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(71) Applicant: **Litwinski, Artur**
02-632 Warszawa (PL)

(72) Inventor: **Litwinski, Artur**
02-632 Warszawa (PL)

(74) Representative: **Godlewski, Piotr**
JWP
Rzecznicy Patentowi Dorota Rzazewska sp.k.
Sienna Center
ul. Zelazna 28/30
00-833 Warszawa (PL)

(54) MOUNTING SUPPORT FOR A DRIVING DEVICE, PARTICULARLY FOR A DOOR LOCK

(57) The subject matter of the invention is a mounting support (100) for a driving device (1), particularly for a door lock, the lock enabling access to protected areas.

Mounting support (100) for a driving device (1), particularly for unlocking and locking a lock, the lock fitted with a cylinder insert (2) and enabling access to protected areas, wherein the driving device (1) is intended to co-operate with a rotary control element (7) placed in the body (6) of the cylinder insert (2) of a lock and the mounting support (100) comprises means for connecting it to the driving device (1), wherein the mounting support (100) is essentially in the form of a flat plate and is provided with a recess (101), the recess having a bottom (101"), with walls (102) of the recess, when the mounting support (100) has been attached to the body (6) of the cylinder insert (2), surrounding, at least partially, the body (6) of the insert (2) such that the inner surface of the walls (102) of the recess (101) follows at least part of the outer surface of the end piece of the body (6) of the cylinder insert (2) and a pass-through opening (101') is formed in the bottom (101") of the recess (101) such that the axis of the rotary control element (7) of the cylinder insert (2) passes through the area of the pass-through opening (101'), characterised in that a longitudinal circumferential projection (103) is formed on the inner surface of the wall (102) of the recess (101), i.e. on part of its surface, with one end of the projection seated in the material of the mounting support (100) and the other end being free, wherein a threaded opening (104) is made in the mounting support (100), with a set screw (105) seated in the opening, and with the set screw (105), when screwed down, pushing against the circumferential projection (103) between the ends of the circumferential projection (103), towards the body of (6) the cylinder insert (2).

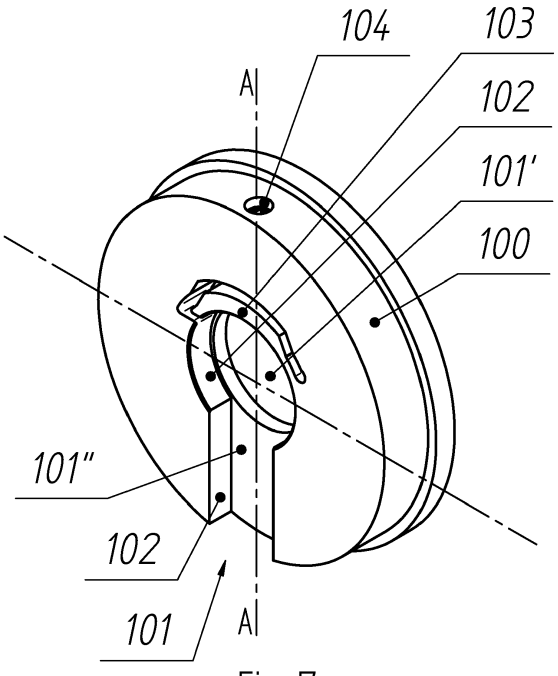

Fig. 7

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Description

[0001] The subject matter of the invention is a mounting support for a driving device, the device particularly for a door lock, the lock enabling access to protected areas. Specifically, it is intended for so called "intelligent locks" with a driving device, where the unlocking or locking of the locks is possible without an authorised person directly contacting the lock.

[0002] Mounting supports are known for mounting a driving device, the device with its own drive or driven manually, for a door lock fitted with a cylinder insert, with the mounting supports making it possible to attach the driving device to the cylinder insert and to drive the lock in order to block or unblock it.

[0003] From international application WO2019185417A1, a support is known for installing opening and closing devices in lock cylinders. The support comprises a base structure configured to install an opening and closing device. The base structure comprises an opening, a tightening system and fastening elements distributed along the perimeter in the opening. The opening houses an end of the cylinder of the lock, where fastening elements fasten the base structure to the end of the cylinder of the lock by means of a pressure exerted by the tightening system, the tightening system consisting of two bolts, wherein each of the bolts is threaded to nuts and crosses through holes of the base structure. Tightening these bolts makes the fastening elements of the support clamp together on the lock cylinder.

[0004] Numerous driving device solutions are now known used for unlocking and locking a lock fitted with a cylinder insert.

[0005] A driving device is known in the art for unlocking and locking a lock, the lock enabling access to protected areas, the device having a driving assembly for driving the lock, the driving assembly arranged within a housing which is in the form of a bush and is secured from the outside with a cover from one side and with a base from the other side, the base fixed in relation to the lock, with driving assembly components being attached to or seated in the housing. The driving assembly comprises a current generator, electric motor and gear assembly. The drive from the electric motor is transmitted via the gear assembly, consisting of toothed wheels, to a component used to control the lock. The base has an opening through which passes a control element of the lock, with the second end of this element connected to the lock mechanism. The bush, being the housing of the driving device, has teeth from the inside, the teeth cooperating with one of the toothed wheels of the gear assembly of the driving assembly. The driving device is installed from the inside of an apartment, in all door types with an adjusted profile insert (non-standard).

[0006] From the description of application WO2017046399, a solution is known being a driving device intended to cooperate with the cylinder insert of a lock, the device comprising means to drive an element controlling the lock, the element seated in the body of the lock insert. The driving device according to this solution comprises a mounting plate, which can be attached to the cylinder insert by means of screws screwed into threaded openings specially made in the cylinder insert. Assemblies and elements of the driving device are attached to the mounting plate.

[0007] From Polish application P.336314, a driving device for a lock is known. The driving device is attached on the door with screws, by means of a support in the form of a flat plate, and the device is used for motor-driven and manual actuation of a locking cylinder. The driving device has a drive shaft for transmitting a rotation to the locking cylinder, a turning handle for manually turning the drive shaft and a gear motor arranged in the turning handle for the motor-driven rotation of the drive shaft. A driving toothed wheel is seated on the drive shaft in a non-rotating manner and is connected to the turning handle such that it transmits torque. The gear motor is coupled to the plate fitting in a non-rotating manner and to the driving toothed wheel by means of a coupling if a current is applied.

[0008] From German patent application DE102014009826A1, a device for unlocking and locking entrances to access-protected areas is known. The device has a cylindrical housing. The housing holds a base plate, miniature motor, preferably a direct current motor, electric battery, blocking assembly and control unit. The blocking element of the blocking assembly is a rod with a ring, the rod moved with an electric motor via a torsion spring, the torsion spring accommodated to transmit motion from the motor to the rod. The electric battery is to provide power supply to the control system irrespective of power-supplying the device via an external power supply line. The control unit is controlled via a wireless connection. The driving device is attached to the door leaf with screws by means of a base plate.

[0009] From Polish application P.421765, a driving device for unlocking and locking a door lock is known. The driving device for unlocking and locking a lock, the lock enabling access to protected areas, within its housing comprises: a gear assembly, at least one electric energy source in a protective housing and a driving motor transmitting the drive to a rotary control element for the lock mechanism by means of the gear assembly. The lock has a body, in which the control element is seated in a rotating manner. The driving device is fitted with a base, the base fixed in relation to the lock, with the gear assembly, the at least one electric energy source and the driving motor being seated fixedly with respect to the base. The control element for the lock mechanism is connected to a toothed wheel, the toothed wheel being one of the wheels of the gear assembly, and the housing is in the form of a bush seated in the bearing in the base and the housing, from the inner side, has teeth engaging with the toothed wheel of the gear assembly, with the control element for the lock mechanism being connected to the wheel.

[0010] When using a driving device for unlocking a lock fitted with a cylinder insert it is preferred that the driving device is attached to the part of the cylinder insert that protrudes from the door, from the inside (from the apartment).

[0011] In most locks on the market today cylinder inserts are commonly used which are made by manufacturers to several popular standards that relate to the shape of the cross-section of the insert, i.e. its profile. Thereby profile cylinder inserts from various manufacturers can cooperate with locks from other manufacturers provided that the profile standard is met. Most popular are Euro profile cylinder inserts, oval profile cylinder inserts or round, so called Swiss profile cylinder inserts.

[0012] When mounting driving devices on profile inserts, there is a problem of attaching them securely without interfering in the body of the insert and without the risk of destroying the protruding end part of the insert while mounting. This is especially difficult because the part of the insert available for mounting often protrudes only by few millimetres from the door.

[0013] Set screws are most often used to attach the mounting support to the cylinder insert, the set screws placed in the mounting support around an opening intended for inserting the protruding part of the insert, placed radially around that opening and pushing against the body of the insert when screwed down. Such a solution often results in the body of the insert being destroyed while the screws are being pressed down because they contact the body of the insert at points and cause the body of the insert to deform under point pressure. An option would be to increase the number of screws but it would be uncomfortable for the user and would not solve the problem as the user may press one of the screws down much harder.

[0014] The problem is partly eliminated by the solution suggested in international application WO2019185417A1, as more contact points were used there and the pressure needed for attaching is distributed to a greater number of contact points. This solution is, however, complicated because it comprises many elements and additionally, two halves of the support clamped on the insert become dislocated (come closer towards each other) while being mounted, which is why the openings, or other means for attaching the driving device, made in the halves have their final spacing dependent on the fabricating tolerance of the body of the insert and on the clamping force used. Furthermore, such a structure makes it impossible to produce the support as a toothed ring concentric with the rotation axis of the control element of the lock, the element necessary to drive the driving device in a preferred embodiment, because parts of the teeth made on the pressed-down parts of the mounting support would become dislocated while being clamped on the body of the insert and thus make it impossible to keep the geometry of the toothed ring.

