

(19)



(11)

EP 2 123 852 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

25.11.2009 Bulletin 2009/48

(51) Int Cl.:

E05B 23/00 (2006.01)

E05B 35/08 (2006.01)

(21) Application number: **09005751.4**

(22) Date of filing: **24.04.2009**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK TR**

(30) Priority: **21.05.2008 IT MI20080932**

(71) Applicant: **ISEO SERRATURE S.p.A.
25055 Pisogne (Brescia) (IT)**

(72) Inventors:

- **Andreoli, Gian Pietro
25040 Artogne
Brescia (IT)**
- **Fenini, Federico
25040 Esine
Brescia (IT)**

(74) Representative: **Rapisardi, Mariacristina
Ufficio Brevetti Rapisardi S.r.l.,
Via Serbelloni, 12
20122 Milano (IT)**

(54) **Safety lock of the type with deadlock plates, in particular for armored doors**

(57) The safety lock of the type with deadlock plates, in particular for armored doors, comprises a keyhole in which a first operating key for a plurality of locks can be inserted, means for disabling said first key operated by

a second key that can be inserted in the keyhole and is operative only on the lock, and means for actuating at least one element for closing the lock irrespective of the deadlock plates.

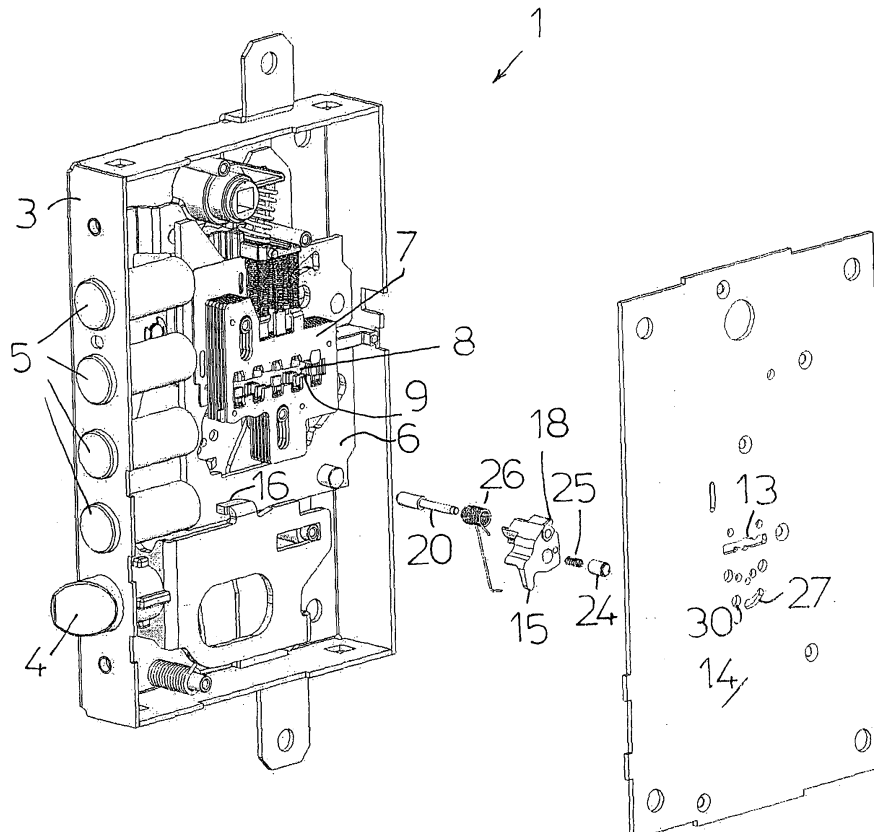


FIG 1

EP 2 123 852 A2

Description

[0001] The present invention relates to a safety lock with a high flexibility of use, to be employed in general for doors, gates, safes, etc.

[0002] As is known, in work-sites the doors of the apartments being built are each provided with at least one lock of the type for armored doors, so that over the entire work-site there exists a multiplicity of locks to be opened and closed according to the need of the works to be carried out or completed inside the premises.

[0003] Above all in work-sites in which there remain residual jobs to be carried out, such as may be those of a plumbing or electrical type or for finishing of the interiors, it is necessary to be able to open the apartments not with the master key, i.e., the final key that will be handed over to the owner of the apartment, but, for example, with a so-called "work-site key", i.e., a key which remains in the hands of the workers who in this way have free access to the apartment.

[0004] Sometimes, in addition to the master key and to the work-site key also a so-called "service key" is provided, which subsequently the owner of the dwelling can hand over, for example, to persons on whom he can rely so as to allow them to have free access to the apartment for instance to carry out the necessary daily cleaning thereof.

[0005] Consequently, the work-site key is disabled to enable use of just the service key and/or master key.

[0006] Hence, in the light of what has been said above, normally each lock of a door present in a work-site is provided with a work-site key, a service key, and a master key, which is able to exclude, as likewise the service key, the possibility of using the work-site key once the main jobs inside the apartment have been completed in such a way as to prevent access to the apartment only to persons on whom it is possible to rely.

[0007] It should be pointed out that, whereas the work-site key is able to open all the locks of all the doors of all the apartments present on the work-site, the service key and the master key are able to open only and exclusively the lock to which they are matched.

[0008] For the reasons highlighted above, there exist on the market at least three main categories of locks that use work-site and master keys and possibly also service keys.

[0009] For example, known to the art is a type of lock that has a part of the mechanism of operation of opening and closing contained in a provisional block with parts made of plastic and that has an extremely contained cost.

