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(54) **LOCK FOR A WINDOW OR DOOR**

(57) The lock for a window or door comprises a case (1) and inside the case (1) a fixed support (12), a latch (4) that is extractable from the case (1) to a lock closing position, a rotatable follower (11) that is provided with a housing (13) for a square pin for controlling retraction of the latch (4) into the case (1) to an opening position of the lock, an automatic return torsion spring (14) of the rotatable follower (11) as far as a limit stop (34), the torsion spring (4) having a first end (14A) rigidly coupled in rotation with the rotatable follower (11) and a second end (14B), there being further provided mechanical adjusting means of the preload of the torsion spring (14) acting on the second end (14B) of the spring (14).

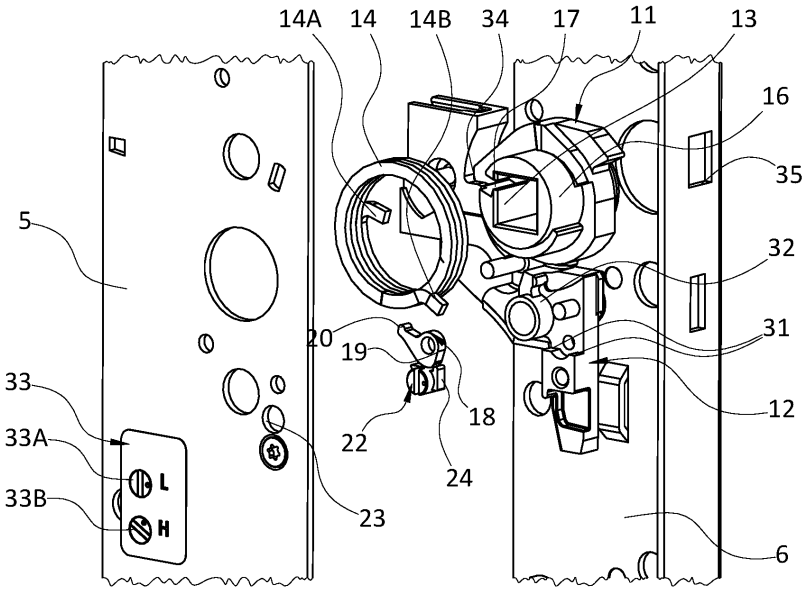

Fig. 2

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Description

[0001] This invention refers to a lock for a window or door, of the type comprising a case housing a latch of the lock, a rotatable follower provided with a housing for a square pin for controlling the latch, and an automatic return torsion spring of the rotatable follower when the manual force actuating the control square pin is released.

[0002] The opening element generally includes a latch that is extracted automatically from the case to the closed position of the lock when the manual force actuating the control square pin is released. A traditional lock of the type disclosed above is in general suitable for being combined with a handle by which said manual force is exerted.

[0003] The torsion spring has rigidity that is suitable for ensuring the return of the rotatable follower and consequently of the control square pin and of the handle when the weight of the handle that is installed varies.

[0004] A traditional lock of the type disclosed above is however in general able to function correctly only if combined with a handle.

[0005] A traditional lock of the type disclosed above would hardly be compatible for combination with a panic device.

[0006] In fact, the combination of the panic device, which already has a return spring, with a lock of the type disclosed above that has a further return spring can be useless or even harmful because it leads to extremely high manual opening forces being required that may not conform to current regulations.

[0007] Lock manufacturers accordingly normally supply two different types of locks, one dedicated to being combined with a handle and one dedicated to being combined with a panic device.

[0008] This need to differentiate the supplies according to the final application results in a series of drawbacks of a logistical nature and of difficulties in managing stocks and warehouse and order codes.

[0009] GB 2 323 626 A and EP 2 112 304 A2 show a lock with mechanical adjusting means for adjusting the preload of a torsion spring configured to transform a rotational movement of a selector of the preload into a translation movement of an operating element on the torsion spring. This mechanical means can be rather bulky as it envisages a linear movement of the operating element on the torsion spring.

[0010] The technical task of the present invention is therefore to realise a lock for a window or door that enables the decried technical drawbacks of the prior art to be eliminated.

[0011] Within the context of this technical task, an object of the invention is to realise a lock for a window or door with highly flexible use, adaptable for use in combination with both a handle and with a panic handle.

[0012] Another aim of the invention is to realise a lock for a window or door adaptable for use in combination with both a handle and with a panic handle without having to remove any component.

[0013] The technical task, as well as these and other objects, according to the present invention are attained by realising a lock for a window or door according to claim 1. -Advantageously, it is possible to set a preload value of the torsion spring for use of the lock in combination with a handle, and a reduced preloading value of the torsion spring for use of the lock in combination with a panic device.

[0014] In a preferred embodiment of the invention, said selector has two selection positions to which two operating positions of said second end of said torsion spring correspond.

[0015] In a preferred embodiment of the invention, said adjusting means has two configurations of stable equilibrium at said two selection positions.

[0016] In a preferred embodiment of the invention, said selector is accessible through a window of said case to perform the selection.

[0017] In a preferred embodiment of the invention, said selector has a selection notch.

