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(54) **ELECTRIC LOCK**

ELEKTRISCHES SCHLOSS

SERRURE ÉLECTRIQUE

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(74) Representative: **Modiano, Micaela Nadia et al**

Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

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(73) Proprietor: **Cisa S.p.a.**

48018 Faenza (IT)

(72) Inventor: **FUSTINI, Fausto**

48014 Castel Bolognese (IT)

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EP 3 126 596 B1

Description

[0001] The present invention relates to an electric lock.

[0002] In buildings for communities, such as hotels, residences and office buildings for conferences and meetings, the use is known of electrically-actuated locks, which involve the use of a component provided with a code, as an access key.

[0003] The component is generally a card that can contain a microprocessor or be provided with a magnetic strip: in any case its purpose is to store a code associated with the lock to be actuated.

[0004] The door, protected with this type of lock, has in general, on the inner side, a first handle associated with a respective spring latch, which always allows the door to be opened from the inside.

[0005] On the outer side, there is a second handle, which is also associated with a respective spring latch, and a reader that is capable of engaging with the codified component in the user's possession, in order to receive its authorization and enable this second handle and thus the movement of the spring latch.

[0006] In hotels and in commercial premises, however, the service staff are often provided with universal keys that are capable of opening all doors (in order to carry out cleaning work and the like).

[0007] Doors provided with electronic locks thus have, generally, on the inner side, a knob, which is capable of disabling the second handle which is outside the door, so that it is possible to prevent access to the room by the service staff, or by anyone who has an accredited codified key.

[0008] In particular, by rotating the knob in the direction for closing the door the handle is disabled, and in opposite direction the handle is re-enabled.

[0009] This implies that, depending on the direction in which the door is mounted (whether it opens to the right or to the left), two different models of electronic locks or knobs must be provided.

[0010] Furthermore, the devices that make it possible to disable the second, outer handle of the door are generally complex and are constituted by a plurality of components, with consequent higher probability of malfunctioning that, moreover, involves high maintenance costs, because of the need to disassemble and reassemble the various parts, which are often small.

[0011] WO 89/04413 A1 discloses an operating mechanism for a lock of the type comprising a rotatable operating member and a lock member comprises a primary drive gear arranged to be rotated by rotation of the operating member, a driven gear for connection to the lock member, and a transfer gear for transmitting rotary motion from the drive gear to the driven gear. The transfer gear is mounted on a corner plate which rotates with the drive gear when an electromagnet is energised to bring the transfer gear into mesh with the driven gear.

[0012] The aim of the present invention is to solve the above-mentioned drawbacks, by providing an electric

lock that is constituted by a reduced number of components.

[0013] Within this aim, an object of the invention is to provide an electric lock that is highly versatile.

[0014] Another object of the present invention is to provide an electric lock which is low-cost, easily and practically implemented and safe in application.

[0015] In accordance with the invention, there is provided an electric lock as defined in the appended claims.

[0016] Further characteristics and advantages of the invention will become more apparent from the description of a preferred, but not exclusive, embodiment of the electric lock according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a perspective view of the electric lock according to the invention;

Figure 2 is a perspective view of the electric lock, according to the invention, without a covering element;

Figure 3 is a perspective view from the left of the means of mutual decoupling of the electric lock, according to the invention;

Figure 4 is a perspective view from the right of the means of mutual decoupling of the electric lock, according to the invention;

Figure 5 is a front elevation view of the means of mutual decoupling of the electric lock, according to the invention.

[0017] With reference to the figures, the reference numeral 1 generally designates an electric lock provided, on the inner side, with a first handle 2 and with a knob 3.

[0018] On the outer side, the lock is provided with a second handle and with an assembly for reading a codified key.

[0019] Such key is generally a card or pass on which, according to different methods, a code associated with the lock to be actuated, is stored.

[0020] The card can be provided with a microprocessor, or a bar code, or be provided with a magnetic strip.

[0021] The user, by swiping or inserting the codified key in an adapted seat, or simply by bringing it in the proximity of the reading assembly, enables the second handle, and as a consequence the spring latch, thus gaining access to the room.

[0022] In the accompanying figures only the inner side of the lock 1 is shown, the outer side being mirror-symmetrical to the inner side, differing only in the presence of the reading assembly and the lack of the knob 3.

[0023] Such second handle is associated with a respective spring latch, and means of mutual decoupling 4 are interposed between the handle and the spring latch.

[0024] According to the invention, the electric lock 1 comprises a main body 5 provided with a seat 6 for the rotatable accommodation of a transverse shank 7 of the knob 3.

[0025] In particular, the decoupling means 4 comprise a contoured disk 8 which is integral with the knob 3, an idle toothed wheel 9 that is provided with a lower profiled plate 10 that constitutes a cam, and a switch 11 facing the edge 12 of the plate 10.