[0010] Once the work-site activities have all been completed, the provisional block is replaced by a definitive block containing a pack of levers designed to restore the lock with a new mapping.

[0011] The defects that said solution presents are prevalently due to the fact that it is necessary to intervene on the door by means of removal of the escutcheons, a task that is carried out by specialized staff.

[0012] The costs of said lock then rise considerably also on account of the long times necessary for replacing the provisional block with the definitive block and on account of the fact that two types of locks are necessary, one for doors with opening on the left, and one for doors with opening on the right in so far as, normally, the aforesaid operations are carried out only on the inside of the door.

[0013] Finally, it is to be pointed out that said type of locks needs to be tested on the installation site and not in the factory, with all the drawbacks that this situation can create.

[0014] Another type of locks is substantially similar to the one described above, but, instead of envisaging replacement of the provisional block with a definitive block, it envisages simply replacement of an element capable of modifying mapping of the lock.

[0015] Basically, hence, as compared to the lock described above, only a mapping part is replaced, with lower costs, even though there still remain defects such as the differences in tolerances due prevalently to the fact that testing is not carried out in the workshop but directly on the installation site, giving rise to drawbacks that imply the need to take the lock down for setting it for operation.

[0016] Another type of locks currently present is that of a recodable type, which presents a work-site key and a master key.

[0017] In this case, there is no disassembly of the lock, and hence the lock installed remains unaltered from the moment of installation on.

[0018] In this type of lock, the master key is able, by means of a particular procedure and the use of specific tools, to reprogram mapping of the lock in such a way that the possibility of use of the work-site key is excluded, leaving hence the possibility of using only the master key.

[0019] The drawbacks of this type of locks are prevalently a high cost of the coding device in so far as the levers or plates of which it is made up, in addition to having to move in a vertical direction, must also be able to move, by means of a particular tool, also in a horizontal direction to provide a new coding.

[0020] Consequently, the mechanism of the lock is very complex and also tends to jam easily.

[0021] The task of the present invention is to eliminate the drawbacks outlined above in regard to the known art.

[0022] In particular, in the framework of this task, an important purpose of the invention is to provide a lock that uses a basic mechanism that is inexpensive, and a work-site key that is the same for all the locks of the work-site.

[0023] Another purpose of the invention is to provide a lock that will enable in an automatic way exclusion of the work-site key and/or of the service key by means of a system and mechanism that are extremely simple and functional without the use of any type of tool, without the intervention of specialized staff, and without having to carry out testing on the doors on the work-site, but enabling testing in the factory with all the advantages that

this solution can afford.

[0024] Yet a further purpose of the invention is to provide a lock that can be indifferently used on doors with opening on the left or opening on the right without presenting a particular and special production of levers or deadlock plates.

[0025] Not the least important purpose of the invention is to provide a lock that will enable use of a considerable number of mappings, giving rise to different locks, i.e., that will make it possible to provide a considerable number of locks in so far as the work-site key acts in a way totally independent of the plates of the lock.

[0026] The technical task, as well as the above and further purposes, are achieved, according to the present invention, by providing a safety key in accordance with Claim 1 attached herein.

[0027] Further characteristics of the present invention are moreover defined in the subsequent claims.

[0028] Further characteristics and advantages of the invention will emerge more clearly evident from the description of a preferred though non-exclusive embodiment of the safety lock according to the invention, illustrated purely by way of indicative and non-limiting example, in the attached plates of drawings, in which:

- Figure 1 is an exploded perspective view of the safety lock according to a preferred embodiment of the invention;
- Figure 2 is a side elevation of the safety lock of Figure 1, with the bolt member completely retracted and the spring latch extracted, in the configuration in which the first key is enabled;
- Figure 3 is a side elevation of the safety lock of Figure 1, with the bolt member and the spring latch retracted, once again in the configuration in which the first key is enabled;
- Figure 4 is a side elevation of the safety lock of Figure 1, with the bolt member partially extracted, in the configuration in which the first key is temporarily disabled;
- Figure 5 is a side elevation of the safety lock of Figure 1, with the bolt member completely extracted, in the configuration in which the first key is definitively disabled and the second key is temporarily disabled;
- Figure 6 is a perspective view of the cam of the safety lock of Figure 1; and
- Figures 7, 8, and 9 show a side elevation of a work-site key, of a master key, and of a service key, respectively, for the lock of Figure 1.

[0029] With reference to the aforesaid figures, a safety lock is illustrated, designated as a whole by the reference number 1.

[0030] The lock 1, preferably but not necessarily of the four-throw type, comprises a rigid box-like case 3 present inside which are a spring latch 4 and a bolt member 5, which are kinematically associated to one another.

[0031] The plates 14 for covering the box-like case 3

have a keyhole 13 for introduction of one from amongst a plurality of keys with which the lock 1 can be operated.

[0032] In the keyhole 13 of the safety lock 1 it is possible to introduce a first key 2a, which can operate also on other locks, at least one second key 2b, which can operate only on the lock 1, and preferably also at least one third key 2c, which can operate only on the lock 1.

[0033] The bolt member 5 is carried by a supporting plate 6, which is horizontally mobile between a position of retraction of the bolt member 5 within the box-like case 3 for opening the lock, a partially extracted position corresponding to closing of the lock with two throws, and a completely extracted position corresponding to closing of the lock with four throws.

[0034] The spring latch 4 is, in turn, horizontally mobile between a position retracted within the box-like case 3 for opening of the lock, and an extracted position for closing of the lock.

[0035] The lock 1 presents at least the traditional system for movement of the spring latch 4, comprising a lever 11 for pushing the spring latch 4 pivoted in 12 to the box-like case 3 and a mechanism for transmission of the movement from the key to the thrust lever 11.