[0015] The objective of the invention is to develop a new kind of a mounting support for a driving device for locking and unlocking a lock, the mounting support having simple structure which eliminates the problems described and making it possible to use driving devices in already existing door locks, especially with no need to interfere in the structure of the locks, and in particular in the cylinder insert; to make it possible to mount the driving device more easily on the cylinder inserts; and also to obtain a secure attachment without the risk of destroying the insert; and to deliver a solution of a new type.

[0016] According to the invention, the mounting support for a driving device - the device particularly for unlocking and locking a lock, the lock fitted with a cylinder insert and enabling access to protected areas, and the device further intended to cooperate with a rotary control element placed in the body of the cylinder insert of the lock - is essentially in the form of a flat plate and is provided with a recess, the recess having a bottom, with walls of the recess, when the mounting support has been attached to the body of the cylinder insert, surrounding, at least partially, the body of the insert such that the inner surface of the walls of the recess follows the outer surface of the end piece of the body of the cylinder insert. A longitudinal circumferential projection is formed on the inner surface of the wall of the recess, i.e. on part of its surface, with one end of the projection seated in the material of the mounting support and the other end being free. A pass-through opening is formed in the bottom of the recess such that the axis of the rotary control element of the cylinder insert passes through the area of the pass-through opening. A threaded opening is made in the mounting support, radially to the pass-through opening, with a set screw seated in the threaded opening, and with the set screw, when screwed down, pushing against the circumferential projection between the ends of the circumferential projection, towards the body of the cylinder insert. The mounting support comprises means for connecting it to the driving device.

[0017] It is preferred that the set screw pushes with its end against the circumferential projection between the ends of the circumferential projection directly.

[0018] It is also preferred that the pass-through opening in the bottom of the recess is round in shape and its diameter is shorter than the width of the body of the insert.

[0019] It is more preferred that the set screw is a grub screw.

[0020] It is more preferred that the means for connecting the mounting support to the driving device are support openings, formed in the front surface of the mounting support in parallel to the longitudinal axis of the pass-through opening, and support screws, passing through the support openings.

[0021] It is even more preferred that the means for connecting the mounting support to the driving device are shaped catches.

[0022] It is also preferred that the mounting support is intended for a cylinder insert, whose body, in the cross-section, is elongated and curvilinear in shape, wherein in the upper part it has the shape of a circle connected

to the elongated part resembling a rectangle with a rounded lower side.

[0023] It is preferred that the longitudinal axis of the threaded opening is parallel to the longitudinal axis of the elongated part of the curvilinear shape of the cross-section of the body of the cylinder insert.

[0024] It is also preferred that the mounting support is intended for a cylinder insert, whose body, in the cross-section, is round in shape.

[0025] It is also preferred that the mounting support is intended for the cylinder insert, whose body, in the cross-section, is oval in shape.

[0026] It is preferred that the driving device comprises a driving assembly placed in a rotary housing and comprising a driving motor and a toothed gear with a coupling, where an end toothed wheel cooperates with a toothed ring and where the housing is seated in the bearing in a rotational manner and axially non-slidably on the toothed ring.

[0027] It is more preferred that the toothed ring is fixedly connected to the mounting support.

[0028] It is even more preferred that the toothed ring is formed in the material of the mounting support.

[0029] It is also preferred that the toothed ring, being the mounting support, is attached only to the body of the insert of the lock.

[0030] It is also preferred that the rotary housing is seated in the bearing only on the toothed ring, being the mounting support.

[0031] It is further preferred that the teeth of the ring, being the mounting support, are inner teeth.

[0032] It is also preferred that the mounting support is placed from the inner side of an entrance to access-protected areas and on the opposite side to the key-controlled part of the insert.

[0033] The subject matter of the invention is shown through embodiments in the drawing, wherein Fig. 1 shows the mounting support for a driving device in the first embodiment of the invention in the form of a rectangular plate, as seen from the Euro profile lock insert, Fig. 1a shows the mounting support for a driving device in the first embodiment of the invention in the form of a rectangular plate, as seen from the Swiss profile lock insert, Fig. 1b shows the mounting support for a driving device in the first embodiment of the invention in the form of a rectangular plate, as seen from the oval profile lock insert, Fig. 2 shows the mounting support for a driving device in the second embodiment of the invention in the form of a round-shaped plate and attached to the body of the insert, in a perspective view from the insert side, Fig. 3 shows the mounting support for a driving device in the second embodiment of the invention in the form of a round-shaped plate, in a perspective view from the insert side, Fig. 4 shows the mounting support for a driving device in the second embodiment of the invention in the form of a round-shaped plate, in a perspective view from the driving device side, Fig. 5 shows the insert, mounting support in the third embodiment of the invention in the form of a toothed ring and the driving device with the end toothed wheel cooperating with the toothed ring, in an exploded, perspective view from the insert side, Fig. 6 shows the driving device, mounting support in the third embodiment of the invention in the form of a toothed ring and the insert, in an exploded, perspective view from the driving device side, Fig. 7 shows the mounting support in the third embodiment of the invention in the form of a toothed ring, in a perspective view from the insert side, Fig. 7a shows, in a section along line A-A of Fig. 7, the mounting support in the third embodiment of the invention in the form of a toothed ring, Fig. 8 shows the mounting support in the second embodiment of the invention connected to the toothed ring, in a perspective view from the insert side, Fig. 8a shows, in a section along line B-B of Fig. 8, the mounting support in the second embodiment of the invention connected to the toothed ring, Fig. 9a shows an embodiment of the invention illustrating how the set screw pushes against the circumferential projection and Fig. 9b shows another embodiment of the invention illustrating how the set screw pushes against the circumferential projection.

[0034] Fig. 1, Fig. 1a, Fig. 1b, Fig. 2, Fig. 3 and Fig. 4 show, in embodiments of the invention, the mounting support 100 for a driving device 1, the device particularly for unlocking and locking a lock, the lock fitted with a cylinder insert 2 and enabling access to protected areas. The cylinder insert 2 of a door lock has a body 6, in which a control element is placed, with rotation of the control element causing the lock to become blocked or unblocked. The cylinder insert 2 is a typical solution used in door lock structures and is meant for the lock to be controlled only by persons authorised thereto.

[0035] Fig. 1a shows, in an embodiment of the invention, the mounting support 100 for a driving device 1, the device particularly for unlocking and locking a lock fitted with the cylinder insert 2, which is round in cross-section. In this embodiment of the invention the mounting support 100 has a recess 101, which is round in cross-section, and a round pass-through opening 101' in the recess, with the longitudinal axis of the control element 7 of the cylinder insert 2 (the latter not shown) passing through the opening.

[0036] Fig. 1b shows, in an embodiment of the invention, the mounting support 100 for a driving device 1, the device particularly for unlocking and locking a lock fitted with the cylinder insert 2, which is oval in cross-section. In this embodiment of the invention the mounting support 100 has a recess 101, which is oval in cross-section, and a round pass-through opening 101' in the recess, with the longitudinal axis of the control element 7 of the cylinder insert 2 (the latter not shown) passing through the opening.

[0037] From the outside of the door leaf, in which the lock with the cylinder insert is placed 2, the lock is controlled with a dedicated key placed in the cylinder insert 2. Now it is often the case that the lock can additionally be controlled by means of a driving device, the device

placed from the inside of the door leaf and often controlled remotely, for instance by means of a mobile device. Such a driving device can be attached indirectly or directly to a door lock. In the embodiments of the invention shown in Fig. 1, Fig 1a, Fig 1b, Fig. 2, Fig. 3, Fig. 4, Fig. 5, Fig. 6, Fig. 7, Fig. 7a, Fig. 8 and Fig. 8a, the mounting support 100, on which the driving device 1 is mounted, is attached on the outer surface of the end part of the body 6 of the cylinder insert 2. The cylinder insert 2 has a profile selected from the group of commercially available profiles and can, for instance, have a round shape of the cross-section, oval shape of the cross-section or a shape of the cross-section being a so called Euro profile or another shape.

[0038] The mounting support 100 shown in the embodiments of the invention shown in Fig. 1, Fig. 2, Fig. 3 and Fig. 4 - the support for a driving device 1, the device particularly for unlocking and locking a lock, the lock fitted with a cylinder insert 2 and enabling access to protected areas - is essentially in the form of a flat plate. In the embodiments of the invention shown in Fig. 1, Fig. 1a and Fig. 1b, the mounting support 100 has the shape of a rectangle and in Fig. 2, Fig. 3 and Fig. 4 it has the shape of a circle, but of course it can have different shapes, for example of a square, triangle or the like, and any other shape.

[0039] In the embodiments shown in Fig. 1, Fig. 1a, Fig. 1b, Fig. 2, Fig. 3 and Fig. 4, the mounting support 100 is provided with a recess 101, the recess having a bottom 101", with walls 102 of the recess, when the mounting support 100 has been attached to the body 6 of the cylinder insert 2, surrounding, at least partially, the body 6 of the insert 2 such that the inner surface of the walls 102 of the recess 101 follows, at least partially, the outer surface of the end piece of the body 6 of the cylinder insert 2 with a small clearance.

[0040] A longitudinal circumferential projection 103 is formed on the inner surface of the wall 102 of the recess 101, on part of the circumference of the recess 101, with the first end of the projection seated in the material of the mounting support 100 and the other end being free such that to a certain extent it can become dislocated in relation to the mounting support 100, with the first end of the longitudinal circumferential projection 103 being fixed.