[0026] The contoured disk 8 comprises a toothing 13 that is distributed over a predefined angle and is coupled removably with respective recesses 14 of the toothed wheel 9.

[0027] The rotation of the knob 3 by the user who is inside the room thus causes the rotation of the disk 8 with consequent entrainment of the toothed wheel 9, limited to the predefined angle of the toothing 13, and orientation of the plate 10 that corresponds to its interference with the button 15 of the switch 11.

[0028] Thus the user, in order to actuate the switch 11 and prevent access to the room by the service staff, or by anyone who has an accredited codified key, can rotate the knob 3 in both directions, obtaining in any case the necessary coupling between the disk 8 and the toothed wheel 9, and orienting the plate 10 so that it can interfere with the button 15 of the switch 11.

[0029] According to a specific embodiment of undoubted applicative interest, which is shown in the accompanying Figures 3, 4 and 5, the contoured disk 8 can be provided with at least two teeth 16 that are arranged over a predefined angle and are coupled removably with respective recesses 14 of the toothed wheel 9.

[0030] The lock 1, according to the invention, can comprise a dynamometric locking device 17 to prevent the accidental rotation of the toothed wheel 9.

[0031] Such device thus prevents an unforeseen rotation, for example owing to the action of the force of gravity on the toothed wheel 9 or on a component connected thereto, such as the knob 3, from causing the actuation of the switch 11, and the consequent inability of the user to access the room.

[0032] It should be noted that the locking device 17 can comprise a pin 18 that is elastically forced on the recesses 14 of the toothed wheel 9 by way of a spring 19 that has an axial action.

[0033] The rotation of the toothed wheel 9 by way of the action of the knob 3 thus causes the retraction of the pin 18 from a recess 14, bypassing of the tooth 20, and insertion in a successive recess 14.

[0034] The elastic action of the spring 19 thus causes the locking of the wheel 9 at applied moments of an intensity lower than a preset value.

[0035] More specifically, the switch 11 is controlled by a mechanical actuator that decouples the second handle from the spring latch.

[0036] In this manner, anyone outside, after the reading and recognition of the codified key by the reading assembly, who tries to lower the handle will not succeed in opening the door, and thus in accessing the room.

[0037] In particular, the plate 10 has a shape that is preferably selected from an ellipsoid, a shape with an eccentric circumference, and the like.

[0038] The mechanical actuator, which decouples the second handle from the spring latch, can be controlled by the assembly for reading a codified key.

5 **[0039]** According to an embodiment of particular practical and applicative interest, the switch 11 disables the reading assembly.

[0040] As a consequence, even if the codified key is correctly read, the reading assembly cannot disable the mechanical actuator, and thus access to the room by the service staff, or by anyone who has an accredited codified key, is in this manner prevented.

10 **[0041]** Furthermore, the lock 1 according to the invention can comprise a signaling device, that can emit a light beam of differing preset color depending on whether the switch is engaged or otherwise.

15 **[0042]** The user, once inside the room, when he or she needs to prevent access thereto by other people, rotates the knob 3, in one direction or the other, until the signaling device emits a light beam of a different and preset color.

20 **[0043]** In this manner, the user will immediately be aware of the condition of access to the room.

[0044] Advantageously, the electric lock 1 is constituted by a reduced number of components.

25 **[0045]** Conveniently the electric lock 1, according to the invention, is highly versatile.

[0046] In fact, independently of the direction in which the door is mounted (whether it opens to the right or to the left), the lock 1 can be mounted without any modification or adaptation being necessary.

30 **[0047]** The knob 3 can rotate in both directions, thus ensuring in any case the necessary coupling between the disk 8 and the toothed wheel 9, and orienting the plate 10 so that it can interfere with the button 15 of the switch 11.

35 **[0048]** The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements as long as they are defined by the appended claims.

40 **[0049]** In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

45 **[0050]** In practice, the materials employed, as well as the dimensions and the shapes, may be any according to requirements and to the state of the art.