[0036] Superimposed on the supporting plate 6 is a pack of deadlock plates or gorges 7, each of which is mobile in vertical translation and has a window 8 with teeth defining passage notches 9 corresponding to the codings of the keys of the lock 1.

[0037] Fixed to the plate 6 for supporting the bolt member 5 is a deadlock element 10 or mentonnet set inside the windows 8.

[0038] Each deadlock plate 7 has, in particular, five notches, which are divided into notches X for actuation of the second and fourth throw and of the spring latch 4 and notches Y for actuation of the first and third throw of the bolt member 5.

[0039] According to an outstanding aspect of the invention, the lock 1 comprises means for disabling the first key 2a, which can be operated at least by the second key 2b and in particular also by the third key 2c, and means for actuation of at least one member for closing the lock 1, in particular the spring latch 4, irrespective of the deadlock plates 7.

[0040] Consequently, the keys 2b and 2c act on the deadlock plates 7 causing the teeth of the windows 8 to coincide so as to open a corridor in which the deadlock element 10 is enabled to slide.

[0041] The key 2a acts, instead, on the deadlock plates but without causing matching of the teeth of the windows and hence without opening the corridor.

[0042] The means for actuating the spring latch 4 irrespective of the deadlock plates 7 comprise at least one cam 15 activated by the first key 2a and acting on the spring latch 4 and in particular on a projection 16 of the plate 17 itself that supports the spring latch 4.

[0043] According to a particularly advantageous aspect, hence, the spring latch 4 can be actuated in a known way by the lever 11 (by means of the second key 2b and

the third key 2c) but also additionally by the cam 15 (by means of the first key 2a) independently of actuation via the lever 11.

[0044] The cam 15 is hinged to the lock 1 and has at least one tooth 18, which can be engaged with at least one countertooth 19 of the first key 2a.

[0045] The first key 2a is able to turn the cam 15 between a position of extraction and a position of retraction of the spring latch 4.

[0046] In particular, the cam 15 is hinged to the covering plates 14 of the box-type body 3 by means of a hinge pin 20, having its axis orthogonal both to the direction of horizontal translation common to the bolt member 5 and to the spring latch 4 and to the vertical direction of displacement of the deadlock plates 7.

[0047] The cam 15 can be actuated by the first key 2a in contrast to and by the action of a torsional return spring 26, wound around the hinge pin 20 and bearing, on one side, upon the cam 15 and, on the other, upon the box-type case 3, which tends to bring it automatically back towards the position of extraction of the spring latch 4.

[0048] The disabling means comprise, instead, a slide 21, activated at least by the second key 2b and preferably also at least by the third key 2c, which has an element 22 for engagement with the cam 15, which is designed to drive it in rotation in a direction opposite to the direction of movement that the key 2a can bestow on the cam 15.

[0049] The slide 21 is obtained from the same plate 6 that supports the bolt member 5.

[0050] The engagement element 22 is mobile between an initial position (Figure 2), in which the first key 2a is kept enabled, an intermediate position (Figure 4), in which it temporarily disables the first key 2a, and a final position (Figure 5), in which it definitively disables the first key 2a.

[0051] In the initial position, the engagement element 22 is disengaged from the cam 15 in such a way as to enable free retraction of the spring latch 4 as a result of driving in rotation of the cam 15 due to engagement of the countertooth 19 of the first key 2a with the tooth 18 of the cam 15.

[0052] In the intermediate position, the engagement element 22 bears upon the cam 15 to oppose rotation thereof from the position of extraction to the position of retraction of the spring latch 4 as a result of engagement of the countertooth 19 of the first key 2a with the tooth 18 of the cam 15.

[0053] In the final position, the engagement element 22 drives the cam 15 in rotation until it is permanently set in a deactivation position in which it can no longer interact with the first key 2a.

[0054] A stud 24, which is mobile in contrast to and for the action of a spring 25, is supported by the cam 15 and is designed to engage in a seat 30 of the lock 1, and in particular of a plate 14 for covering the box-type body 3, to withhold the cam 15 in its deactivation position.

[0055] Advantageously, the first 2a key is a work-site key, the second key 2b is a master key, and the third key

2c is a supplementary service key.

[0056] In this way, the master key is designed to exclude definitively and in an automatic way the work-site key and temporarily and in an automatic way the service key after a pre-set number of turns or throws.

[0057] The service key is, in turn, designed to exclude temporarily and in an automatic way the work-site key after a pre-set number of turns or throws lower than that whereby the master key excludes definitively and in an automatic way the work-site key.

[0058] Basically, the lock 1 enables progressive disabling of the keys that operate it so that each key is automatically disabled either definitively or temporarily by another key with a different coding.

[0059] In the case described in which the lock 1 is of the four-throw type, the service key disables temporarily and in an automatic way the work-site key with the first two throws, whereas the master key disables temporarily and in an automatic way the service key and definitively and in an automatic way the work-site key with the next two throws.

[0060] Each key 2a, 2b, 2c is preferably, but not necessarily, of the double-bit type.

[0061] The first key 2a has, in addition to the countertooth 19, two neutral bits that do not enable it to actuate the deadlock plates 7.

[0062] The keys 2b and 2c, instead, have a first bit corresponding to the notches X and a second bit corresponding to the notches Y, and each bit has as many notches as are the deadlock plates 7. The central area of the keys 2b and 2c is not encoded and has the purpose of driving in horizontal translation the plate 6 for supporting the bolt member 5.