[0018] In a preferred embodiment of the invention, a label is provided on the case showing two graphic reproductions of said selector in the two selection positions.

[0019] The lock is suitable for use with a handle or with a panic device by a simple adjustment that does not requires dismantling or removal of any component.

[0020] The adjustment is advantageously reversible because the movement of the kinematic chain formed by the selector and by the movement element is reversible.

[0021] The lock can thus be used in two different contexts and the installer is free to choose to adopt the lock configuration that the occasion requires.

[0022] As said, in the case of a combination of the lock with a handle, the installer selects the selection position to which the greater preload corresponds, whereas in the case of a combination of the lock with a panic handle device the installer selects the selection position to which the lesser preload corresponds.

[0023] Other features of the present invention are defined, moreover, in the subsequent claims.

[0024] Further features and advantages of the invention will become more apparent from the description of a preferred, but not exclusive, embodiment of the lock for a window or door, according to the invention, which is illustrated by way of approximate and thus non-limiting example in the appended drawings, in which:

figure 1 shows a side elevation view of the lock;

figure 2 shows an exploded view of the main components of the lock;

figure 3 shows a side elevation view of the lock with the selector in the first selection position in which the adjusting means adopts the first stable equilibrium configuration;

figure 4 shows a side elevation view of the lock with the selector in an intermediate selection position between the first selection position and the second se-

lection position in which the adjusting means does not adopt a stable equilibrium configuration;
figure 5 shows a side elevation view of the lock with the selector in the second selection position in which the adjusting means adopts the second stable equilibrium configuration;
figures 6, 7 and 8 highlight the system of forces that causes the two configurations of stable equilibrium when the selector is actuated.

[0025] With reference to the cited figures, a lock is shown having two distinct opening elements, i.e. latch and a bolt, but the invention extends to locks for windows and doors provided with only a latch.

[0026] In a known manner, the lock has a case 1 that houses the latch 4 and the bolt 2.

[0027] The bolt 2 is actuatable by a cylinder 3 having a stator 3A and a rotor 3B provided with a slit 10 for inserting a key (not shown).

[0028] The case 1 is formed by two parallel flat sides 5, a bottom 6, a base 7 and a cap 8.

[0029] The case 1 is closed frontally by a plate 9 having suitable openings for extracting and retracting the bolt 2 and the latch 4.

[0030] Inside the case 1, there is a fixed support 12 and a rotatable follower 11 provided with a housing 13 for a square pin (not shown) for controlling retraction of the latch 4 into the case 1 to an opening position of the lock.

[0031] The rotatable follower 11 is rotatable reversibly between a first limit stop 34 corresponding to the closed position of the lock closed by the latch 4 in which the latch 4 is protracted from the case 1 and a second limit stop 35 corresponding to the opening position of the lock opened by the latch 4.

[0032] The limit stop 34 of the rotatable follower 11 is obtained on the fixed support 12.

[0033] The limit stop 35 of the rotatable follower 11 is obtained on the case 1.

[0034] Inside the case 1, there is also an automatic return torsion spring 14 of the rotatable follower 11. The torsion spring 14 has a first end 14A rigidly coupled in rotation with the rotatable follower 11 and a second end 14B.

[0035] The first end 14A of the spring 14 is formed by a spring 14 section turned towards the inside of the cylindrical generatrices of the coils of the spring 14, whereas the second end 14B of the spring 14 is formed by a section turned to the outside of the cylindrical generatrices of the coils of the spring 14.

[0036] The spring 14 surrounds a protrusion 16 of the rotatable follower 11 in which the housing 13 is obtained.

[0037] The protrusion 16 of the rotatable follower 11 has a split 17 in which the first end 14A of the spring 14 is engaged.

[0038] The lock features mechanical adjusting means of the preload of the torsion spring 14 acting on the second end 14B of the torsion spring 14.

[0039] The mechanical adjusting means comprises a movement element 18 of the operating position of the second end 14A of the spring 14.

[0040] The movement element 18 is fitted rotatably in the case 1.

[0041] The movement element 18 has a rotation movement receiving cam 19 and a movement cam 20 of the second end 14A of the spring 14 4.

[0042] The mechanical adjusting means also comprises a suitable selector 22 interacting with the movement receiving cam 19 to move the movement element 18.

[0043] The selector 22 has two selection positions to which two different positions of the second end 14A of the spring 14 4 correspond and consequently two different preload values of the spring 14 4.

[0044] Advantageously, the mechanical adjusting means has two different configurations of stable equilibrium at the two selection positions of the selector 22.

[0045] Also the selector 22 is fitted rotatably in the case 1.

[0046] The selector 22 is nevertheless accessible through a window 23 of the case 1 to perform the selection.

[0047] The selector 22 has a selection notch 24 that is engageable by a tool that is accessible through the window 23 of the case 1.

[0048] For example, the selection can be made using the tip of a screwdriver.

[0049] The movement element 18 and the selector 22 are rotatable around respective fixed rotation axes 25, 26 parallel to the fixed rotation axis 27 of the rotatable follower 11.

[0050] Such rotation axes 25, 26, 27 are orthogonal to the flat sides 5 of the case 1.

