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(54) **COUNTER LOCK FOR AN INACTIVE LEAF OF A DOUBLE LEAF DOOR**

(57) Counter lock for an inactive leaf comprising a cam (30) coupled to a follower (10), sliders (12, 15) configured for being coupled to rods through which the blocking of the inactive leaf at blocking points is maintained in a neutral position, the cam (30) being configured for moving at least one of the sliders (12, 15) when the follower (10) is rotated in an opening direction releasing the blocking points, and a pusher (50) configured for actuating a latch which, in the neutral position, is housed in the counter lock (5) blocking an active leaf at a central blocking point. The cam (30) is configured for actuating the pusher (50) when the follower (10) is rotated in the opening direction causing the release of the central point, and to then move one of the sliders (12, 15) unblocking the rest of the blocking points.

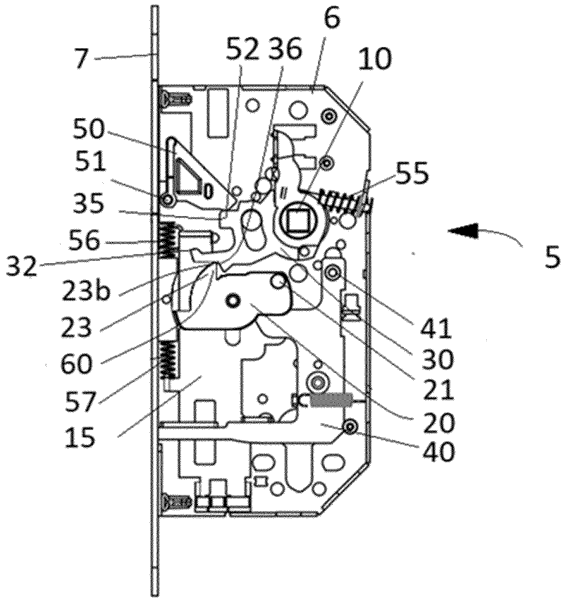

FIG. 5

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Description

TECHNICAL FIELD

[0001] The present invention relates to a counter lock for an inactive leaf for a double leaf door.

PRIOR ART

[0002] Emergency doors or fire doors comprising a main leaf in turn comprising a lock and a secondary leaf comprising a counter lock are known. The counter lock works together with the lock to block the door. These doors are configured to withstand stresses as required by law, where they can only be opened when the user acts on the lock or counter lock. When acting on the lock only the main leaf opens, whereas both leaves open when acting on the counter lock.

[0003] The secondary leaf is blocked at upper and lower blocking points by means of rods that are coupled to the counter lock, particularly to respective sliders housed in the counter lock, and at the ends of which there are arranged bolts which are inserted in respective housings, blocking the secondary leaf. When the counter lock is actuated, said blocking points are eliminated, making it possible to open the door. The counter lock furthermore includes a central blocking point with the lock such that a latch of the lock is housed in the counter lock when the door is closed.

[0004] EP1524390A2 describes a counter lock comprising sliders which move vertically and have ends coupled to the corresponding rods, a laminar element that can be actuated through a security bar and includes a front which can retain the sliders in the retracted position until the leaf closes completely and a latch of the lock is coupled in the counter lock. To block the sliders in the position in which the door is open, the selvage includes a pusher which retains the latch of the lock when the door is closed, the pusher including a coupling tooth which engaged a toothed ring rotating with respect to the sliders.

DISCLOSURE OF THE INVENTION

[0005] The object of the invention is to provide a counter lock for an inactive leaf for a double leaf door, as defined in the claims.

[0006] The counter lock according to the invention comprises an actuating cam coupled to a follower, an upper slider configured for being coupled to an upper rod through which the blocking of the inactive leaf at an upper blocking point is maintained when the counter lock is in a neutral position, a lower slider configured for being coupled to a lower rod through which the blocking of the inactive leaf at a lower blocking point is maintained when the counter lock is in the neutral position, both sliders being movable with respect to one another, the actuating cam being configured for moving at least one of the sliders when the follower is rotated in an opening direction causing the release of the upper and lower blocking points of the inactive leaf, and a pusher configured for actuating a latch of a lock, with the latch being housed at least partially in the counter lock when the counter lock is in the neutral position blocking an active leaf of the double leaf door at a central blocking point.

[0007] The actuating cam is configured for actuating, in a first step, the pusher when the follower is rotated in the opening direction causing the release of the central blocking point, and to then, in a second step, move at least one of the sliders unblocking the upper and lower blocking points of the inactive leaf.

[0008] The counter lock enables the sequential opening of the blocking points of the door. By acting directly on the follower or on the manual pull, the central blocking point is released first, and once said blocking point has been released, the actuating cam acts on one of the sliders causing the release of the upper and lower blocking points. Therefore, the user will have to apply less force to open the door while still complying with the requirements of the existing regulations.

[0009] These and other advantages and features of the invention will become evident in view of the drawings and detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

[0010]

Figure 1 shows a schematic front view of a double leaf door comprising a counter lock according to the invention.

Figure 2 shows an exploded view of the elements comprised in the double leaf door shown in Figure 1.

Figure 3 shows in detail the counter lock and a lock of the double leaf door both shown in Figure 1, arranged in a neutral position.

Figure 4 shows a front view of the counter lock shown in Figure 1 in the neutral position.

Figure 5 shows another front view of the counter lock shown in Figure 1.

Figure 6 shows a front view of the counter lock shown in Figure 1 in a first position in which the follower is operated.

Figure 7 shows a front view of the counter lock shown in Figure 1 in a second position in which the follower is operated.

Figure 8 shows a front view of the counter lock shown in Figure 1 in a position in which the lock is open.

Figure 9 shows another front view of the counter lock shown in Figure 1 in the position in which the lock is open.

Figure 10 shows a detailed view of the swing comprised in the counter lock shown in Figure 1.

Figure 11 shows a detailed view of the actuating cam comprised in the counter lock shown in Figure 1.

