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(54) RIM LOCK

(57) The rim lock (1) comprises a casing (2, 3, 4, 5, 6, 7) which houses a bolt (8) and a spring latch (9), and a cylinder (10) having a drive cog wheel (18), the casing (2, 3, 4, 5, 6, 7) housing a first support plate (16) of the bolt (8), a second support plate (17) of the spring latch (9), at least a first driven cog wheel (19) connected to the drive cog wheel (18), a drawing pin (22) of the first support plate (16) supported by the first driven cog wheel (19), a return lever (25) of the spring latch (9) oscillating in opposition to and by action of an elastic element (26), and a drawing member (24) of the return lever (25) supported by the first driven cog wheel (19).

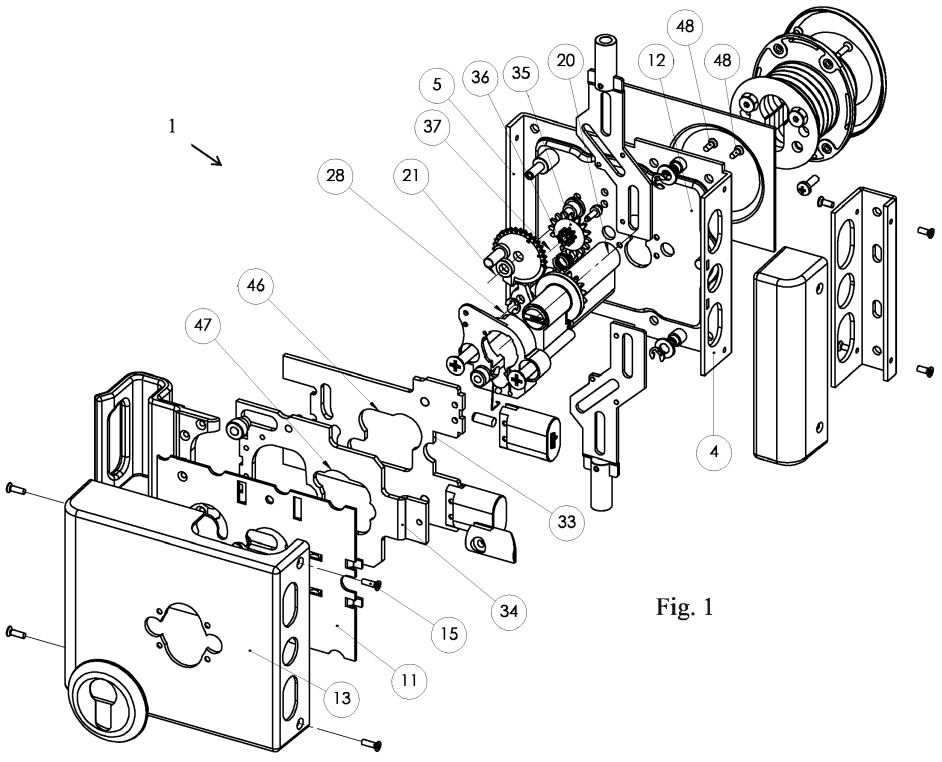

Fig. 1

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Description

[0001] The present invention relates to a rim lock that ensures high security and flexibility of use.

[0002] A rim lock generally has a casing that houses a cylinder for actuating a bolt and a spring latch.

[0003] Various types of rim locks are present on the market; they differ in the type of cylinder, for example the European cylinder, Swiss cylinder, pump cylinder, etc., and the mechanism inside the casing designed to actuate the bolt and the spring latch.

[0004] This clearly complicates not only the production line, which cannot be standardised for the various types of rim locks, but also the logistics of storing and supplying the specifically dedicated components for assembling the various types of rim locks.

[0005] What is more, the various types of rim locks present on the market often have very different standards in terms of security and break-in resistance, with the result that some products are much less widely available in the market than others.

[0006] The technical task of the present invention is thus to provide a rim lock which enables the aforesaid technical drawbacks of the prior art to be eliminated.

[0007] Within the scope of this technical task, one object of the invention is to provide a high-security rim lock that uses components which are compatible for operation with cylinders of a varying type.

[0008] A further object of the invention is to provide a rim lock which offers a high standard of security, irrespective of the type of cylinder used.

[0009] Yet another object of the invention is to provide a high-security rim lock that has a simple and inexpensive construction.

[0010] The technical task, as well as these and other objects according to the present invention are achieved by providing a rim lock comprising a casing which houses a bolt and a spring latch extractable through a flank of said casing, and a cylinder for actuating said bolt and said spring latch having a drive cog wheel, characterised in that said casing houses a first support plate of the bolt which is translatable in the extraction direction of the bolt, a second support plate of the spring latch which is translatable in the extraction direction of the spring latch parallel to said first plate, at least a first driven cog wheel connected to said drive cog wheel and having a rotation axis fixed to said casing, a drawing pin of said first plate supported by said first driven cog wheel, a return lever of the spring latch oscillating in opposition to and by action of an elastic element, a drawing member of said return lever supported by said first driven cog wheel, and in that, when said bolt is in a completely extracted position, said drawing pin and said rotation axis of said first driven wheel are aligned in the extraction direction of said bolt.

[0011] A wall of said casing preferably has an end stop of said drawing pin, and when said bolt is in a completely extracted position, said drawing pin engages said end stop.

[0012] If solely said first driven cog wheel is provided, it meshes directly with said drive cog wheel.

[0013] If said first driven cog wheel and a second driven cog wheel are provided, said first driven cog wheel is driven by said second drive cog wheel, which is in turn driven by said drive cog wheel.

[0014] The second drive cog wheel, if present, has the primary purpose of modifying the transmission ratio so as to reduce the actuating strain on the key.

[0015] In a preferred embodiment of the invention said first support plate, said second support plate, and said wall of said casing have passage openings compatible for mounting various types of cylinder.

[0016] In a preferred embodiment of the invention, said first plate has a wall interfering with said second plate when said bolt is in a completely extracted position so as to lock said spring latch in a completely extracted position.

[0017] In a preferred embodiment of the invention, there is provided a second drive cog wheel interposed between said drive cog wheel and said first driven cog wheel.

[0018] In a preferred embodiment of the invention, said second drive cog wheel meshes directly with said drive cog wheel and has a pinion that meshes with said first driven cog wheel.

[0019] In a preferred embodiment of the invention, said casing houses at least a relay member for a locking peg, said relay member being constrained to said bolt translatable perpendicularly to said bolt.

[0020] The present invention further discloses a set of rim locks which differ in the type of cylinder used and have the same bolt, same spring latch, same first and second support plate, same wall of said casing, same first driven cog wheel and same transmission ratio between said drive cog wheel and said first driven cog wheel.

[0021] Other features of the present invention are also defined in the claims hereinbelow.

