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(54) LOCK UNIT FOR DOORS AND WINDOWS

(57) A lock unit (1) for doors and windows, such as roller shutters, up-and-over doors, grills and other closing elements, comprises a first drive member (2) and a second (3) drive member that are movable along respective projecting/retracting (DI, DII) directions with respect to a box body (4) of the lock unit (1), the first drive member (2) and second drive member (3) being connectable to respective bolts to be driven to engage with, disengage from, respective locking seats provided on a wall or on a fixed counterframe; a control element (5) suitable for coupling with a rotatable handle to move the first (2) and second (3) drive members in the aforesaid projecting/retracting (DI, DII) directions; transmitting means (T) for transmitting a movement of the first (2) and second (3) member for driving the bolts, configured for transforming rotation of the control element (5) into linear movement of the first (2) and second (3) drive members in the projecting/retracting (DI, DII) directions; a seat (6) shaped for housing a lock cylinder (C) for key locking the lock unit (1); a control device (W) is provided that is activatable by the lock cylinder (C) and configured for enabling the rotation of said handle in a first rotation direction only as far as the cylinder (C) is taken, by the respective key (K), to a first angular position, on the other hand impeding, in this first angular position, the rotation of the handle in a second rotation direction opposite the first rotation direction; the control device (W) enables the rotation of the handle in the second rotation direction only as far as the cylinder (C) is taken, by the key (K), to a second angular position, preventing, in this second angular position, the rotation of the handle in the first rotation direction.

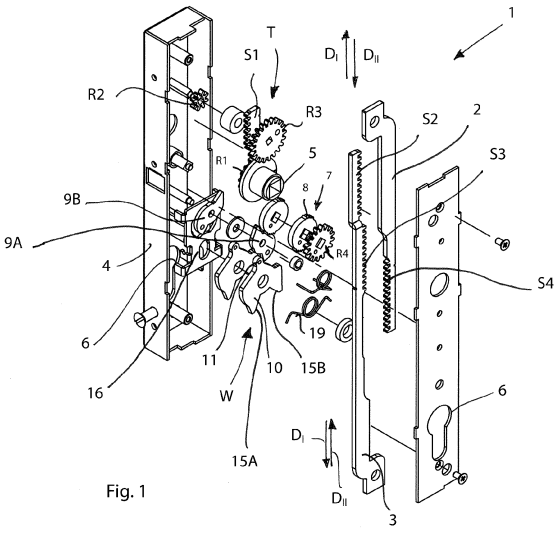

Fig. 1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a lock unit for closing elements in general, such as roller shutters, up-and-over doors, security grills, gates and other doors and windows.

PRIOR ART

[0002] Locks for doors and windows are known that enable, for example, a roller shutter, or an up-and-over door or a security grill or a gate or the like to be opened and closed by acting on appropriate handles coupled therewith.

[0003] A known lock, for example for a security grill, in addition to the manually drivable handle, also comprises a cylinder, which is drivable by a dedicated key, for immobilizing, i.e. key locking, the grill in the locked position.

[0004] A lock of this type generally comprises internally a transmission mechanism that enables the movement of the handle to be transferred to the bolts, which are slidable respectively in a zone placed above and in a zone placed below the lock, in the case of a grill. The transmission mechanism transforms a rotation of the handle in a linear movement, in mutually opposite directions, of the two bolts that in such a manner can engage with an upper engaging seat and a lower engaging seat, obtained on the opposite stationary upper and lower crosspieces, of the counterframe of the door or window.

[0005] When key locking of the grill is required, the user has to bring the grill up to the counterframe, rotate the handle to the locked position, and drive, by the respective key, the cylinder to a first angular key locking position. By doing so, the handle remains immobilized, preventing accidental opening of the grill both from the inside and the outside (in the case of the presence of handles on both sides) thus preventing any undesired intrusion from the outside.

[0006] In order to release the security grill, the user has to act, by the key, to rotate the cylinder to a second angular release position. After key unlocking, the handle can be freely rotated in one or the other direction, to close or open the grill, without obviously key locking it. One limit of this lock is that, in certain circumstances, the possibility of rotating the handle freely to close or open the grill, without being in possession of the key for the cylinder, can lead to undesired situations.

[0007] Let the case be considered for example of a grill that places a garden or a balcony in communication with the interior rooms of a dwelling, assuming that the grill is provided with a handle only on the inner side.

[0008] If the key of the lock remains inside the house, a child could for example become separated from his or her family members located outside and lock himself or herself inside the house unbeknownst to the family members, who are thus not able to access the house. Similarly, an undesired result would be obtained if, instead of child, an ill-intentioned person got locked inside the house.

[0009] Another example follows that shows the drawbacks of the lock described above. Consider, for example, the applicational context of a sports facility, for example a soccer pitch with changing rooms to which access from the pitch is possible via a door or security grill provided with a handle only on the inside, and with a key lock cylinder.

[0010] The key is generally in the hands of the caretaker looking after the facility who, in the normal course of sporting activities may not necessarily be near the changing rooms but be elsewhere to perform other duties or tasks. Also in this case, an individual, acting innocently, or worse, with ill intent, although not possessing the key, would have the possibility of locking the grill by acting only on the handle, blocking the user players on the pitch and preventing the user-players from accessing the changing rooms.

[0011] Another interesting case is that of the motor-driven roller shutter of a shop. The roller shutter can be raised and lowered by driving a suitable motor with which the roller shutter is fitted. The roller shutter is immobilized in the locked position by acting manually on a handle with which a key lock cylinder is also coupled.

[0012] Before driving the motor, it is necessary to make sure that the bolts are disengaged from the respective seats provided on the wall, to prevent the motor getting strained and damaged. At this point, if the manager of the shop needs to leave the shop for a few minutes, he or she can simply lower the roller shutter without using the handle positioned externally. In this case, although the bolts are not engaged in the seats, the motor brake ensures a certain resistance to an unauthorized attempt at opening by manual lifting of the roller shutter. If in the meantime another individual, who can also be a colleague acting in good faith or another person wanting to pay a practical joke, acts on the handle to engage the bolts in the respective seats (and can do so without having to use the key), the undesired damage event indicated above can occur. In exact terms, the manager, upon returning from the break, remembering that he or she had not used the handle and thus thinking that the bolts are disengaged from the seats, will activate the motor directly, which at this point will be subjected to strain with the risk of damage.

[0013] Basically, there are innumerable other practical situations in which the above lock has drawbacks and limits to use like the practical cases exemplified above.

[0014] The further limits set out below are added to the aforementioned limits.

[0015] In certain cases, the operations of installing a grill or a roller shutter, or another closing element may not be performed correctly, or may be difficult because of the particular conformation of the walls on which to install the door or window, this resulting in assembly precision levels that are hardly satisfactory. There may thus

be very pronounced clearances and gaps between the movable closing element (the door or grill etc ...) and the fixed part to which it is movably connected (counterframe or portion of masonry). In particular, in the case of a grill, there could be a significant clearance or gap between the horizontal uprights of the grill and the crosspieces of the accommodating counterframe. In this case, the projecting stroke of the bolts could be insufficient to achieve engagement with the respective locking seats, or at least, whilst reaching these seats, the required degree of penetration and engagement in the seats would not be ensured, the security requirement of the window or door being thus prejudged.

[0016] EP1321613 discloses lock device, particularly for windows or doors.

[0017] FR2423610 discloses a casement lock for French windows.

[0018] In the light of what has been disclosed above, ample room for improvement on the currently available known locks is noted.

OBJECTS OF THE INVENTION

[0019] The object of the present invention is to improve currently used locks.

[0020] Another object of the present invention is to provide a new and different solution for a lock that is able to overcome the aforementioned limits and drawbacks.

