

(19)



(11)

**EP 2 031 157 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**04.03.2009 Bulletin 2009/10**

(51) Int Cl.:  
**E05B 9/00 (2006.01) E05B 59/00 (2006.01)**  
**E05C 9/02 (2006.01) E05C 9/18 (2006.01)**

(21) Application number: **07016904.0**

(22) Date of filing: **29.08.2007**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR MK RS**

(72) Inventor: **Anselmi, Enzo**  
**50021 Barberino val d'Elsa (FI) (IT)**

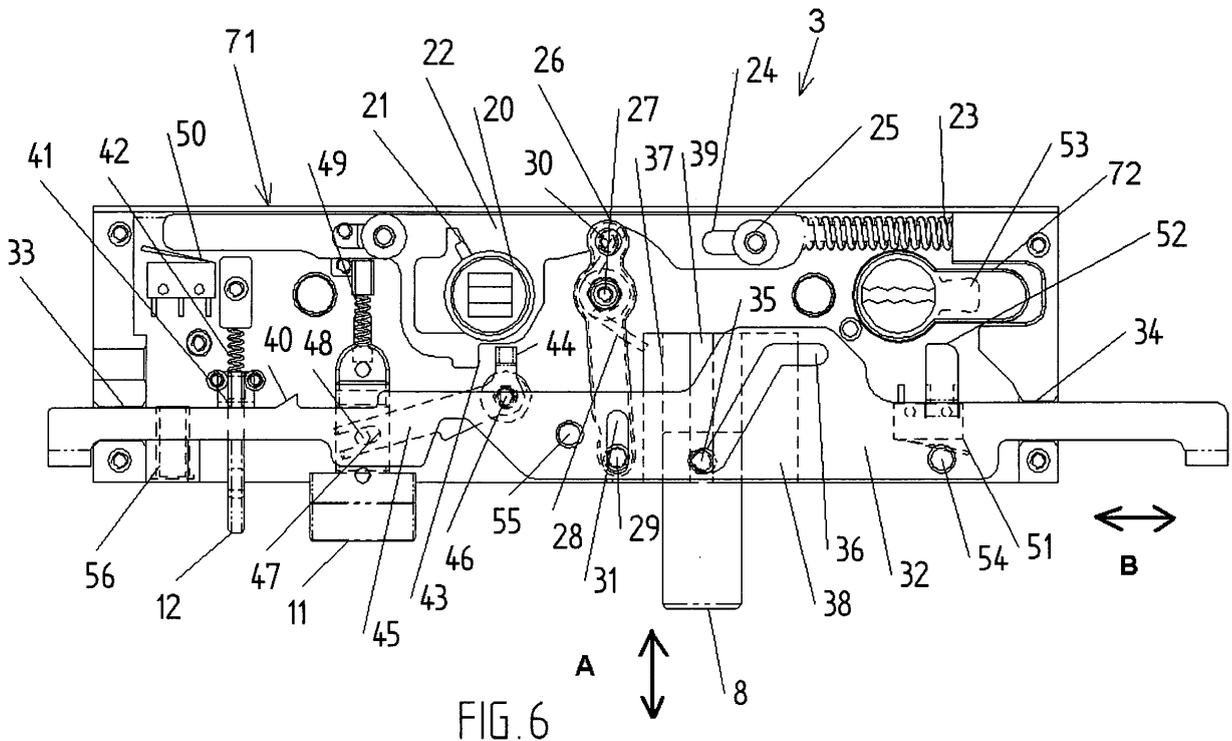
(74) Representative: **Lanzoni, Luciano**  
**Bugnion S.p.A.**  
**Via dei Rustici, 5**  
**50122 Firenze FI (IT)**

(71) Applicant: **Anselmi, Enzo**  
**50021 Barberino val d'Elsa (FI) (IT)**

(54) **Safety lockset**

(57) Safety lockset for abutting shutters, comprising at least a safety element (8) and at least a release catch (11, 12) which are solid to an abutting shutter, and further comprising an opening/closing mechanism able to operate said safety element and said catch to removably insert

them into corresponding seats (14, 16, 13) of a stationary selvage (2) in order to block the shutter to the selvage (2) on command, wherein said safety element consists of a cylinder (7, 9) sliding in a direction (A) transverse to selvage (2) inside a cylindrical seat (37) formed in a metal block (38) solid to the movable shutter.



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## Description

**[0001]** The present invention refers to a safety lockset of a type applicable to a movable shutter of a door or window, and comprising at least a closing latch to be engaged on command into a seat or selvage solid to a stationary striker.

**[0002]** The safety locksets of known type are not always satisfactory from the point of view of their resistance against attempts of breaking the door open, and exhibit also further drawbacks when the doors in question must be suited for an emergency opening, for example, when they are of so-called antipanic type and be able to open up also when subjected to significant pressure, such as in the case of a mass of people rushing off of an ambient to be evacuated.

**[0003]** In all these cases, there is the need for a safety door which is robust and at the same time able to meet law requirements for the opening thereof in an emergency situation.