[0022] Further characteristics and advantages of the invention will become more apparent from the description of a preferred, but not exclusive, embodiment of the rim lock, according to the invention, and which is illustrated by way of approximate and thus non-limiting example in the attached drawings, of which:

figure 1 shows an exploded view of a rim lock in accordance with a first embodiment of the invention;
figure 2 shows a front view of the lock of figure 1;
figure 3 shows a front view of the lock of figure 2, from which the wall of the casing has been removed;
figure 4 shows a front view of the lock of figure 3 from which the second support plate of the spring latch has also been removed;
figure 5 shows a front view of the lock of figure 4 from which the first support plate of the bolt has also been removed;
figure 6 shows a front view of the lock of figure 5 from

which the support for the drive cog wheel has also been removed;

figure 7 shows an exploded view of a rim lock in accordance with a second embodiment of the invention;

figure 8 shows an exploded view of a rim lock in accordance with a third embodiment of the invention; and

figure 9 shows a preferred system for locking the cylinder to the lock in the versions illustrated in figure 1 and figure 7.

[0023] With reference to the various embodiments of the invention, analogous components will be indicated with the same numerical reference.

[0024] With reference to the above-mentioned figures, they show a rim lock which is denoted in its entirety by the reference number 1.

[0025] The lock 1 comprises a casing 2, 3, 4, 5, 6, 7 which houses a bolt 8 translatable for extraction and retraction into the casing 2, 3, 4, 5, 6, 7, a spring latch 9 which is translatable parallel to the bolt 8 for extraction from and retraction into the casing 2, 3, 4, 5, 6, 7, and a cylinder 10 for actuating the bolt 8 and the spring latch 9. The casing 2, 3, 4, 5, 6, 7 has the shape of a parallelepiped and has a front wall 2, a rear wall 3, and two flanks 4, 5.

[0026] In the case shown purely by way of example, the front wall 2 of the casing 2, 3, 4, 5, 6, 7 is formed by a flat front plate 11, the rear wall 3 and the two flanks 4, 5 are formed by a "U"-shaped rear plate 12, whilst the upper side 6 and the lower side 7 of the casing 2, 3, 4, 5 are delimited by the upper and lower walls of a cover 13, which also covers the front wall 2 and the two flanks 4, 5, of the casing 2, 3, 4, 5, 6, 7.

[0027] The flat front plate 11 is fixed by means of screws 14 to the "U"-shaped rear plate 12, whilst the cover 13 is fixed by means of screws 15 to the flanks 4, 5 of the "U"-shaped rear plate 12.

[0028] The casing 2, 3, 4, 5, 6, 7 houses a first support plate 16 of the bolt 8 and a second support plate 17 of the spring latch 9.

[0029] The first support plate 16 is supported by the casing 2, 3, 4, 5, 6, 7 translatably in the direction of extraction and retraction of the bolt 8 from the flank 4 of the casing 2, 3, 4, 5, 6, 7.

[0030] The second support plate 17 is supported by the casing 2, 3, 4, 5, 6, 7 translatably in the direction of extraction and retraction of the spring latch 8 from the same flank 4 of the casing 2, 3, 4, 5, 6, 7.

[0031] The first support plate 16 and the second support plate 17 lie mainly in parallel planes positioned adjacent to each other.

[0032] In particular, the first support plate 16 and the second support plate 17 lie mainly in planes parallel to the plane in which the flat front plate 11 delimiting the casing 2, 3, 4, 5, 6, 7 lies.

[0033] The cylinder 10 has a drive cog wheel 18 connected to at least a first driven cog wheel 19.

[0034] The drive cog wheel 18 has a rotation axis 20 perpendicular to the planes in which the first support plate 16 and the second support plate 17 mainly lie.

[0035] The first driven cog wheel 19 has a rotation axis 21 parallel to the rotation axis of the drive cog wheel 18.

[0036] The rotation axis 21 of the first driven cog wheel 19 is fixed between the front wall 2 and the rear wall 3 of the casing 2, 3, 4, 5, 6, 7.

[0037] In the casing 2, 3, 4, 5, 6, 7, there is further provided a second drive cog wheel 35 interposed between the drive cog wheel 18 and the first driven cog wheel 19.

[0038] The second drive cog wheel 35 meshes directly with the drive cog wheel 18 and has a coaxial pinion 36 that meshes with the first driven cog wheel 19.

[0039] The rotation axis 37 of the second drive cog wheel 35 is fixed to the casing 2, 3, 4, 5, 6, 7 parallel to the rotation axis 21 of the first driven cog wheel 19.

[0040] In some of the solutions shown, the casing 2, 3, 4, 5, 6, 7 internally comprises an insert 38 fixed by means of screws 48 to the rear wall 3 of the casing 2, 3, 4, 5, 6, 7 and said insert 38 directly supports the cylinder 10 with the drive cog wheel 18 and the rotation axis 37 of the second drive cog wheel 35.

[0041] In such solutions in particular, the insert 38 has an engagement seat 60 for a screw 61 fastened against a pawl 62 projecting laterally from the cylinder 10 so as to lock the cylinder 10 in the lock.

[0042] In some of the solutions shown, there is also provided an external protection of the cylinder fixed to the lock by screws 39.

[0043] In the casing 2, 3, 4, 5, 6, 7, the first driven cog wheel 19 supports a drawing pin 22 for drawing the first support plate 16 of the bolt 8.

[0044] The drawing pin 22 is fixed to the first driven cog wheel 19 in an eccentric position parallel to the rotation axis 21 of the first driven cog wheel 19 and engages slidingly in a slot 23 of the first support plate 16.

[0045] The first driven cog wheel 19 further supports a drawing member 24 for drawing a return lever 25 of the spring latch 9.

[0046] The drawing member 24 is fixed to the first driven cog wheel 19 in a peripheral position and engages with a tooth 27 for picking up the movement formed on a first arm of the return lever 25.

[0047] The return lever 25 oscillates in opposition to and by the action of an elastic element 26.

[0048] The rotation axis 28 of the return lever 25 is parallel to the axis 21 of the first driven cog wheel 19 and is fixed to the casing 2, 3, 4, 5, 6, 7.

[0049] The second arm of the return lever 25 has a slot 29 in which a pin 30 fixed to the second support plate 17 is slidingly engaged so that the rotation of the return lever 25 may be transmitted to the spring latch 9.

[0050] The elastic element 26 is in particular a torsion spring having one attached to the casing 2, 3, 4, 5, 6, 7 and one end attached to the return lever 25.

[0051] The elastic element 26 retains the return lever 25 in a position associated with the complete extraction of the spring latch 9.

[0052] The retraction of the spring latch 9 can be effected by overcoming the force of the elastic element 26 or manually by means of a grip 31 fixed to the second support plate 17 or by being driven by the cylinder 10.

[0053] The drawing pin 22 is engaged in a slot 32 present on a wall of the casing 2, 3, 4, 5,6,7.

[0054] The slot 32 defines, at one end thereof, an end stop for the drawing pin 22.

[0055] The slot 32 is fashioned on the front wall 2 of the casing 2, 3, 4, 5, 6, 7.

[0056] In particular, the slot 32 has the shape of an arch centred on the rotation axis 21 of the first driven cog wheel 19.

