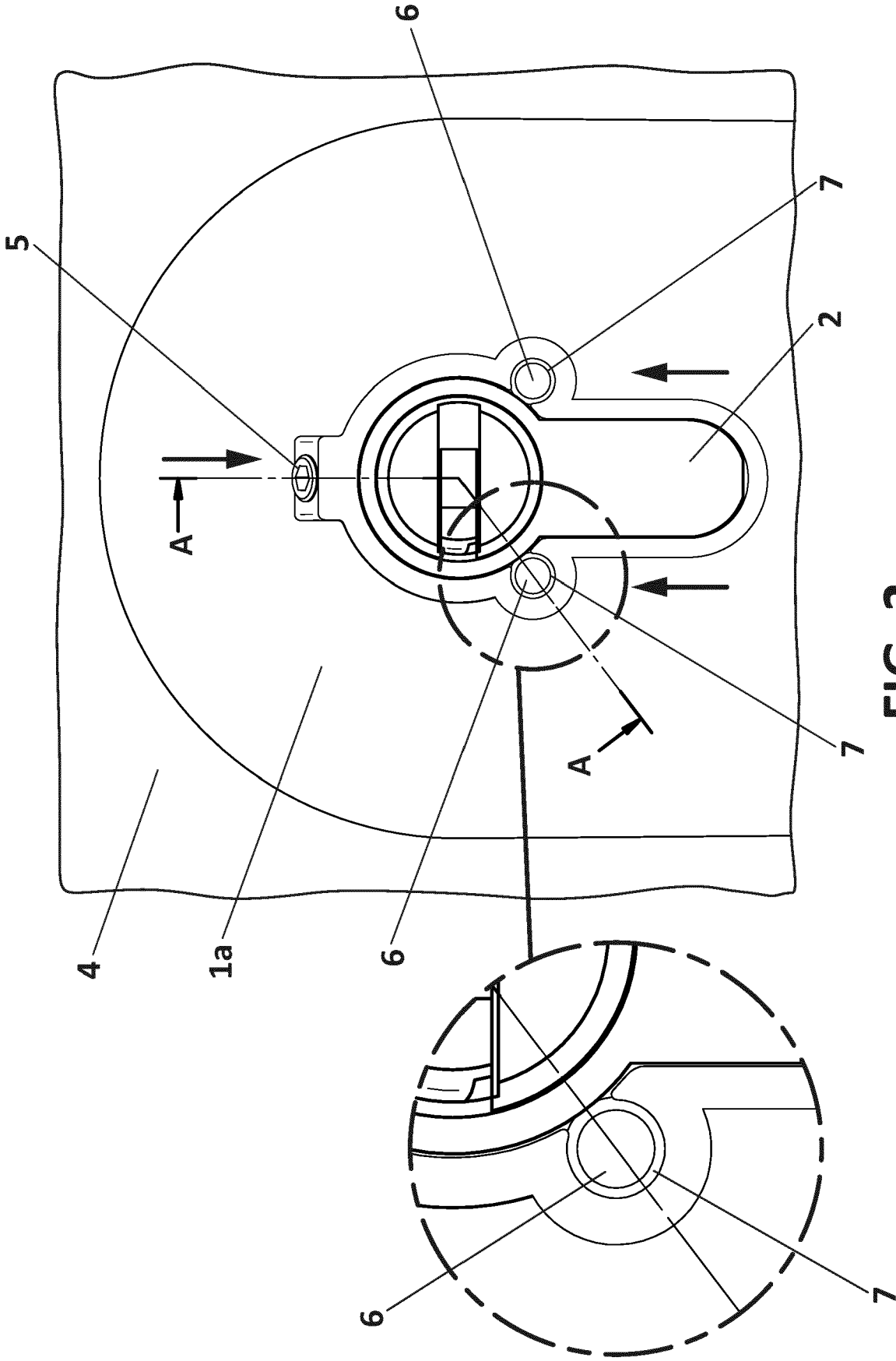


FIG. 1



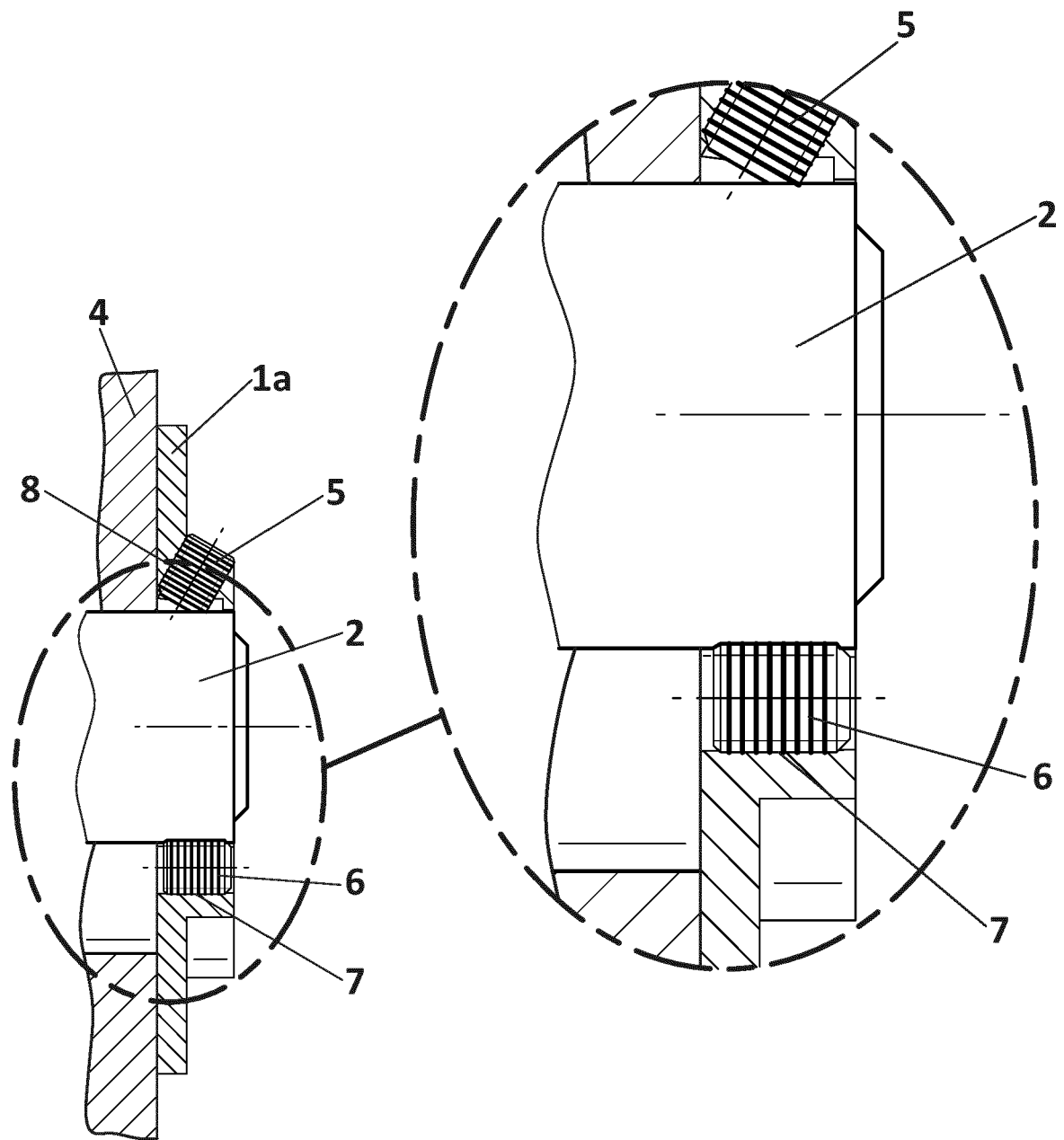


FIG. 3
A-A

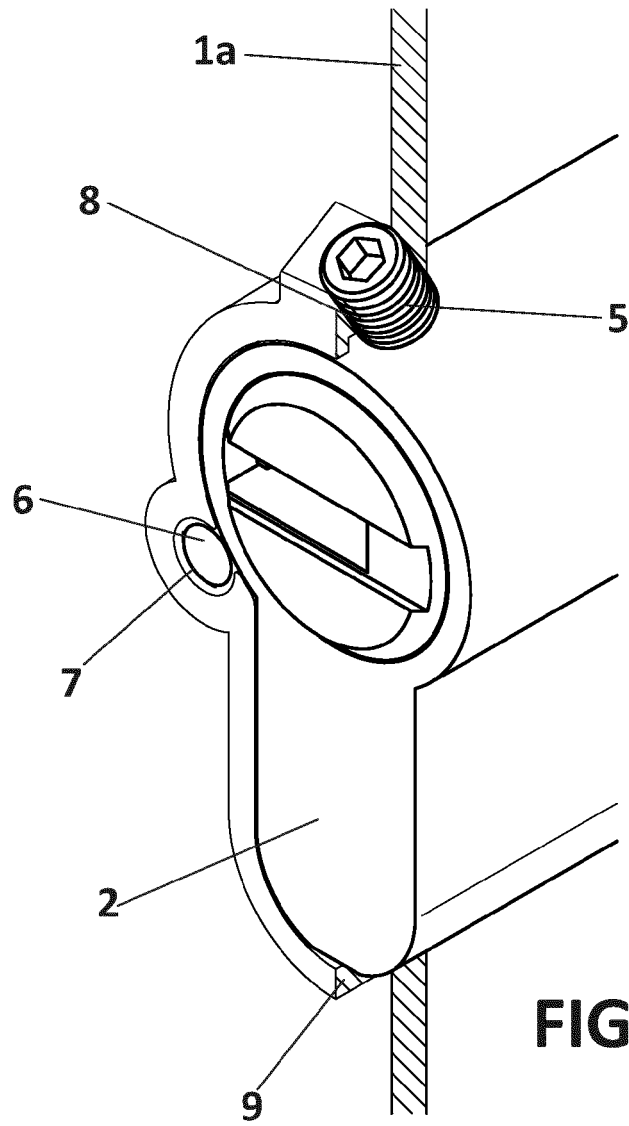


FIG. 4

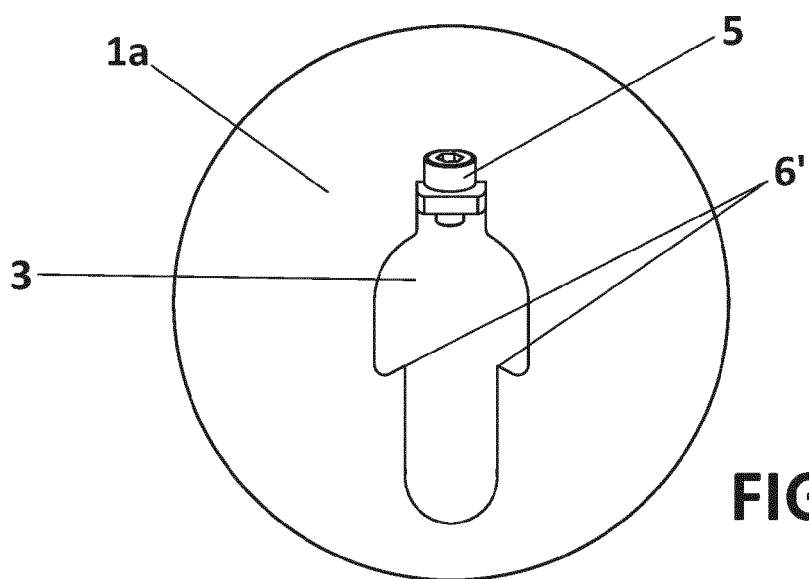


FIG. 5



EUROPEAN SEARCH REPORT

Application Number

EP 23 20 5715

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EPO FORM 1503 03.82 (P04C01)

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A	* paragraph [0053]; figure 1c *	4, 5	ADD. E05B15/02
A	WO 2022/034531 A1 (LITWINSKI ARTUR [PL]) 17 February 2022 (2022-02-17) * page 8; figures 3, 3a, 6 *	1	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 February 2024	Examiner Ansel, Yannick
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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