**[0004]** A first object of the invention is therefore to propose a safety lockset which is both reliable and able to meet the requirements for "antipanic" doors.

**[0005]** A second object is to propose a lockset whose opening condition, from the inside and the outside, and by means of a handle or a key, can be remote-controlled.

**[0006]** The technical task and the specified objects are substantially achieved by a safety lockset which has the technical characteristics set forth in one or more of the appended claims.

**[0007]** Further characteristics and advantages of the present invention will be more evident from a reading of the indicative, and thus not limiting, description of a preferred, non-exclusive embodiment thereof, as illustrated in the accompanying drawings, wherein:

- Figs. 1 and 2 are, respectively, a side view and a front view of a lockset for movable shutter, according to the invention;
- Figs. 3 and 4 are, respectively, a side view and a front view of a selvage for a lockset according to the invention;
- Fig. 5 is an axonometric view of the lockset of Fig. 1;
- Fig. 6 shows a first configuration of a detail of the central body of the lockset in Fig. 1;
- Fig. 7 shows a second configuration of a detail of the central body of the lockset in Fig. 1;
- Fig. 8 shows a detail of a terminal body of the lockset in Fig. 1;
- Fig. 9 shows a detail in a rear view of the central body of the lockset in Fig. 1.

**[0008]** With reference to the attached figures 1 to 4, a lockset according to the invention comprises a closing central body 3 fixed to a front 6 of a movable shutter of a door or window (not shown) which, in use, moves close to a selvage 2 intended to be secured to a stationary shutter of the same door.

**[0009]** In the illustrated example, the body 3 is provided with a safety cylinder 8, a main release catch 11 and a second catch 12, and is completed by a pair of peripheral closing bodies 4, 5 connected to the main body by rods 18, 19 (Fig. 5).

**[0010]** In the approaching position, the catch 11 and cylinders 7, 8, 9 correspond to the position of as many seats 11, 14, 16 of selvage 2.

**[0011]** Advantageously, according to the invention, the seat 13 of catch 11 is adjustable transversally by set-screw means 70, and the dimensions of the slots 14-16 intended to receive the cylinders have such dimensions that, in use, when the shutter is closed and the cylinders and the catch are inserted into the respective seats, the contact occurs only with the catch's seat 13.

**[0012]** By this solution, also in case of a high pressure on the door, the cylinders are free to move and the frictions that counteract the opening of the door result reduced, so that the law requirements for "antipanic" locksets are met.

**[0013]** Following herebelow, with reference to Figs. 6 and 7, is a more detailed description of the operation of the lockset 1 in relation to the main closing body 3.

**[0014]** The body 3 comprises a frame 71 inside which an opening/closing square piece 20 is able to rotate.

**[0015]** The square piece 20 is provided with a tooth 21 which, upon the rotation of same square piece, engages a plate or slide 22 which is guided for a longitudinal sliding movement by fixed pivots 25 going through slots 24 of plate 22 against the action of a counteracting spring 23.

**[0016]** In its ongoing travel (to the right in Fig. 6), the plate 22 engages and moves a first end 30 of a lever 26 having central fulcrum 27 and also rotating against the action of a return spring 28. The opposite end of lever 26 is provided with a pivot 29 sliding into a transverse slot 31 of a plate or slide 32 longitudinally guided by guides 33, 34 formed in the frame 71.

**[0017]** The plate 32 is also provided with a Z-shaped slot 36 having an inclined central length and inside which a pin 35, solid to the cylinder 8, is slidingly engaged.

**[0018]** The cylinder 8 is in turn engaged for sliding within a cylindrical seat 37 of a solid metal block 38, the sliding pin 35 being kept in transverse position by an upper slit 39 of seat 37.

**[0019]** Advantageously, the disposition of the cylinder which remains, at least partially, always inside a metal block 38, lends the lockset greater sturdiness and reliability against any attempt of breaking the door open.

**[0020]** The plate 32 is also provided with a tooth 40 which, upon the forward travel of plate 32, moves to the right until it finds, and then gets past, a striker 41 of the second catch (12).

**[0021]** It should be noted that in this stage, the lockset is performing the opening movement, that is, with the catch 12 being into abutment against the selvage 2 and in a retracted position with the spring 42 in compressed condition.

**[0022]** After the first rotation of square piece 20, the

cylinder 8 results partially re-entered into the seat 37, and the plate 22 has moved forward to the left as far as to engage a tooth 43 thereof which protrudes to interfere with the first end 44 of a lever 45 having central fulcrum 46, the opposite end of the lever being provided with a slot 47 along which a pin 48, solid to the body of catch 11, is able to slide.

**[0023]** As the square piece continues to rotate, the catch 11 is made to fully retract, so that the movable shutter disengages from the selvage and the door can open up.

**[0024]** Upon the opening, the catch 12 is released from its contrasting relationship with the selvage 2 and is withdrawn by the spring 49. In this opening configuration of the lockset (Fig. 7), the tooth 40 has passed the striker 41 on the right so as to counteract the spontaneous return of plate 32 to the left (at the bottom in the position of use) owing both to the action of gravity and of springs 23, 28.