[0057] Advantageously, when the bolt 8 is in a completely extracted position, the drawing pin 22 is engaged with the end stop and is aligned with the axis 21 of the first driven cog wheel 19 in the extraction direction of the bolt 8.

[0058] The lock has an incremental break-in resistance, since in a break-in attempt, if a force is applied in the retraction direction of the bolt 8, part of this force is released by the drawing pin 22 onto the wall of the slot 32 and from the latter directly onto the axis 21 of the first driven cog wheel 19.

[0059] With the aim of further improving the break-in resistance, the first support plate 16 has a wall 33 interfering with the second support plate 17 when the bolt 8 is in a completely extracted position so as to lock the spring latch 9 in a completely extracted position.

[0060] The wall 33 is in particular a perimeter wall of the first support plate 16 proximal to the bolt 8 and interferes with a projection 34 of the second support plate 17.

[0061] The projection 34 is perpendicular to the plane in which the second support plate 17 mainly lies and is set in a position proximal to the spring latch 9.

[0062] With the spring latch 9 retained in the extracted position, the lock thus adds a locking point to the one provided by the bolt 8.

[0063] Finally, the casing 2, 3, 4, 5, 6, 7 houses at least a relay member for a locking peg, in particular a first relay member 40 for a first locking peg and a second relay member 41 for a second locking peg.

[0064] Each relay member 40, 41 is guided in translation perpendicular to the bolt 8.

[0065] In particular, each relay member 40, 41 has an inclined slot 42, 43 in which a pin 44, 45 mounted in the first support plate 16 slidingly engages.

[0066] In the usual vertical mounting position of the lock 1, in which the support plates 16, 17 are vertical, the bolt 8 and the spring latch 9 are horizontally translatable, whereas the two relay members are vertically translatable.

[0067] Advantageously, the first plate 16, the second plate 17, and the wall 2 of the casing in which the slot 32 is provided have passage openings 46, 47 compatible for introducing and fixing various types of cylinder 10 to the casing 2, 3, 4, 5, 6, 7. The various locks thus differ in the type of cylinder used, but they have the same bolt 8, the same spring latch 9, the same first and second support plate 16, 17, a casing with the same wall 2 which includes the slot 32, the same first driven cog wheel 19 and the same transmission ratio between the drive cog wheel 19 and the first driven cog wheel 18.

[0068] Essentially, therefore, a part of the casing 2, 3, 4, 5, 6, 7, as well as the cylinder 10, can vary from one lock to another.

[0069] The operation of the rim lock according to the invention appears clear from the description and illustration and, in particular, is substantially as follows.

[0070] When the key is inserted and turned in the cylinder 10, the drive cog wheel 18 is set into rotation and thus actuates the gear which also comprises the first driven cog wheel 19 and the second driven cog wheel 35 with its pinion 36.

[0071] The first driven cog wheel 19 moves the drawing pin 22, which moves the first support plate 16, which in turn moves the bolt 8 in the extraction direction and the relay members 40, 41 with the respective locking pegs.

[0072] The retraction of the bolt 8 and of the relay members 40, 41 with the respective locking pegs is obtained by inserting the key in the cylinder 10 and turning it in the opposite direction.

[0073] A further rotation of the key will also bring about the retraction of the spring latch 9 as a result of the drawing exerted by the drawing member 24 on the return lever 25, which in turn brings about the return of the support plate 17.

[0074] The rim lock thus conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept; furthermore, all the details are replaceable by technically equivalent elements.

[0075] The materials used, as well as the dimensions, may in practice be of any type, according to needs and the state of the art.

Claims

1. A rim lock (1) comprising a casing (2, 3, 4, 5, 6, 7) which houses a bolt (8) and a spring latch (9) extractable through a flank (4) of said casing (2, 3, 4, 5, 6, 7), and an actuating cylinder (10) of said bolt (8) and said spring latch (9) having a drive cog wheel (18), **characterised in that** said casing (2, 3, 4, 5, 6, 7) houses a first support plate (16) of the bolt (8) translatable in the extraction direction of the bolt (8), a second support plate (17) of the spring latch (9) translatable in the extraction direction of the spring latch (9) parallel to said first plate (17), at least a first driven cog wheel (19) connected to said drive cog wheel (18) and having a rotation axis (21) fixed to said casing (2, 3, 4, 5, 6, 7), a drawing pin (22) of said first support plate (16) supported by said first

driven cog wheel (19), a return lever (25) of the spring latch (9) oscillating in opposition to and by action of an elastic element (26), a drawing member (24) of said return lever (25) supported by said first driven cog wheel (19), and **in that**, when said bolt (8) is in a completely extracted position, said drawing pin (22) and said rotation axis (21) of said first driven wheel (19) are aligned in the extraction direction of said bolt (8).

2. The rim lock (1) according to claim 1, **characterised in that** a wall (2) of said casing (2, 3, 4, 5, 6, 7) has an end stop of said drawing pin (22), and **in that**, when said bolt (8) is in a completely extracted position, said drawing pin (22) engages said end stop.

3. The rim lock (1) according to any one of the preceding claims, **characterised in that** said first support plate (16), said second support plate (17), and said wall (2) of said casing (2, 3, 4, 5, 6, 7) have passage openings (46, 47) compatible for mounting of various types of cylinder (10).

4. The rim lock (1) according to any one of the preceding claims, **characterised in that** said end stop is formed by the end of a sliding slot (32) of said drawing pin (22).

5. The rim lock (1) according to any one of the preceding claims, **characterised in that** said first support plate (16) has a wall (33) interfering with said second support plate (17) when said bolt (8) is in a completely extracted position so as to lock said spring latch (9) in a completely extracted position.

6. The rim lock (1) according to any one of the preceding claims, **characterised in that** said first and second support plate (16, 17) have parallel main lie planes positioned one adjacent to another.

7. The rim lock (1) according to any one of the preceding claims, **characterised in that** said wall (33) of said first support plate (16) interferes with a projection (34) of said second support plate (17) that is perpendicular to the lie plane thereof.

8. The rim lock (1) according to any one of the preceding claims, **characterised in that** it comprises a second driven cog wheel (35) interposed between said drive cog wheel (18) and said first driven cog wheel (19).

9. The rim lock (1) according to the preceding claim, **characterised in that** said second driven cog wheel (35) meshes directly with said drive cog wheel (18) and has a pinion (36) that meshes with said first driven cog wheel (19).

10. The rim lock (1) according to any one of the preceding claims, **characterised in that** said casing (2, 3, 4, 5, 6, 7) houses at least a relay member (40, 41) for a locking peg, said relay member (40, 41) being constrained to said bolt (8) translatable perpendicularly with respect to said bolt (8).

11. The rim lock (1) according to any one of the preceding claims, **characterised in that** said casing (2, 3, 4, 5, 6, 7) internally comprises an insert (38) having an engagement seat (60) for a screw (61) fastened against a pawl (62) projecting laterally from said cylinder (10) for locking said cylinder (10) in said lock.