50 **[0051]** Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

1. An electric lock provided on the inner side with a first handle (2) and with a knob (3), and on the outer side with a second handle and with an assembly for reading a codified key, interposed between said second handle and a said spring latch means of mutual decoupling (4) being provided, a main body (5) provided with a seat (6) for the rotatable accommodation of a transverse shank (7) of said knob (3), said decoupling means (4) comprising a contoured disk (8), an idle toothed wheel (9), said contoured disk (8) comprising a toothing (13) that is distributed over a predefined angle and is removably coupled with respective recesses (14) in said toothed wheel (9), the electric lock being **characterized in that** said contoured disk (8) is integral with said knob (3), said toothed wheel (9) being provided with a lower profiled plate (10) that constitutes a cam, and the lock further comprising a switch (11) facing an edge (12) of said plate (10), the rotation of said knob (3) determining the rotation of said disk (8), with consequent entrainment of said toothed wheel (9), limited to the predefined angle of said toothing (13), and orientation of said plate (10) corresponding to its interference with a button (15) of said switch (11), wherein said switch (11) disables said reading assembly.
2. The electric lock according to claim 1, **characterized in that** said contoured disk (8) is provided with at least two teeth (16) that are arranged at a predefined angle and are removably coupled with respective recesses (14) of said toothed wheel (9).
3. The electric lock according to claim 1, **characterized in that** it comprises a dynamometric locking device (17) to prevent the accidental rotation of said toothed wheel (9).
4. The electric lock according to claim 3, **characterized in that** said dynamometric locking device (17) comprises a pin (18) that is elastically forced on said recesses (14) of said toothed wheel (9) by way of a spring (19) that has an axial action, the rotation of said wheel (9) by means of the action of said knob (3) causing the retraction of said pin (18) from a recess (14), bypassing of the tooth (20), and insertion in a successive recess (14), the elastic action of said spring (19) causing the locking of said wheel (9) with applied moments of intensity lower than a preset value.
5. The electric lock according to one or more of the preceding claims, **characterized in that** said switch (11) is controlled by a mechanical actuator that decouples said second handle from said spring latch.
6. The electric lock according to one or more of the

preceding claims, **characterized in that** said plate (10) has a shape that is preferably selected from an ellipsoid, a shape with an eccentric circumference, and the like.

7. The electric lock according to claim 5, **characterized in that** said actuator is controlled by said assembly for reading a codified key.
8. The electric lock according to one or more of the preceding claims, **characterized in that** it comprises, on the inner side, a signaling device, said signaling device emitting a light beam of differing preset color depending on whether said switch (11) is engaged or otherwise.

Patentansprüche

1. Ein elektrisches Schloss, ausgestattet an der Innenseite mit einem ersten Griff (2) und einem Knopf (3) und an der Außenseite mit einem zweiten Griff und einem Aufbau zum Lesen eines kodifizierten Schlüssels; wobei zwischen dem zweiten Griff und einer Zungenfeder Mittel (4) zur gegenseitigen Entkopplung angebracht sind; einem Hauptkörper (5), ausgestattet mit einem Sitz (6) für die drehbare Aufnahme eines Querschafts (7) des Knopfs (3); wobei die Entkopplungsmittel (4) eine konturierte Scheibe (8), ein gezahntes Zwischenrad (9), umfassen, wobei die konturierte Scheibe (8) einen Zahnsatz (13) umfasst, der über einen vordefinierten Winkel verteilt und lösbar mit entsprechenden Vertiefungen (14) in dem Zwischenrad (9) gekoppelt ist; wobei das elektrische Schloss **dadurch gekennzeichnet ist, dass** die konturierte Scheibe (8) integral mit dem Knopf (3) ist; wobei das Zwischenrad (9) mit einer unteren profilierten Platte (10) ausgestattet ist, die einen Nocken bildet, und das Schloss weiter einen Schalter (11) umfasst, der einer Kante (12) der Platte (10) zugewandt ist; wobei die Drehung des Knopfs (3) die Drehung der Scheibe (8) bestimmt, mit daraus folgender Mitnahme des Zwischenrads (9), begrenzt auf den vordefinierten Winkel des Zahnsatzes (13), und wobei die Ausrichtung der Platte (10) ihrem Eingriff mit einem Knopf (15) des Schalters (11) entspricht, wobei der Schalter (11) den Leseaufbau deaktiviert.
2. Das elektrische Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die konturierte Scheibe (8) mit mindestens zwei Zähnen (16) versehen ist, die in einem vordefinierten Winkel angeordnet und lösbar mit entsprechenden Vertiefungen (14) des Zwischenrads (9) gekoppelt sind.
3. Das elektrische Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** es eine elektrodynamische Sperrvorrichtung (17) zur Verhinderung der

unbeabsichtigten Drehung des Zwischenrades (9) umfasst.