**[0025]** Alternatively, the opening of lockset 1 may take place, instead of by rotating the square piece 20 with a handle, by acting on a cylinder 72 provided with a rotary bit 53 able to engage a tooth 52 of plate 32 and performing the displacement of the rod as above described.

**[0026]** It is to be noted that in this case, the movement of catch 11 occurs when a pivot 55 of plate 32 encounters the lever 45 and, by forcing it into rotation, makes it to perform the movement above described, while the plate 22 remains inactive.

**[0027]** According to the invention, the plates 32 and 22 are provided with switches 51, 50 which are activated the moment the opening configuration of the door is reached, said switches being able to feed a door-opening signal to a remote control unit.

**[0028]** Advantageously, since in case of door-opening by means of cylinder 72, the plate 22 remains inactive, if the switch 51 is made to close and the switch 50 remains open, the processing control unit provides the information that the door has been opened by a user who has a key.

**[0029]** Fig. 7 shows the configuration of catch 11 just before the abutment of the shutter against the selvage 22 upon the closing of the door.

**[0030]** In this configuration, when the catch 11 encounters the edge of selvage 2 and begins to withdraw (before the catch 12 encounters in its turn the same selvage), provision is made for a catch's pin 57 engaging a recess (58) of plate 32 to prevent the same plate from dropping. This configuration keeps on until the catch 11 goes into the seat 13, the pin 57 advances and disengages the plate 32, and the catch 11 is again compressed, thereby releasing the tooth 40, so that the plate 32 is able to perform the closing travel.

**[0031]** Fig. 8 illustrates the opening/closing movement of cylinder 9 of terminal block 5. However, the same considerations apply to block 4.

**[0032]** The closing movement of plate 32 is transmitted by the rod 19 to a plate 59 of block 5 sliding on guides 67 formed in the frame 73 of same block 5. The plate 59 is also provided with a slot 64 sliding longitudinally on

fixed pivot 65 against the action of a spring abutting against a tab 68 of plate 59.

**[0033]** The plate 59 is further provided with a Z-shaped slot having its central length inclined to the transverse direction and inside which a pin 60 of cylinder 9 can slide, the same pin being also able to slide inside a cylindrical seat 63 of a metal block 62 so as to perform the extraction and retraction travels operated through the movement of the main plate 32.

**[0034]** Finally, Fig. 9 shows, in a rear view of block 3, a plate 22', twin of the above described plate 22 and having the same functions, save for the fact that the plate 22 is driven, against the thrust of a spring 23', by a second square piece 20' operable from the outer side of the movable shutter.

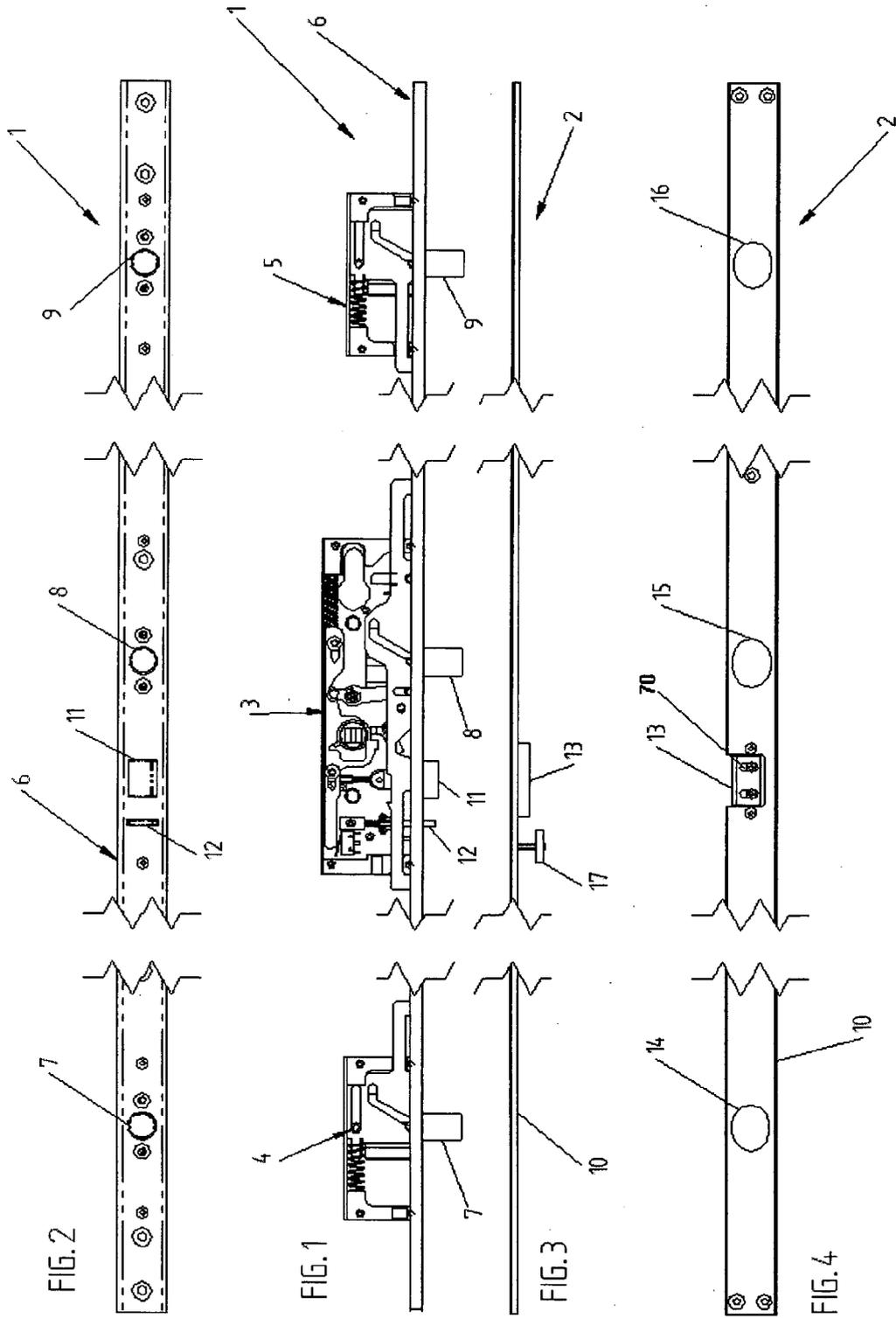
**[0035]** Advantageously, the rod 22', when actuated, compresses a relevant switch 50', so that the remote control unit is able to distinguish whether the opening has occurred from the outside with the actuation of switch 50', or from the inside with the actuation of switch 50.