[0041] A pass-through opening 101' is formed in the bottom 101" of the recess 101 such that the axis of the rotary control element 7 of the cylinder insert 2 passes through the area of the pass-through opening 101'. A piece of the control element 7 of the cylinder insert passes through the pass-though opening 101', the piece being for instance a part of a dedicated key, with torque being transmitted to the piece from the driving device 1 while the lock is being unlocked or locked.

[0042] In the embodiments of the invention shown in Fig. 1, Fig. 1a, Fig. 1b, Fig. 2, Fig. 3 and Fig. 4, the longitudinal circumferential projection 103 is placed in the upper part (upon mounting the mounting device 100 on the insert in the door leaf), but it is obvious that it can be placed in an angular manner in any location according to current mounting needs. The longitudinal circumferential projection 103 is made in the material of the mounting support 100 by known methods, such as *inter alia* by pressure die-casting or a powder sintering method.

[0043] As shown in Fig. 1, Fig. 1a, Fig. 1b, Fig. 2, Fig. 3, Fig. 4, Fig. 5, Fig. 6, Fig. 7, Fig. 7a, Fig. 8 and Fig. 8A, in all embodiments of the invention shown, a threaded opening 104 is made in the mounting support 100, radially in relation to the axis of the pass-through opening 101', with a set screw 105 seated in the threaded opening. The set screw 105, while being screwed down, presses with its inner end 106 against the circumferential projection 103 between the ends of the latter. The set screw 105 is a grub screw, which is why the thickness of the mounting support 100 can be very low owing to that the distance between the threaded opening 104 and the surface of the mounting support 100, from the side of the cylinder insert 2, is very low such that the mounting support 100 can overlap the end piece of the body 6 of the cylinder insert 2 by a distance even smaller than 1 millimetre for correct attachment of the mounting support 100 on the body 6 of the cylinder insert 2. It is preferred in that, in the case of an escutcheon plate (not shown), the cylinder insert 2 can protrude from the door leaf by a not much larger distance. Screwing the set screw 105 down in the threaded opening 104 results in pressing the longitudinal circumferential projection 103 in the inner surface of the walls 102 of the recess 101 of the mounting support 100 against the outer surface of the body 6 of the cylinder insert 2 and blocking the mounting support 100 on the cylinder insert 2. Secure attachment is ensured even with small pressure, with the pressure providing high friction between the walls 102 of the recess 101 of the mounting support 100 and the outer surface of the body 6 of the cylinder insert 2. At the same time, since the longitudinal circumferential projection 103, form the side of the recess 101, has a shape which reflects the end piece of the body 6 of the cylinder insert 2 and fits the end piece, even strong screwing the set screw 105 down will not carry the risk of deformation to the body of the cylinder insert 2 because the pressure is distributed through the longitudinal circumferential projection 103 over a large part of the surface of the body 6 of the cylinder insert 2. Here it is obvious that in other embodiments of the invention, the set screw 105 does not need to be a grub screw and can be located in the mounting support in other ways which ensure pressing the circumferential projection 103 against the body 6 of the cylinder insert 2.

[0044] In the embodiments of the invention shown in Fig. 1, Fig. 1a, Fig. 1b, Fig. 2, Fig. 3, Fig. 7, Fig. 7a, Fig. 8 and Fig. 8a, the threaded opening 104 is made perpendicularly to the longitudinal axis of the pass-through opening 101' and the set screw 105, while being screwed down, presses directly against the circumferential projection 103. It is, however, obvious that the longitudinal axis of the threaded opening 104 does not need to be perpendicular to the longitudinal axis of the pass-through

opening 101 and the set screw 105 can press the circumferential projection 103 through intermediate elements, such as for instance a ball in a passage transverse to the axis of the threaded opening or an intermediate lever.

[0045] Fig. 9a shows an embodiment of the invention where the set screw 105 is placed in the threaded opening 104 tangent to the circumferential projection 103. In this embodiment of the invention, the end of the set screw 105 terminates in a conical shape and, while the set screw 105 is being screwed into the threaded opening 104, this conical part of the set screw 105 presses the circumferential projection 103 against the body 6 of the cylinder insert 2.

[0046] Fig. 9b shows an embodiment of the invention where the set screw 105 is placed in the threaded opening 104, the latter parallel to the surface of the circumferential projection 103, and a steel ball 110 is placed in an additional opening 109 bored perpendicularly to the surface of the circumferential projection 103. In this embodiment of the invention, the end of the set screw 105 also terminates in a conical shape and, while the set screw 105 is being screwed into the threaded opening 104, this conical part of the set screw 105 presses the steel ball 110 in the additional opening 109 against the circumferential projection 103 and the circumferential projection 103 is pressed against the body 6 of the cylinder insert 2.

[0047] In the embodiments of the invention shown in Fig. 1, Fig. 3, Fig. 5, Fig. 7 and Fig. 8, the mounting support 100 - on its front side being outer in relation to the housing 3 of the driving device 1, to which the support is attached, i.e. on the side from the cylinder insert 2 - has the recess 101 having, in cross-section, at least partially the shape of the outer contour of the body 6 of the insert 2, i.e. the so called European insert. The recess 101 makes it at the same time impossible to slide the mounting support 100 over the body 6 of the cylinder insert 2 deeper than it was planned.

[0048] As shown in Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 8 and Fig. 8a, in the embodiments of the invention, the mounting support 100 comprises means for connecting it to the driving device 1, the means being support openings 107 shown in the above figures, with support screws 108, as shown in Fig. 8 and Fig. 8a, screwed in the support openings. The support screws 108 can be screwed into threaded openings in the driving device 1 (not shown).

[0049] Of course, the support openings 107 and support screws 108 are not the only means for connecting the mounting support 100 to the driving device 1. The mounting support 100 can be connected to the driving device 1, for instance, with a flange connection (not shown), which is known from constructing driving devices, as explained below, or with a tight and snap connection.

[0050] Fig. 5 and Fig. 6 show, in the embodiment of the invention, the mounting support 100 being an element of the driving device 1, the device intended for driving the control element 7, the element placed in the body 6 of the cylinder insert 2 of the lock. The driving device 1 comprises a driving assembly placed in a rotary housing 3 and comprising a driving motor and a toothed gear with a coupling (not shown), with the end toothed wheel 4 illustrated in Fig 5. The toothed wheel 4 is the end element of the driving assembly and cooperates with the toothed ring 5, the ring being the mounting support 100 in this embodiment of the invention 100. The housing 3 is seated in the bearing in a rotational manner and axially non-slidably on the toothed ring 5 such that, together with the elements placed in the housing, the housing can rotate in relation to the toothed ring 5 being the mounting support 100. Since the rotary housing 3 comprises means (known in the prior art) connecting the housing to the control element 7 of the cylinder insert 2 of the lock, the control element 7 of the cylinder insert 2 of the lock rotates together with the housing which results in unlocking or locking the lock.

[0051] In the embodiment of the invention shown in Fig. 5 and Fig. 6, the housing 3 of the driving device 1 is seated in the bearing on the outer surface of the toothed ring 5, the ring being the mounting support 100, and in this embodiment of the invention, this is the only way of bearing the rotary housing 3 of the driving device 1.

[0052] In the embodiment of the invention shown in Fig. 7 and Fig. 7a, the toothed ring 5 is illustrated, the ring being the mounting support 100 described above.

[0053] Fig. 8 and Fig. 8a show, in the embodiment of the invention, the mounting support 100, with the toothed ring 5 of the driving device 1 attached to the support by means of support screws 108 placed in support openings 107. In the embodiment of the invention shown in Fig. 8 and Fig. 8a, the openings in the toothed ring 5 are threaded and the support screws 108 placed in the support openings 107 are screwed into the openings.

[0054] In all the embodiments of the invention shown in Fig. 6, Fig. 7a and Fig. 8a, the toothed ring 5 is provided with teeth being inner teeth, but a toothed ring 5 with outer teeth is of course possible to be used in constructing the driving device 1 according to the invention.

[0055] The driving device 1, particularly for locking and unlocking a lock, the lock enabling access to protected areas, is fitted with an electronic control unit (not shown), the unit placed in the housing 3 and managing the driving assembly in the housing 3 and comprising a sensor (not shown), the sensor being an accelerometer and determining the angular position of the rotary housing 3 in relation to the cylinder insert 2 of the lock.

[0056] In the embodiments of the invention shown, the driving device 1, particularly for locking and unlocking a lock, the lock enabling access to protected areas, is controlled by the control unit in a wireless manner by means of a computer program, preferably an application software for a mobile device, in particular a smartphone, via a wireless link, such as, for instance, Bluetooth.

[0057] The electronic control unit is fitted with an elec-

tric socket intended to deliver supply voltage and to transfer data, the socket placed on the rotary part of the housing 3 (not shown).

[0058] The driving device 1 is fitted with an electric energy source in the form of a primary or secondary cell (not shown).

[0059] The driving device 1 is placed on the inner side of an entrance to access-protected areas and on the opposite side to the key-controlled part of the cylinder insert 2 of the lock.