4. Das elektrische Schloss gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die elektrodynamische Sperrvorrichtung (17) einen Stift (18) umfasst, der von einer Feder (19) mit axialer Wirkung elastisch auf die Vertiefungen (14) des Zwischenrades (9) gedrückt wird, wobei die Drehung des Rades (9) durch die Wirkung des Knopfs (3) den Rückzug des Stifts (18) aus einer Vertiefung (14), die Umgehung des Zahns (20) und das Einführen in eine darauf folgende Vertiefung (14) auslöst; wobei die elastische Wirkung der Feder (19) die Blockade des Rades (9) verursacht, wenn die einwirkenden Momente eine Intensität haben, die unter einem voreingestellten Wert liegt.
5. Das elektrische Schloss gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Schalter (11) von einem mechanischen Betätigungselement gesteuert wird, das den zweiten Griff von der Zungenfeder entkoppelt.
6. Das elektrische Schloss gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Platte (10) eine Form hat, die vorzugsweise gewählt ist aus einem Ellipsoid, einer Form mit exzentrischem Umfang und dergleichen.
7. Das elektrische Schloss gemäß Anspruch 5, **dadurch gekennzeichnet, dass** das Betätigungselement von dem Aufbau zum Lesen eines kodifizierten Schlüssels gesteuert wird.
8. Das elektrische Schloss gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** es an der Innenseite eine Signalvorrichtung umfasst, wobei die Signalvorrichtung einen Lichtstrahl von verschiedener voreingestellter Farbe aussendet, je nachdem, ob der Schalter (11) eingeschaltet ist oder nicht.

Revendications

1. Serrure électrique pourvue, sur le côté intérieur, d'une première poignée (2) et d'un bouton (3), et, sur le côté extérieur, d'une seconde poignée et d'un ensemble pour lire une clé codée, des moyens de découplage mutuel (4) étant prévus intercalés entre ladite seconde poignée et un pêne à ressort, un corps principal (5) pourvu d'un siège (6) pour la réception rotative d'une tige transversale (7) dudit bouton (3), lesdits moyens de découplage (4) comportant un disque à contour façonné (8), une roue dentée montée folle (9), ledit disque à contour façonné (8) comportant une denture (13) qui est répartie sur

un angle prédéfini et est couplée de manière amovible à des évidements (14) respectifs dans ladite roue dentée (9), la serrure électrique étant **caractérisée en ce que** ledit disque à contour façonné (8) est solidaire dudit bouton (3), ladite roue dentée (9) étant pourvue d'une plaque profilée inférieure (10) qui constitue une came, et la serrure comportant en outre un commutateur (11) dirigé vers un bord (12) de ladite plaque (10), la rotation dudit bouton (3) déterminant la rotation dudit disque (8), avec un entraînement conséquent de ladite roue dentée (9), limitée à l'angle prédéfini de ladite denture (13), et l'orientation de ladite plaque (10) correspondant à son interférence avec un bouton (15) dudit commutateur (11), dans laquelle ledit commutateur (11) désactive ledit ensemble de lecture.

2. Serrure électrique selon la revendication 1, **caractérisée en ce que** ledit disque à contour façonné (8) est pourvu d'au moins deux dents (16) qui sont agencées à un angle prédéfini et sont couplées de manière amovible avec des évidements (14) respectifs de ladite roue dentée (9).

3. Serrure électrique selon la revendication 1, **caractérisée en ce qu'elle** comporte un dispositif de blocage dynamométrique (17) pour empêcher la rotation accidentelle de ladite roue dentée (9).

4. Serrure électrique selon la revendication 3, **caractérisée en ce que** ledit dispositif de blocage dynamométrique (17) comporte un ergot (18) qui est élastiquement forcé sur lesdits évidements (14) de ladite roue dentée (9) au moyen d'un ressort (19) qui a une action axiale, la rotation de ladite roue (9) au moyen de l'action dudit bouton (3) entraînant la rétraction dudit ergot (18) à partir d'un évidement (14), en contournant la dent (20), et l'insertion dans un évidement (14) successif, l'action élastique dudit ressort (19) entraînant le blocage de ladite roue (9) avec des moments appliqués d'intensité inférieure à une valeur préétablie.

5. Serrure électrique selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit commutateur (11) est commandé par un actionneur mécanique qui découple ladite seconde poignée dudit pêne à ressort.

6. Serrure électrique selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite plaque (10) a une forme qui est de préférence choisie parmi un ellipsoïde, une forme avec une circonférence excentrique et analogue.

7. Serrure électrique selon la revendication 5, **caractérisée en ce que** ledit actionneur est commandé par ledit ensemble de lecture d'une clé codée.

8. Serrure électrique selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comporte, sur le côté intérieur, un dispositif de signalisation, ledit dispositif de signalisation émettant un faisceau lumineux de couleur préréglée différente en fonction de si ledit commutateur (11) est enclenché ou non.