**[0036]** The invention thus conceived is evidently suited for industrial application; the same invention can also be subjected to several modifications and changes falling within the scope of the inventive idea; moreover, all the parts may be replaced by other elements technically equivalent.

### Claims

1. Safety lockset for abutting shutters, comprising at least a safety element (8) and at least a release catch (11, 12) which are solid to an abutting shutter, and further comprising an opening/closing mechanism able to operate said safety element and said catch to removably insert them into corresponding seats (14, 16; 13) of a stationary selvage (2) in order to block the shutter to the selvage (2) on command, wherein said safety element consists of a cylinder (7-9) sliding in a direction (A) transverse to selvage (2) inside a cylindrical seat (37) formed in a metal block (38) solid to the movable shutter.
2. Lockset according to claim 1, wherein the position of the seat (13) for the insertion of catch (11) is adjustable in transverse direction on the selvage (2) so that, in the configuration of approach of the movable shutter to the selvage (2) and of insertion of the cylinder and catch into the respective seats (13, 15), there will be a contact between catch (11) and adjustable seat (13) and absence of contact between cylinder (8) and respective seat (15).
3. Lockset according to claim 1 or 2, wherein said sliding of the cylinder is obtained through a first shaped plate (32) sliding in longitudinal direction (B) and engaged with the cylinder (8) by a pin (35) solid to the cylinder and sliding along an inclined slot (36) of plate

- (32).
4. Lockset according to claim 3, wherein the longitudinal sliding of plate (32) is caused by the rotation of an opening/closing square piece (20) engaged to a second shaped plate (21) which slides longitudinally and is its turn engaged to one end of a lever having central fulcrum (26) and bearing on the opposite end a pin (29) slidingly engaged within a transverse slot (31) of the first plate (32). 5
  5. Lockset according to claim 3, wherein the longitudinal sliding of plate (32) is caused by the rotation of a bit (53) abutting against a tooth (52) of same longitudinally sliding plate (32). 10
  6. Lockset according to claim 4, wherein said second shaped plate (21) is able to slide longitudinally owing to the rotation of square piece (20) and to engagement thereof with a first end of a lever having central fulcrum (45) and provided with a slot (47), at the opposite end, in which a transversally running pin (48) is slidingly engaged solid to catch (11). 15
  7. Lockset according to claim 6, wherein said longitudinally sliding plate (32) is provided with a pivot (55) able to press onto a side of lever (45) being engaged with pin (48) of catch (11) by means of slot (47). 20
  8. Lockset according to any of the preceding claims 3-7, comprising a second catch (12) transversally sliding between an extracted position for the opening of the shutter and a retracted position in abutment with said selvage (2) for the closing of same shutter, wherein the catch (12) comprises an engagement surface (41) which, in said extracted position, interferes with the longitudinal sliding of a tooth (40) of plate (32), and in said retracted position allows the longitudinal sliding of same tooth (40). 25
  9. Lockset according to any of the preceding claims 3-8, wherein said plate (32) has a recess (58) which, in use, is engaged by a pin (57) solid to the catch (11) so as to temporarily prevent a longitudinal sliding of return travel of plate (32). 30
  10. Lockset according to any of the preceding claims, comprising a sensor, associated with said movable shutter and with said selvage, to detect the condition of the movable shutter moving close to the selvage. 35
  11. Lockset according to claim 10, wherein said sensor comprises a magnet solid to the selvage and an alignment detector solid to the movable shutter in correspondence of the magnet's position. 40
  12. Lockset according to any of the preceding claims, comprising a switch (51), operable after the sliding of plate (32) upon the opening travel, to feed a signal, relevant to the opening condition of cylinder (8), to a remote control unit. 45
  13. Lockset according to any of the preceding claims, comprising a switch (52), operable after the sliding of second plate (22) upon the closing travel, to feed a signal, relevant to the opening condition of cylinder (8) due to the rotation of square piece (20), to a remote control unit. 50
  14. Lockset according to any of the preceding claims, comprising a second twin plate (22') matched to said plate (22) and movable by the action of a second square piece (20') operable from a side external to the shutter, and further comprising a switch (51'), operable after the sliding of twin plate (22') upon the opening travel, to feed a signal, relevant to the opening condition of cylinder (8) due to the rotation of second square piece (20'), to a remote control unit. 55
  15. Lockset according to any of the preceding claims, comprising a pair of intermediate-control rods (18, 19) connected to closing blocks (4, 5) disposed below and above said central block (3) and each being provided with at least a closing cylinder (7, 9) sliding in a direction (A) transverse to selvage (2) within a cylindrical seat (63) formed in a solid metal block (62) integral with the movable shutter.
  16. Lockset according to claim 14, wherein said sliding of cylinder (7, 9) is achieved by a third shaped plate (59) sliding in a longitudinal direction (B) along with said plate (32) and being engaged with cylinder (7, 9) by means of a pin (60) solid to the cylinder and sliding along an inclined slot (61) of plate (59).
  17. Lockset according to claim 14, wherein the longitudinal distance between said blocks (4, 5) is between 50 and 150 cm, preferably 100 cm.