Claims

1. Mounting support (100) for a driving device (1), particularly for unlocking and locking a lock, the lock fitted with a cylinder insert (2) and enabling access to protected areas, wherein the driving device (1) is intended to cooperate with a rotary control element (7) placed in the body (6) of the cylinder insert (2) of a lock and the mounting support (100) comprises means for connecting it to the driving device (1), wherein the mounting support (100) is essentially in the form of a flat plate and is provided with a recess (101), the recess having a bottom (101"), with walls (102) of the recess, when the mounting support (100) has been attached to the body (6) of the cylinder insert (2), surrounding, at least partially, the body (6) of the insert (2) such that the inner surface of the walls (102) of the recess (101) follows at least part of the outer surface of the end piece of the body (6) of the cylinder insert (2) and a pass-through opening (101') is formed in the bottom (101") of the recess (101) such that the axis of the rotary control element (7) of the cylinder insert (2) passes through the area of the pass-through opening (101'), **characterised in that** a longitudinal circumferential projection (103) is formed on the inner surface of the wall (102) of the recess (101), i.e. on part of its surface, with one end of the projection seated in the material of the mounting support (100) and the other end being free, wherein a threaded opening (104) is made in the mounting support (100), with a set screw (105) seated in the opening, and with the set screw (105), when screwed down, pushing against the circumferential projection (103) between the ends of the circumferential projection (103), towards the body of (6) the cylinder insert (2).

2. The mounting support of claim 1, **characterised in that** the set screw (105) pushes with its end (106) against the circumferential projection (103) between the ends of the circumferential projection (103) directly.

3. The mounting support of claim 1, **characterised in that** the pass-through opening (101') in the bottom of the recess (101) is round in shape and its diameter is shorter than the width of the body (6) of the insert (2).

4. The mounting support of claim 1, **characterised in that** the set screw (105) is a grub screw.

5. The mounting support of claim 1, **characterised in that** means for connecting the mounting support to the driving device (1) are support openings (107), formed in the mounting support (100) in parallel to the longitudinal axis of the pass-through opening (101'), and support screws (108), going through the support openings (107).

6. The mounting support of claim 1, **characterised in that** the means for connecting the mounting support to the driving device (1) are shaped catches.

7. The mounting support of claim 1, **characterised in that** it is intended for a cylinder insert (2), whose body, in the cross-section, is elongated and curvilinear in shape, wherein in the upper part it has the shape of a circle connected to an elongated part (61) resembling a rectangle with a rounded lower side.

8. The mounting support of claim 7, **characterised in that** the longitudinal axis of the threaded opening (104) is parallel to the longitudinal axis of the elongated part (61) of the curvilinear shape of the cross-section of the body (6) of the cylinder insert (2).

9. The mounting support of claim 1, **characterised in that** it is intended for the cylinder insert (2), whose body (6), in the cross-section, is round in shape or is oval in shape.

10. The mounting support of claim 1, **characterised in that** the driving device (1) comprises a driving assembly placed in a rotary housing (3) and comprising a driving motor and a toothed gear with a coupling, where the end toothed wheel (4) cooperates with the toothed ring (5) and where the housing (3) is seated in the bearing in a rotational manner and axially non-slidably on the toothed ring (5).

11. The mounting support of claim 11, **characterised in that** the toothed ring (5) is fixedly connected to the mounting support (100).

12. The mounting support of claim 11, **characterised in that** the toothed ring (5) is formed in the material of the mounting support (100).

13. The mounting support of claim 13, **characterised in that** the toothed ring (5), being the mounting support (100), is attached only to the body (6) of the insert (2) of the lock.

14. The mounting support of claim 11, **characterised in that** the rotary housing (3) is seated in the bearing only on the toothed ring (5), being the mounting support (100).

15. The mounting support of claim 11, **characterised in that** the teeth (9) of the ring (5), being the mounting support (100), are inner teeth.

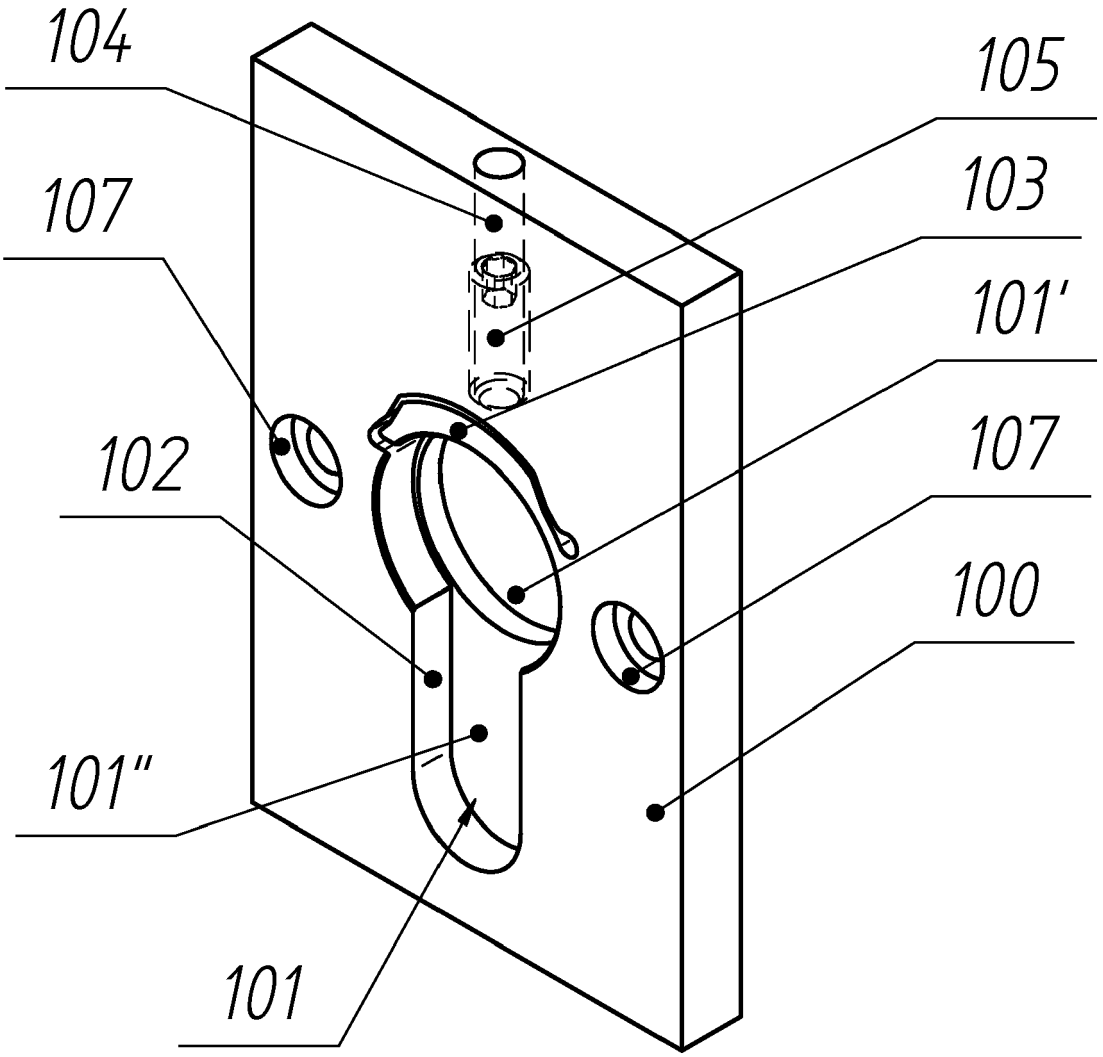

Fig. 1

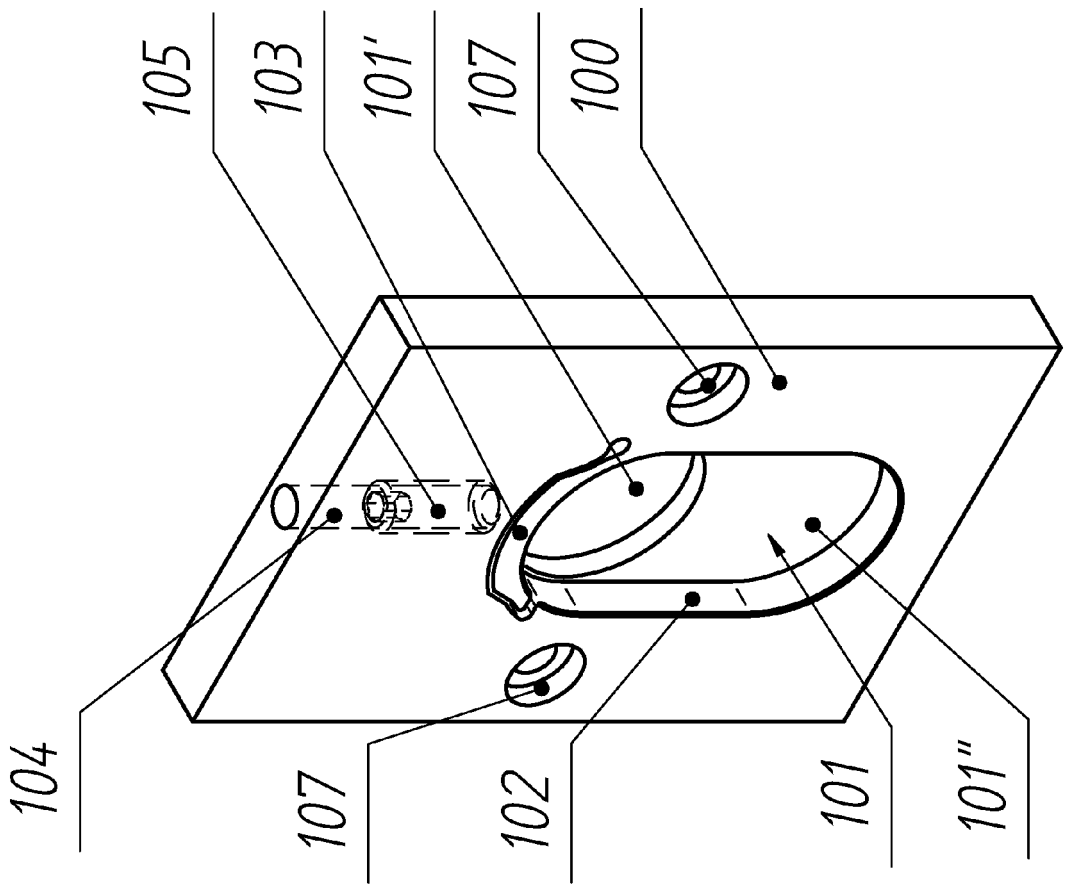
105
103
101'
107
100
104
107
102
101
101''