[0021] In particular one object is to provide a lock unit that is so configured as to prevent the undesired situations referred to above. More precisely, the intention is to provide a technical solution by means of which the user of the lock unit always has the certainty and security that the lock unit is and remains in the operating state (key locked position, unlocked position) set by the user by the key, preventing the handle associated therewith from being able to be rotated freely from one operating position to another position by a user who is not in the possession of the key. The object is thus to provide a lock unit configured in such a way that each change of position of the handle/s requires, to be actuated, preliminarily a corresponding enabling action that is achievable only by the aforesaid key.

[0022] A further object is to provide a lock unit with increased levels of security, with particular reference to the projection stroke of the bolts that engage in the respective locking seats.

[0023] In particular, it is desired to provide a technical solution that facilitates assembly operations, compensating to a greater extent any problems of positioning, mechanical gaps and the shortcomings at the level of precision in the assembly of doors and windows.

[0024] A still further object is to provide a lock unit that despite having compact dimensions and being simplified from the constructional point of view enables high bolt excursion values to be provided to thus ensure increased levels of security in the action of shutting the doors and windows.

SHORT DESCRIPTION OF THE INVENTION

[0025] The present invention thus aims to achieve the aforesaid objects and overcome the drawbacks of conventional locks for doors and windows by a solution according to claim 1.

[0026] In particular, according to present invention, a lock unit for doors and windows is provided, comprising:

- a first drive member and a second drive member that are movable along respective projection/retraction directions with respect to a box body of said lock unit, each said first drive member and second drive member being suitable for being connected to, and moving a respective bolt so as to engage the bolt with and disengage the bolt from, a respective immobilizing seat provided on a wall or on a fixed counterframe,
- a control element suitable for coupling with a rotatable handle to move said first member and second drive member in said projection/retraction directions,
- transmitting means for transmitting a movement of said first member and second member for driving the bolts, said transmitting means being configured for transforming a rotation of a control element in a linear movement of said first drive member and second drive member in said projection/retraction directions,
- a seat shaped for housing a lock cylinder for key locking said lock unit,
- a control device that is activatable by said lock cylinder and configured for enabling the rotation of said handle in a first rotation direction only by as much as said lock cylinder is taken, by the respective key, to a first angular position, on the other hand preventing , in this first angular position of the key, the rotation of said handle in a second rotation direction opposite said first rotation direction,
- said control device being configured for enabling the rotation of said handle in said second rotation direction only by as much as said lock cylinder is taken, by the respective key, to a second angular position, preventing, in this second angular position of said key, the rotation of said handle in the first rotation direction.

[0027] Owing to the invention, all the limits of prior-art locks are overcome and the objects set out above are achieved.

SHORT DESCRIPTION OF THE DRAWINGS

[0028] The invention and a possible embodiment thereof will be disclosed below with reference to the attached drawings, in which:

Figure 1 is an exploded view of the lock unit according to the invention;

Figures 2 and 3 are two different perspective views of the lock unit in which the inner components are visible;

Figures 4 and 5 are further perspective views that show, from another side, the inner components of the lock unit according to the invention;

Figures 6 to 10 show, in different views, a control device with which the lock unit is provided;

Figures 11 to 15 show the lock unit, devoid of the box body, in different operating positions.

DETAILED DESCRIPTION OF THE INVENTION

[0029] With reference to the attached figures, a lock unit 1 according to the invention is disclosed below that is suitable for being fitted to a door or window in general, such as a roller shutter, an openable security grill, a gate, an up-and-over door, a sectional door and other possible closing elements.

[0030] The lock unit 1 is of the type comprising a cylinder C drivable by a respective key K, from the inside and/or the outside with respect to a room that is accessible through the door or window.

[0031] With the lock unit 1, a handle is couplable, for example only on the side inside the room, or also on the side of the door or window outside the room.

[0032] The lock unit 1 comprises a box body 4 inside which the various mechanical components are enclosed.

[0033] The lock unit 1 comprises a first drive member 2 and a second drive member 3 that are movable along respective projection directions D_I, and along respective retraction directions D_{II} for retracting with respect to the box body 4. The first drive member 2 and the second drive member 3 have, in particular, an elongated shape, more precisely a shaped bar shape, and are shaped to be connected to respective lock bolts, or bolts, that can be moved to engage with and disengage from, respective locking seats, provided on the masonry parts or on the fixed counterframe to which the door or window is fixed movably.

[0034] The lock unit 1 is provided with a control element 5 suitable for coupling with a rotatable handle to move the aforesaid first member 2 and second drive member 3, and thus the respective bolts, in the projecting/retracting DI, DII directions. In the case of a roller shutter, or also of an up-and-over door, the projecting/retracting DI, DII directions are horizontal directions, whilst in the case of a gate, grill, or the like, the projecting/retracting DI, DII directions are vertical directions.

[0035] The control element 5, in particular, is shaped with a toothed wheel part and another disk-shaped part and has centrally a hole of square section that is suitable for coupling with a square pin that is connectable to the handle/s.

[0036] The lock unit 1 includes transmitting means T for transmitting a movement of the first member 2 and second member 3 to drive the bolts.

[0037] The transmitting means T is configured for transforming rotation of the control element 5 into linear movement of the first member 2 and second drive member 3 in the aforesaid projecting/retracting (DI, DII) directions. Below, the transmitting means T will be disclosed in greater detail.

[0038] The lock unit 1 comprises a seat 6 shaped for housing the lock cylinder C for key locking the lock unit 1.

[0039] In the lock unit 1, a control device (W) is provided that is activatable by the cylinder C and configured for enabling rotation of the handle/s in a first rotation direction only as far as the cylinder C is taken, by the respective key K, in a first angular position, on the other hand impeding, in this first angular position of the key K, rotation of the handle/s in a second rotation direction opposite the aforesaid first rotation direction.

[0040] The control device W is configured for enabling rotation of the handle/s in the aforesaid second rotation direction only by as far as the lock cylinder C is taken, by the respective key K, in a second angular position, preventing, in this second angular position of the key K, the rotation of the handle in the first rotation direction.

[0041] The control device W comprises a ratchet mechanism (7, 8, 9) configured for enabling/disabling rotation of the aforesaid control element 5 in function of the angular position in which the lock cylinder C is rotated. The control device W will be disclosed in greater detail below.

[0042] The aforesaid transmitting means comprises toothed wheel means R and rack means S cooperating together to transmit movement from the control element 5 to the first member 2 and second drive member 3 (bar members shaped for the lock bolts) to move the bolts.

[0043] The aforesaid toothed wheel means R comprises a first toothed wheel R1, which is integrally connected to or wholly obtained on, the aforesaid control element 5 that engages with a first rack S1 of the aforesaid rack means S. The first rack S1 engages with a second toothed wheel R2, coaxially connected integrally to a third wheel R3, or obtained completely, together with the latter, from a single piece.

[0044] The third wheel R3 engages with a second rack S2 obtained on the second drive member 3 on which a third rack S3 is also obtained engaging with a fourth toothed wheel R4 that is coaxial and rotationally integral with the aforesaid wheel means R3 of the ratchet mechanism.

[0045] The fourth toothed wheel R4 engages, on a side opposite the third rack S3, with a fourth rack S4 obtained on the first drive member 2, so that a linear movement of the second drive member 3 is matched by an identical movement, but in the opposite direction, of the first drive member 2.

[0046] During operation, a rotation of the handle, and thus of the control element 5 to which the first wheel R is integrally connected, causes movement of the first rack S1, which in turn rotates the second wheel R2. The third wheel R3, which is rotationally integral with the second wheel R2, moves the second rack S2 (obtained on the

second drive member 3) in a direction opposite the movement of the first rack S1. Owing to a suitable and well-studied configuration of the wheels R1, R2, R3 the desired movement values of the first rack S1 and of the second rack S2 are obtained. In particular, owing to a suitable choice of the ratios between the radii of the first wheel R1 and of the second wheel R2, and also between the second wheel R2 and the third wheel R3, amplification is advantageously obtained of the movement of the second rack S2 compared with the rotation of the control element 5. In other words, advantageously, a small rotation of the handle is matched by a significant stroke of the drive member 2, and also, as is shown by the following description, of the drive member 3 in the opposite movement direction. This clearly translates into a significant projection stroke of the bolts in opposite directions.