[0051] The selector 22 has in particular a movement transfer cam 28 transferring movement to the movement receiving cam 19, and a first and a second plane 29, 30 that are mutually tilted and selectively engageable against an abutment plane 31 formed on the support 12.

[0052] The abutment plane 31 defines a first rotation limit stop of the selector 22 when it engages the first plane 29 of the selector 22 at the first stable equilibrium configuration of the mechanical adjusting means and a second rotation limit stop of the selector 22 when it engages the second plane 30 of the selector 22 at the second stable equilibrium configuration of the mechanical adjusting means.

[0053] In the first stable equilibrium configuration of the mechanical adjusting means the movement element 18 is positioned against a limit stop 32 formed on the fixed support 12.

[0054] In order to understand better the bistability of the equilibrium of the mechanical adjusting means, figures 6, 7 and 8 can be referred to.

[0055] If the selector 22 is rotated slightly anticlockwise from the first selection position illustrated in figure 3 to the second selection position, as illustrated in figure 6, the movement cam 20 pushes onto the second end 14B

of the spring 14, moving the spring 14 away angularly from the first end 14A.

[0056] The second end 14B of the spring 14 reacts on the movement element 18 with a force "Fm" with arm "a" relative to the rotation axis 25 of the movement element 18, and the thus urged movement element 18 in turn exerts on the selector 22 a force "Fb" with arm "b" relative to the rotation axis 26 of the selector 22.

[0057] This force "Fb" generates torque that tends to rotate the selector 22 clockwise to the original selection position.

[0058] Figure 7 shows that as the rotation of the selector 22 increases from the first selection position, the arm "b" of the force "Fb" decreases.

[0059] The force "Fb" nevertheless also generates torque in the situation illustrated in figure 7, which torque tends to rotate the selector 22, still in a clockwise direction, to the original selection position.

[0060] If, lastly, the selector 22 is rotated more significantly from the first selection position illustrated in figure 3 to the second selection position, as illustrated in figure 8, the second end 14B of the spring 14 reacts on the movement element 18 with a force "Fm" with arm "a" relative to the rotation axis 25 of the movement element 18, and the thus urged movement element 18 exerts in turn on the selector 22 a force "Fb" with arm "b" relative to the rotation axis 26 of the selector 22, but this time this force "Fb" generates torque that tends to rotate the selector 22 in an opposite direction to the cases illustrated above.

[0061] The selector 22 then rotates to the second selection position because this time, compared to the cases illustrated above, the rotation of the selector 22 is sufficiently great to make the application direction of the force "Fb" travel through the rotation axis 26 of the selector 22.

[0062] The second end 14B of the spring 14 then, through actuation of the selector 22, can be positioned stably only in the two operating positions.

[0063] A label 33 is applied to the case 1, the label 33 showing two graphic reproductions 33A and 33B of the selector 22 in the two selection positions.

[0064] In the illustrated example, the label 33 is staggered from the selector 22.

[0065] Nevertheless, the lock can be provided with the selector 22 in a default selection position, for example the first selection position, on which the approved graphic reproduction 33A, 33B of the selector 22 is superimposed.

[0066] In this case, for switching from the first to the second selection position, the installer necessarily has to bore the label 33 with the tip of the screwdriver.

[0067] However, it needs to be made clear, also from the visual point of view, that the default selection has been deliberately modified.

[0068] The lock as conceived herein is susceptible to many modifications and variations, all falling within the scope of the invented concept; furthermore, all the details are replaceable by technically equivalent elements.

[0069] In practice, the materials used, as well as the dimensions, can be any depending on the needs and the state of the art.

Claims

1. A lock for a window or door, comprising a case (1) and inside said case (1) a fixed support (12), a latch (4) that is extractable from the case (1) to a lock closing position, a rotatable follower (11) that is provided with a housing (13) for a square pin for controlling retraction of the latch (4) into the case (1) to an opening position of the lock, an automatic return torsion spring (14) of the rotatable follower (11), said torsion spring (14) having a first end (14A) rigidly coupled in rotation with said rotatable follower (11) and a second end (14B), there being further provided mechanical adjusting means of the preload of said torsion spring (14) acting on said second end (14B) of said torsion spring (14), **characterised in that** said mechanical adjusting means comprises a movement element (18) of the operating position of said second end (14B) of said torsion spring (14), said movement element (18) having a rotation movement receiving cam (19) and a movement cam (20) of said second end (14B) of said torsion spring (14), said mechanical adjusting means further comprising a selector (22) interacting with said movement receiving cam (19) to move said movement element (18), said movement element (18) and said selector (22) being rotatable around respective fixed rotation axes (25, 26) parallel to a fixed rotation axis (27) of said rotatable follower (11).

2. The lock for a window or door according to any preceding claim, **characterised in that** said spring (14) surrounds a protrusion (16) of the rotatable follower (11) in which said housing (13) is obtained.

3. A lock for a window or door according to any preceding claim, **characterised in that** said selector (22) has two selection positions to which two operating positions of said second end (14B) of said torsion spring (14) correspond.

4. The lock for a window or door according to the preceding claim, **characterised in that** said adjusting means has two configurations of stable equilibrium at said two selection positions.