Fig. 1b

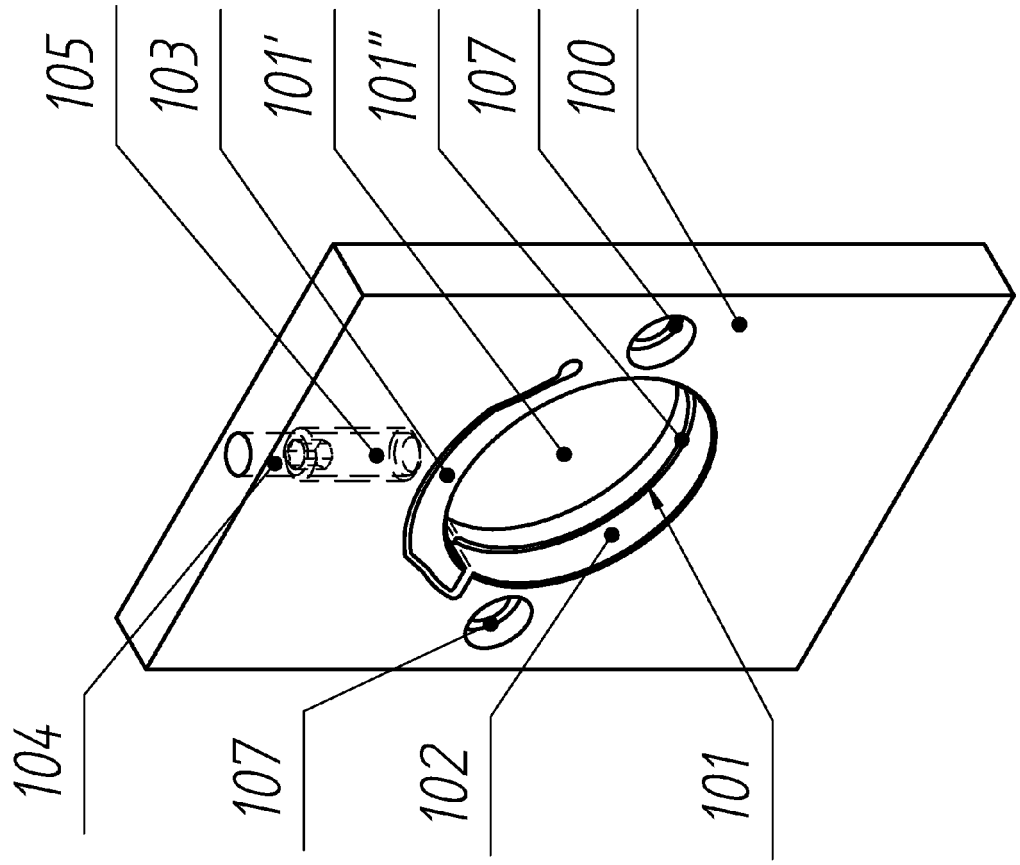
105
103
101'
101''
107
100
104
107
102
101