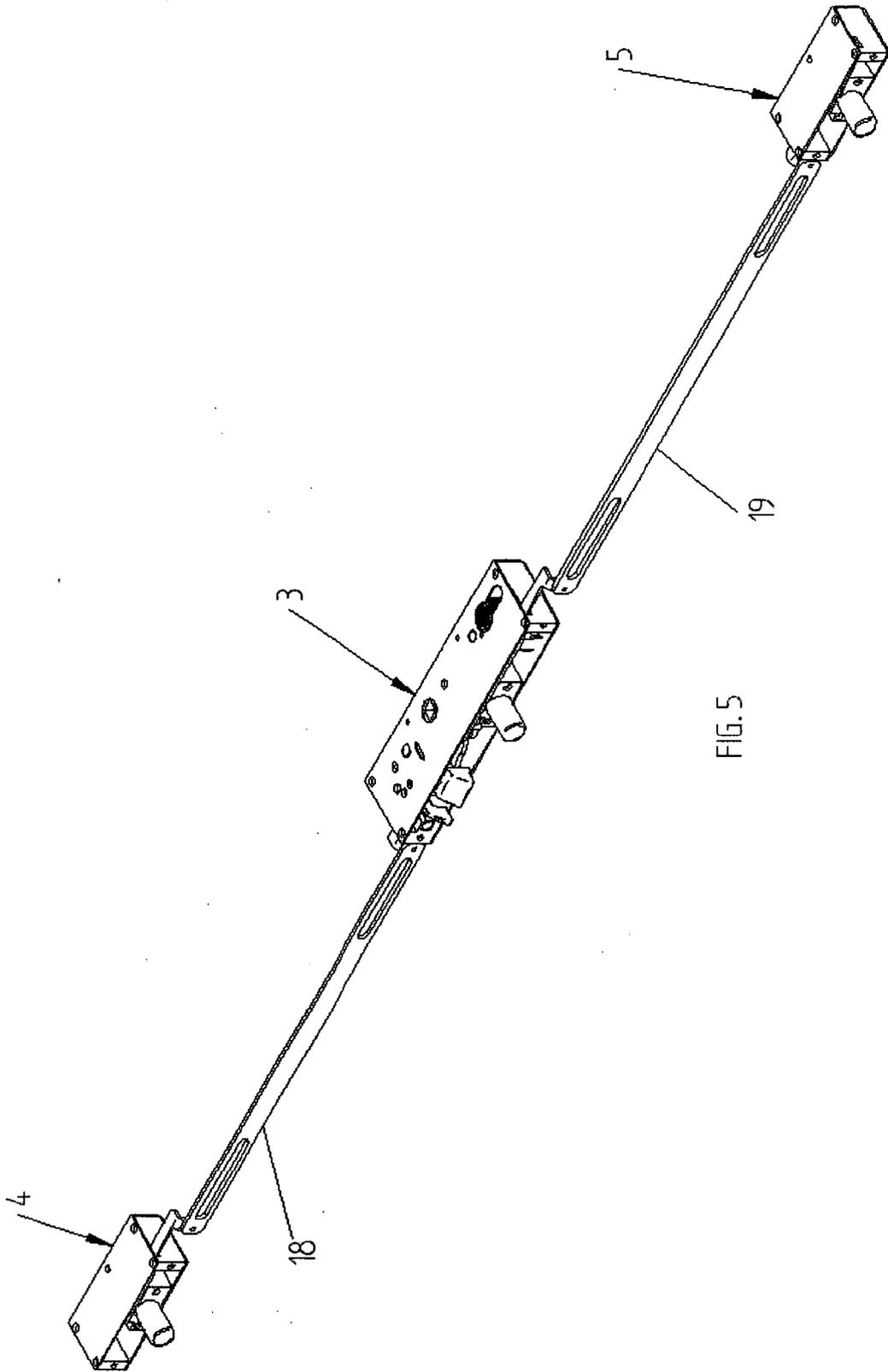


FIG. 5

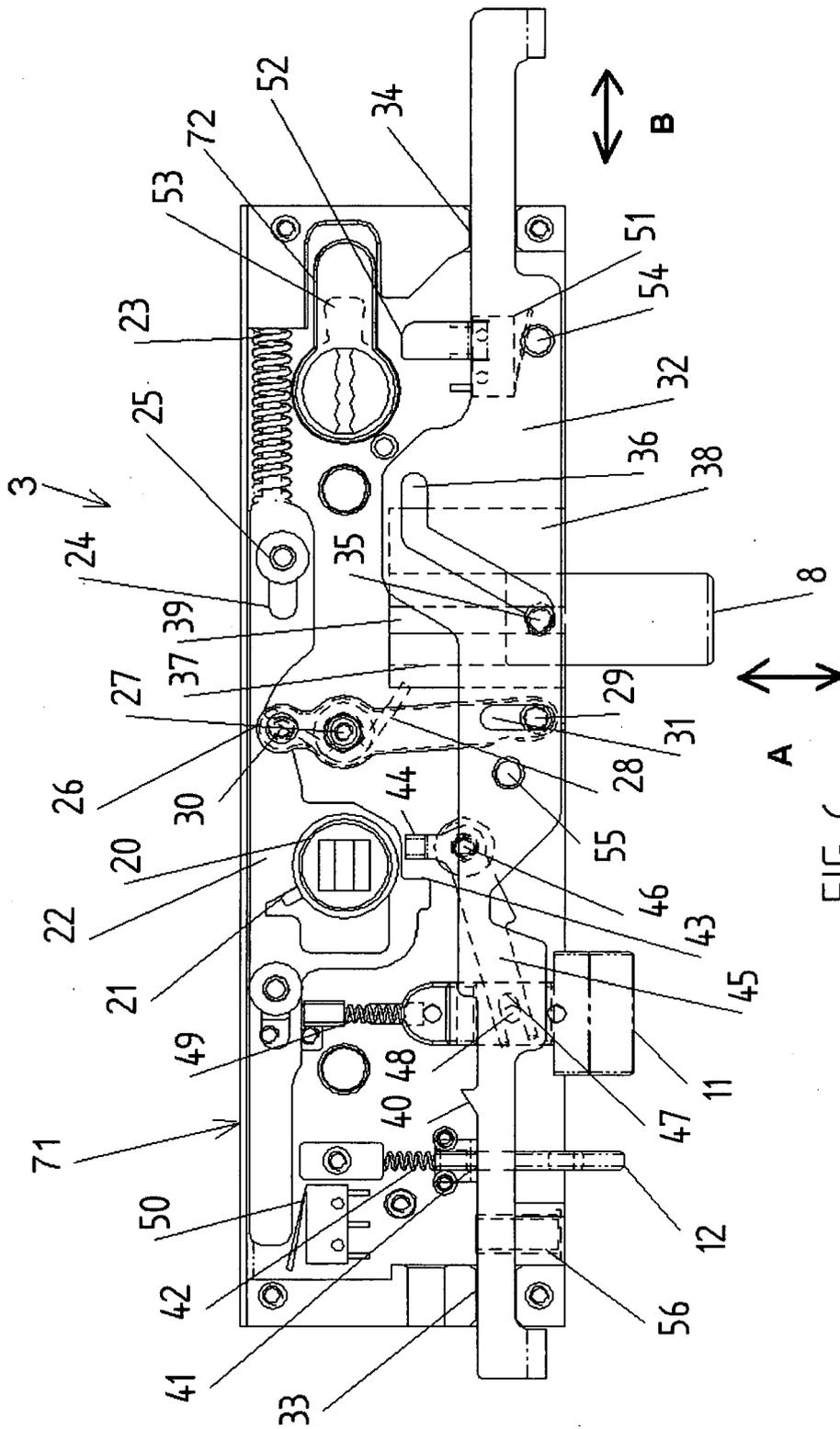


FIG. 6

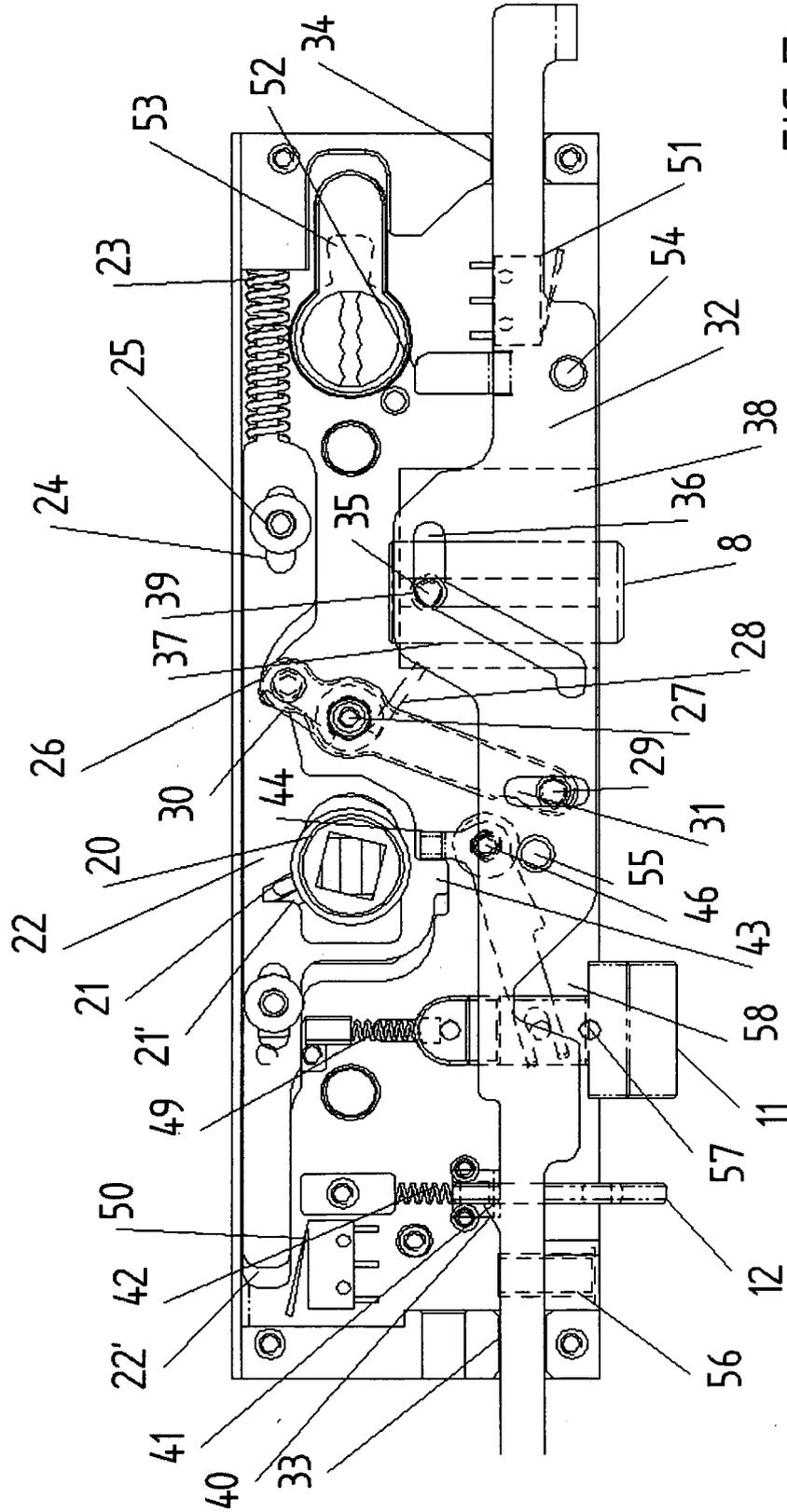


FIG.7