5. A lock for a window or door according to any preceding claim, **characterised in that** said selector (22) is accessible through a window (23) of said case (1) to perform the selection.

6. The lock for a window or door according to the preceding claim, **characterised in that** said selector

(22) has a selection notch (24).

7. The lock for a window or door according to the preceding claim, **characterised in that** it has on the case (1) a label (33) showing two graphic reproductions (33A, 33B) of said selector (22) in said two selection positions.

8. A window or door with a handle, **characterised in that** it comprises a lock compliant with any preceding claim.

9. A window or door with a panic handle, **characterised in that** it comprises a lock compliant with any one of claims 1 to 7.

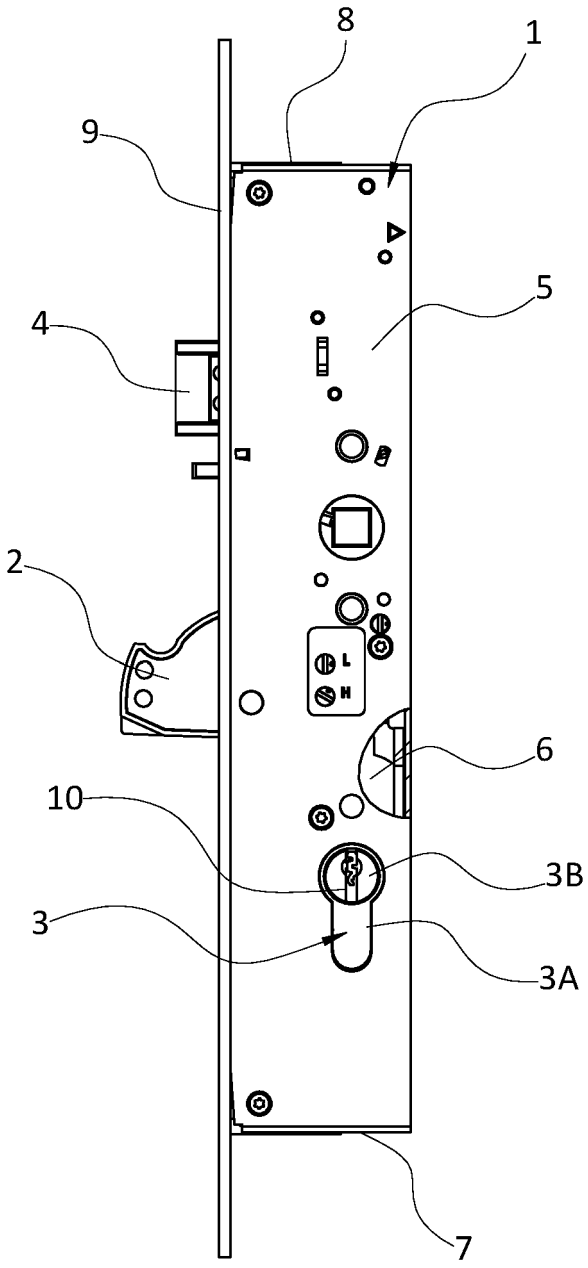
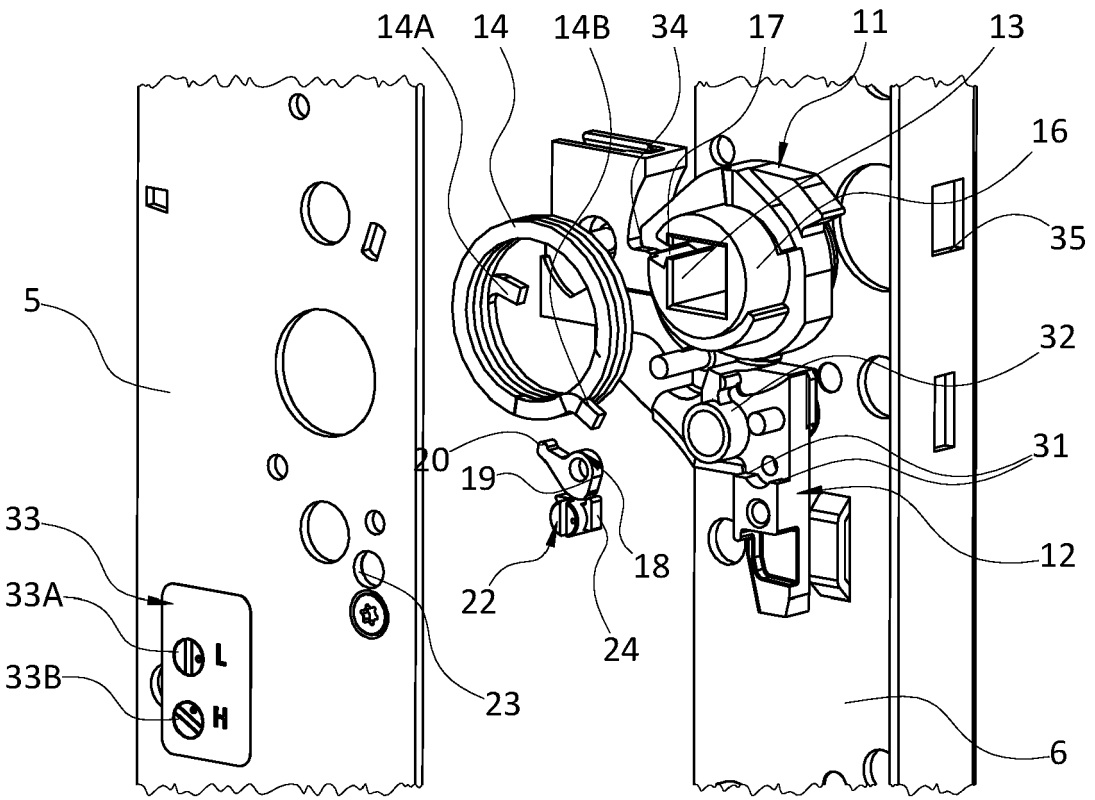