[0063] The two bits of the keys 2a, 2b and 2c are repeated, rotated through 180° with respect to the centre of the key, because the deadlock plates 7 and the cam 15 are positioned asymmetrically within the box-type case 3.

[0064] Operation of the lock 1 is described in brief in what follows.

[0065] The lock 1 is initially in the configuration of Figure 2: even though the bolt member 5 is retracted, the spring latch 4 is extracted so that the lock 1 is closed.

[0066] By introducing the key 2a in the keyhole 13 and turning it, the countertooth 19 acts against the tooth 18 of the cam 15, which is hence driven in rotation (in a counterclockwise direction as viewed in the figures). In rotation, the cam 15 in turn pushes the projection 16 of the plate 17 causing retraction of the spring latch 4 until the lock 1 is opened (Figure 3). During this movement of the cam 15, the stud 24 slides within an arched slot 27 of the plate 14 having its centre of curvature on the rotation pin 20.

[0067] If, starting from the configuration of the lock 1 of Figure 2, the key 2c is introduced into the keyhole 13, after two closing throws, the slide 21 moves into the position in which the engagement element 22 engages against a shoulder 23 of the cam 15 (Figure 4) thus pre-

venting rotation of the cam 15 in the direction for enabling retraction of the spring latch 4. Hence, if in this latter configuration of the lock 1, the key 2a is again introduced into the keyhole 13, in no case will the key 2a be able to bring about retraction of the spring latch 4, given that the cam 15 is blocked. Only with the two opening throws of the key 2c can the key 2a be re-enabled.

[0068] If, starting from the configuration of the lock 1 of Figure 2, the key 2b is introduced into the keyhole 13, during execution of the second two closing throws, the slide 21 advances just enough for the engagement element 22, by engaging against the shoulder 23 of the cam 15, to push the cam 15 into the deactivation position (Figure 5): during rotation of the cam 15, the stud 24 is retracted overcoming the reaction of the spring 25 so as to come out of the slot 27 and then continues penetrating by snap-action into the seat 30 to maintain the cam 15 in the deactivation position. In this position, the cam 15 cannot interact with the key 2a, which is definitively disabled. Also the key 2c is temporarily disabled, given that its coding for the two throws is different from the coding for the four throws of the key 2b. The key 2c is hence again enabled only following upon execution of the first two opening throws of the key 2b. Following upon execution of the four opening throws, the key 2a remains disabled because, as has been said, the cam 15 remains in the deactivation position.

[0069] The lock according to the present invention uses a basic mechanism that is not costly, and a work-site key that on the one hand is the same for all the keys of the work-site and on the other can be excluded by means of an automatic mechanism that is extremely simple and functional that does not require use of any type of tool, or recourse to specialized staff, or execution of testing on the doors on the work-site.

[0070] The lock according to the present invention can be indifferently used on doors with opening on the right and doors with opening on the left.

[0071] Not of least importance, the lock according to the present invention makes it possible to provide a considerable number of locks in so far as the work-site key acts in a way totally independent of the deadlock plates.

[0072] In practice, the materials used, as well as the dimensions, can be any whatsoever according to the requirements and the state of the art.

Claims

1. A safety lock of the type with deadlock plates, in particular for armored doors, **characterized in that** it comprises a keyhole in which a first operating key for a plurality of locks can be inserted, means for disabling said first key, operated by a second key that can be inserted in said keyhole and is operative only on said lock, and means for actuating at least one element for closing said lock irrespective of said deadlock plates.

2. The safety lock according to Claim 1, **characterized in that** said actuation means comprise at least one cam activated by said first key and acting on said closing element.

3. The safety lock according to one or more of the preceding claims, **characterized in that** said closing element is the spring latch of said lock.

4. The safety lock according to one or more of the preceding claims, **characterized in that** said cam is hinged on said lock and has at least one tooth that can be engaged with at least one countertooth of said first key.

5. The safety lock according to one or more of the preceding claims, **characterized in that** said disabling means comprise a slide, which can be actuated by at least said second key, which has an element for engagement with said cam designed to drive it in rotation in a direction opposite to the direction of movement that said first key is designed to bestow on said cam.

6. The safety lock according to one or more of the preceding claims, **characterized in that** said engagement element is mobile between an initial position of disengagement from said cam, in which said first key is enabled, an intermediate position, in which it counters rotation of said cam for temporary disabling of said first key, and a final position, in which it sets said cam permanently in a deactivation position for definitive disabling of said first key.

7. The safety lock according to one or more of the preceding claims, **characterized in that** said cam comprises at least one stud that is mobile in contrast to and by the action of a spring, said pin being designed to engage in a seat of said lock for withholding said cam in said deactivation position.

8. The safety lock according to one or more of the preceding claims, **characterized in that** it comprises at least one third key designed to activate said disabling means.

9. The safety lock according to one or more of the preceding claims, **characterized in that** said first key is a work-site key, said second key is a master key, and said third key is a supplementary service key, said master key being designed to exclude definitively and in an automatic way said work-site key and temporarily and in an automatic way said service key after a pre-set number of turns or throws.

10. The safety lock according to one or more of the preceding claims, **characterized in that** said service key is designed to exclude temporarily and in an au-

tomatic way said work-site key after a pre-set number of turns or throws lower than that whereby said master key excludes definitively and in an automatic way said work-site key.