[0047] The movement of the second rack S2, i.e. of the second drive member 3, entails movement of the third rack S3 (fully obtained on the second drive member 3) which thus rotates the fourth wheel R4 which engages, on the diametrically opposite side, with the fourth rack S4 obtained on the first drive member 2. It is thus clear that a rotation of the fourth wheel R4 simultaneously moves by the same amount, but in opposite directions, the first drive member 2 and the second drive member 3.

[0048] The transmitting means T, in the combination thereof, are so configured that the first 2 and second drive members 3, and thus the respective bolts, have a projection stroke of at least 35 mm. In particular, in one embodiment, this stroke is equal to about 50 mm.

[0049] This projection stroke, which is noticeably greater than the usual approximately 25 mm of conventional locks, enables higher levels of security to be obtained, owing to a greater length of engagement of the bolts in the respective seats.

[0050] Further, owing to the configuration according to the invention, possible clearances or gaps between the door or roller shutter and the corresponding counterframe are compensated more easily. In other words, in the case of an installation of the door or window that is not completely correct, in which there is greater distance between the engaging seats for the bolts and the outer ends of the bolts, owing to the lock unit thus configured according to the invention, correct operation would not be compromised during the locking step: the significant projection extent of the bolts would anyway ensure, even in the presence of significant separation spaces between the movable part and fixed part of the door or window, the correct and secure engagement with the fixed locking seats.

[0051] Further, another advantage of the lock unit 1 is provided by the particular configuration of the rack system S1, S2, S3, S4, in particular owing to the doubling of the first rack S1 with respect to the first drive member 2, which enables significantly reduced overall dimensions to be obtained, above all in the width of the box body 4, and a significant excursion of the bolts.

[0052] The aforementioned control device W is now disclosed in greater detail.

[0053] The ratchet mechanism, which is part of the aforesaid control device W, comprises a wheel 7 provided with toothed portions 8 and engaging lever means 9 configured for engaging with the toothed portions 8 to prevent a rotation of the wheel 7 in a determined rotation direction.

[0054] The toothed portions 8 can affect, only extend along one or more arch portions of the circular edge of the wheel 7, or in an equivalent manner, can extend along the entire round angle of this peripheral circular edge of the wheel 7.

[0055] In particular, the engaging lever means comprises a pair of lever elements 9A, 9B which are rotatable around the same axis A2 with respect to one another and are mutually connected by a return spring element 20.

[0056] When the lever element 9A is engaged with a toothed portion 8, it exerts a blocking action on the wheel 7, preventing the latter from rotating in the first direction Z1 indicated in Figure 9.

[0057] When the other lever element 9B is engaged with a toothed portion 8, the other lever element 9B exerts a blocking action on the wheel 7, preventing the latter from rotating in the second rotation direction Z2 indicated in Figure 9.

[0058] The control device W comprises a rocker element 10, oscillating around an axis A1, which is rotatable by the bit element 12 of the cylinder C and configured for rotating the pair of engaging levers 9A, 9B in a determined rotation direction according to the rotation that is given with the key K, so as to prevent the rotation of the wheel 7 in the one or the other rotation direction.

[0059] The rocker element 10 is provided with a driving end 11 shaped for selectively coming into contact with, and pushing, a first abutting surface 13 or a second abutting surface 14 each obtained on a respective engaging lever 9A, 9B.

[0060] The driving end 11 alternatively comes into contact with the first abutting surface 13 or with the second abutting surface 14 in function of the rotation of the cylinder C, to prevent rotation of the wheel 7 in one or the other rotation direction.

[0061] The rocker element 10 comprises a scissor-shaped activating end 15, having two protrusions 15A, 15B that are mutually spaced apart and arranged for receiving a thrust action from the bit element 12 of the cylinder C for rotation, respectively, in one direction or in the opposite direction.

[0062] The control device W includes a locking slide element 16, slidable parallel to the aforesaid projecting/retracting DI, DII directions between a stop position, in which it is nearer to the cylinder C, and a release position, in which it is further from the cylinder C.

[0063] The locking slide element 16 is configured for locking, when it is in the stop position, the ratchet mechanism 7, 8, 9 in the desired position, preventing a movement thereof, of accidental type or caused by break-in attempts, to a release position.

[0064] A spring 19 is provided to recall the locking slide element 16 to the stop position.

[0065] The locking slide element 16 comprises a thrust edge 17 that is suitable for receiving the thrust action from the bit element 12 of the cylinder C to reach the release position.

[0066] On the locking slide element 16, a shaped slot 18 is obtained, inside which a peg P is received, projecting from the rocker element 10 orthogonally with respect to the projecting/retracting (DI, DII) directions.

[0067] The slide element 16 comprises a locking protrusion B that extends in the slot 18 and is shaped for locking the peg P, and thus the rocker element 10, when the slide element 16 is in the aforesaid stop position.

[0068] The operation of the control device W is now disclosed, starting from an operating position in which the drive members 2 and 3 (and thus the bolts) are completely retracted. Considering the position shown in Figures 2 to 5, a rotation of the handle to extract the bolts would be prevented by the blocking action that the engaging lever 9b exerts on the wheel 7, and as previously disclosed, is inserted into the sequence of transmission elements consisting of wheels and racks. This position of the control device W is also shown in Figures 6 to 10.

[0069] The rotation of the handle must then be enabled by first rotating the cylinder C with the key K, such that the rocker element 10 moves to the other position (shown for example in figures 13 and 15).

[0070] During rotation of the cylinder C, the bit element 12 first lifts the slide element 16, by disengaging the locking protrusion B from the peg P that is integral with the rocker element 10, and then coming into contact with the activation end 15A of the rocker element 10 by making the latter oscillate to the required position. The slide element 16, recalled by the spring 19, returns down, locking the peg P again.

[0071] At this point it is the engaging lever 9A that is in contact with the wheel 7. In this configuration, anticlockwise rotation of the wheel 7 is enabled (if reference is made to figure 15) (corresponding to direction Z2 in figure 9). It is thus possible to rotate the handle to extract the bolts. It is not possible to rotate the handle in the opposite direction, owing to the blocking action exerted by the engaging lever 9A on the wheel 7.

[0072] Once the bolts reach the extraction position, the configuration shown in Figure 15 is obtained. In order to be able to return the bolts to the retracted position (and thus to open the grill or gate, etc), it is first necessary to intervene on the cylinder C with the appropriate key so as to separate the engaging lever 9A from the wheel 7 and on the other hand bring the engaging lever 9B into contact with the latter. Also in the opening operation, i.e. during retracting of the bolts, projecting the bolts to the exterior again is prevented (by the engaging lever 9B). Also in this case it will be necessary to intervene preliminarily on the cylinder C with the relative key K.

[0073] From what has been disclosed and shown in the drawings, it is clear that the lock unit 1 according to the invention enables the stated objects to be achieved.

[0074] In particular, the new technical solution according to the invention provides the user constantly with the certainty and security that the lock unit 1 is and remains in the key locked operating state or in the unlocked position that the user himself imposes by the key. Without the preliminary intervention only with the key, any change of angular position of the handle associated with the intervention is prevented.

[0075] Thus all the undesired practical situations referred to in the paragraph on the prior art are prevented owing to the lock unit 1 according to present invention.

[0076] Owing to the particular structural and functional configuration of the lock unit 1, which is at the same time compact and structurally simplified, higher levels of security are ensured, in particular owing to the significantly increased projection stroke of the bolts, and irregularities and imprecisions in fitting doors and windows are compensated to a greater degree.

[0077] Further, the lock unit 1 fully meets specific needs of certain markets and/or preferences for use that certain users set.

[0078] What has been said and shown in the attached drawings has been provided merely by way of illustrative example of the innovative features of the lock unit for doors and windows according to certain possible embodiments.

[0079] Modifications to the lock unit, or to parts thereof can be made without thereby falling outside the scope of the claims.