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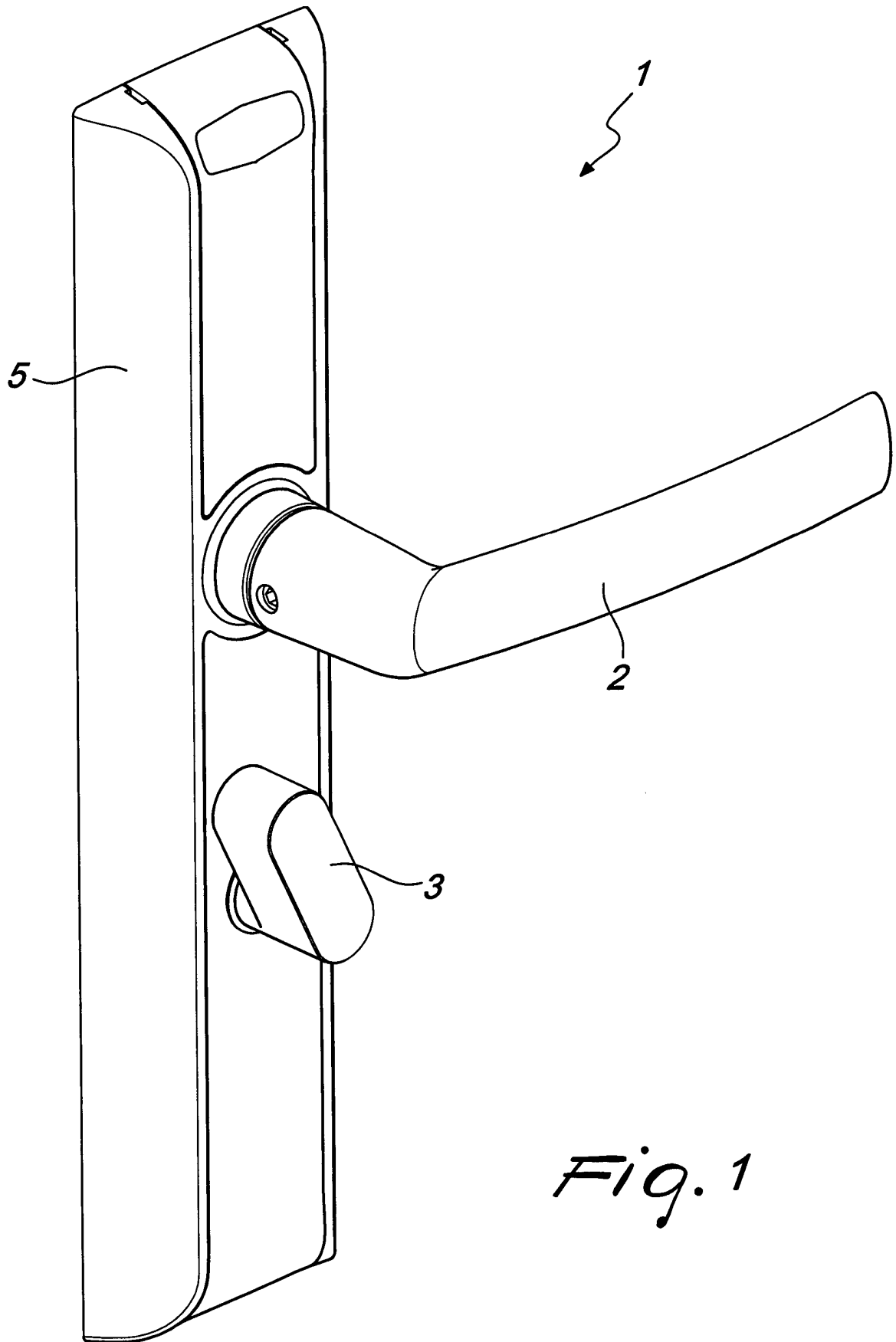