Fig. 1a

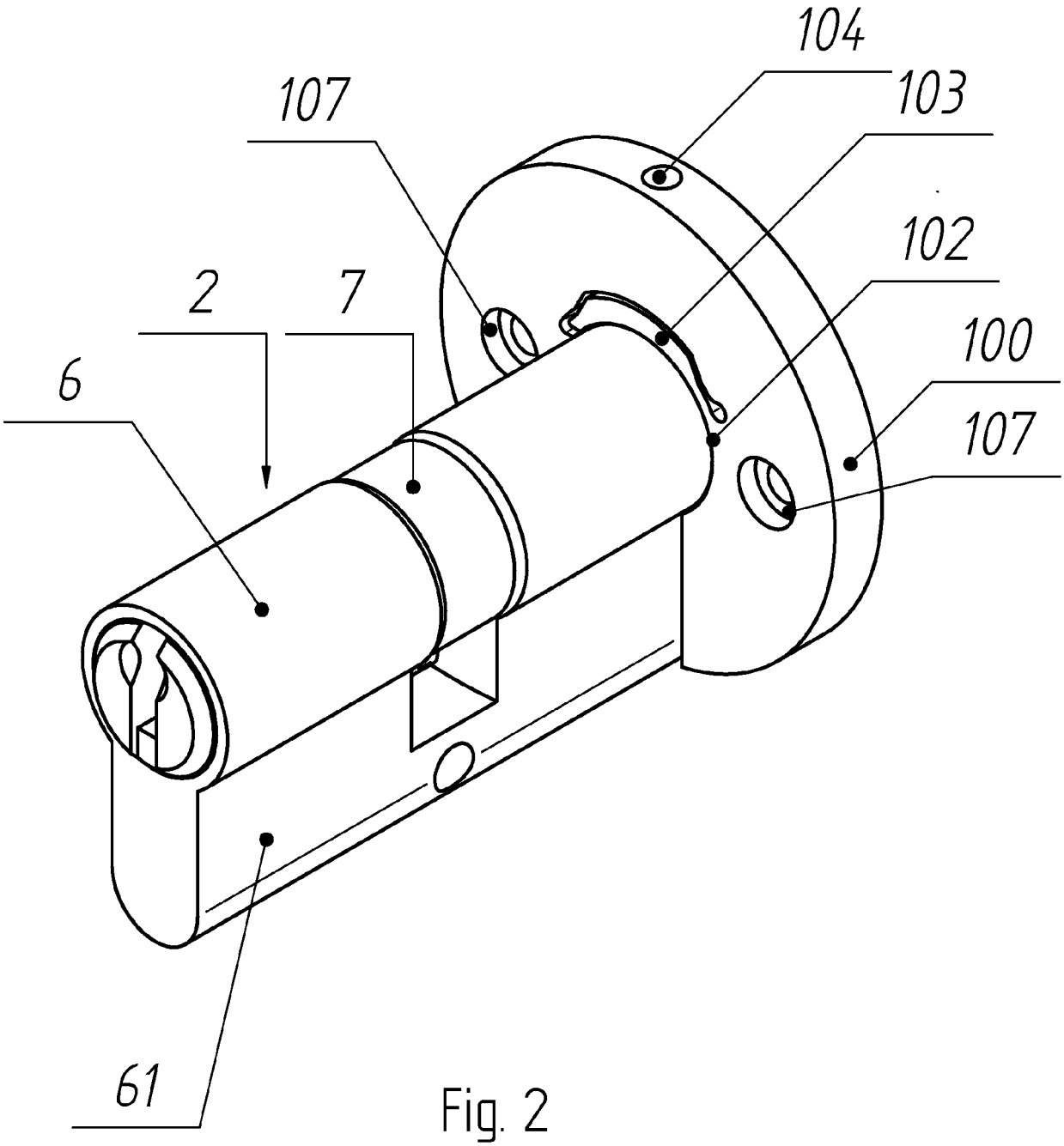

Fig. 2

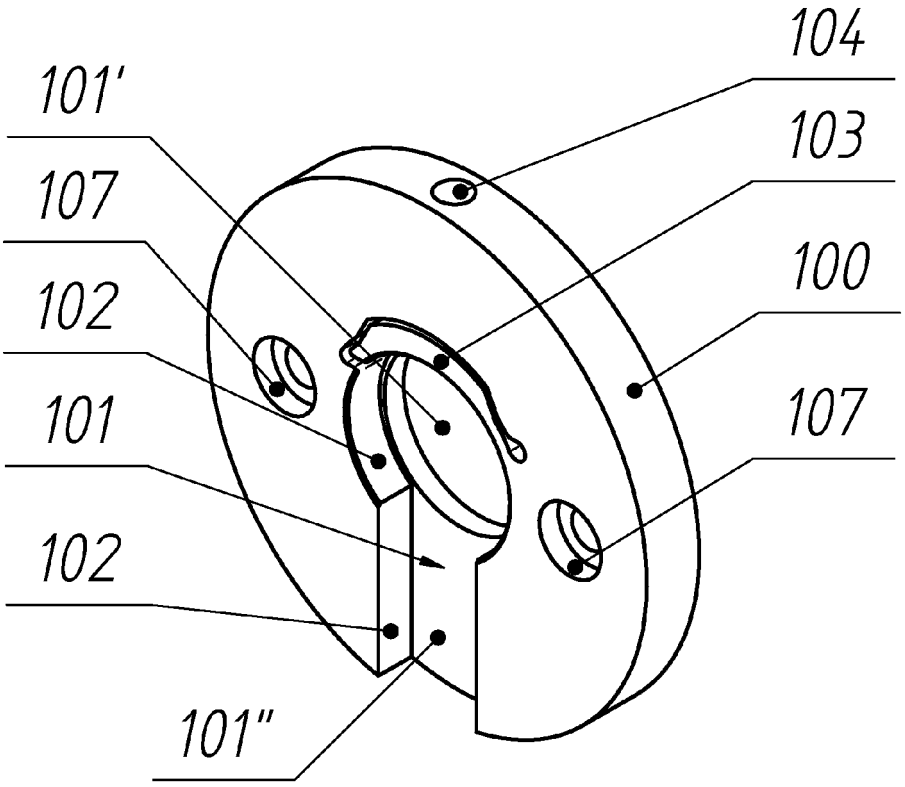

Fig. 3

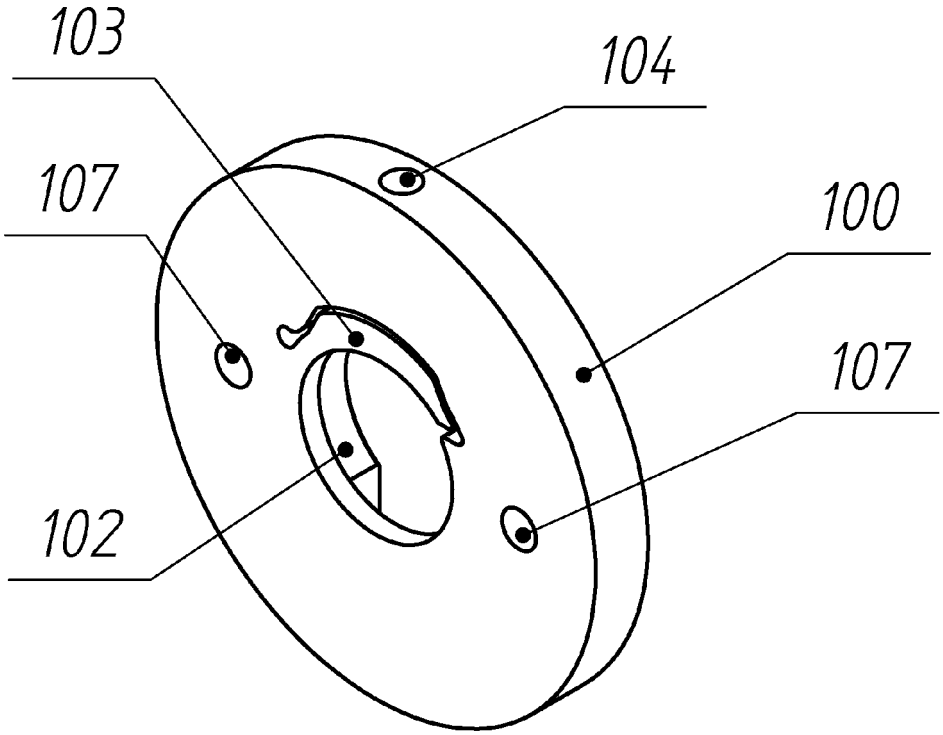

Fig. 4

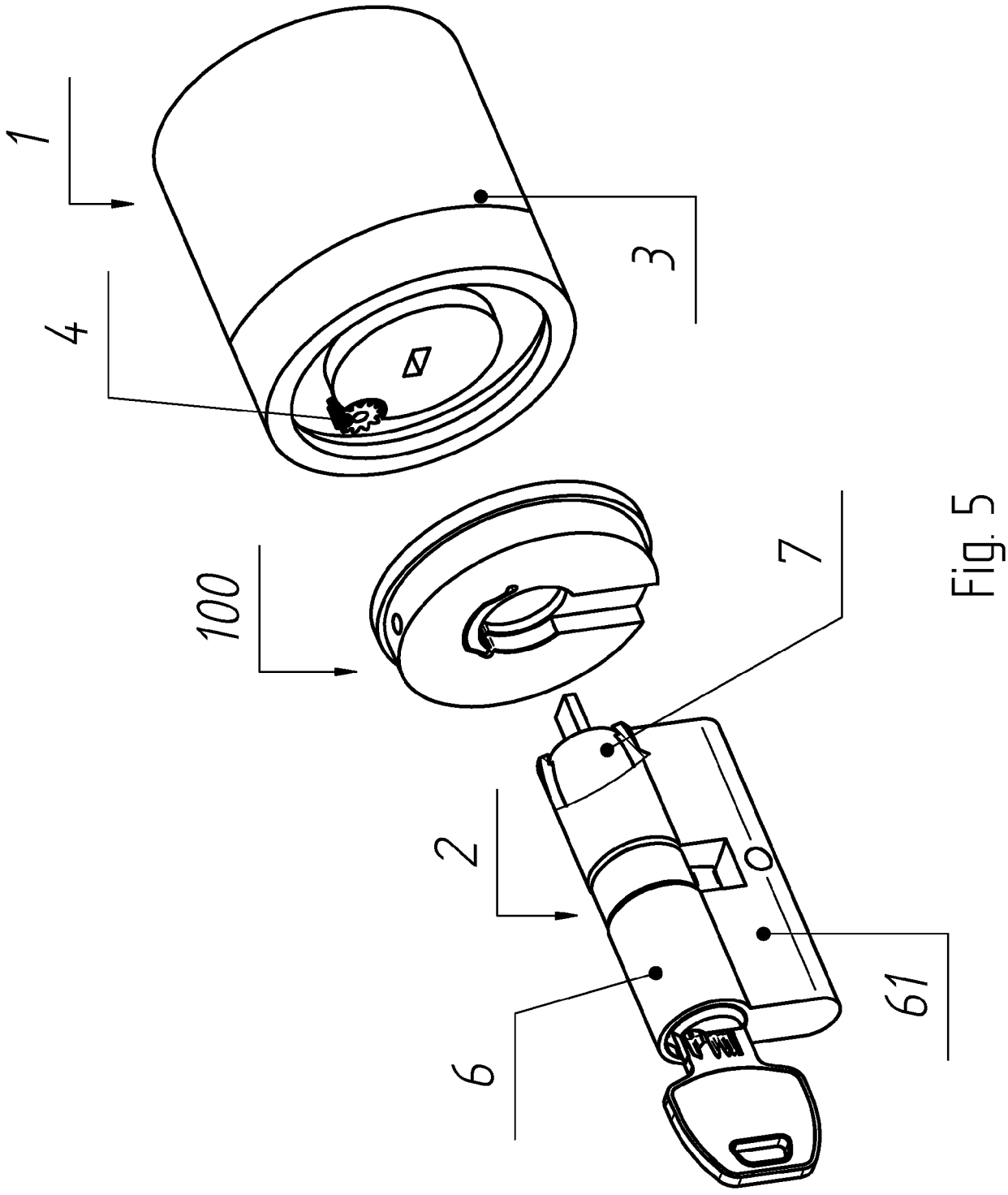

Fig. 5

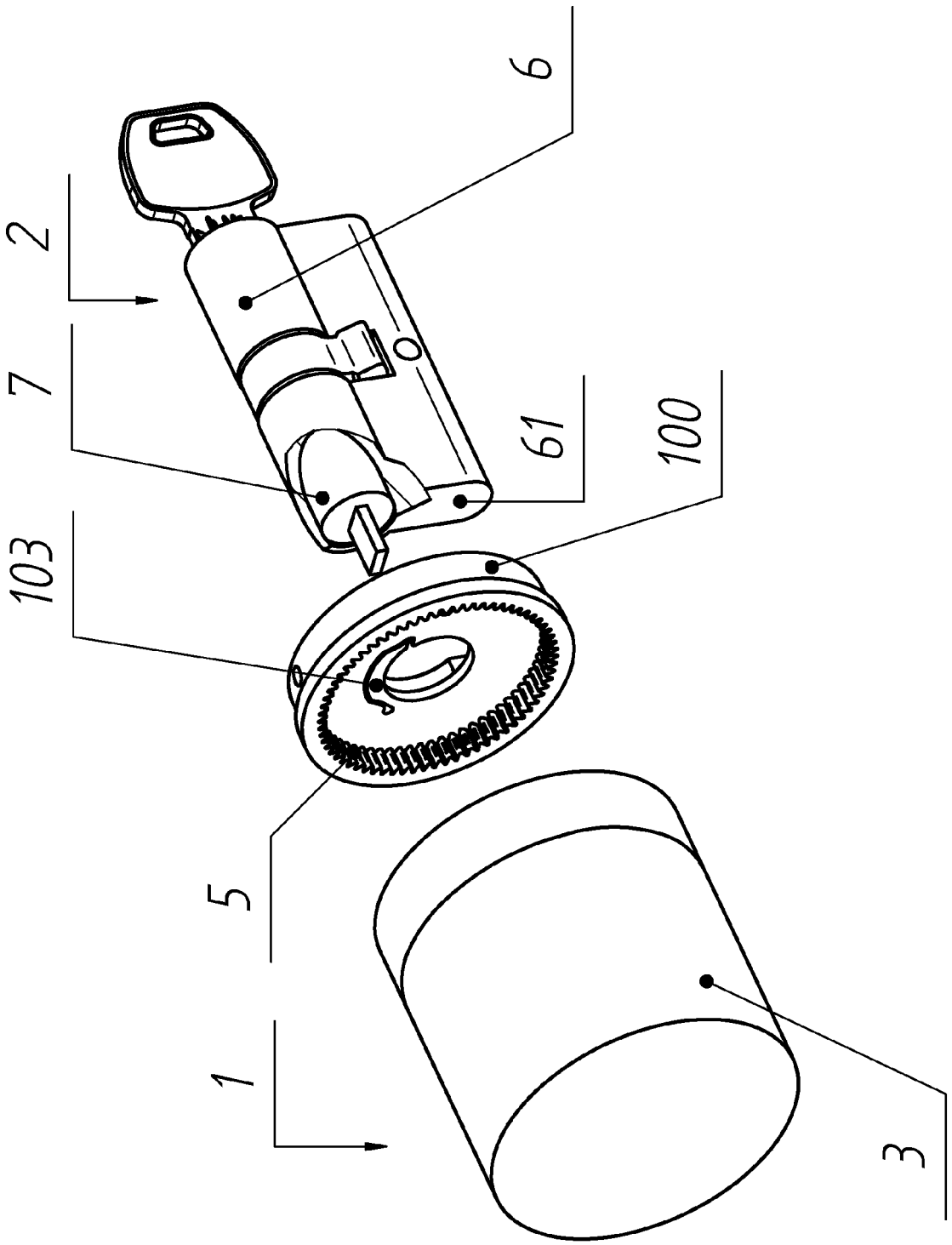

Fig. 6

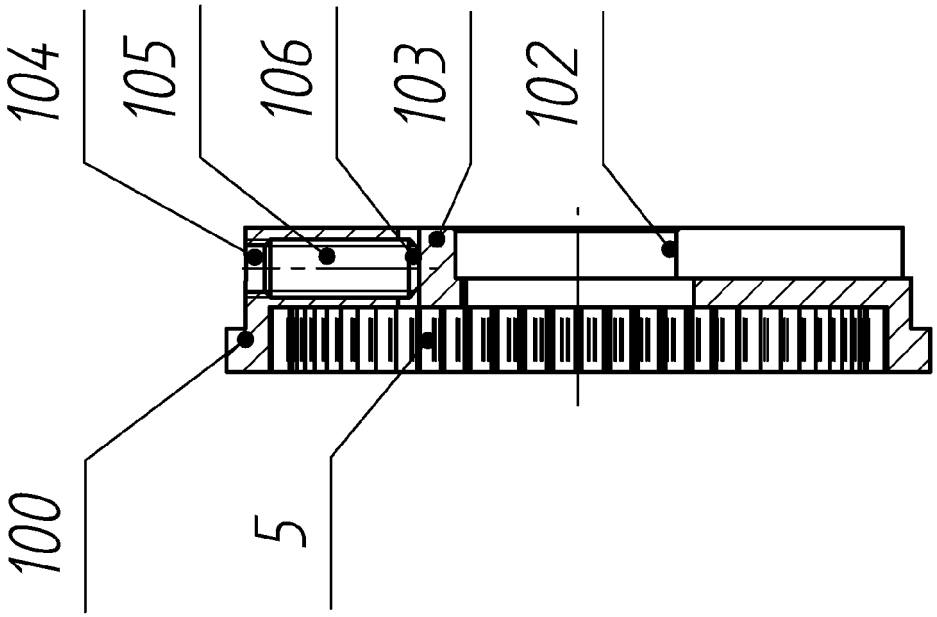

Fig. 7a

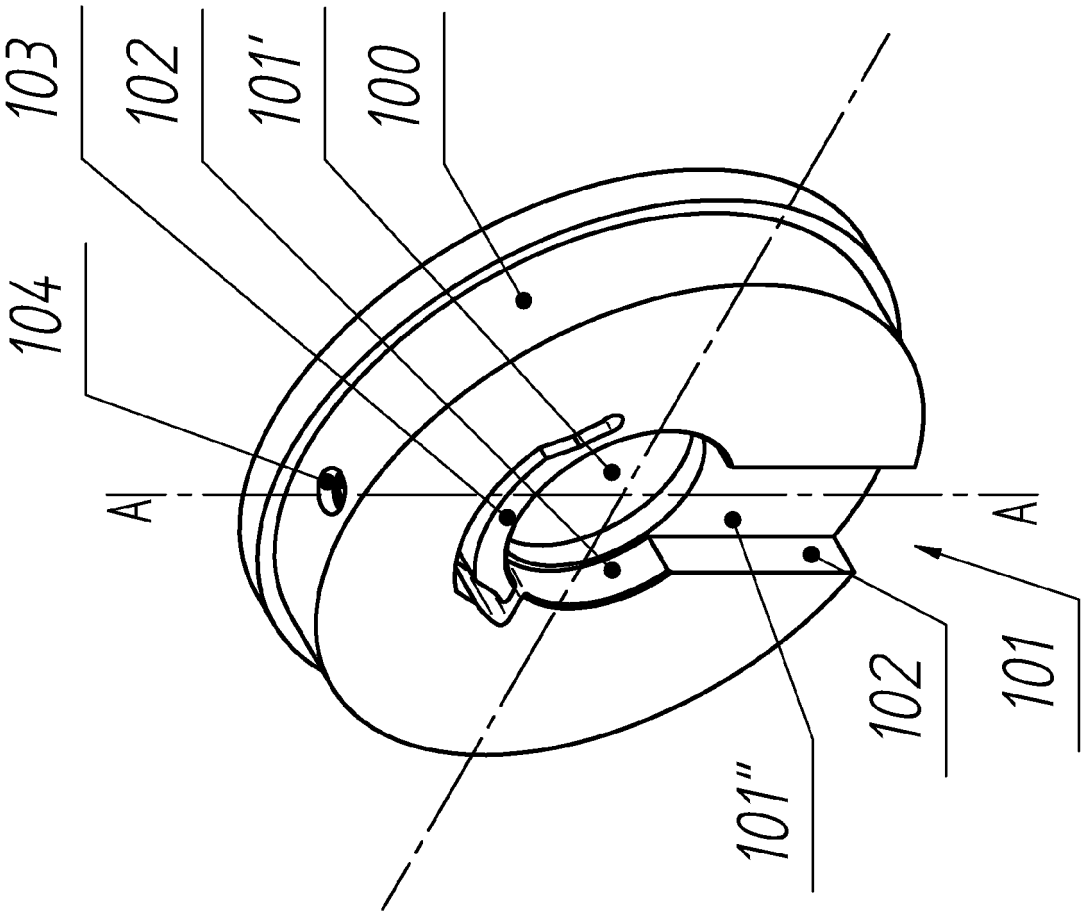

Fig. 7

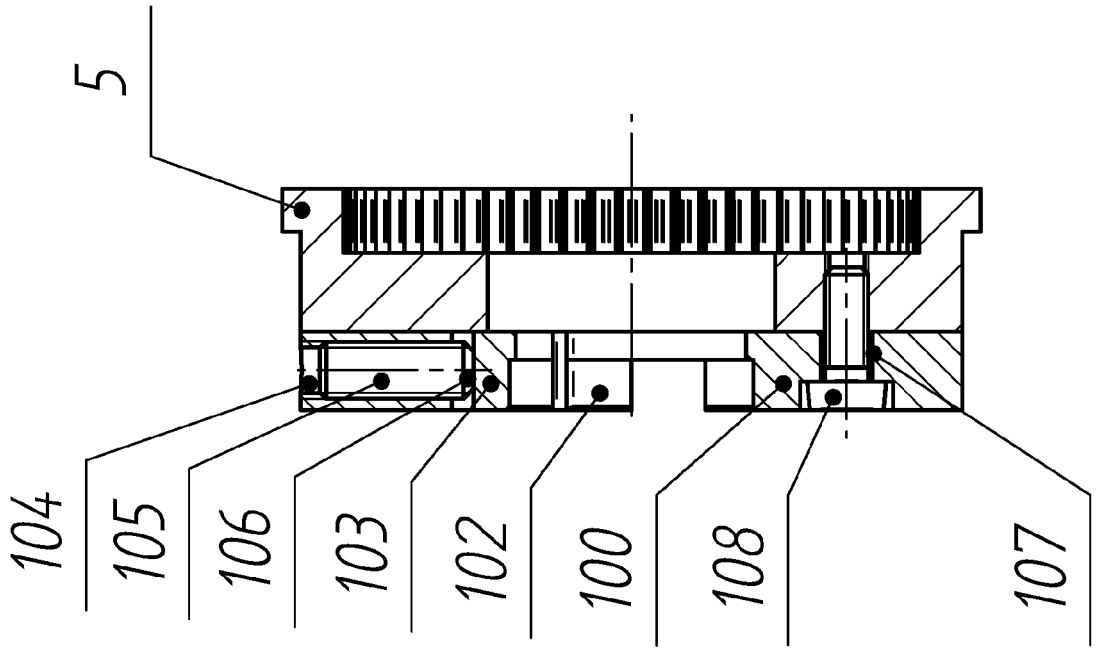
5
104
105
106
103
102
100
108
107

Fig. 8a

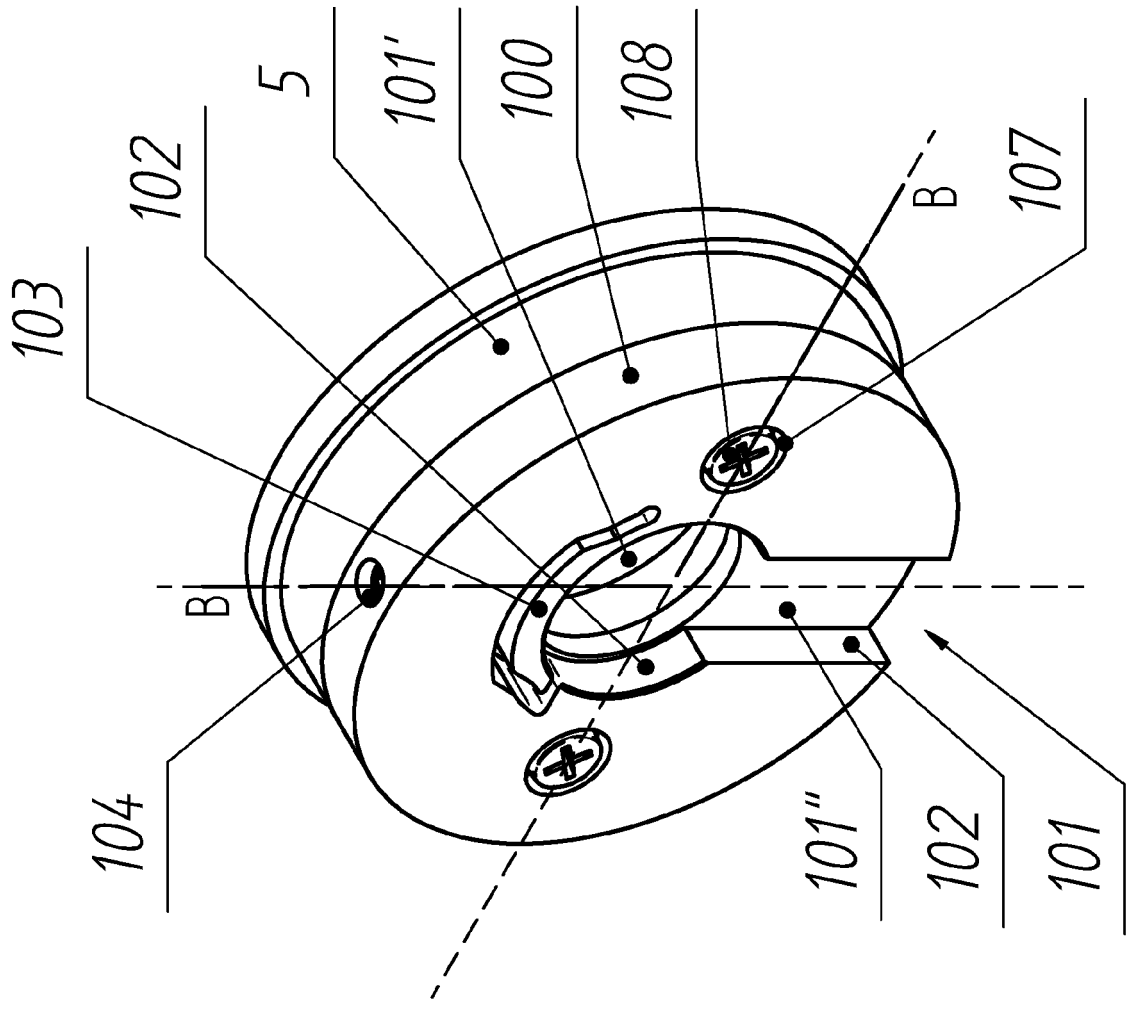
5
101'
100
108
102
103
B
B
107
104
101"
102
101

Fig. 8

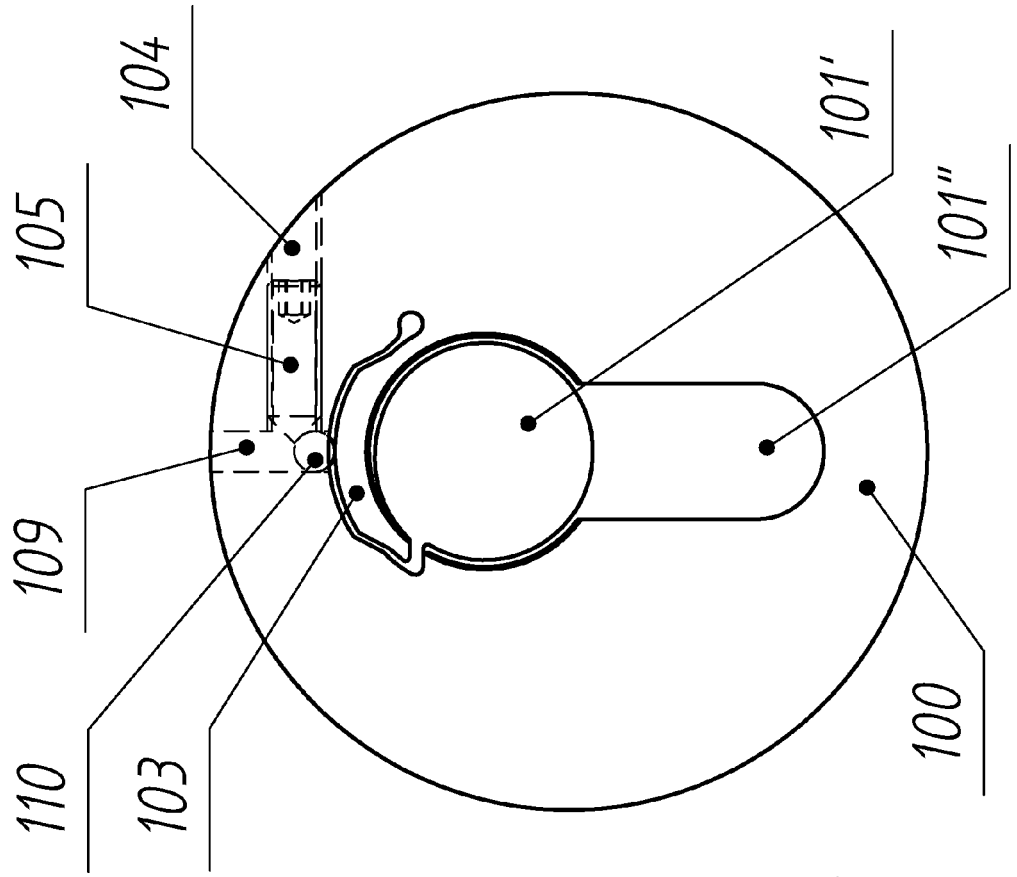

Fig. 9b