[0080] In practice, the materials, insofar as they are compatible with the specific use and with the respective individual components for which they are intended, can be chosen appropriately in function of the required requisites and in function of the available prior art.

[0081] It is possible to configure and size the lock unit and adopt materials according to needs and possible variations on and/or additions are possible to what has been disclosed above and illustrated in the attached drawings.

Claims

1. Locking system for doors or windows, comprising:

- a first drive member (2) and a second drive member (3) that are movable along respective projecting/retracting (DI, DII) directions with respect to a box body (4) of said lock unit (1), each of said first drive member (2) and second drive member (3) being suitable for being connected to and moving a respective bolt so as to engage the respective bolt with and disengage the respective bolt from a respective locking seat provided on a wall or on a fixed counterframe,
- a control element (5) suitable for coupling with a rotatable handle to move said first drive member (2) and second drive member (3) in said pro-

jecting/retracting (D_I, D_{II}) directions,
- transmitting means (T) for transmitting a movement of said control element (5) to said first member (2) and a second member (3) to drive the bolts, said transmitting means (T) being configured for transforming a control element (5) rotation into a linear movement of said first drive member (2) and second drive member (3) in said projecting/retracting (D_I, D_{II}) directions,
- a seat (6) shaped for housing a lock cylinder (C) for key locking said lock unit (1),
- a control device (W) that is activatable by said lock cylinder (C) and configured for enabling the rotation of said handle in a first rotation direction only as far as said lock cylinder (C) is taken, by the respective key (K), in a first angular position, on the other hand preventing , in this first angular position of the key (K), the rotation of said handle in a second rotation direction opposite said first rotation direction,
- said control device (W) being configured for enabling the rotation of said handle in said second rotation direction only as far as said lock cylinder (C) is taken, by the respective key (K), to a second angular position, preventing, in this second angular position of said key (K), the rotation of said handle in the first rotation direction.

2. Lock unit according to claim 1, wherein said control device (W) comprises a ratchet mechanism (7, 8, 9) configured for enabling/disabling the rotation of said control element (5) in function of the angular position in which said lock cylinder (C) is rotated.

3. Lock unit according to claim 2, wherein said ratchet mechanism comprises wheel means (7) provided with toothed portions (8) and engaging lever means (9) configured for engaging with said toothed portions (8) to prevent a rotation of said wheel means (7) in a determined rotation direction.

4. Lock unit according to claim 3, wherein said control device (W) comprises a rocker element (10), oscillating around an axis (A1), which is rotatable by the bit element (12) of said cylinder (C) and configured for rotating said engaging lever means (9) in a determined rotation direction according to the rotation of said key (K), so as to prevent the rotation of said wheel means (7) in one direction or in the other rotation direction.

5. Lock unit according to claim 4, wherein said rocker element (10) is provided with a driving end (11) shaped for selectively coming into contact with, and pushing, a first abutting surface (13) or a second abutting surface (14) of said engaging lever means (9), in function of the rotation of said cylinder (C), to prevent the rotation of said wheel means (7) in one or the other rotation direction.

6. Lock unit according to claim 4 or 5, wherein said rocker element (10) comprises a scissors-shaped activating end (15), having two protrusions (15A, 15B) that are mutually spaced apart and arranged for receiving a thrust action from the bit element (12) of said cylinder (C) to rotate, respectively, in one direction or in the opposite direction.

7. Lock unit according to one of claims 2 to 6, wherein said control device (W) includes a locking slide element (16), slidable parallel to said projecting/retracting (D_I, D_{II}) directions between a stop position, in which it is nearer to said cylinder (C), and a release position, in which it is further from said cylinder (C), said locking slide element (16) being configured for locking, when it is in the stop position, said ratchet mechanism (7, 8, 9) in the desired position, preventing a movement thereof, of accidental type or caused by break-in attempts, to a release position, a spring (19) being provided to recall said locking slide element (16) to said stop position.

8. Lock unit according to claim 7 as appended to claim 4 or 5, wherein said locking slide element (16) comprises a thrust edge (17) that is suitable for receiving the thrust action of the bit element (12) of said cylinder (C) to reach said release position, and a shaped slot (18), inside which a peg (P) is received, projecting from said rocker element (10) orthogonally with respect to said projecting/retracting (D_I, D_{II}) directions, said slide element (16) comprising a locking protrusion (B) that extends in said slot (18) and is shaped for locking said peg (P), and thus said rocker element (10), when said slide element (16) is in said stop position.

9. Lock unit according to claim 3, or according to one of claims 4 to 8 as appended directly or indirectly to claim 3, wherein said engaging lever means (9) comprises a pair of lever elements (9A, 9B) that are rotatable around a same axis (A2) with respect to one another and are mutually connected by a return spring element (20).

10. Lock unit according to any preceding claim, wherein said transmitting means comprises toothed wheel means (R) and rack means (S) that cooperate mutually to transmit movement from said control element (5) to said first member (2) and second drive member (3) for the bolts.

11. Lock unit according to claim 10, wherein said toothed wheel means (R) comprises a first toothed wheel (R1) integrally connected to said control element (5), said first toothed wheel (R1) engaging with a first rack (S1) of said rack means (S), said first rack (S1)

engaging with a second toothed wheel (R2) integrally connected coaxially with a third wheel (R3) of said wheel means.

12. Lock unit according to claim 11 as appended to claim 3 or to one of claims 4 to 10 as appended to claim 3, wherein said third wheel (R3) engages with a second rack (S2) obtained on said second drive member (3), on said second drive member (3) a third rack (S3) being obtained that engages with a fourth toothed wheel (R4) that is coaxial and rotatably integral with said wheel means (7) of said ratchet mechanism.

13. Lock unit according to claim 12, wherein said fourth toothed wheel (R4) engages, on a side opposite said third rack (S3), with a fourth rack (S4) obtained on said first drive member (2), so that a linear movement of said second drive member (3) is matched by a movement of said first (2) drive member that is identical but in the opposite direction.

14. Lock unit according to any preceding claim, wherein said transmitting means (T) is so configured that said first (2) and second (3) drive members, and thus the respective bolts travel a projecting stroke of at least 35 mm along the respective distancing direction (D_I).