Fig. 1

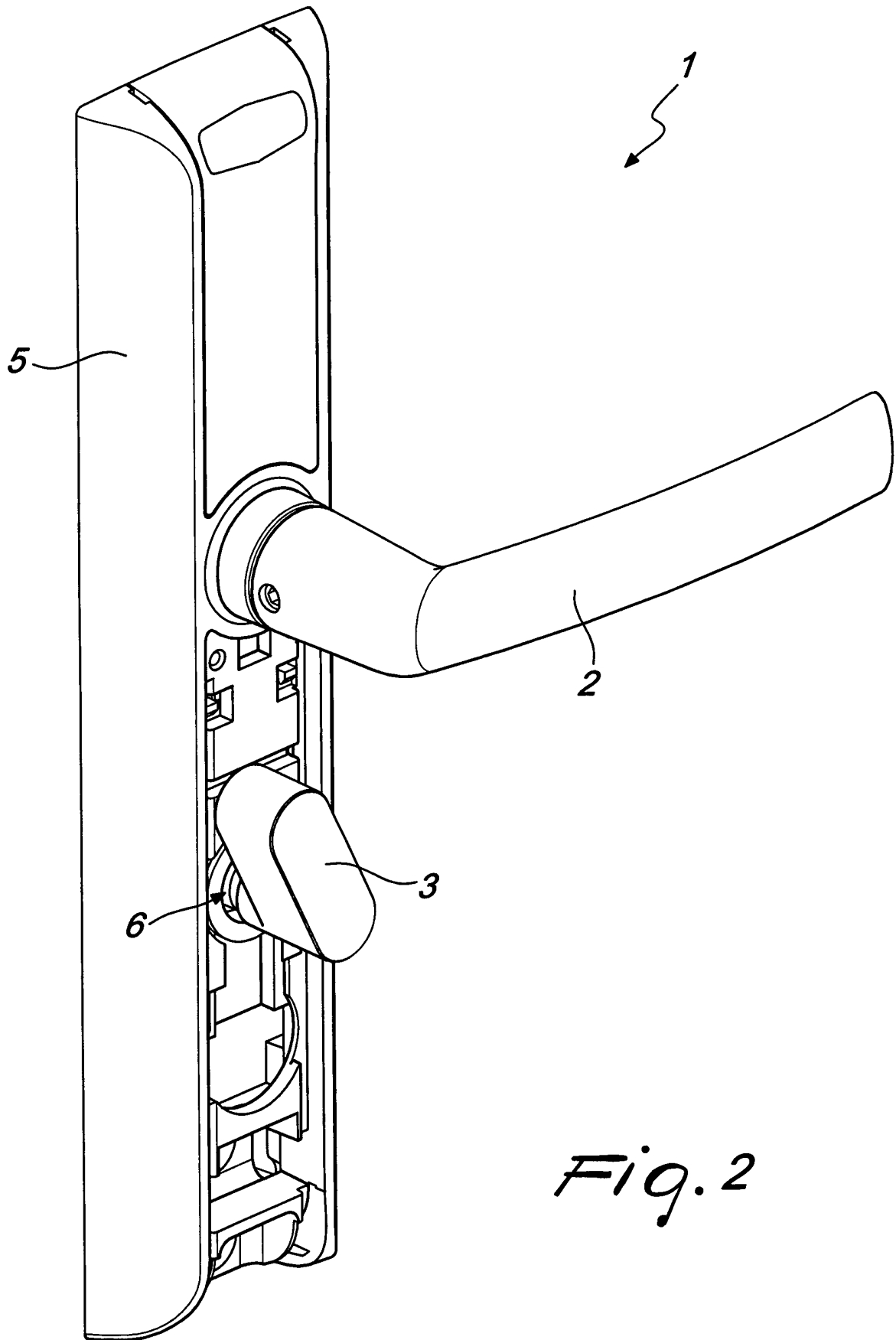


Fig. 2

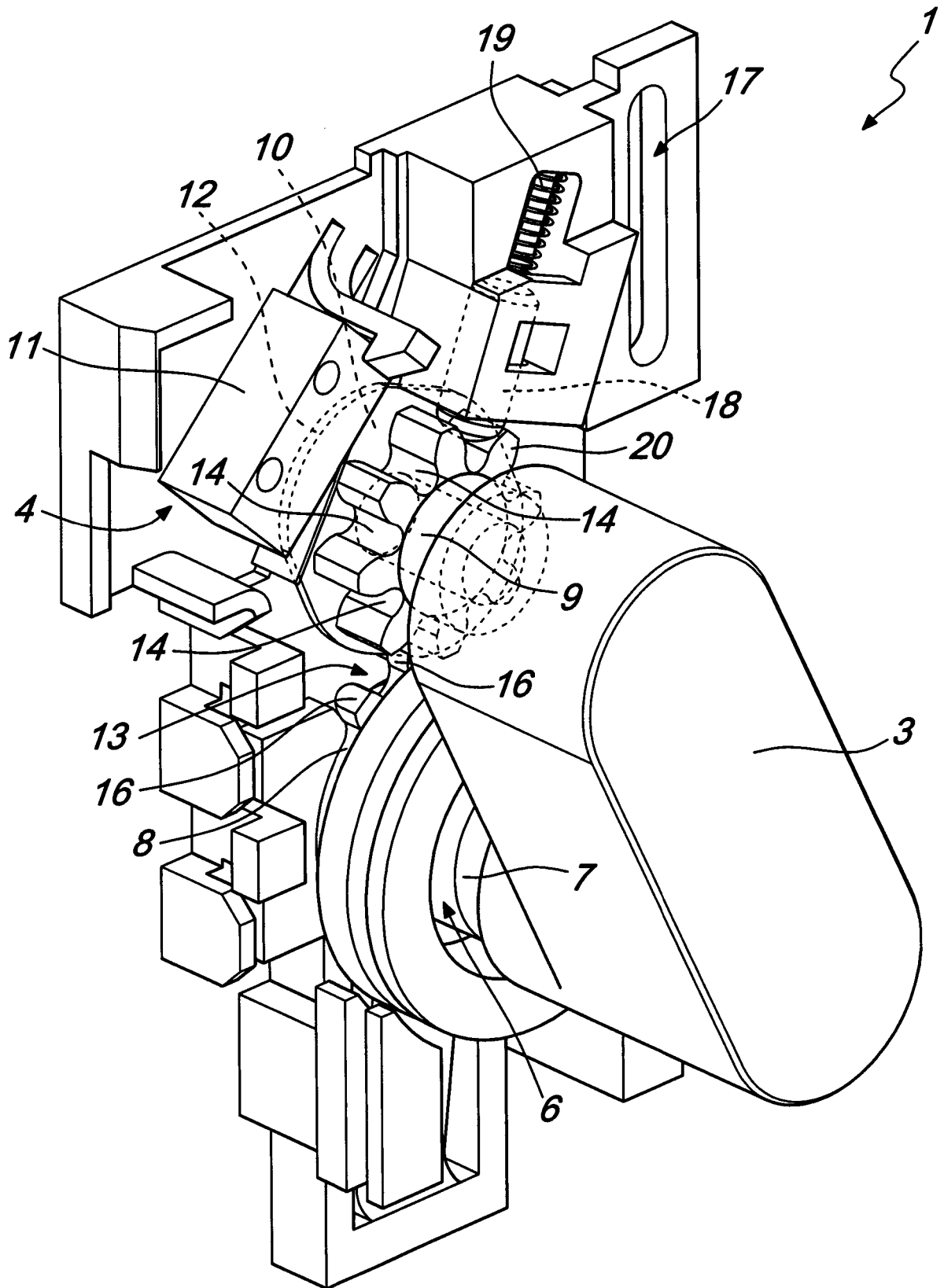