Figure 12 shows a detailed view of the pull comprised in the counter lock shown in Figure 1.

Figure 13 shows a detailed view of the counter lock shown in Figure 1 operated by means of the pull in an initial unblocking position.

Figure 14 shows a detailed view of the counter lock shown in Figure 1 operated by means of the pull in an intermediate unblocking position.

DETAILED DISCLOSURE OF THE INVENTION

[0011] Figure 1 shows an emergency door 1 comprising a lock 4. The emergency door 1 comprises a main leaf 2 also known as the active leaf comprising the lock 4 and a secondary leaf 3 also known as the inactive leaf comprising a counter lock 5 according to the invention.

[0012] When the lock 4 is acted on, only the main leaf 2 opens, whereas when the counter lock 5 is acted on both leaves 2 and 3 open. When arranged in a blocking position, the counter lock 5 maintains the blocking of the secondary leaf 3 at an upper blocking point A, a lower blocking point B, and a central point C as schematically shown in Figures 1 and 2. Said blocking position is also referred to as the neutral position or the closed-door position.

[0013] The emergency door 1 comprises an upper rod 18 fixed at one end to the counter lock 5 and at the free end of which there is inserted a bolt 13, and a lower rod 19 fixed at one end to the counter lock 5 and at the free end of which there is inserted another bolt 14, such that each bolt 13 and 14 is configured for being housed in a corresponding housing 27 and 28 comprised respectively in the floor and in a frame of a wall in which the emergency door 1 is arranged, with the corresponding bolts 13 and 14 being retained inside the respective housing 27 and 28 defining the lower blocking point B and the upper blocking point A, respectively. The blocking at the central point C takes place through a latch 8 of the lock 4 which, in the neutral position, goes through a front 7 of the counter lock 5, being partially housed in the counter lock 5. This geometry of the bolts together with the configuration of the counter lock 5 prevents the bolts 13 and 14 from giving way when excessive forces are applied during panic or fire situations, leading to the door 1 becoming overloaded, preventing said door from being able to be open.

[0014] The counter lock 5 shown in the drawings is mainly adapted to emergency doors as shown in Figures 1 and 2, although it may be used in another type of doors.

[0015] Figures 3 to 9 and 13 to 14 show an embodiment of the counter lock 5 in which some of the components of said counter lock 5 not relevant for the invention have been eliminated to facilitate understanding thereof. The counter lock 5 comprises a lock case 6 housing a follower 10 configured for being operated by a handle (not depicted) or a panic or emergency device 9 depicted in Figures 1 and 2, an upper slider 12 configured for being coupled to the upper rod 18, a lower slider 15 configured for being coupled to the lower rod 19, and an actuating cam 30 coupled to the follower 10, both sliders 12 and 15 being movable with respect to one another and the actuating cam 30 being configured for moving at least one of the sliders 12 and 15 when it is operated in an opening direction, thereby releasing the upper blocking point A and the lower blocking point B of the secondary leaf 3.

[0016] The counter lock 5 further comprises a pusher 50 which, in the neutral position, is housed in the lock case 6 and partially ejected from the lock case 6, striking the latch 8 of the lock 4 and releasing the central blocking point C when the follower 10 is rotated in the opening direction. Therefore, from the neutral position, the rotation of the actuating cam 30 in the opening direction causes the release of the upper blocking point A and the lower blocking point B of the counter lock 5 and of the central blocking point C of the lock 4 by means of said actuating cam 30 directly actuating one of the sliders 12 and 15 and the pusher 50, respectively.

[0017] The pusher 50 is pivotably coupled to the lock case 6 through the corresponding coupling 51. In the neutral position, the pusher 50 is supported on the actuating cam 30, particularly on a support surface 35 arranged in a projection 34 of the actuating cam 30. In the counter lock 5, the support between the pusher 50 and the actuating cam 30 in the neutral position is arranged below the coupling rotating shaft 51, thereby forcing the pusher 50 to remain supported on the actuating cam 30 as a result of gravity.

[0018] Moreover, the counter lock 5 comprises blocking means 60 configured for maintaining the blocking of the movement of the sliders 12 and 15 in the neutral position of the counter lock 5, the blocking means 60 comprising a swing 20 and a retention surface 36 of the actuating cam 30 which retains the swing 20 in the neutral position preventing the movement of the sliders 12 and 15, the blocking means 60 being unblocked when the follower 10 is rotated in the opening direction. As described above, in the neutral position, the inactive leaf 3 is blocked in the upper blocking point A, lower blocking point B, and central blocking point C. From said neutral position in which the door is blocked, and when pressure is applied on the door, said door can be opened quickly and at any time by rotating the follower 10 in the opening direction.

[0019] The swing 20 comprises a wedge-like projec-

tion 23 which, in the neutral position, abuts with the retention surface 36 of the actuating cam 30. The retention surface 36 is a curved surface. In the embodiment shown in the drawings, the retention surface 36 is a curved surface substantially concentric to an axis of rotation of the actuating cam 30.

[0020] The swing 20 is pivotably coupled to the lock case 6 of the counter lock 5 through a first coupling 24, said swing 20 furthermore being coupled to the lower slider 15 and the upper slider 12, respectively, through a second coupling 21 and a third coupling 22, said second coupling 21 and third coupling 22 being arranged at opposite ends of the swing 20. The first coupling 24 is arranged substantially centered in the swing 20.

[0021] Moreover, the upper slider 12 and the lower slider 15 move relatively with respect to one another in a substantially vertical manner when they are operated by the actuating cam 30. When the follower 10 is rotated in the opening direction, both sliders 12 and 15 move closer to one another, forcing the upper rod 18 and the lower rod 19 to move closer to one another, releasing the corresponding bolts 13 and 14 from the corresponding housings 27 and 28, thereby releasing the upper blocking position A and the lower blocking position B, whereas when the follower 10 returns to its starting position as a result of a spring 55, the sliders 12 and 15 move away from one another as a result of respective return springs 56 and 57, with the upper rod 18 and the lower rod 19 returning to the upper blocking position A and the lower blocking position B. The movement of the upper slider 12 and the lower slider 15 is a guided movement, said movement being substantially vertical.