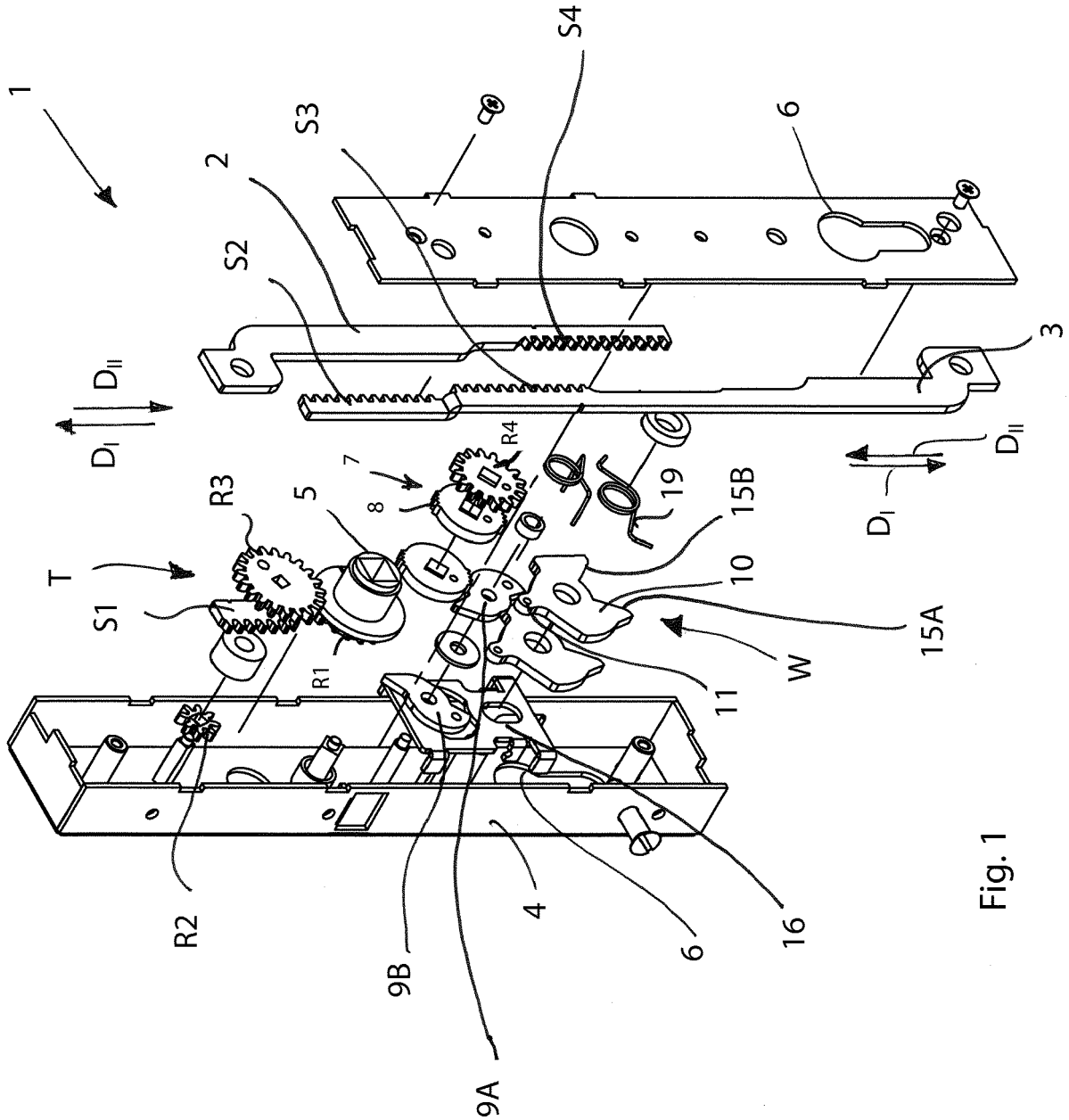
1
2
S3
S4
6
S2
3
D_{II}
D_I
R4
7
8
R3
5
19
15B
T
S1
10
15A
W
R1
11
R2
4
6
16
9B
9A

Fig. 1

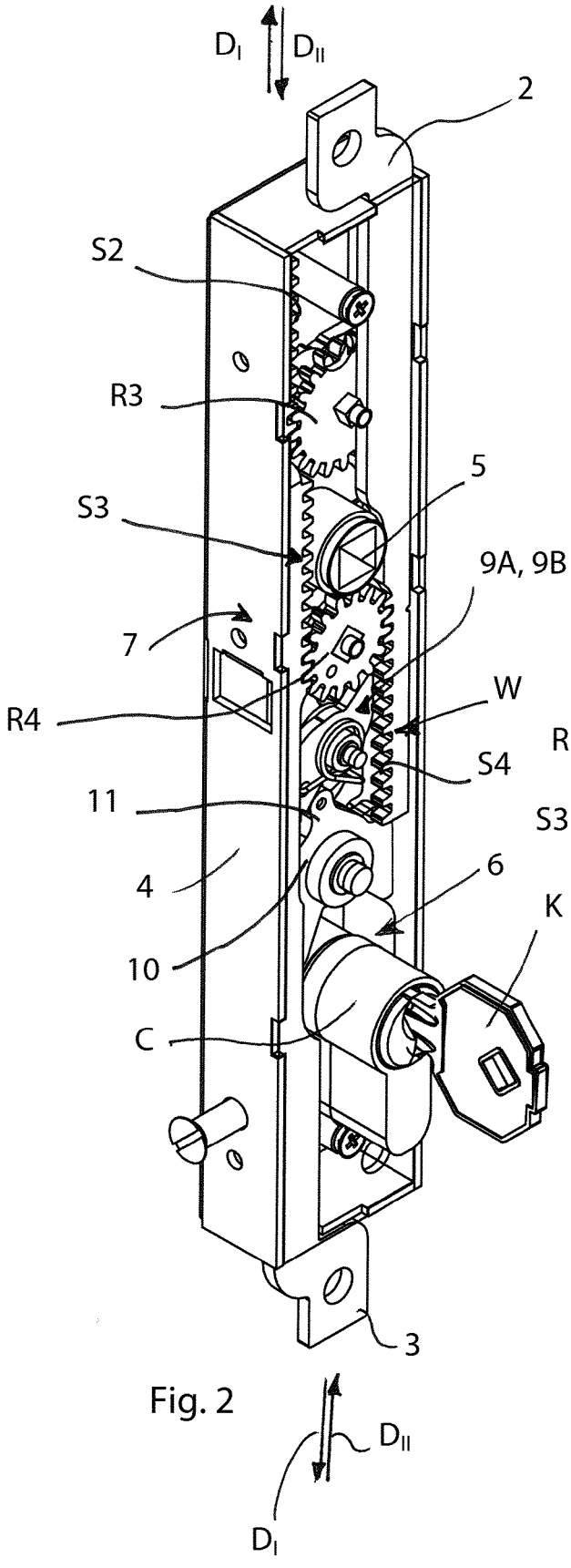
D_I
D_II
2
S2
R3
5
S3
9A, 9B
7
W
R4
S4
11
4
6
K
10
C
3