Fig. 1


14A
14
14B
34
17
11
13
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33A
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Fig. 2

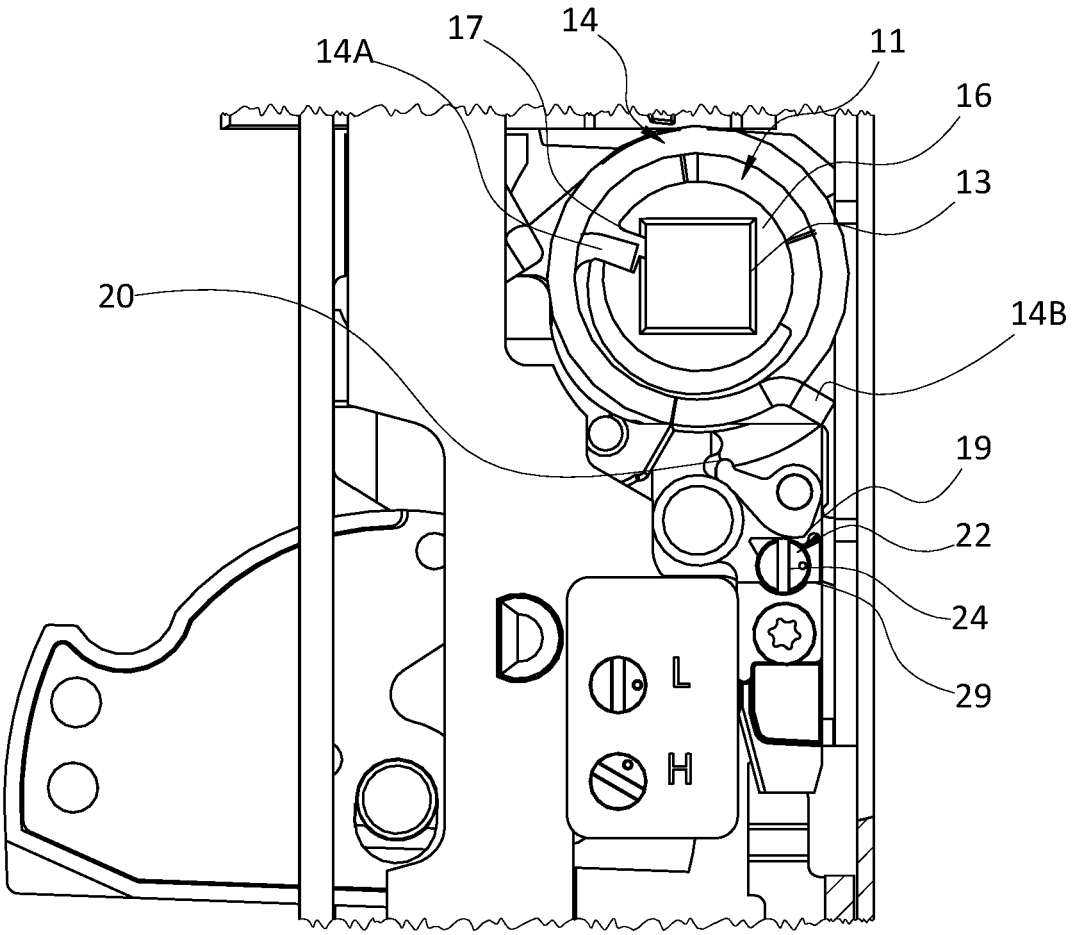