5

11. A process for progressive disabling of keys of a safety lock of the type with deadlock plates, in particular for armored doors, **characterized in that** it consists in the fact that each key is automatically disabled either definitively or temporarily by the subsequent key with different coding. 10
12. A process for progressive disabling of keys of a safety lock of the deadlock-plate and four-throw type, in particular for armored doors, according to the preceding claim, **characterized in that** a service key disables temporarily and in an automatic way a work-site key with the first two throws, and a master key disables temporarily and in an automatic way said service key and definitively and in an automatic way said work-site key with the further two throws. 15 20
13. A set of keys of a safety lock of the type with deadlock plates, in particular for armored doors, **characterized in that** it comprises a work-site key that is operative on at least one element for closing said lock irrespective of the presence of said deadlock plates, a service key, designed to exclude temporarily and in an automatic way said work-site key, and a master key, designed to exclude temporarily and in an automatic way said service key and definitively and in an automatic way said work-site key. 25 30
14. A safety lock of the type with deadlock plates, in particular for armored doors, as described and claimed herein. 35

40

45

50

55

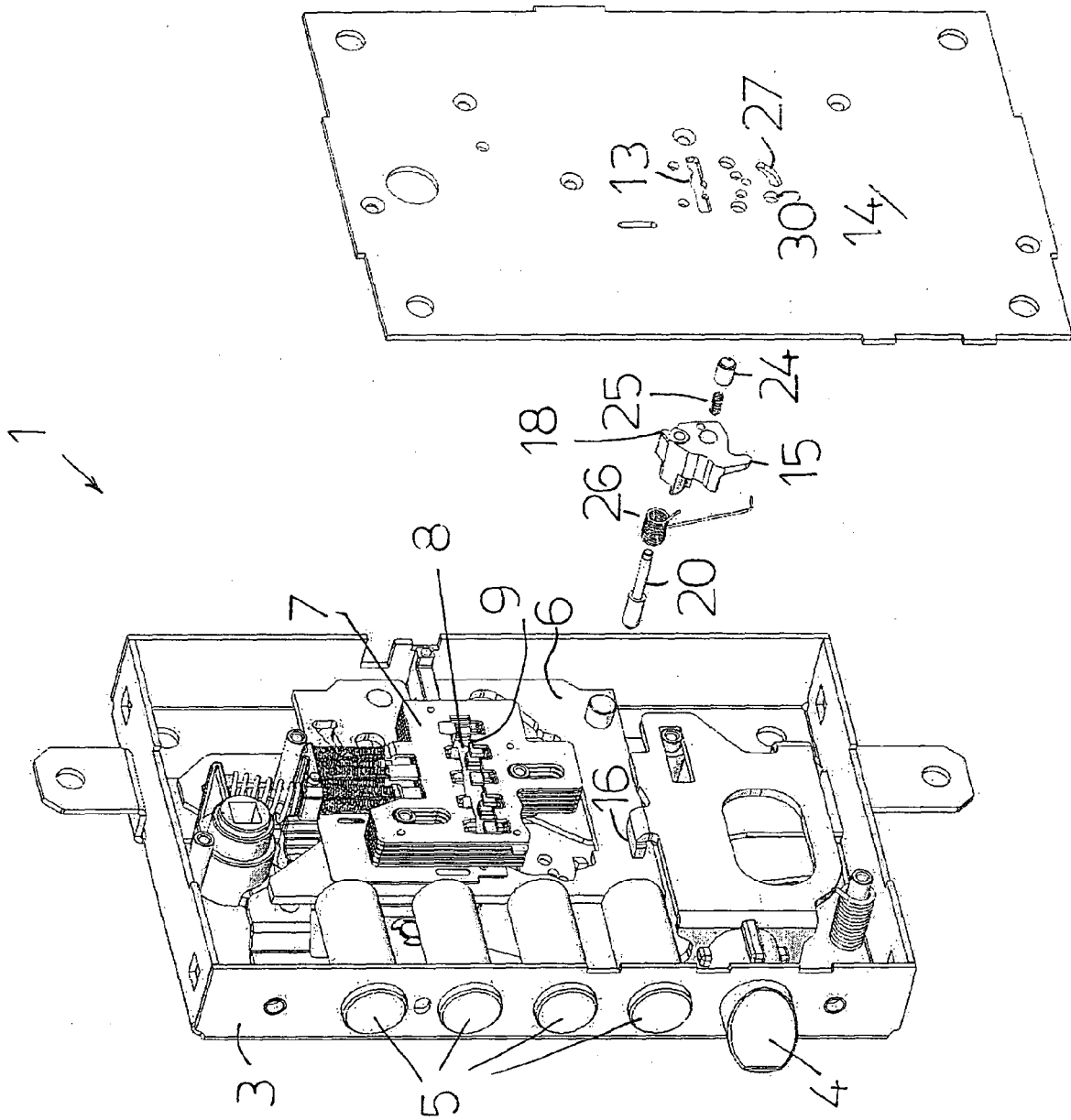
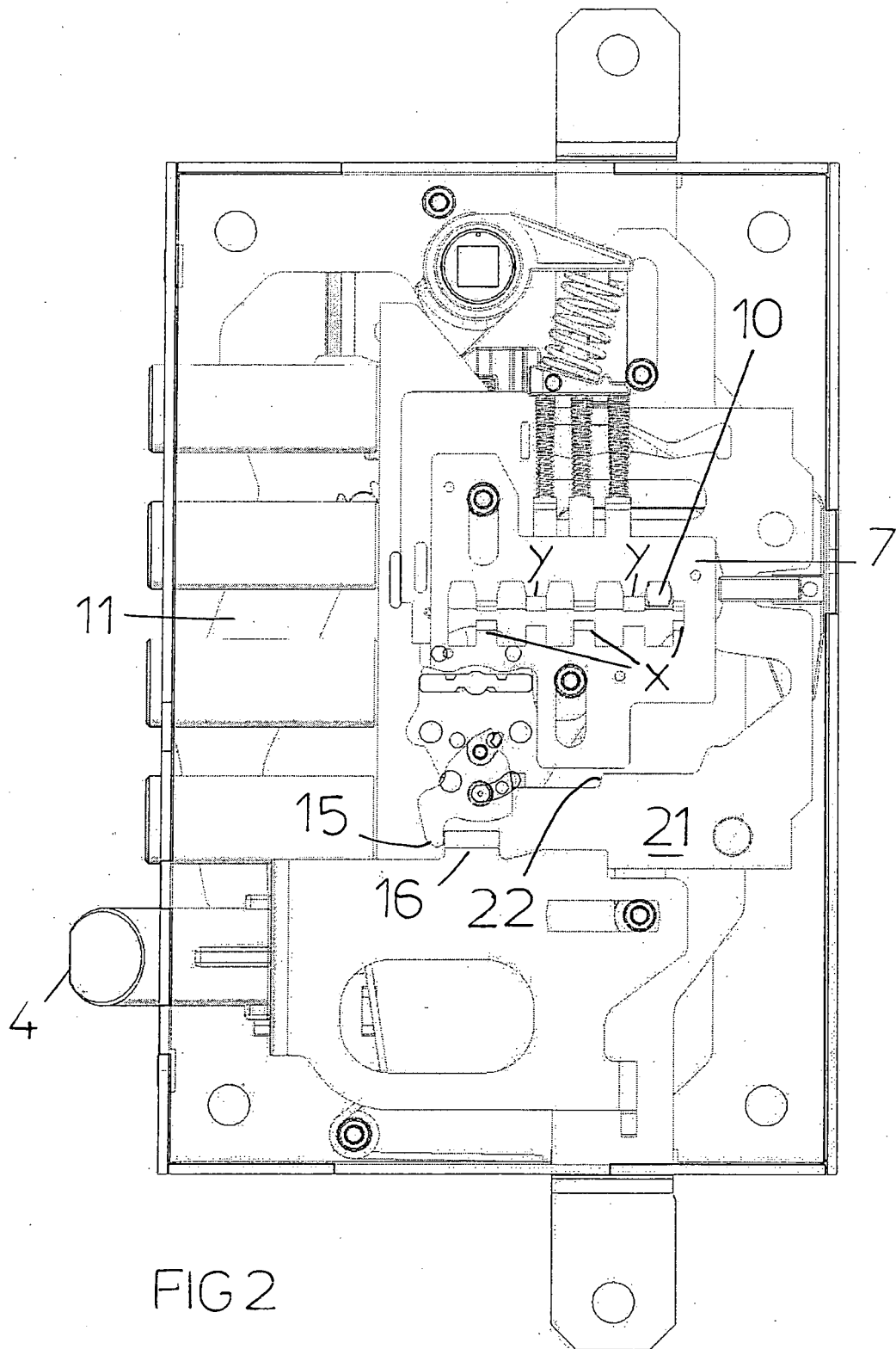
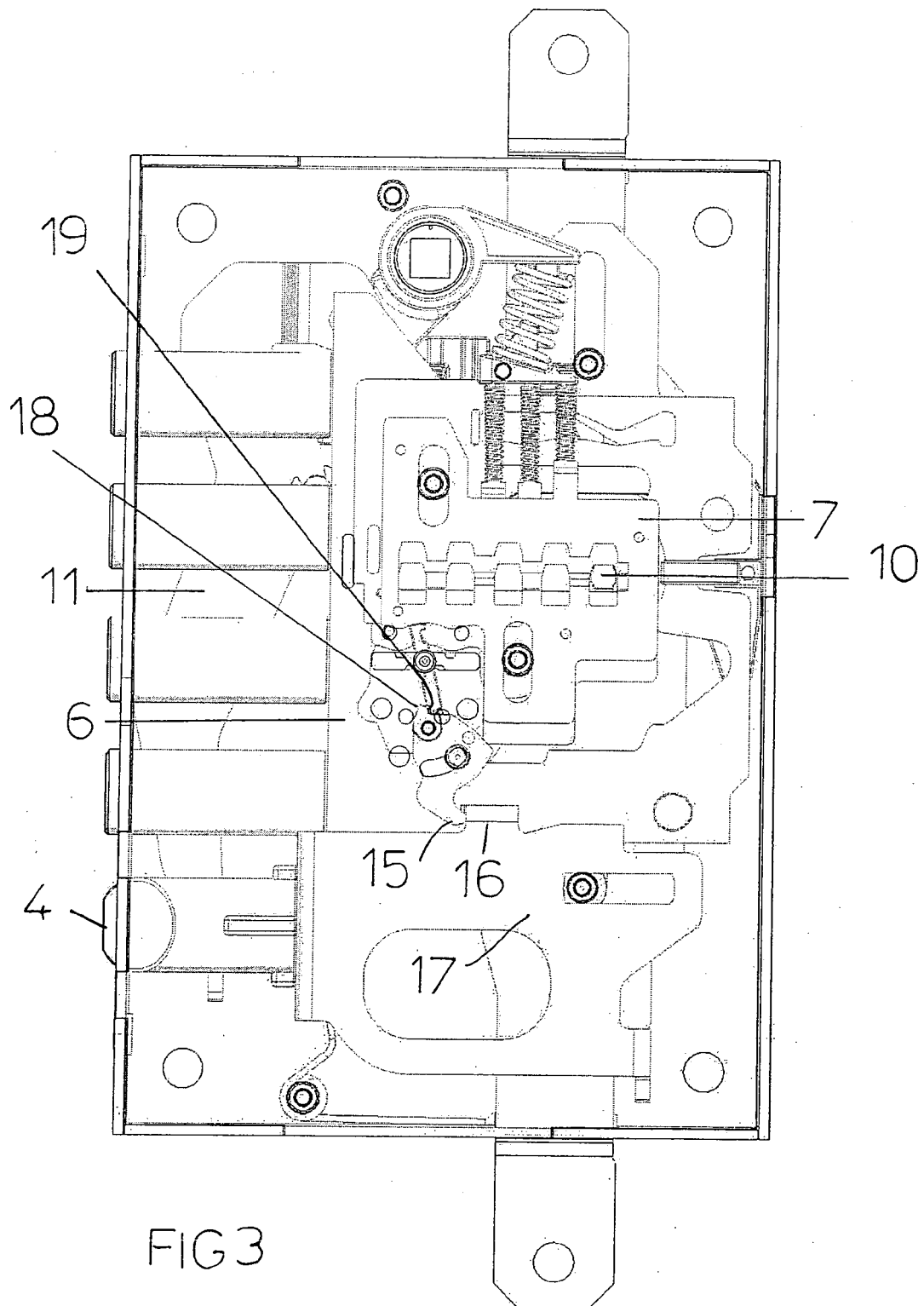
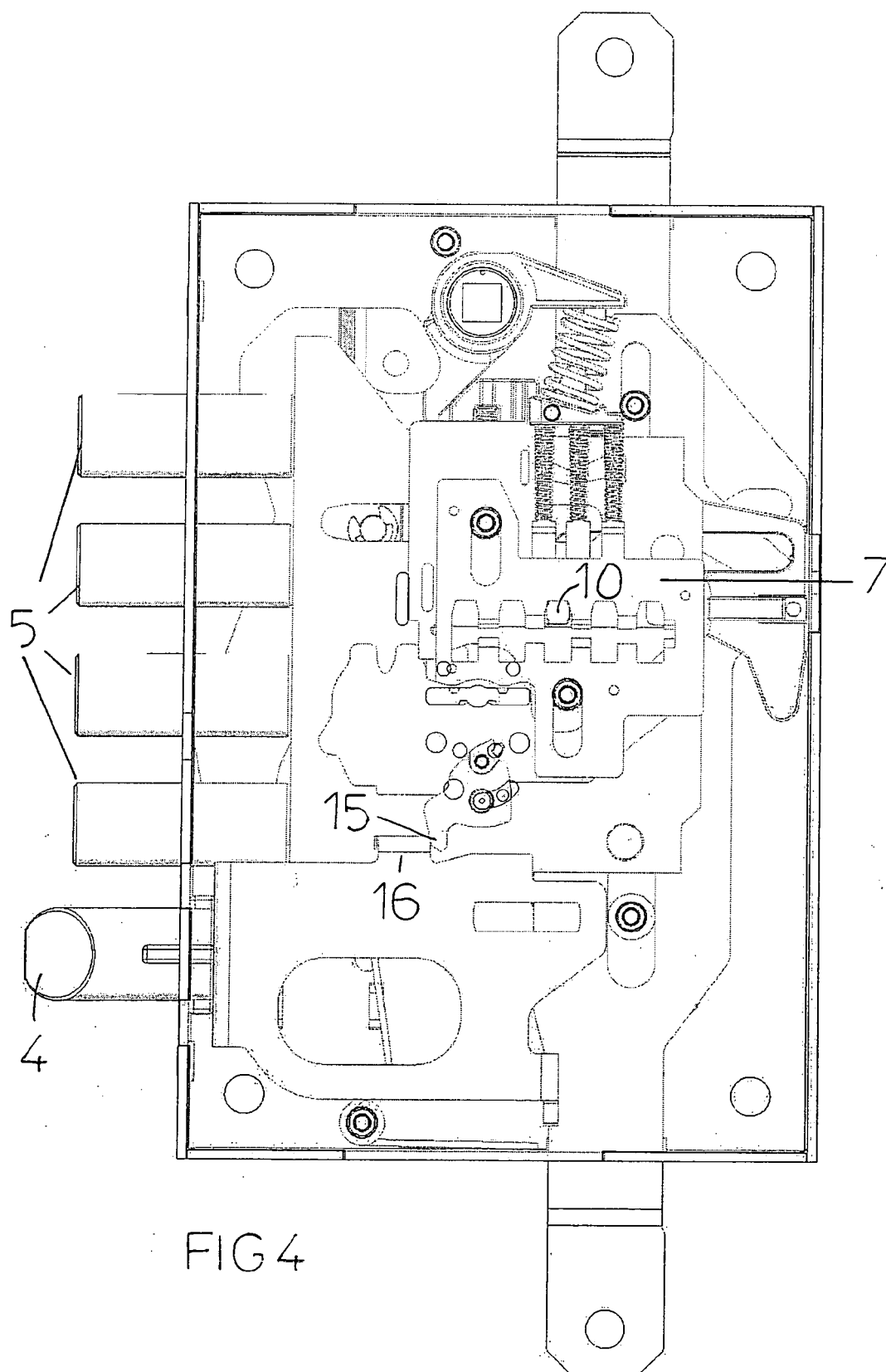
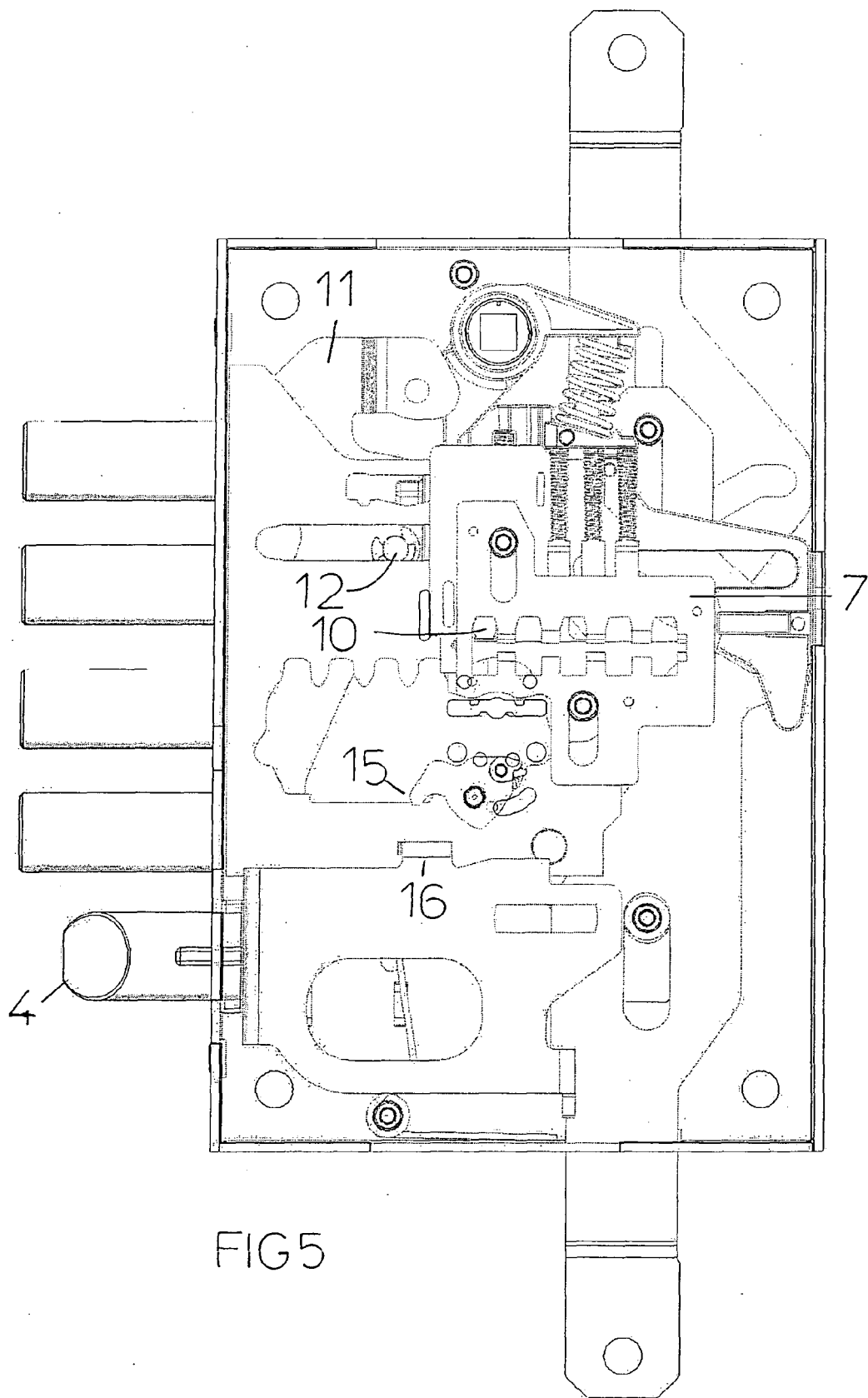