Fig. 2

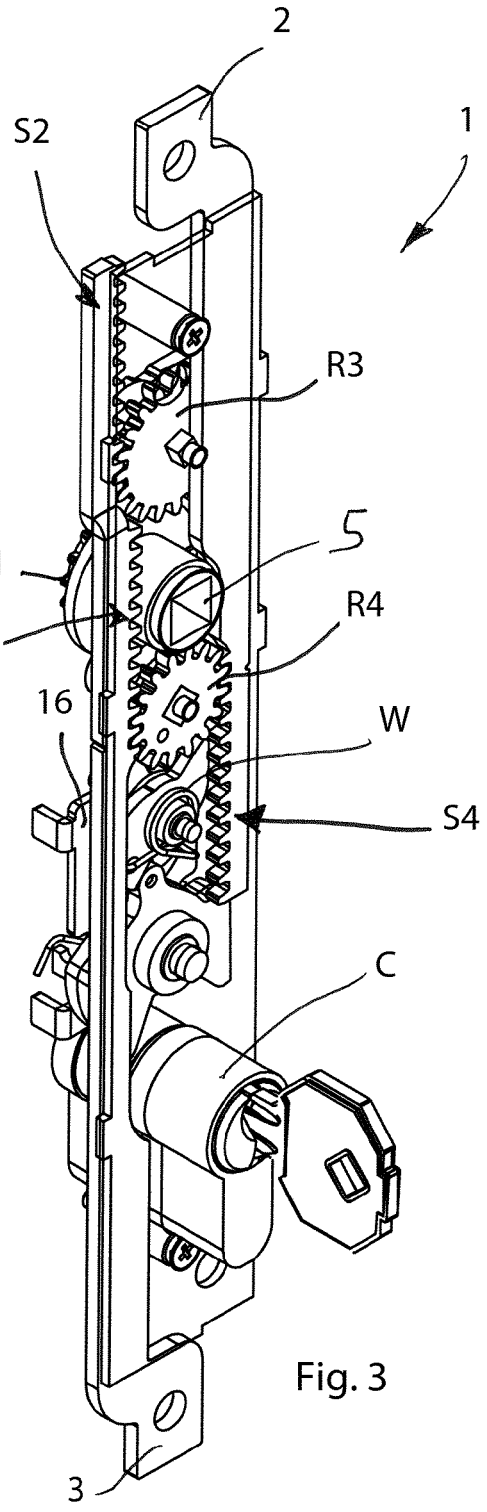
2
1
S2
R3
R1
5
S3
R4
16
W
S4
C
3

Fig. 3

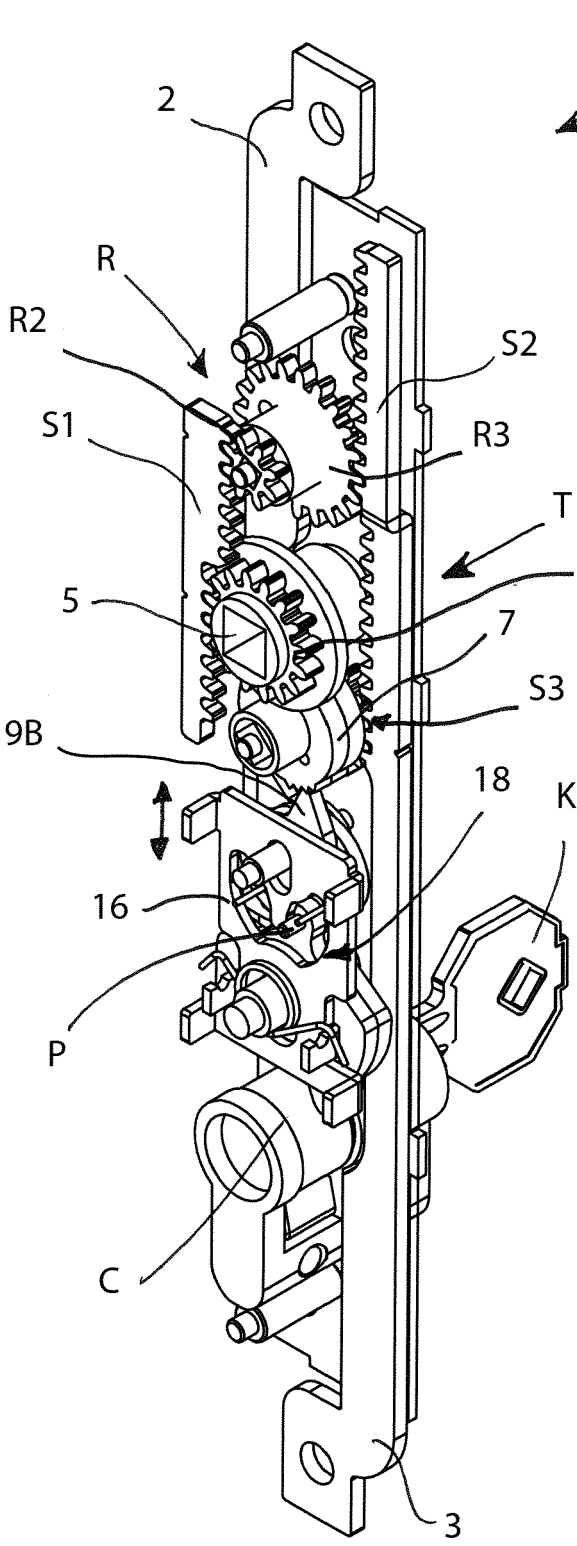
1
2
R
R2
S2
S1
R3
T
R1
5
7
S3
9B
18
K
16
P
C
3

Fig. 4

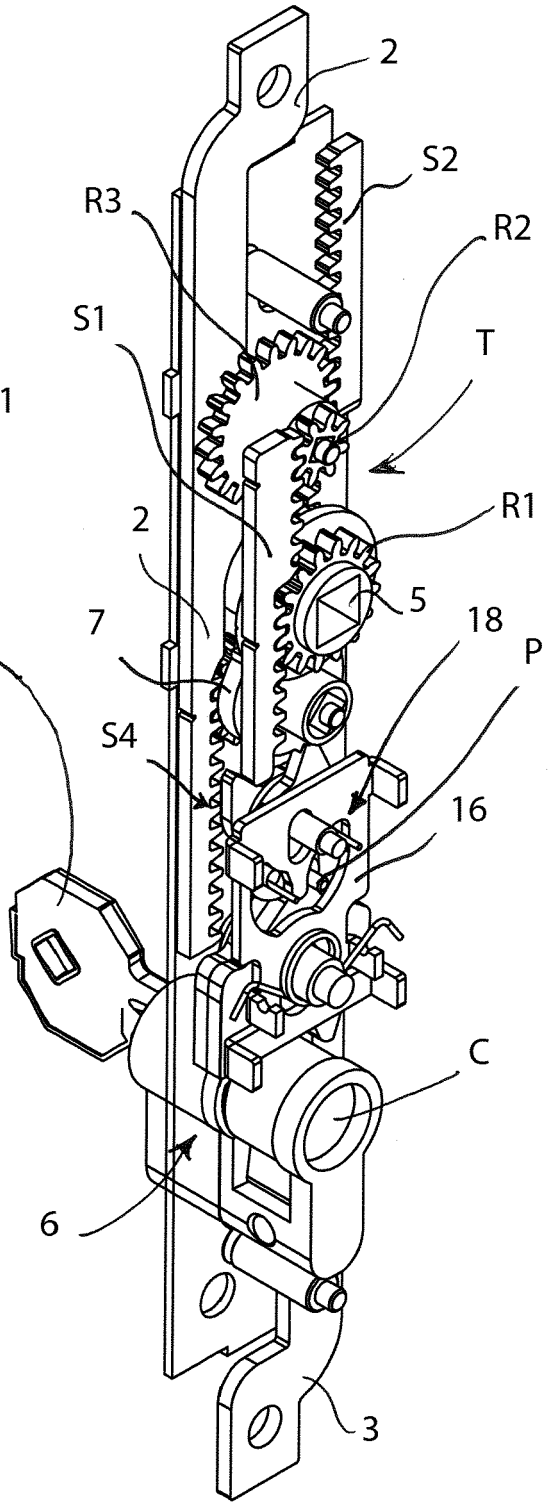
2
S2
R3
R2
S1
T
R1
2
5
7
18
P
S4
16
C
6
3