Fig.3

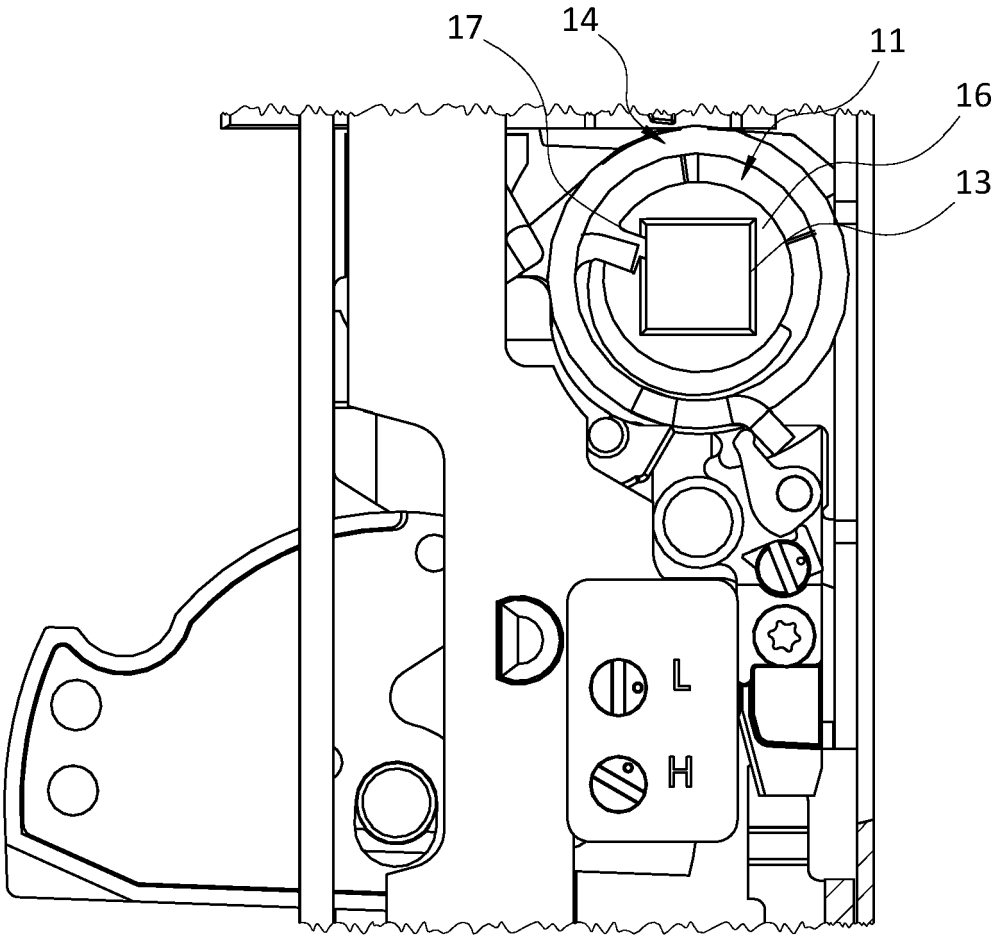

Fig.4

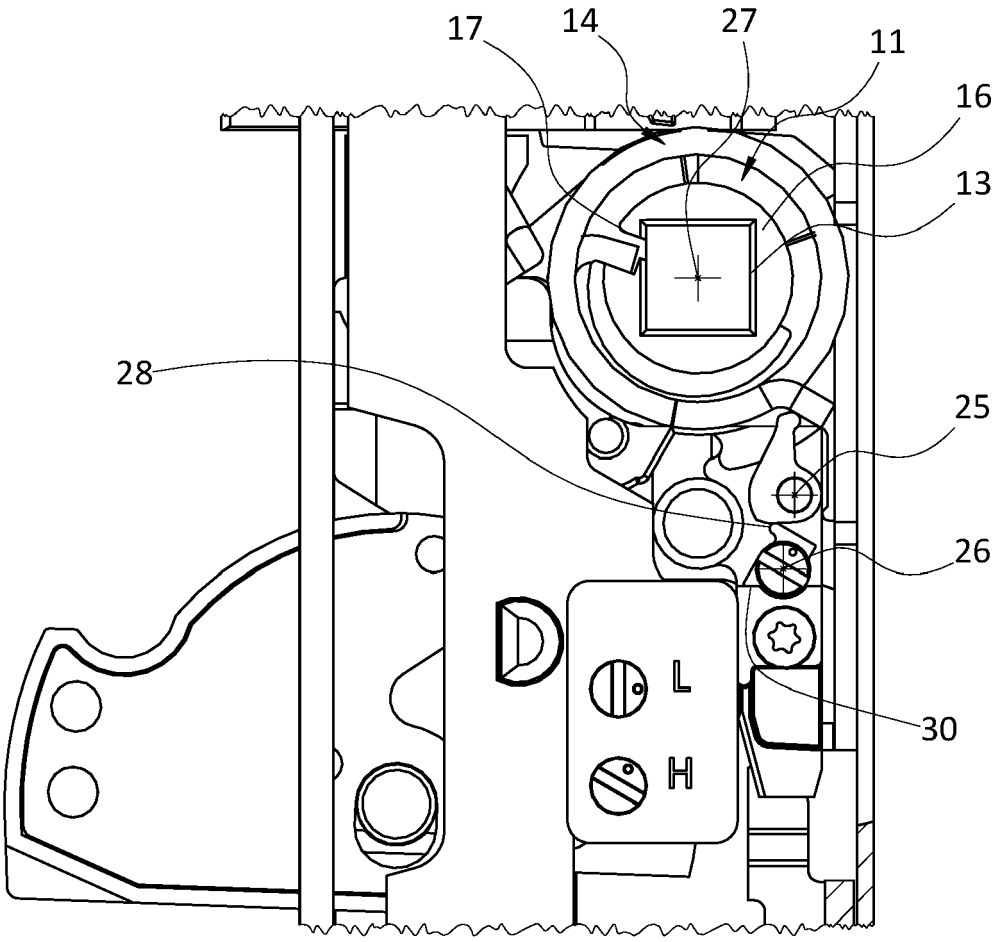

Fig.5

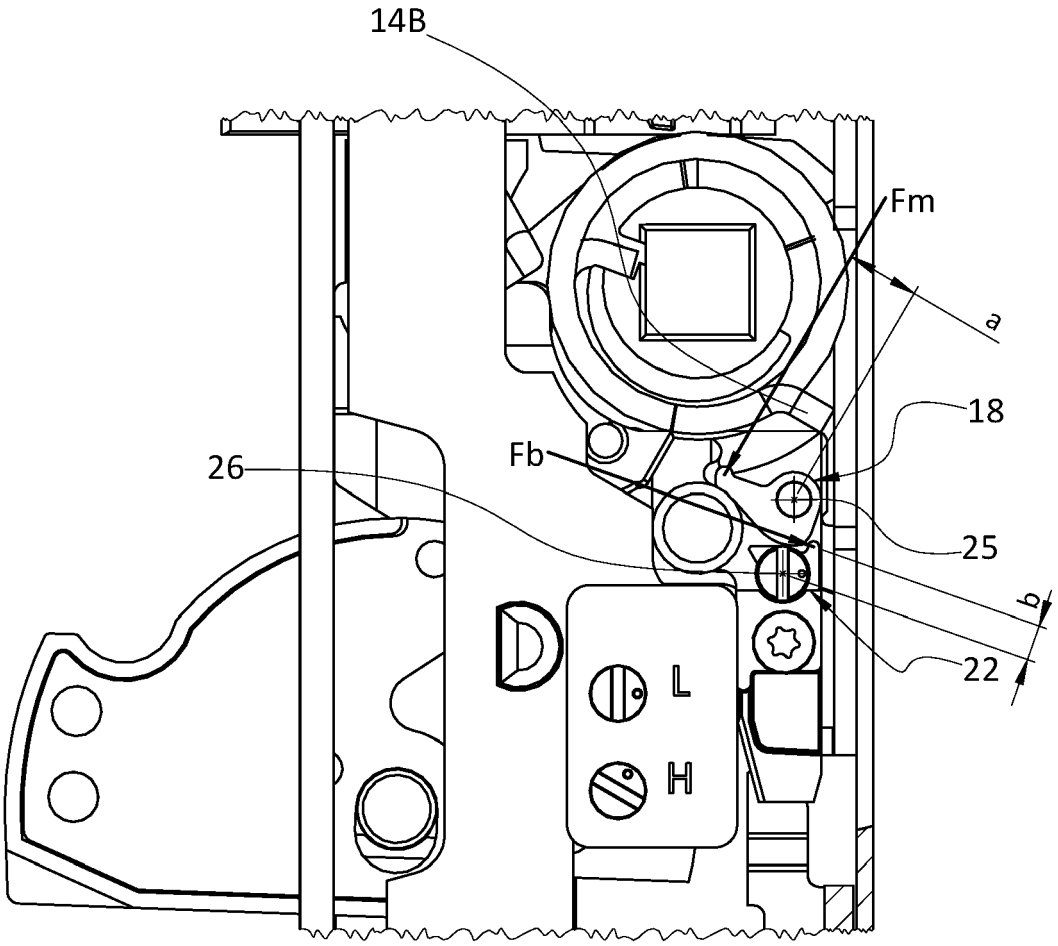

Fig. 6