[0022] The actuating cam 30 shown in detail in Figure 11 comprises a hole 33 through which it is concentrically and integrally coupled to the follower 10 and an arm 31 including an actuating surface 32 configured for pushing and moving the lower slider 15 when the follower 10 is rotated in the opening direction. In particular, the actuating surface 32 acts on a stop 16 arranged at an upper end 15a of the lower slider 15. In addition to blocking the rotation of the pusher 50 in the neutral position, the support surface 35 of the actuating cam 30 is configured for causing the rotation of the pusher 50 in the direction opposite the opening direction of the follower 10 when the follower 10 is operated, causing the partial ejection of said pusher 50 out of the lock case 6 and the corresponding release of the central blocking point C as it strikes the latch 8 of the lock 4, retracting it.

[0023] When the follower 10 is rotated in the opening direction by means of a handle or a panic or emergency device 9, the actuating cam 30 rotates in the opening direction, rotating the pusher 50 in the direction opposite the direction for opening and releasing the central blocking point C in a first step, before coming into contact with the lower slider 15. When the actuating cam 30 is rotated in the opening direction from the neutral position (shown in Figures 3 to 5) until the actuating surface 32 of said actuating cam 30 contacts the stop 16 arranged at the upper end 15a of the lower slider 15 (shown in Figure 6), the retention surface 36 of the actuating cam 30 remains in contact with the end 23b of the projection 23 of the swing 20. During said travel, the swing 20 does not rotate. From this position (see Figures 7 to 9), when the actuating cam 30 has rotated a specific angle in the opening direction from the neutral position, the actuating cam 30 moves the lower slider 15, the actuating cam 30 no longer contacting the swing 20. When the lower slider 15 is moved vertically, the swing 20 rotates in the opening direction causing the movement of the upper slider 12 due to the couplings 21 and 22 of the swing 20 with respect to the sliders 12 and 15, causing the unblocking of the upper blocking point A and the lower blocking point B. By sequencing the release of blocking points, i.e., releasing the central blocking point C first followed by the upper blocking point A and the lower blocking point B being released, a counter lock 5 which minimizes the force the user must apply on the follower 10 of the counter lock 5 to open the door 1 is achieved, complying with the safety requirements demanded of locks of this type.

[0024] Finally, the secondary leaf 3 can be opened by acting directly on the follower 10 of the counter lock 5 or on a pull 40 housed in the lock case 6. The pull 40 is pivotably coupled to the lock case 6 through a respective coupling 41. The pull 40 comprises a projection 43 going through the front 7 of the counter lock 5, being accessible from outside the secondary leaf 3, and an extension 42 housed inside the lock case 6. When the counter lock 5 is manually operated from the outside through the pull 40 by actuating the projection 43 outwards, the pull 40 rotates in the opening direction with respect to the coupling 41, the extension 42 of the pull 40 pushing the actuating cam 30 and causing it to rotate in the opening direction as seen in Figures 13 to 15. The pull 40 directly contacts the actuating cam 30 through the extension 42. Once the pull 40 has rotated the actuating cam 30, the unblocking process described for the case in which the actuating cam 30 is rotated through the follower 10 is repeated upon acting on a handle or safety device, so the entire description above upon rotation of the actuating cam 30 is also applicable herein and it will not be repeated.

Claims

1. Counter lock for an inactive leaf of a double leaf door, comprising an actuating cam (30) coupled to a follower (10), an upper slider (12) configured for being coupled to an upper rod (18) through which the blocking of the inactive leaf (3) at an upper blocking point (A) is maintained when the counter lock (5) is in a neutral position, a lower slider (15) configured for being coupled to a lower rod (19) through which the blocking of the inactive leaf (3) at a lower blocking point (B) is maintained when the counter lock (5) is in the neutral position, both sliders (12, 15) being

movable with respect to one another, the actuating cam (30) being configured for moving at least one of the sliders (12, 15) when the follower (10) is rotated in an opening direction causing the release of the upper and lower blocking points (A, B) of the inactive leaf (3), and a pusher (50) configured for actuating a latch (8) of a lock (4), with the latch (8) being housed at least partially in the counter lock (5) when the counter lock (5) is in the neutral position, blocking an active leaf (2) of the double leaf door (1) in a central blocking point (C), **characterized in that** the actuating cam (30) is configured for actuating, in a first step, the pusher (50) when the follower (10) is rotated in the opening direction causing the release of the central blocking point (C), and to then, in a second step, move at least one of the sliders (12, 15) unblocking the upper and lower blocking points (A, B) of the inactive leaf (3).

2. Counter lock for an inactive leaf according to the preceding claim, wherein the actuating cam (30) comprises a support surface (35) which, in the neutral position, contacts the pusher (50), blocking the rotation of the pusher (50), said support surface (35) being configured for acting on the pusher (50) rotating it in the direction opposite the opening direction in the first step when the follower (10) is rotated in the opening direction, and an actuating surface (32) configured for contacting the lower slider (15) in the second step when the actuating cam (30) has rotated a specific angle in the opening direction from the neutral position.

3. Counter lock for an inactive leaf according to the preceding claim, wherein, in the neutral position, the actuating surface (32) does not contact the lower slider (15).

4. Counter lock for an inactive leaf according to claim 2 or 3, wherein the pusher (50) is coupled through a coupling (51), said pusher (50) being pivotable with respect to said coupling (51), the support between the pusher (50) and the actuating cam (30) being arranged in the neutral position below the axis of rotation of the coupling (51), forcing the pusher (50) to remain supported on the actuating cam (30).

5. Counter lock for an inactive leaf according to any of the preceding claims, comprising blocking means (60) to maintain the blocking of the movement of the sliders (12, 15) in the neutral position of the counter lock (5), the blocking means (60) comprising a swing (20) coupled to at least one slider (12, 15), the actuating cam (30) in the neutral position blocking the rotation of the swing (20), preventing the sliders (12, 15) from moving, the blocking means (60) being unblocked when the follower (10) is rotated in the opening direction.