12. A set of rim locks according to any one of the preceding claims, differing by the type of cylinder (10) used and having the same bolt (8), the same spring latch (9), the same first and second support plate (16, 17), the same wall (2) of said casing (2, 3, 4, 5, 6, 7) wherein it includes said end stop, said first driven cog wheel (19) and said transmission ratio between said drive wheel (18) and said first driven cog wheel (19).

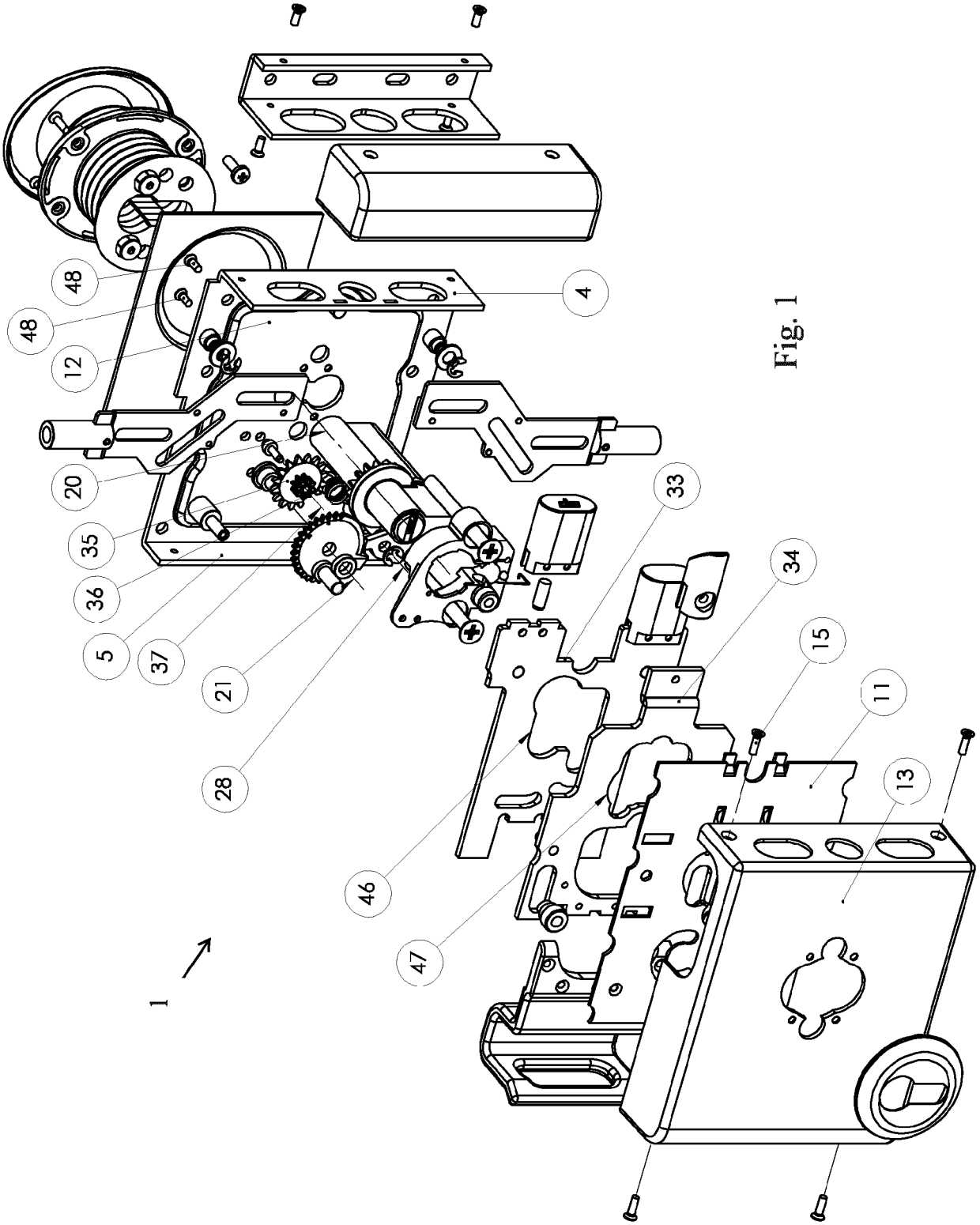


Fig. 1

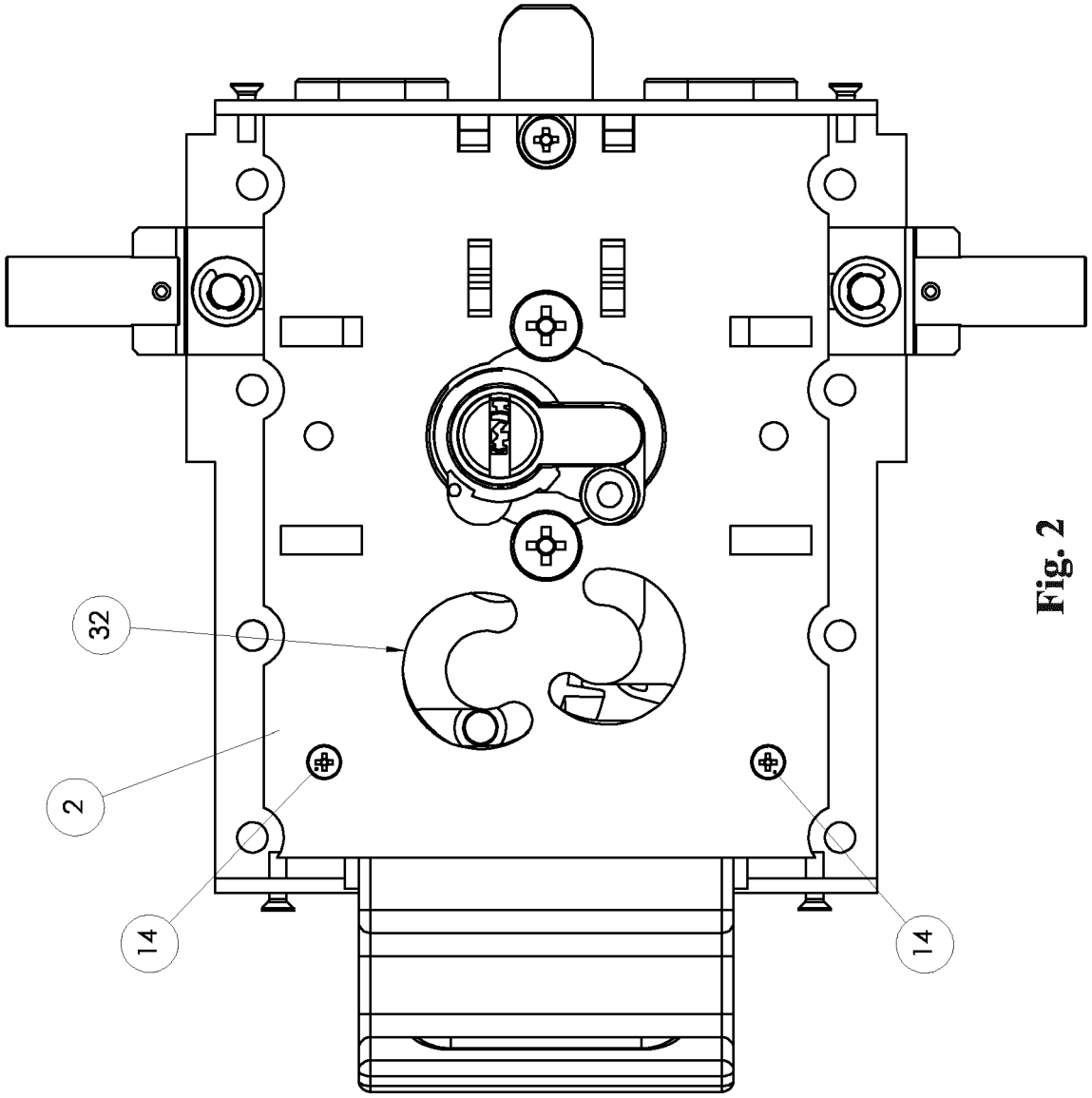


Fig. 2

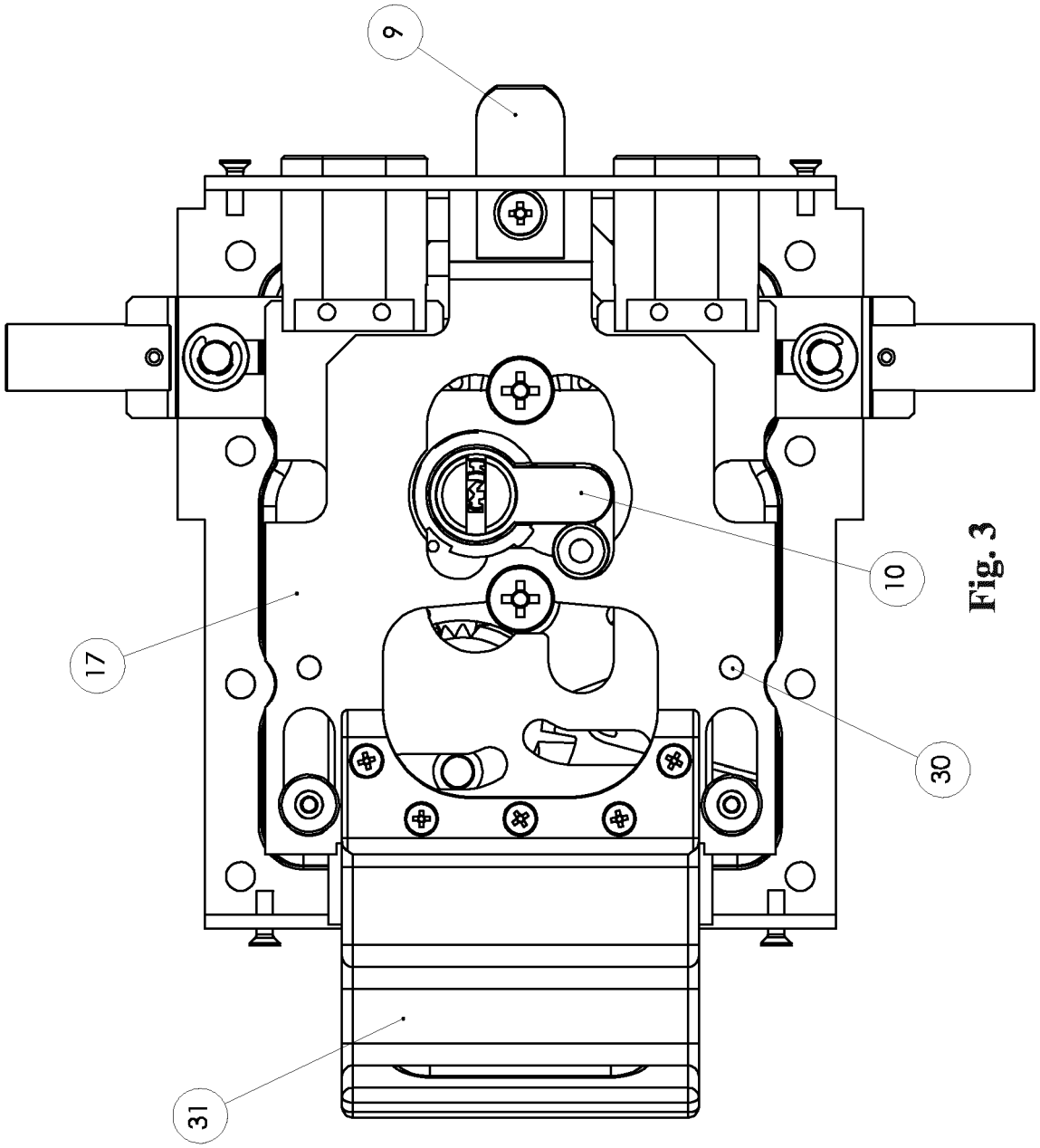


Fig. 3

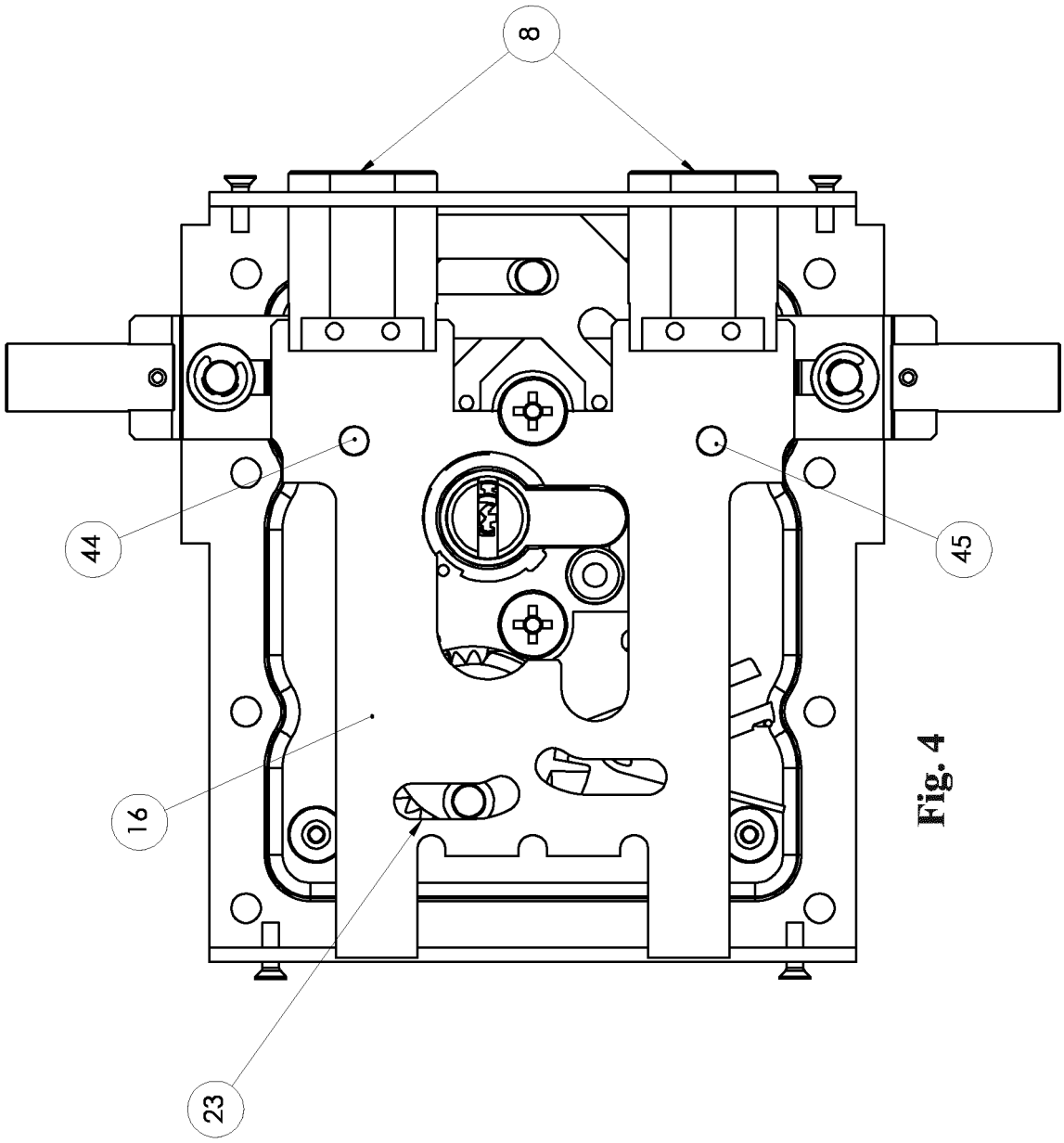


Fig. 4

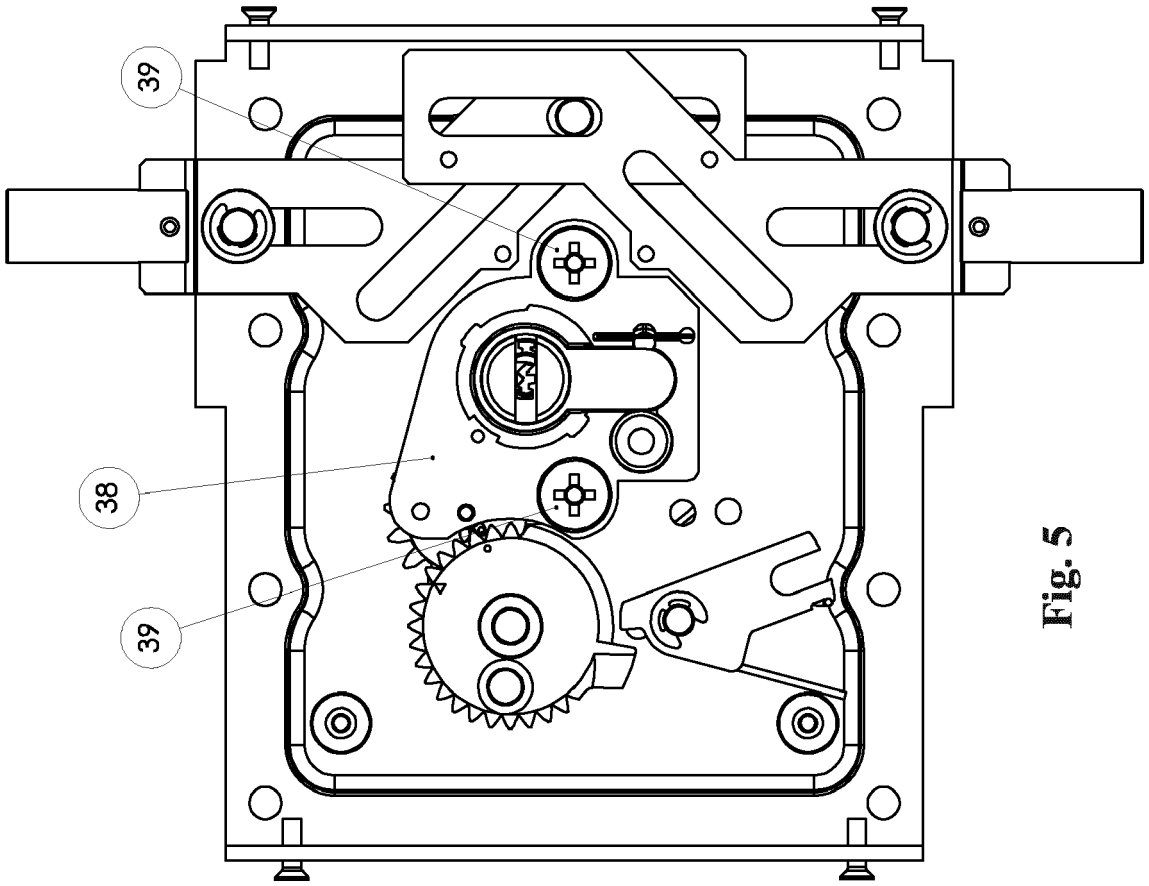