Fig. 3

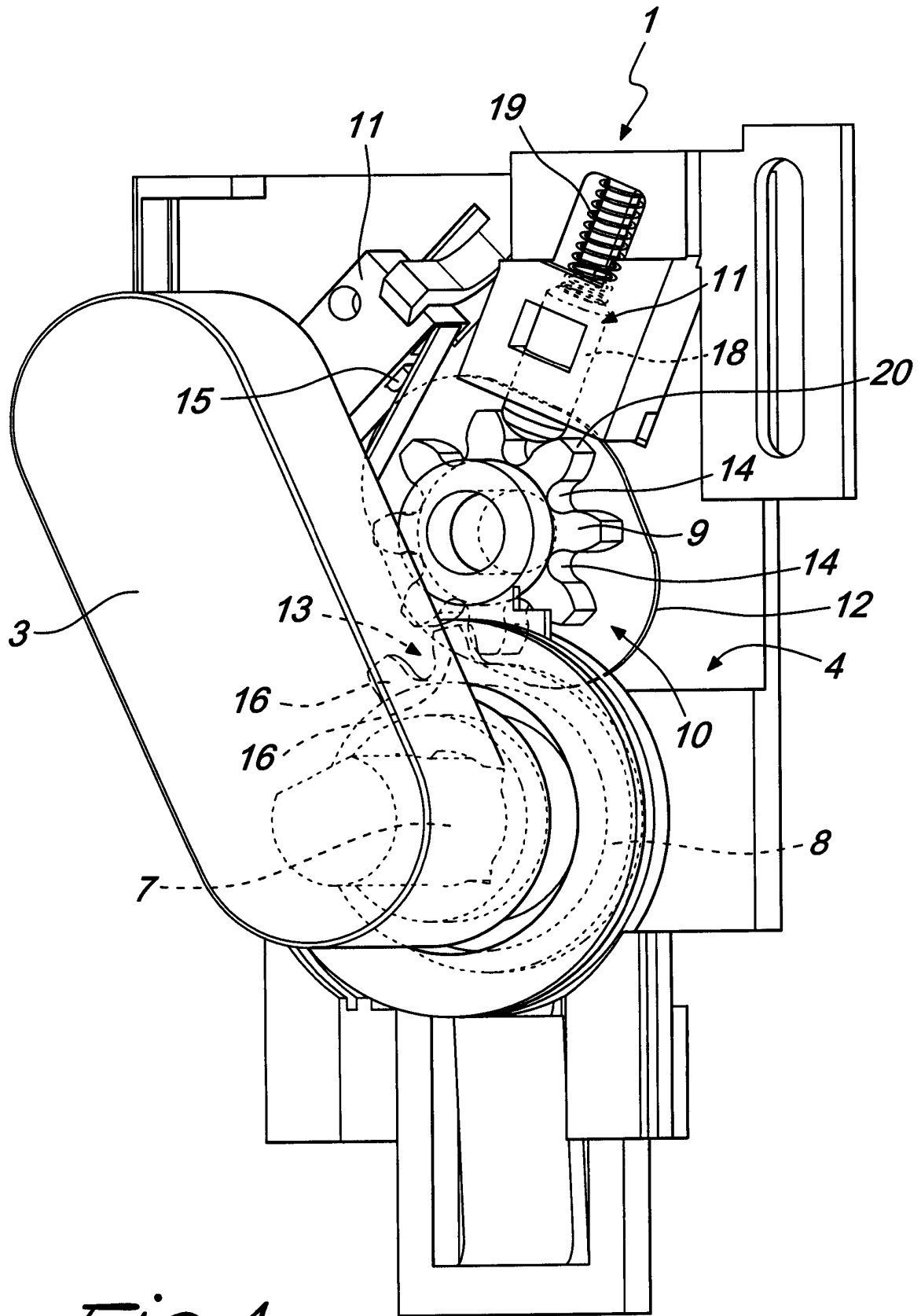


Fig. 4

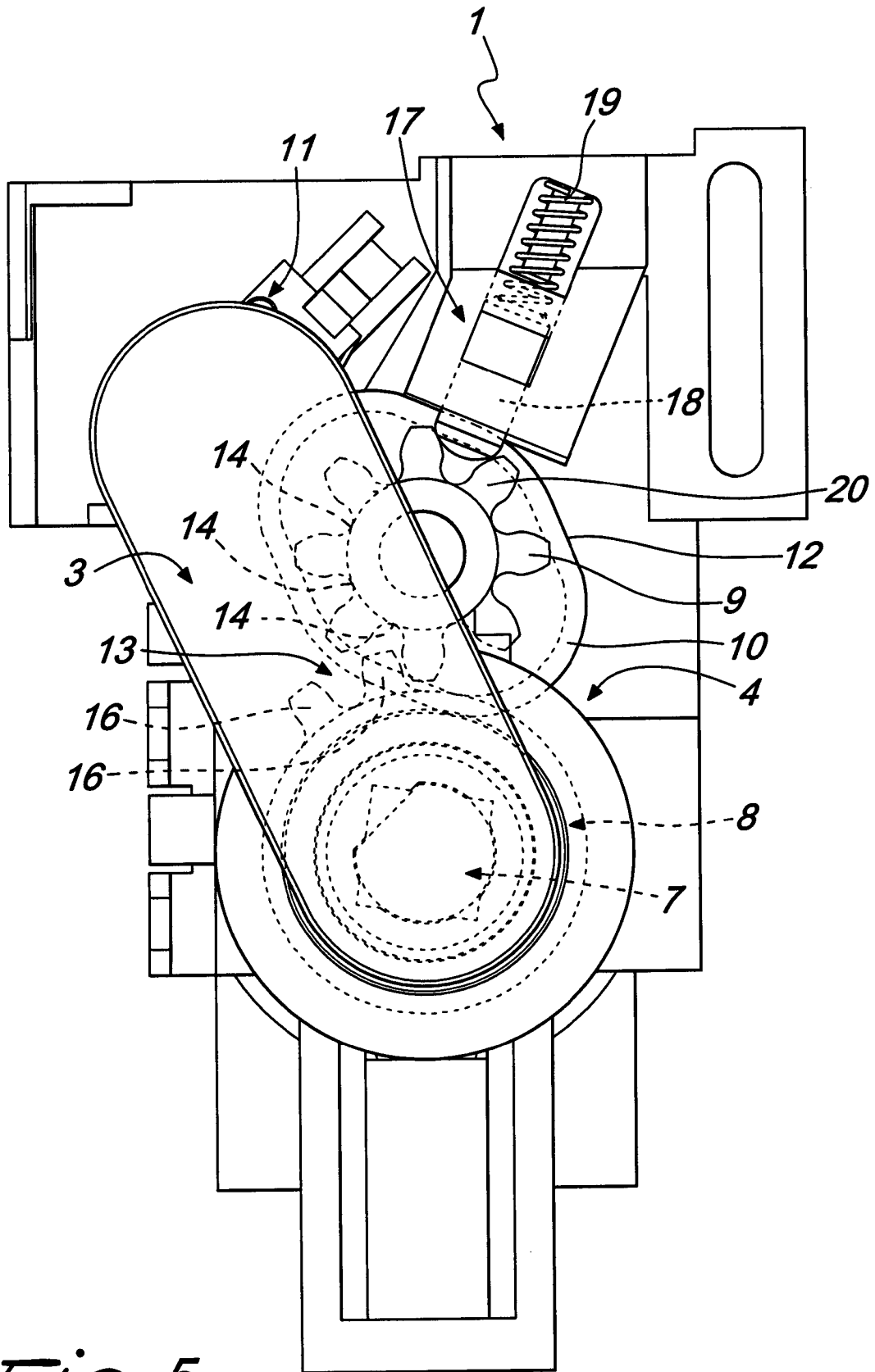


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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