6. Counter lock for an inactive leaf according to the preceding claim, wherein the swing (20) comprises a wedge-like projection (23) which, in the neutral position, abuts with a retention surface (36) of the actuating cam (30).

7. Counter lock for an inactive leaf according to the preceding claim, wherein the retention surface (36) of the actuating cam (30) is a curved surface.

8. Counter lock for an inactive leaf according to the preceding claim, wherein the retention surface (36) is a curved surface substantially concentric to an axis of rotation of the actuating cam (30).

9. Counter lock for an inactive leaf according to any of claims 6 to 8, wherein an end (23b) of the projection (23) of the swing (20) maintains contact with the retention surface (36) of the actuating cam (30) during rotation of the actuating cam (30) in the opening direction from the neutral position until the actuating surface (32) contacts the lower slider (15), the actuating cam (30) preventing the rotation of the swing (20).

10. Counter lock for an inactive leaf according to any of the preceding claims, wherein the swing (20) is pivotably coupled to a lock case (6) of the counter lock (5) through a first coupling (24), said swing (20) furthermore being coupled respectively to the lower slider (15) and the upper slider (12) through a second coupling (21) and a third coupling (22), said second coupling (21) and third coupling (22) being arranged at opposite ends of the swing (20).

11. Counter lock for an inactive leaf according to any of the preceding claims, comprising a pull (40) including a projection (43) accessible from outside the counter lock (5), and an extension (42) configured for actuating the actuating cam (30) such that, when the pull (40) is operated through the projection (43), it causes the rotation of the actuating cam (30) and the release of blocking points (A, B) of the inactive leaf (3).

12. Counter lock for an inactive leaf according to the preceding claim, wherein the pull (40) directly contacts the actuating cam (30) through the extension (42) when the pull (40) is operated from outside, causing said extension (42) to pivot the actuating cam (30) in the opening direction.