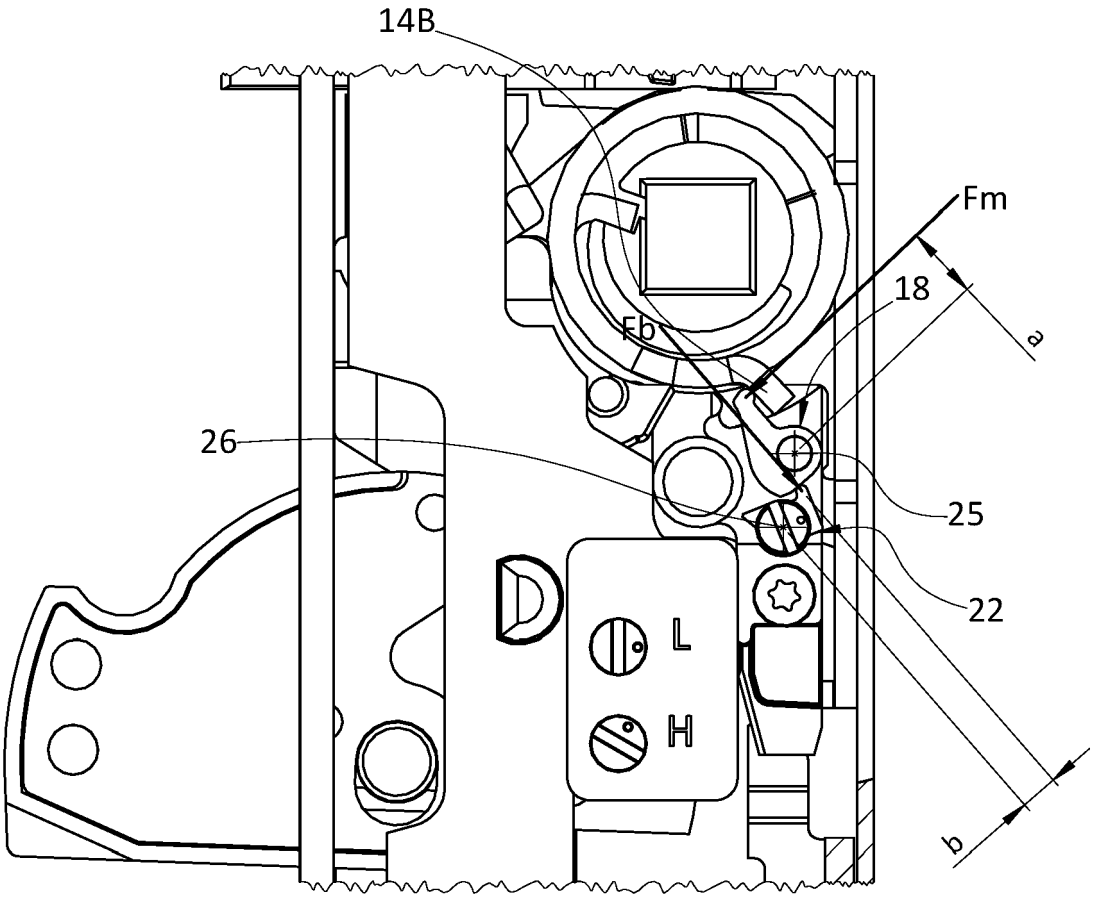

Fig.7

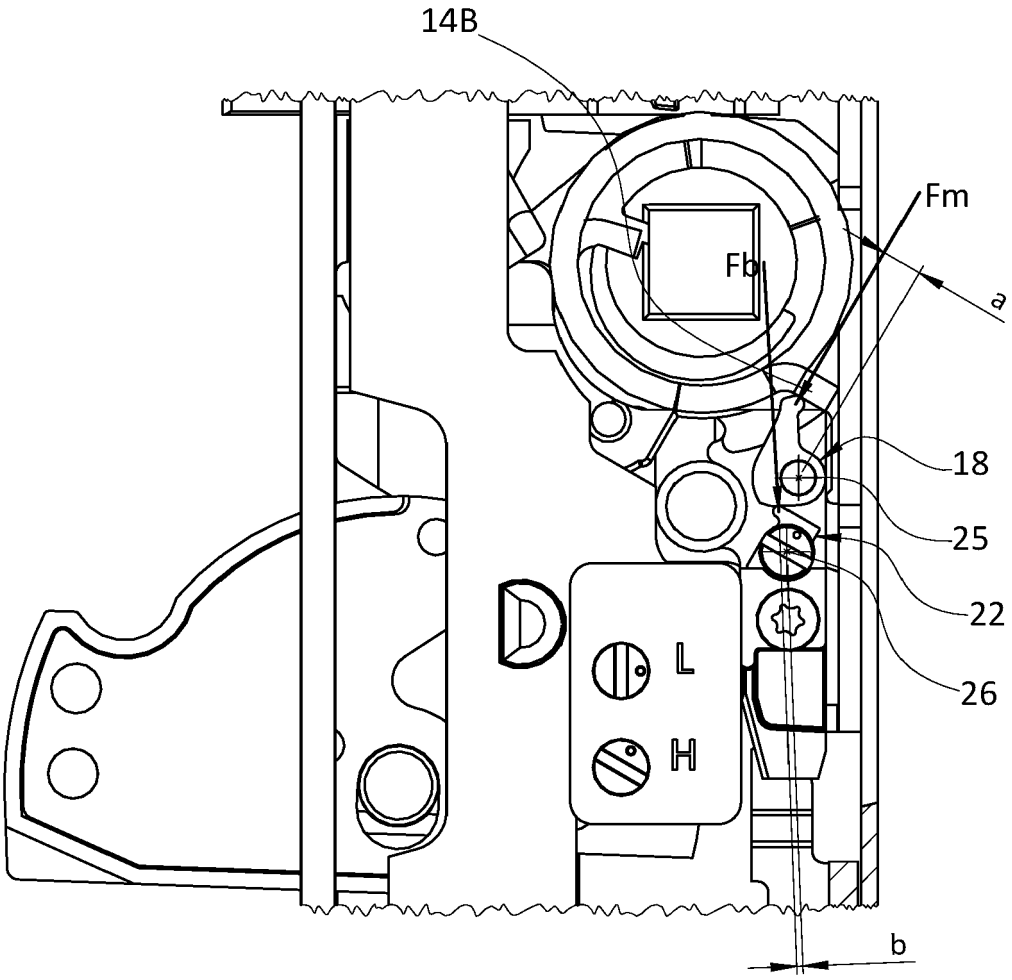

Fig.8

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 3048

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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	8 August 2023	Pérez Méndez, José F

CATEGORY OF CITED DOCUMENTS

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