Fig. 5

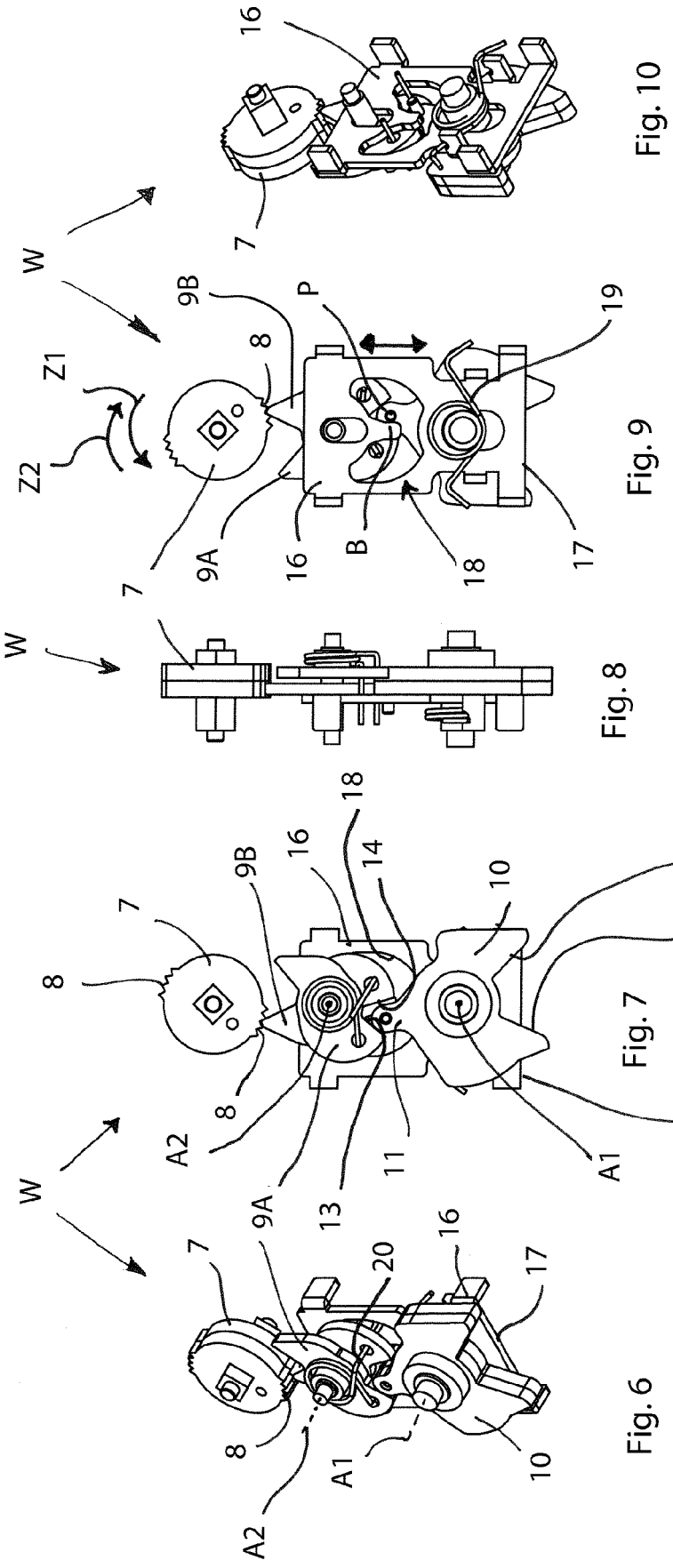

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

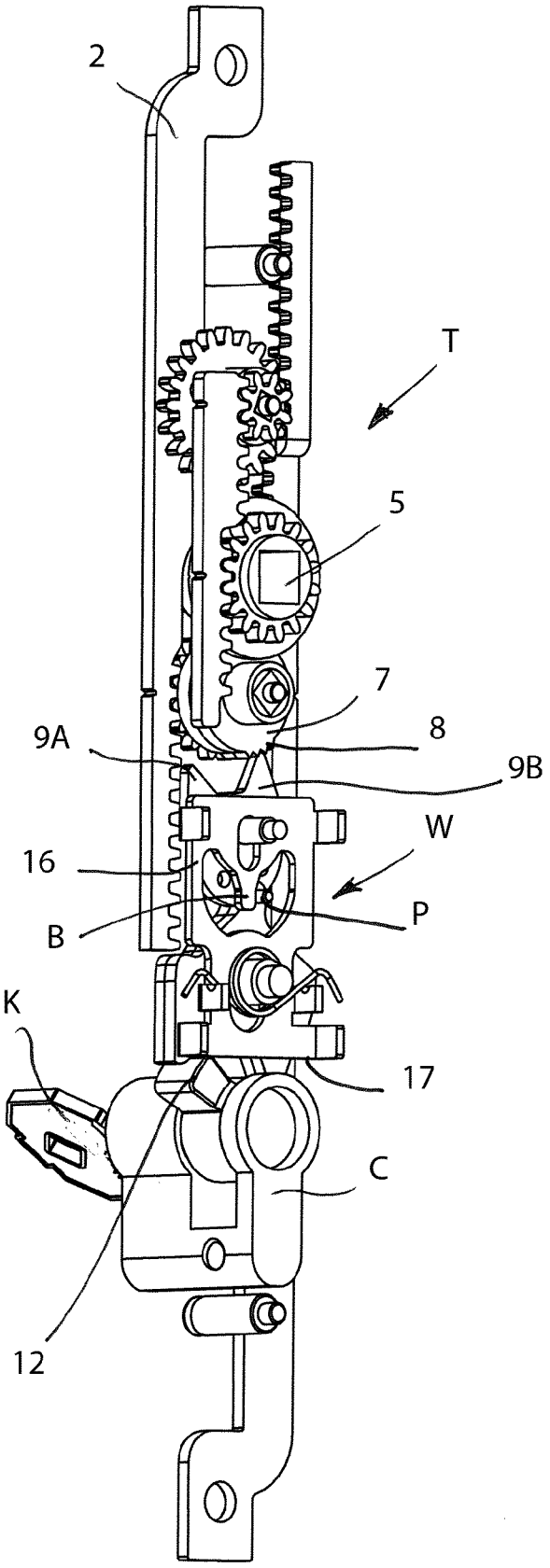

Fig. 11

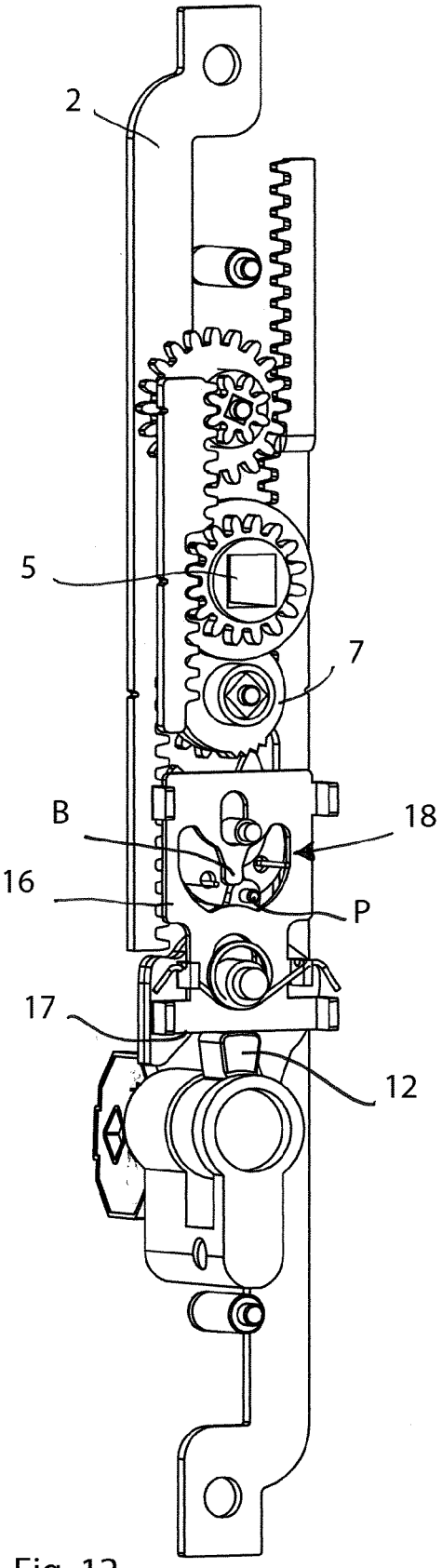

Fig. 12

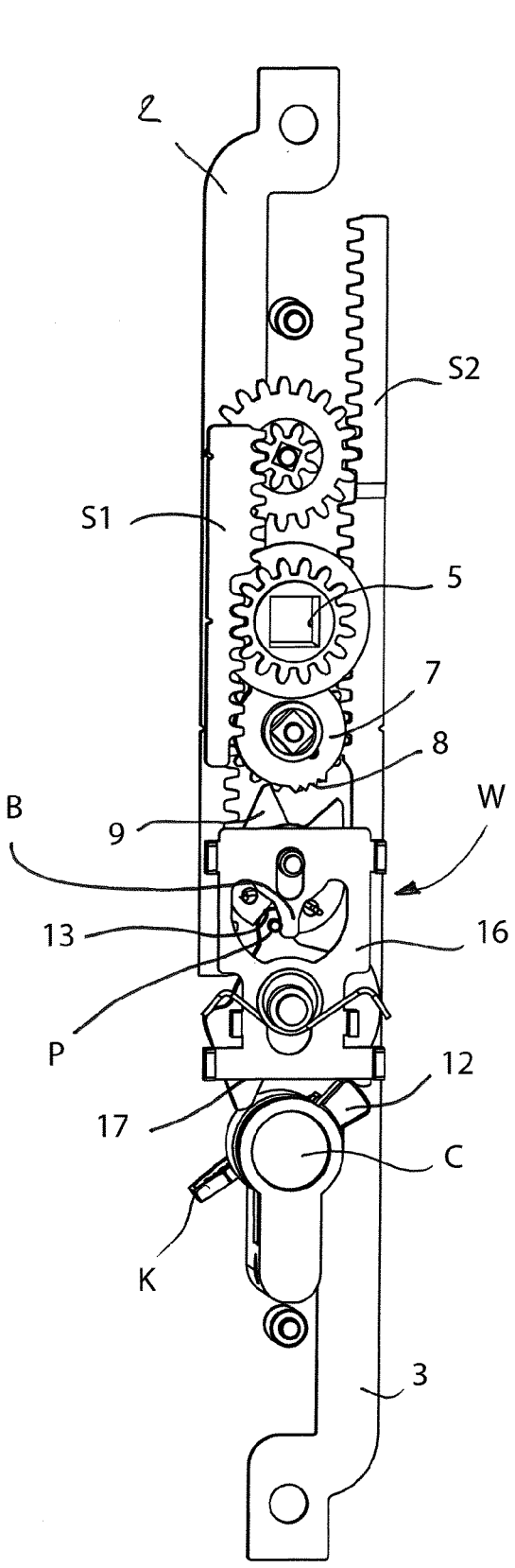

Fig. 13

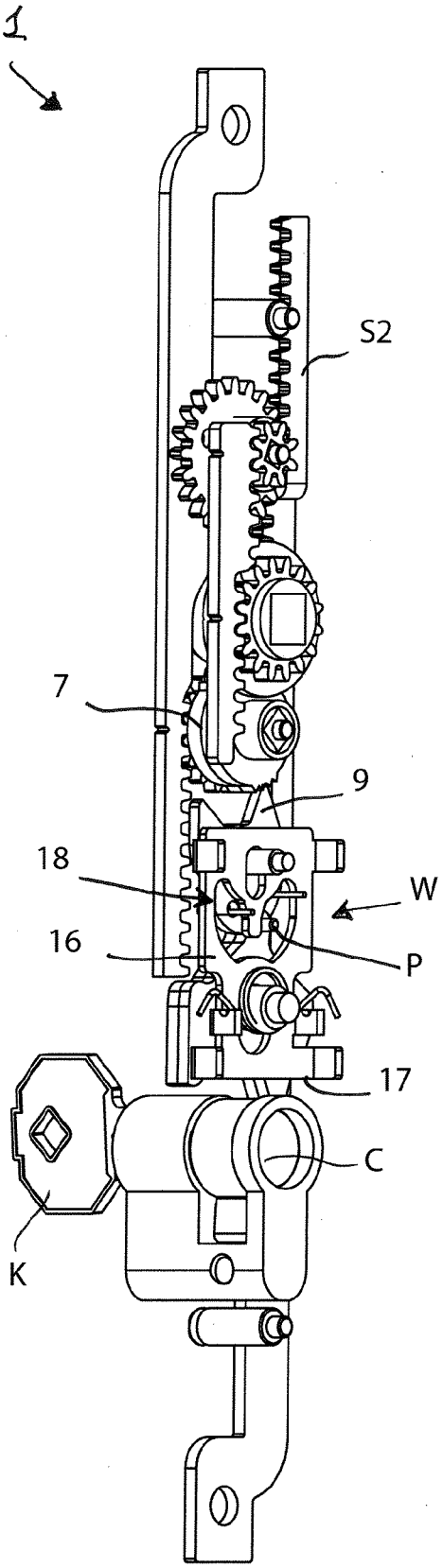

Fig. 14

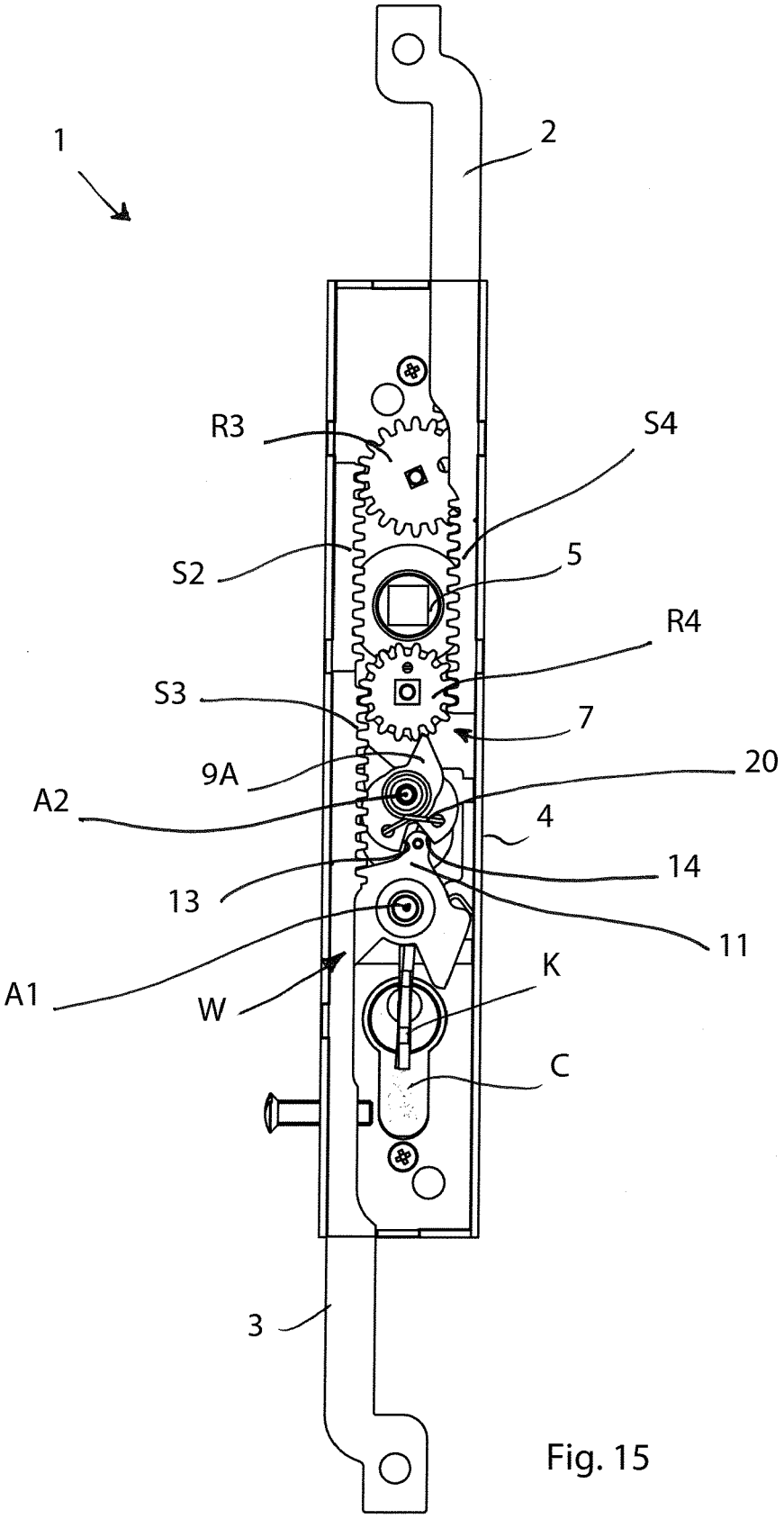

Fig. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 20 16 5197

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	EP 1 321 613 A2 (BLINDATO EFFEPI S R L [IT]) 25 June 2003 (2003-06-25) * paragraph [0009] - paragraph [0032]; figures 1-8b *	1-13	INV. E05C9/04 E05B13/00 E05B63/18
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A	DE 12 47 171 B (WEIDTMANN FA WILHELM) 10 August 1967 (1967-08-10) * paragraph [0004]; figures 1,2 *	1,14	

TECHNICAL FIELDS SEARCHED (IPC)

E05C
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 April 2020	Pérez Méndez, José F

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28-04-2020

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

REFERENCES CITED IN THE DESCRIPTION

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- FR 2423610 **[0017]**