FIG1









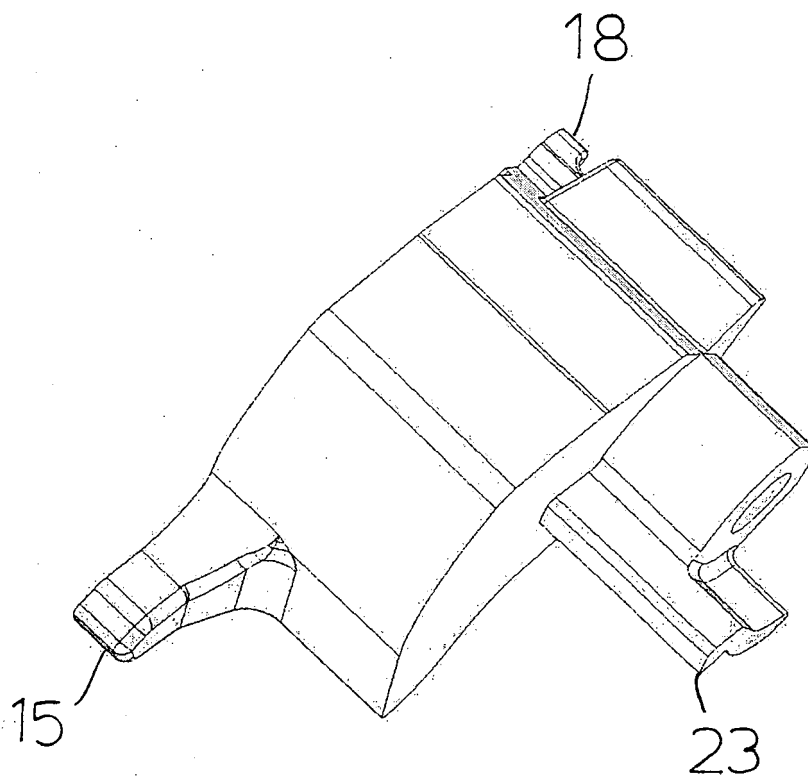


FIG 6