Fig. 5

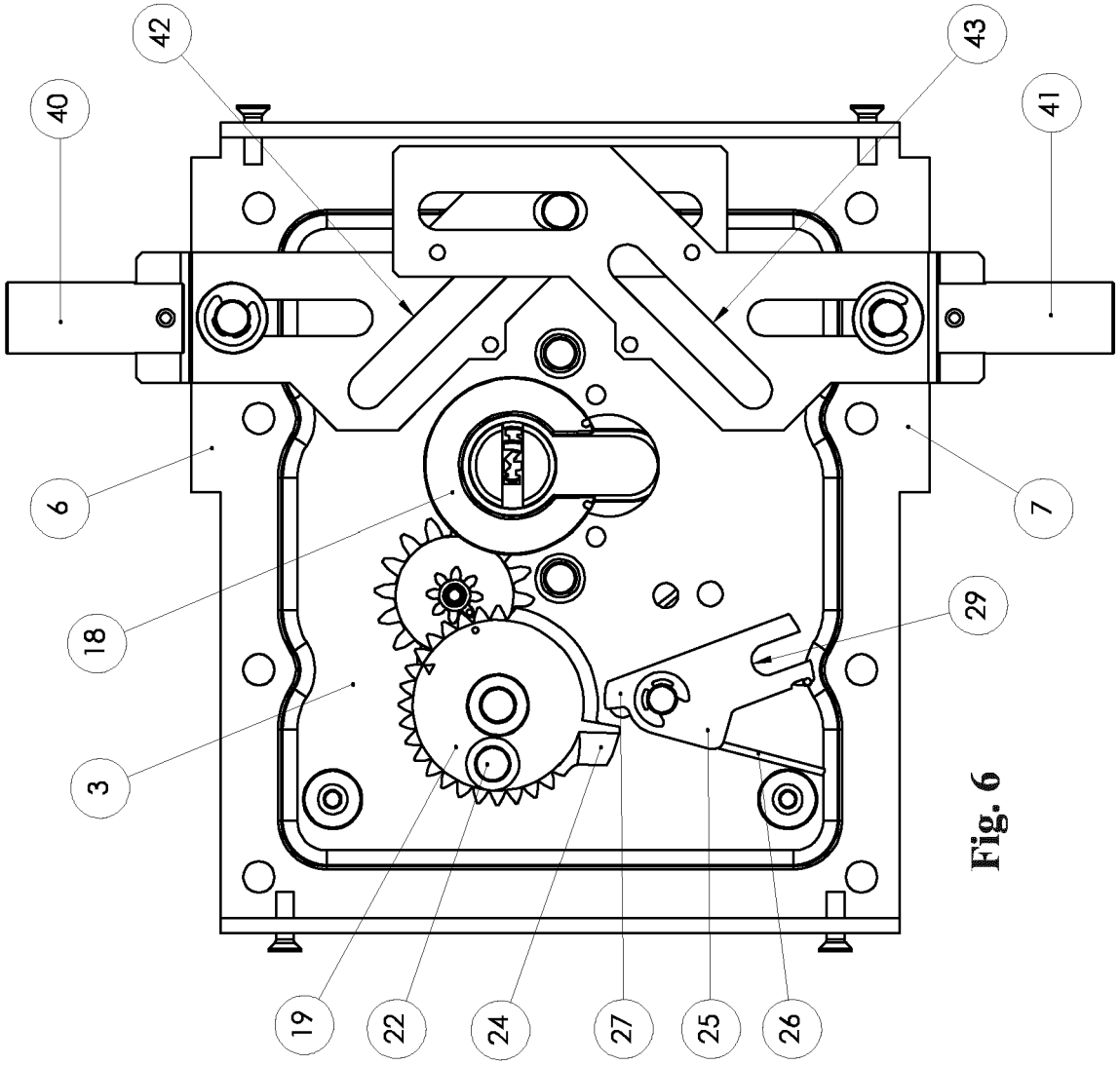


Fig. 6

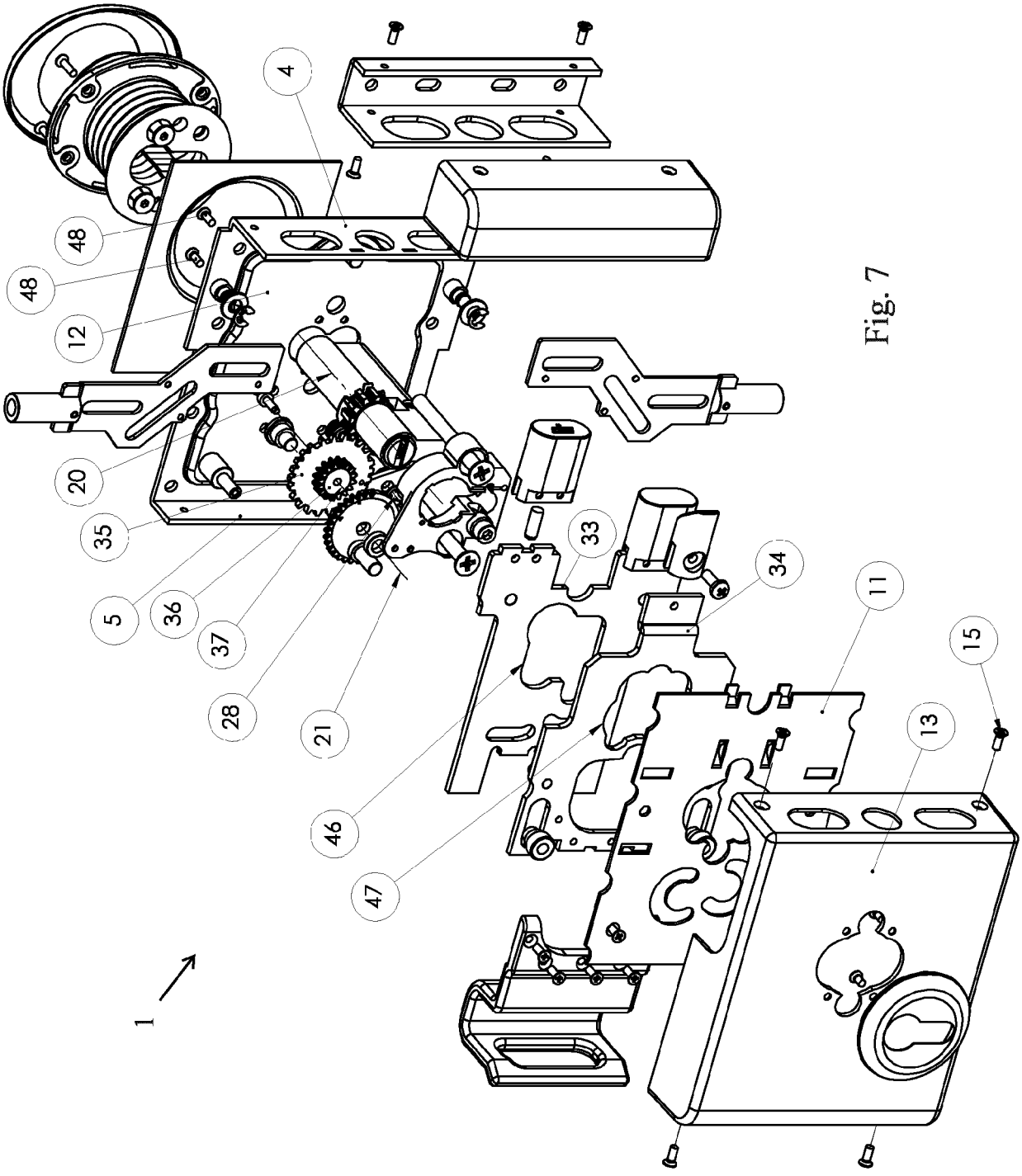


Fig. 7

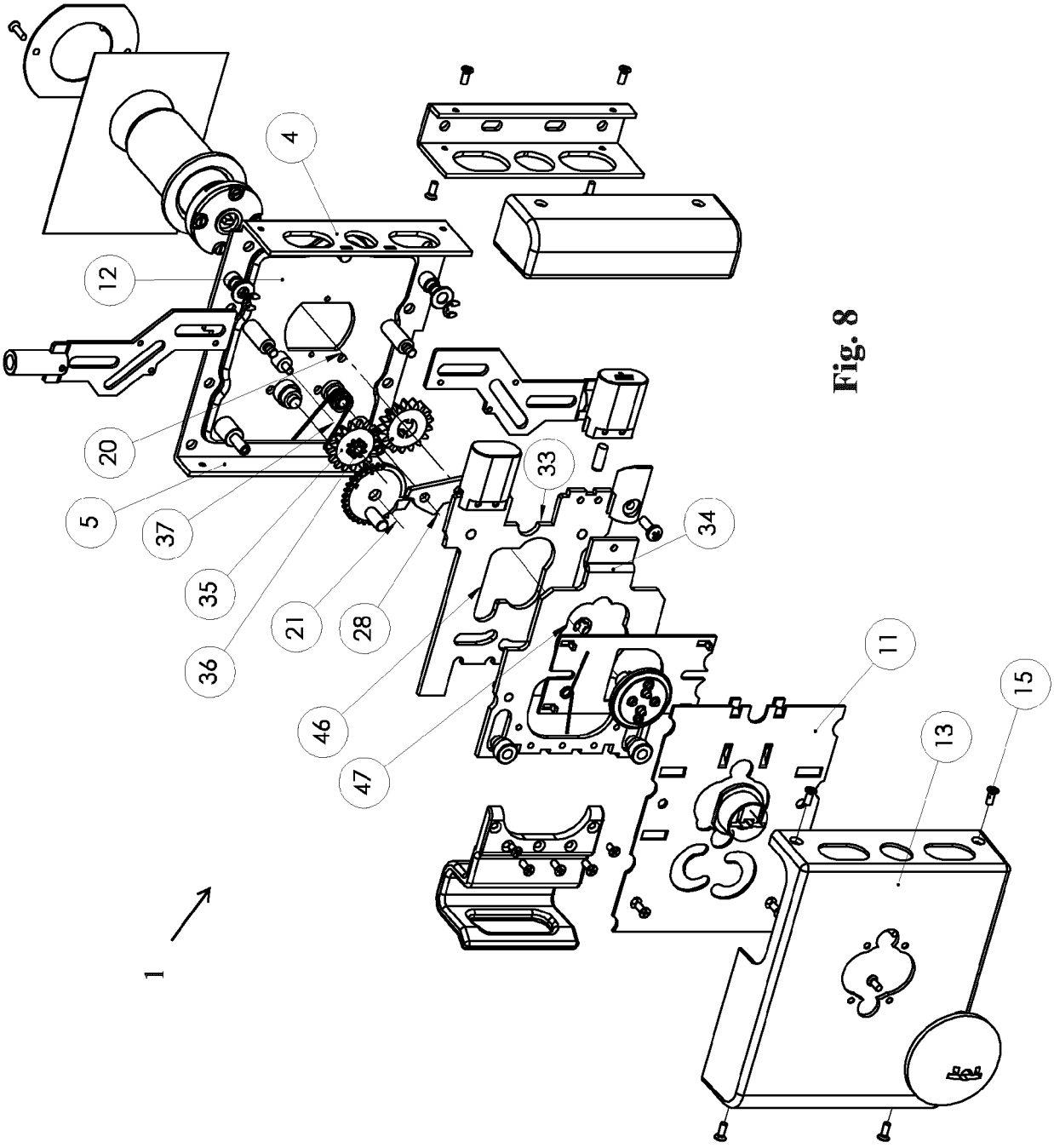
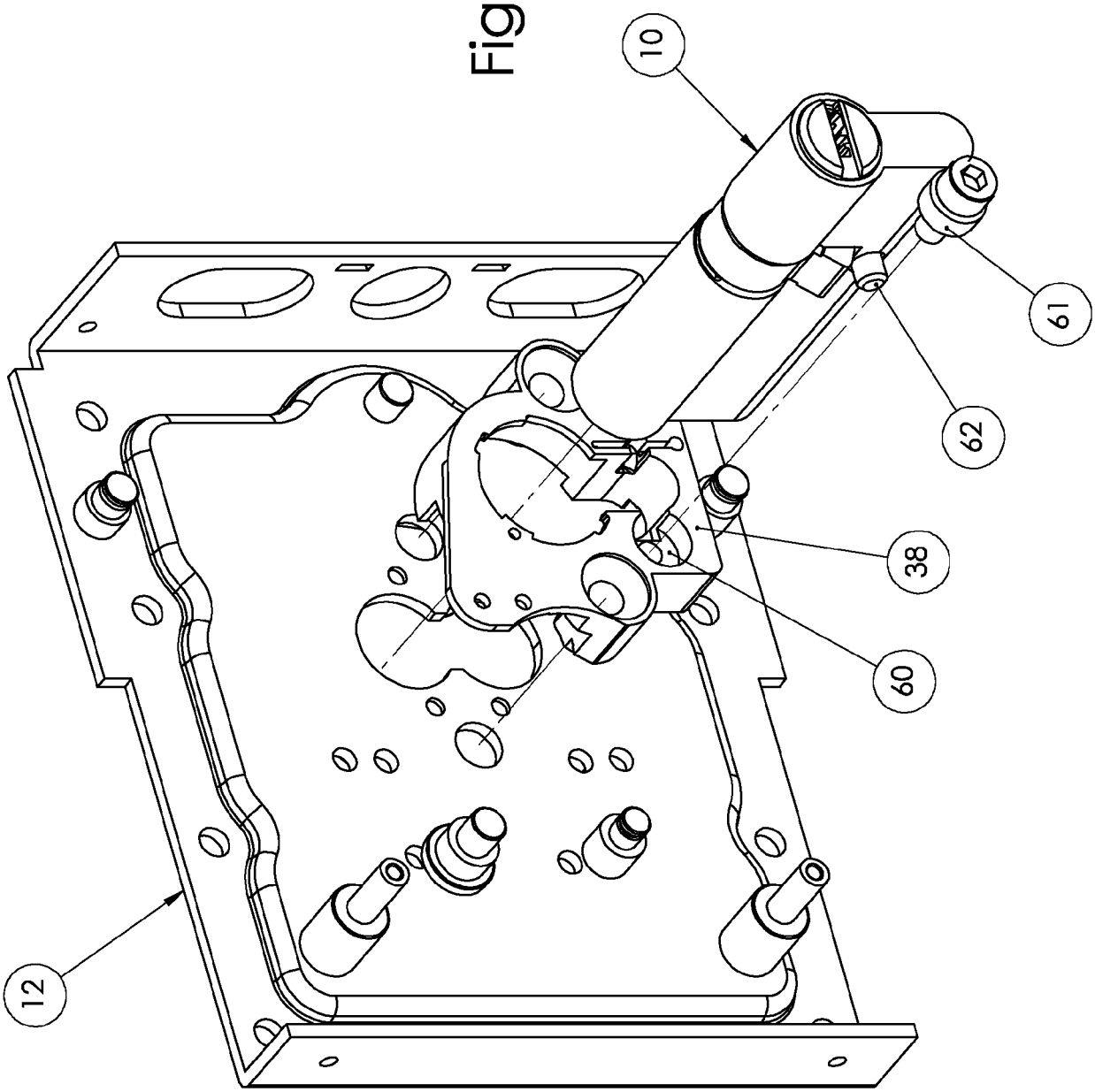


Fig. 8

Fig. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 19 17 8075

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 September 2019	Robelin, Fabrice

CATEGORY OF CITED DOCUMENTS

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