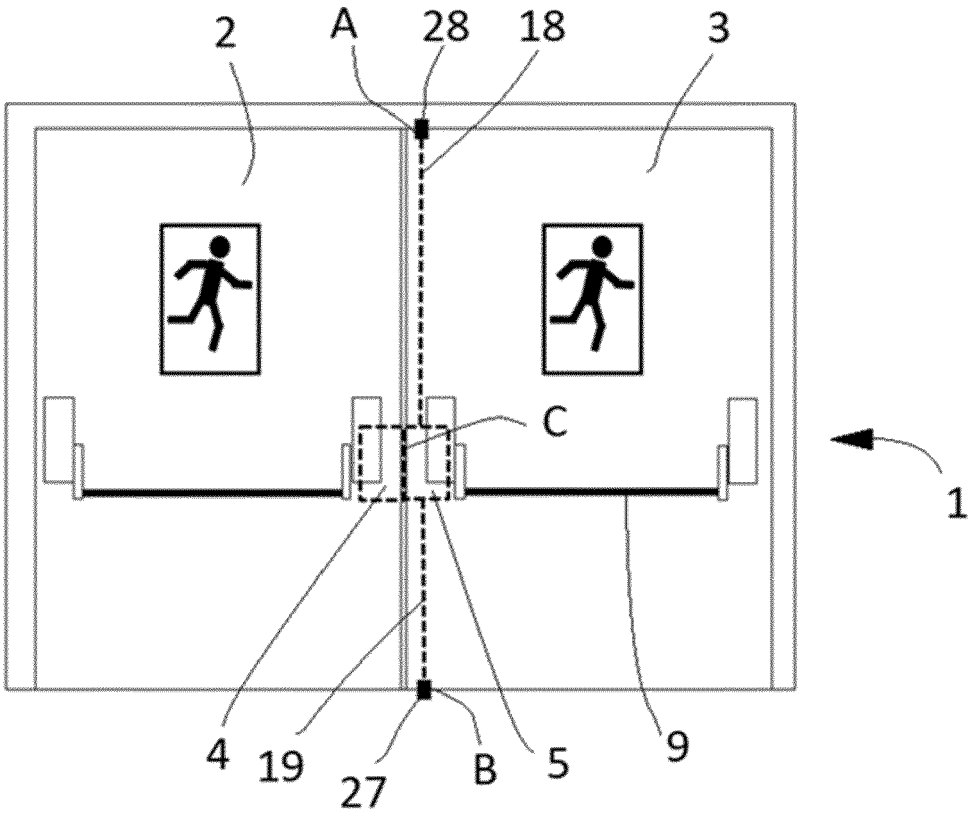

FIG. 1

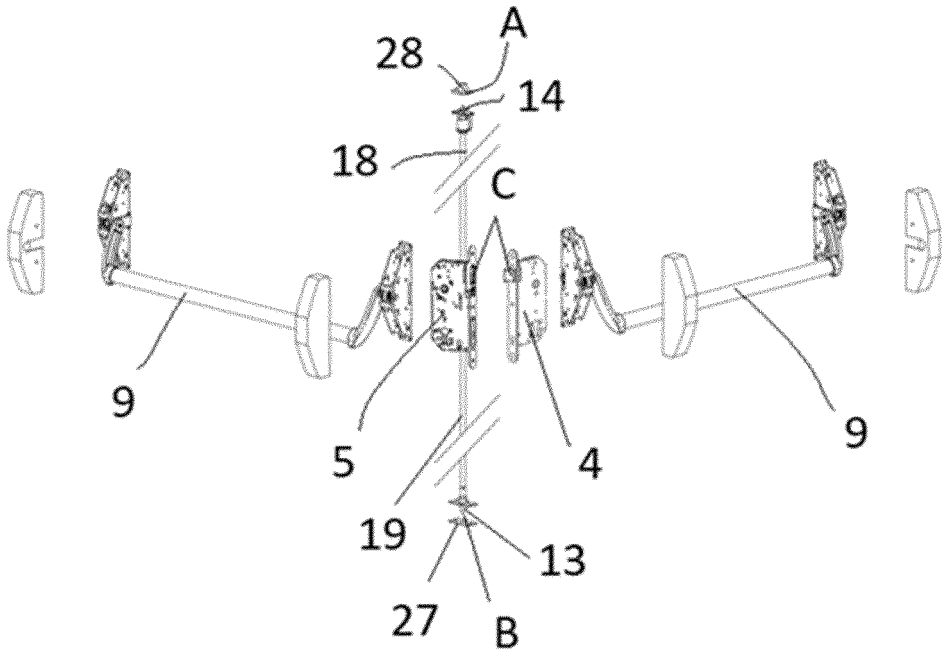

FIG. 2

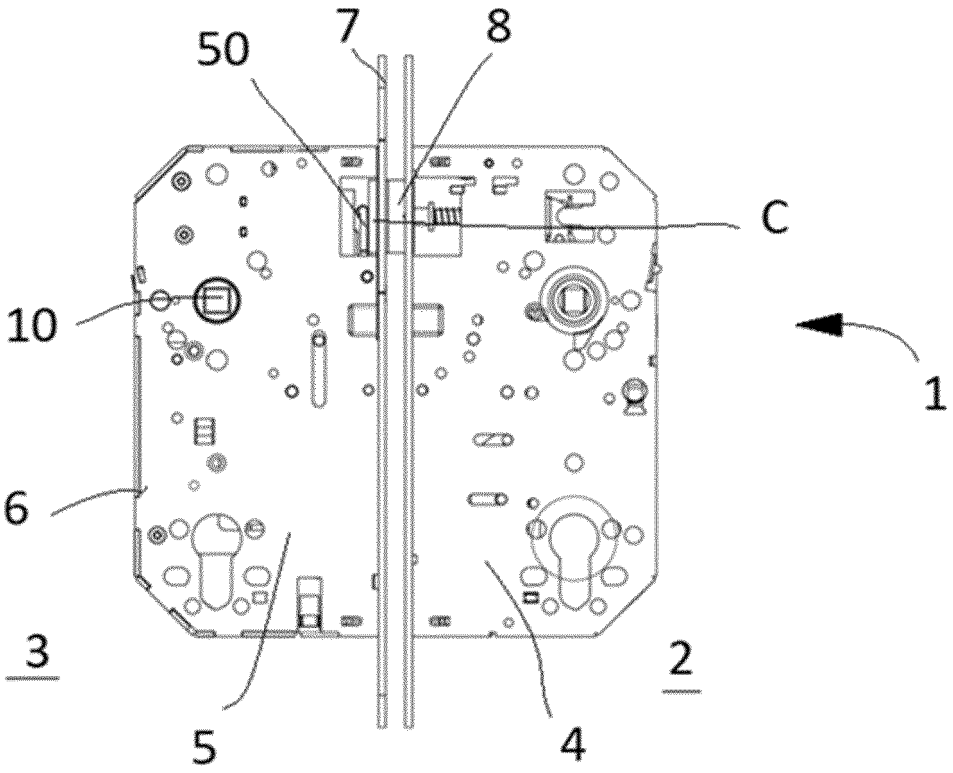

FIG. 3

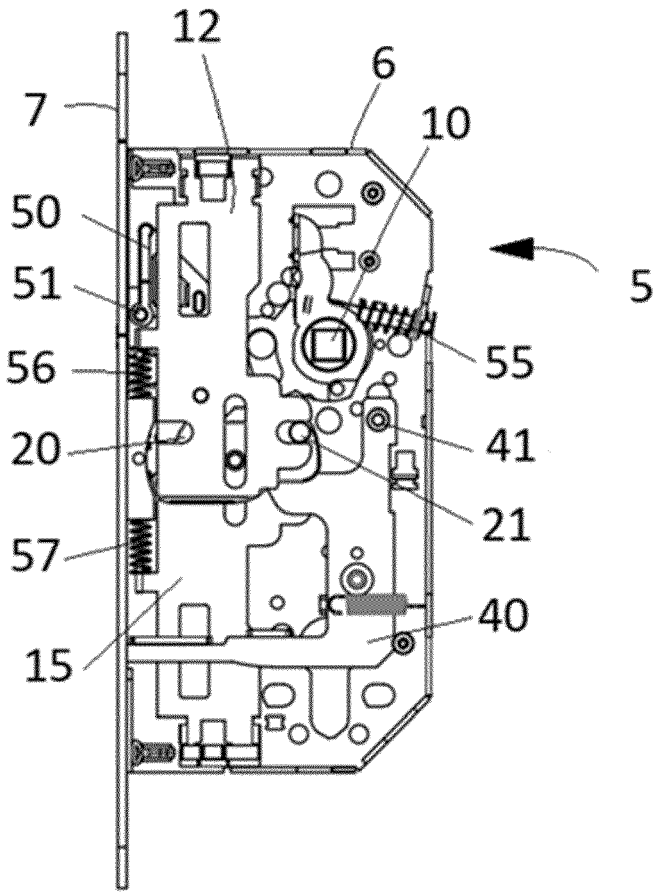

FIG. 4

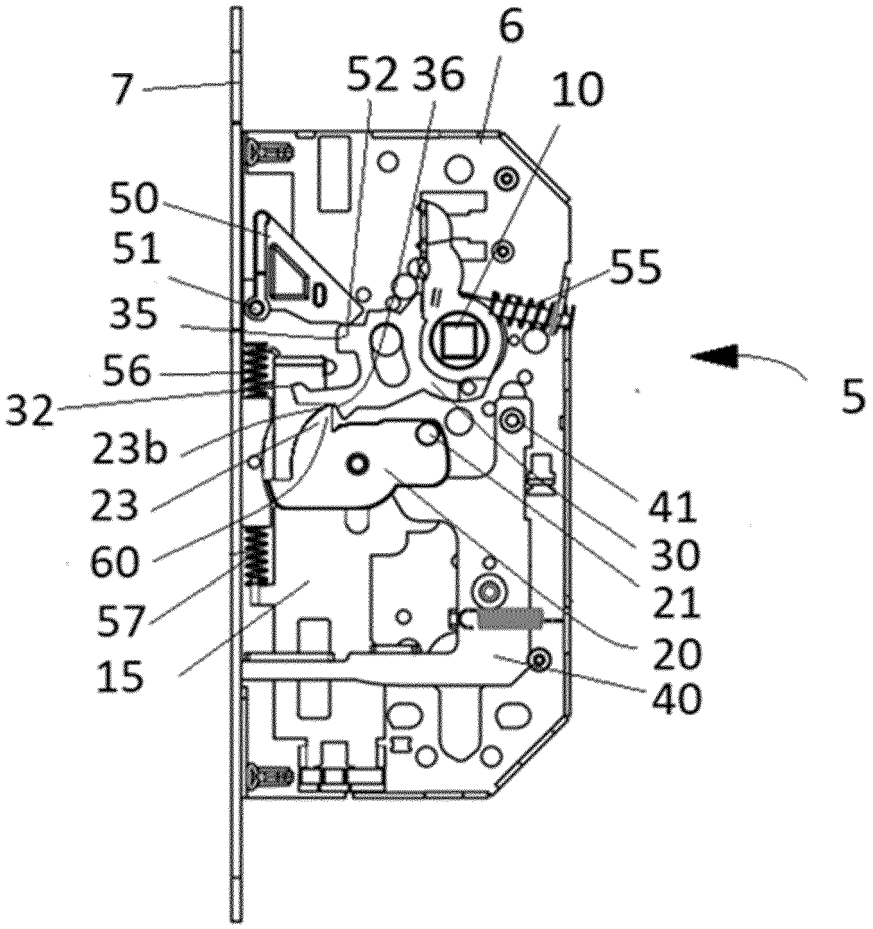

FIG. 5

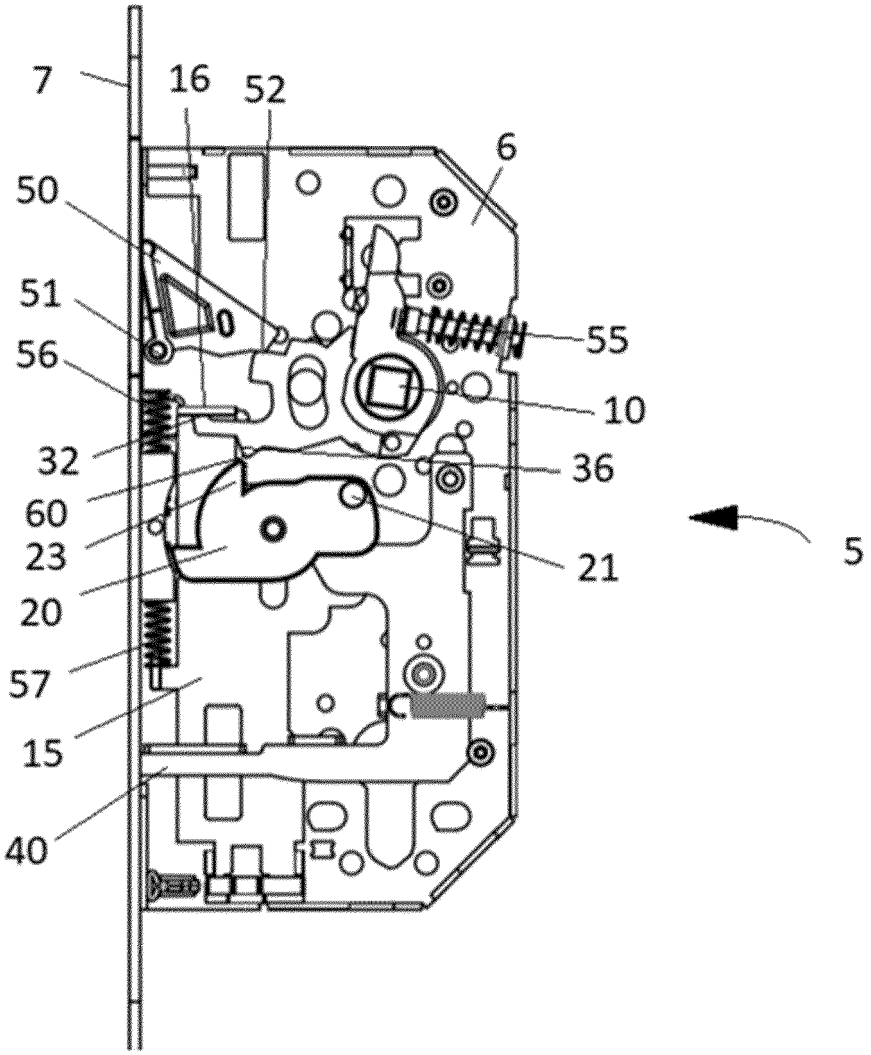

FIG. 6

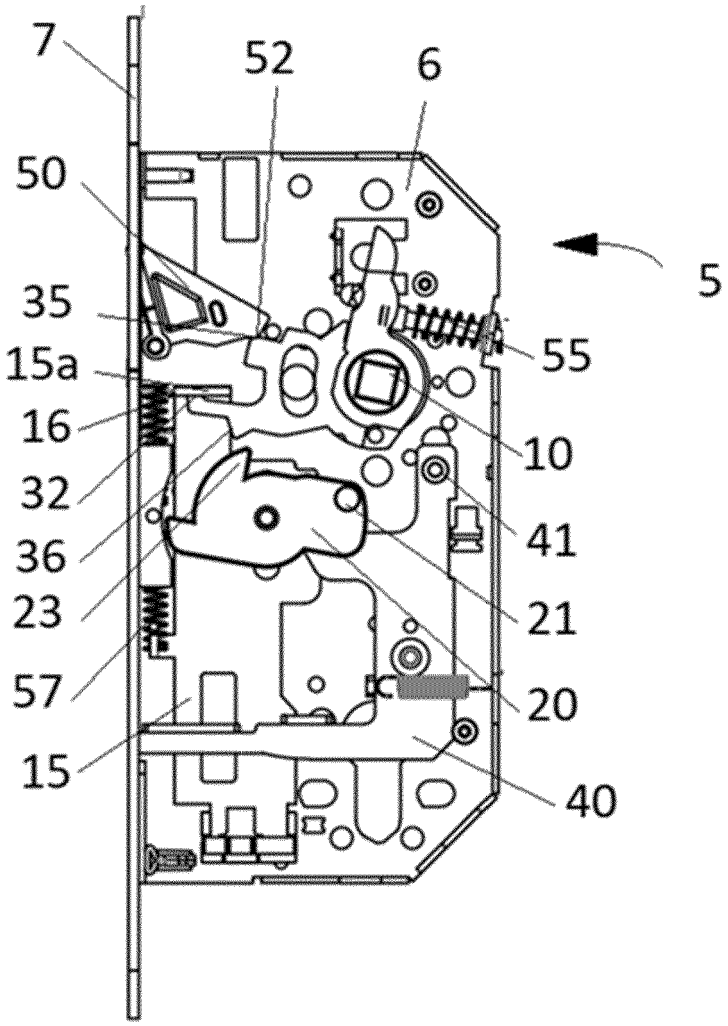

FIG. 7

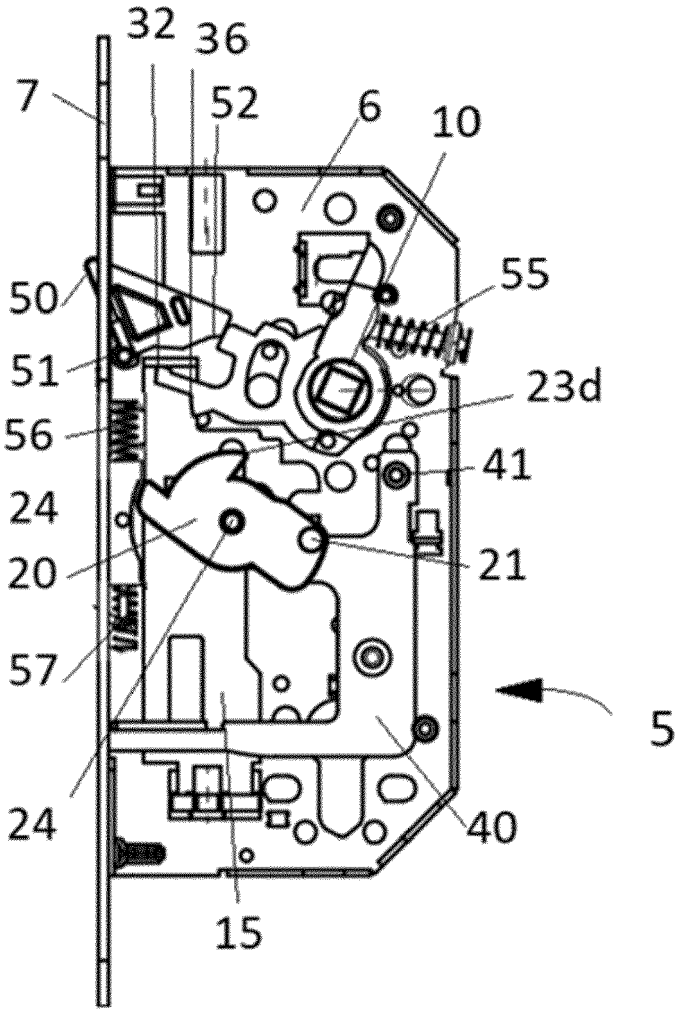