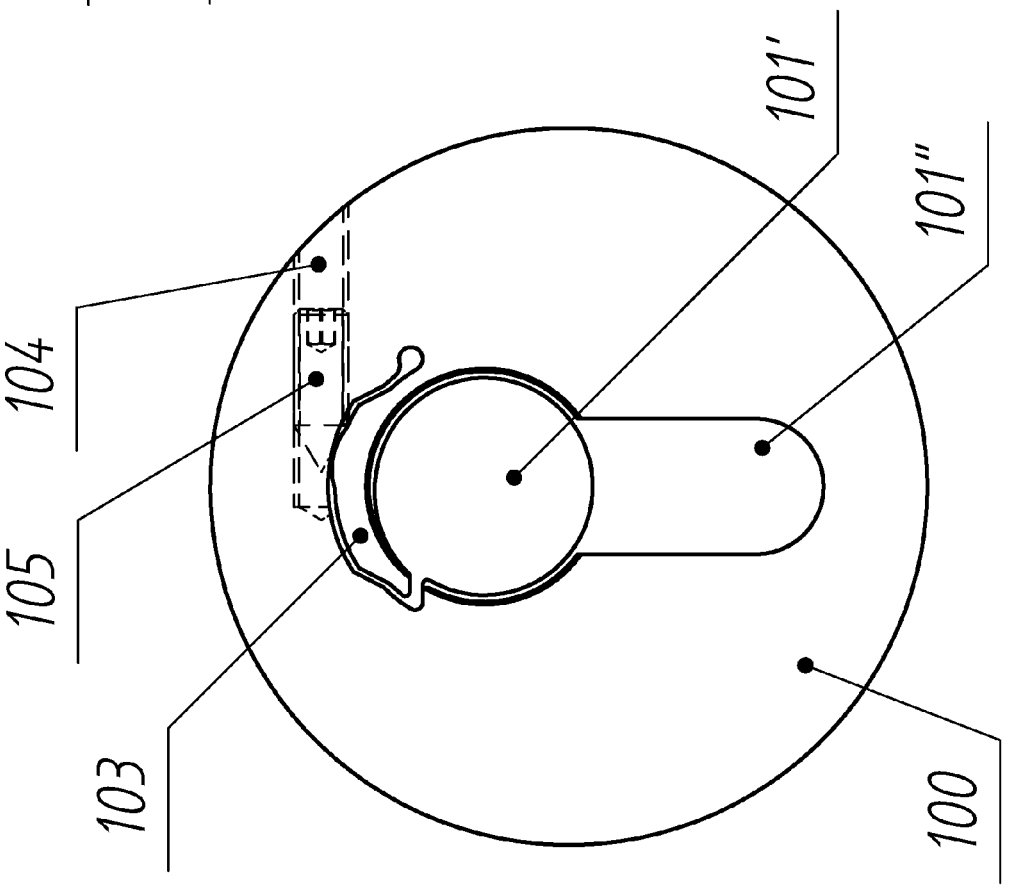

Fig. 9a

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EUROPEAN SEARCH REPORT

Application Number
EP 22 18 4726

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 2019/185417 A1 (SALTO SYSTEMS SL [ES]) 3 October 2019 (2019-10-03) * page 6, line 31 - page 8, line 21; figures 1-8.3 *	1-15	INV. E05B47/00 E05B47/06
A	DE 10 2014 110857 A1 (BASI GMBH [DE]) 4 February 2016 (2016-02-04) * paragraph [0015] - paragraph [0036]; figures 1-7 *	1-15	
A	DE 20 2020 100649 U1 (LITWINSKI ARTUR [PL]) 14 April 2020 (2020-04-14) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 December 2022	Goddar, Claudia

CATEGORY OF CITED DOCUMENTS

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08-12-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019185417 A1	03-10-2019	EP 3775444 A1	17-02-2021
		ES 2725973 A1	01-10-2019
		ES 2901305 T3	22-03-2022
		PL 3775444 T3	31-01-2022
		PT 3775444 T	09-12-2021
		WO 2019185417 A1	03-10-2019
DE 102014110857 A1	04-02-2016	NONE	
DE 202020100649 U1	14-04-2020	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

- WO 2019185417 A1 **[0003] [0014]**
- WO 2017046399 A **[0006]**
- PL P336314 **[0007]**
- DE 102014009826 A1 **[0008]**
- PL P421765 **[0009]**