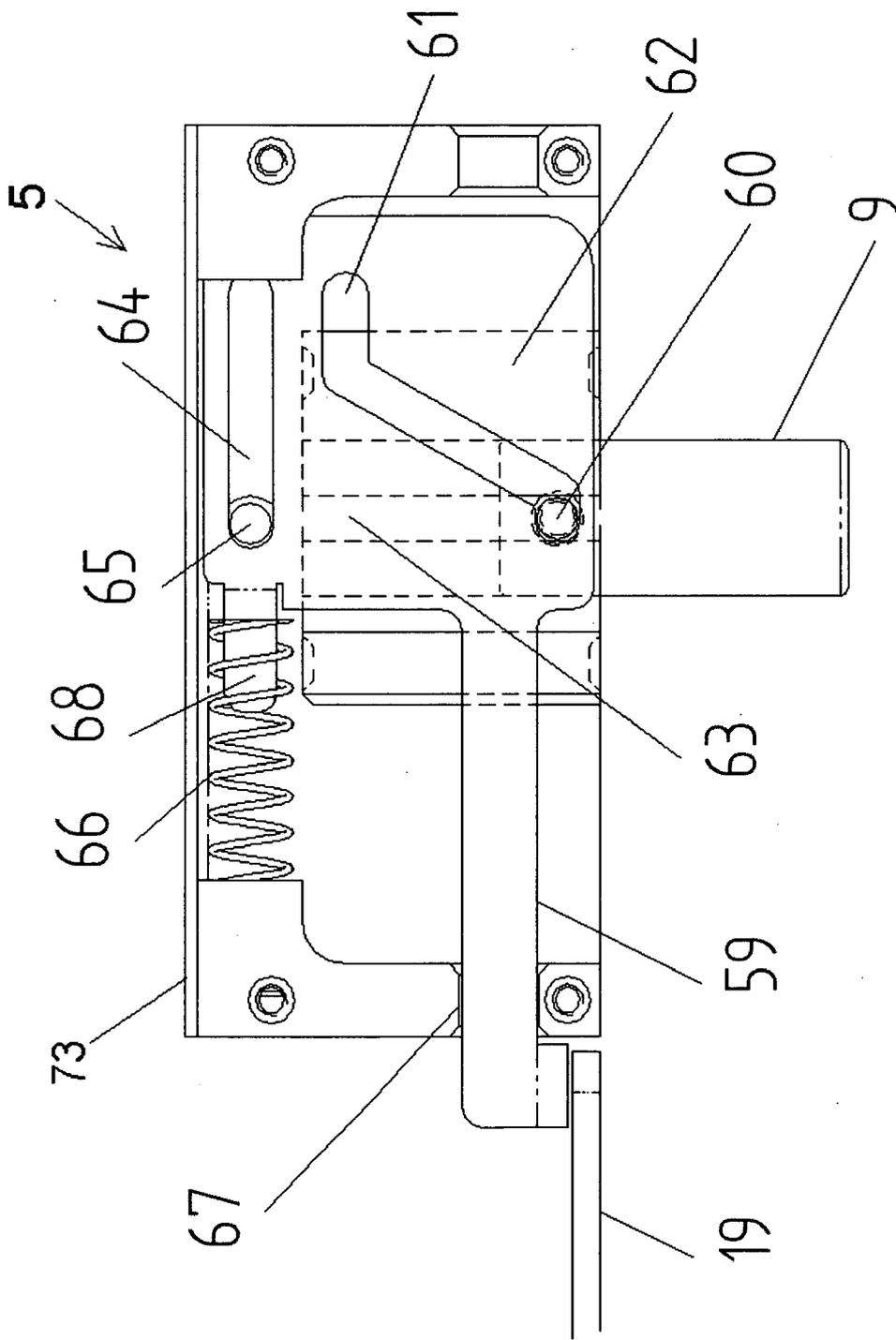


FIG. 8

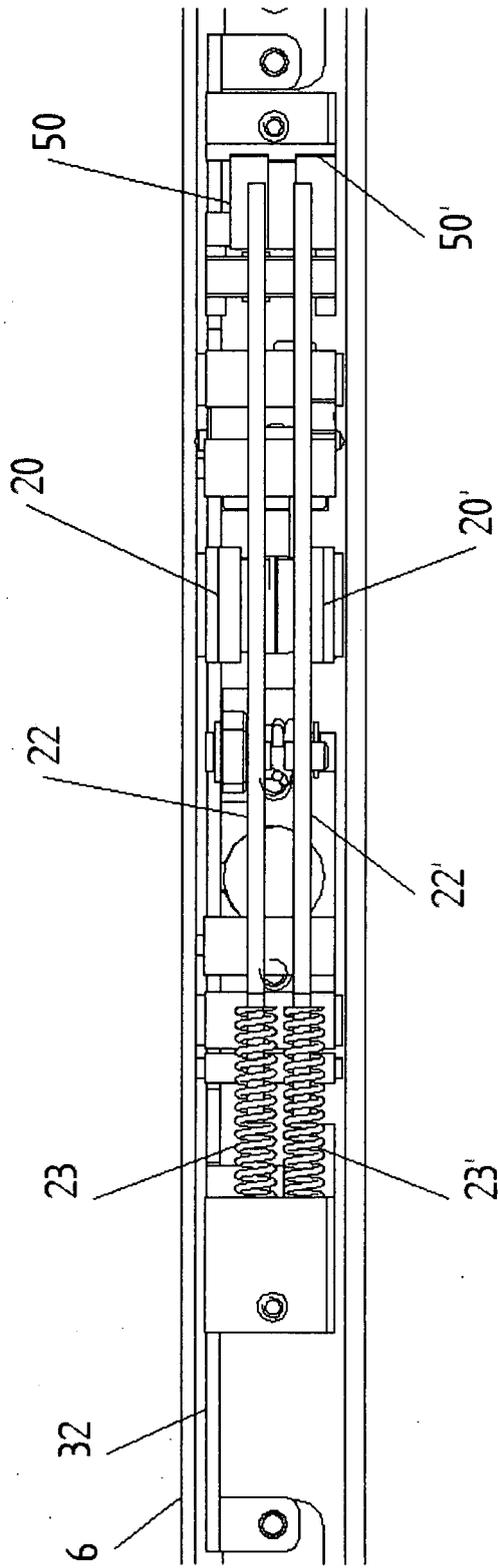


FIG.9



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Place of search The Hague		Date of completion of the search 13 February 2008	Examiner Geerts, Arnold
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Place of search The Hague		Date of completion of the search 13 February 2008	Examiner Geerts, Arnold
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