FIG. 8

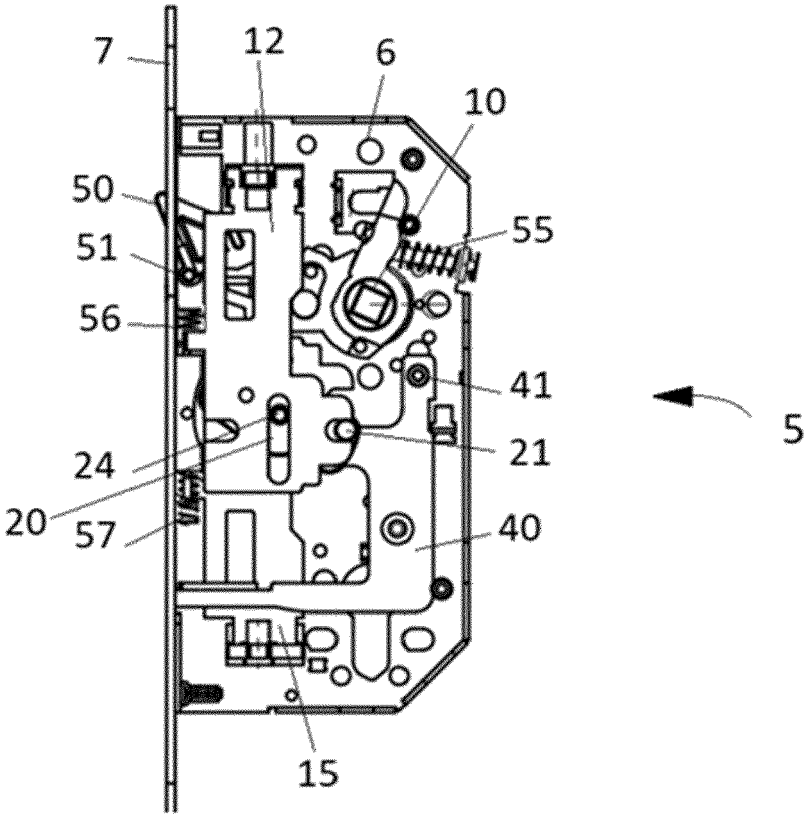

FIG. 9

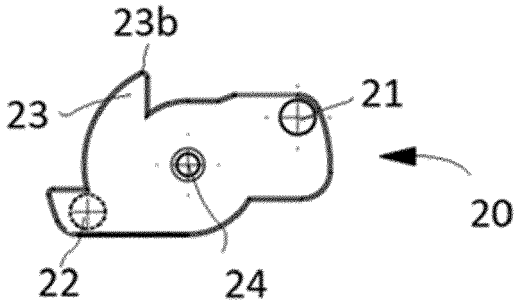

FIG. 10

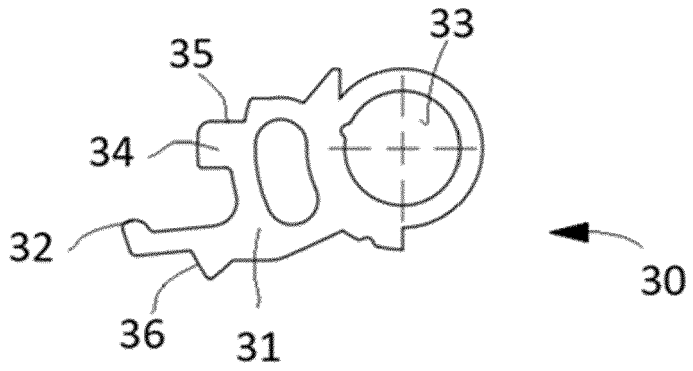

FIG. 11

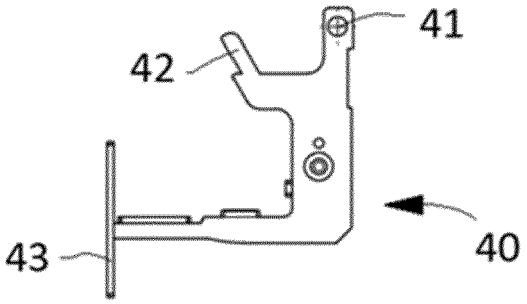

FIG. 12

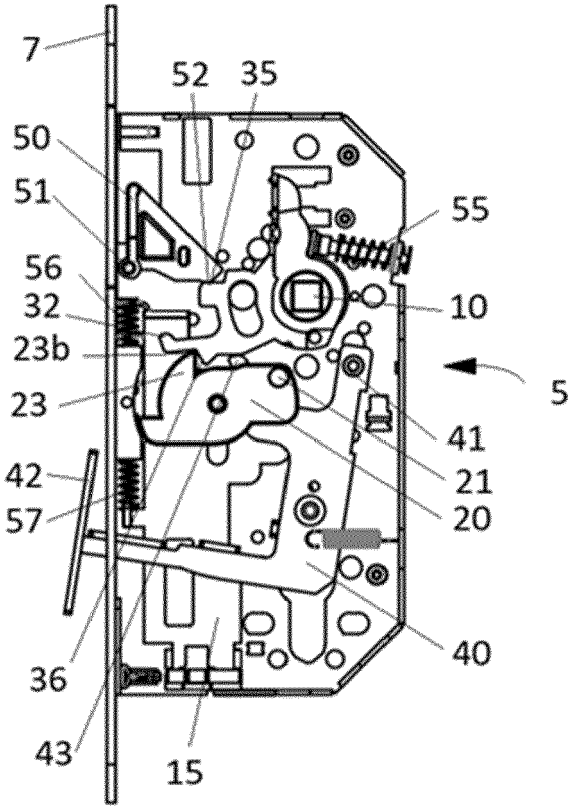

FIG. 13

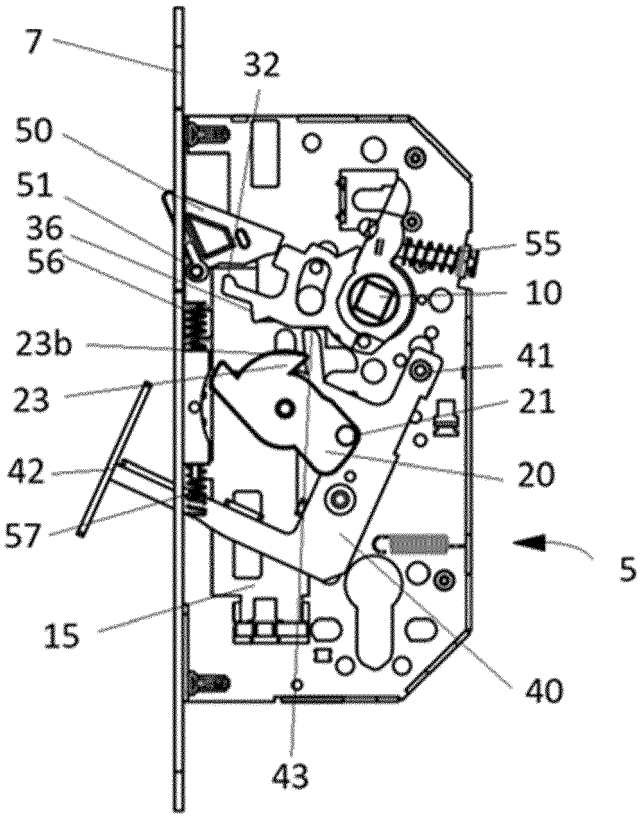

FIG. 14

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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 19 38 2149

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 264 268 A2 (BKS GMBH [DE]) 22 December 2010 (2010-12-22)	1-4,11	INV. E05B65/10
A	* paragraphs [0008], [0030], [0031]; figures 1-9 *	5-10,12	E05C7/04 E05C9/04

X	DE 20 2006 001383 U1 (BKS GMBH [DE]) 13 April 2006 (2006-04-13)	1,11	
A	* paragraphs [0053], [0054], [0067]; figures 1-9 *	2-10,12	

TECHNICAL FIELDS SEARCHED (IPC)

E05B
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 August 2019	Viethen, Lorenz

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 38 2149

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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23-08-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- EP 1524390 A2 **[0004]**