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(54) DOUBLE-PULL VEHICLE LOCK WITH SAFETY CATCH

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VERROU DE VÉHICULE À DOUBLE TRACTION DOTÉ DE LOQUET DE SÉCURITÉ

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Description

[0001] The present invention relates to a double-pull lock for a vehicle lid, in particular for the vehicle hood.

[0002] Lately, automotive manufacturers have been requiring double-pull locks for the hood of a vehicle, in which the lock must be operated by the user for a first time in order to obtain a partial opening of the lock, in which the hood is raised for a few millimeters (25-30 mm), but is still held by the lock, and for a second time in order to obtain a full opening of the hood that can be fully raised.

[0003] These types of locks are commonly referred to as double-pull locks.

[0004] US8,419,114 describes a vehicle hood lock that comprises a first catch that holds the hood in a closed position, and a second catch that holds the hood in a partially open position. The two catches are actuated by a cam connected to a user-operable release mechanism in the passenger compartment. In this way, a first actuation of the release mechanism will release the first catch, and a second actuation of the release mechanism will release the second catch.

[0005] Suck a locking device is impaired by some drawbacks from a safety point of view. In fact, the cam is inserted between the two catches and is connected to a cable operated by a mechanical or electronic system. Therefore, such a locking device can be easily tampered and forced. Moreover, the rotation of the cam, which is pulled by the cable, requires the user to exert a high force on the cable. Therefore, the mechanical actuation is inconvenient for the user, who has to exert a certain amount of force on an actuation lever attached to the cam cable. Electronic actuation requires an electric actuator with some power to exert sufficient force to pull the cable.

[0006] Moreover, the double-pull locks of the prior art do not provide for an automatic closing of a safety catch because of the weight of the hood lid. Therefore, the closing of the lock is delegated to the presence of a microswitch that detects a movement of a catch of the lock.

[0007] The purpose of the present invention is to eliminate the drawbacks of the prior art by providing a double-pull lock for the hood of a vehicle that is safe, versatile, reliable, and simple to make and operate.

[0008] These purposes are achieved in accordance with the invention having the characteristics listed in the independent claim 1.

[0009] Advantageous embodiments appear from the dependent claims.

[0010] The lock according to the invention is defined by claim 1.

[0011] Further features of the invention will appear clearer from the detailed description below, which refers to a merely illustrative and therefore non-limiting embodiment thereof, illustrated in the appended drawings, wherein:

Fig. 1 is an exploded perspective view of all parts of the lock according to the invention;

Fig. 1A is an enlarged view of four parts of Fig. 1;

Figs. 2 and 2A are a front view and a rear view of the lock according to the invention in completely closed position;

Figs. 3 and 3A are a front view and a rear view of the lock during a first actuation;

Figs. 4 and 4A are a front view and a rear view of the lock during a release of the actuation cable;

Figs. 5 and 5A are a front view and a rear view of the lock during a second actuation;

Figs. 6 and 6A are a front view and a rear view of the lock in completely open position;

Figs. 7 and 7A are a front view and a rear view of the lock during a closing of the safety catch due to the weight of the lid;

Figs. 8 and 8A are a front view and a rear view of the lock during a closing, when the pawl is returned;

Figs. 9 and 9A are a front view and a rear view of the lock during a closing, when the reset lever is released; and

Figs. 10 and 10A are a front view and a rear view of the lock during the sliding of the cam surface of the catch and the pawl to obtain a total closure.

[0012] With the aid of the Figures, a lock according to the invention is described, which is generally indicated with reference numeral 100.

[0013] Hereinafter, the terms "upper, lower, right, left, clockwise and counterclockwise" refer to the arrangement of the Figures.

[0014] With reference to Figs. 1 and 2, the lock (100) comprises a base plate (6) to which a catch (1), a pawl (2) and a safety catch (3) are pivoted. A reset lever (4) is pivoted to the catch. The catch (1) and the pawl (2) are arranged in a front side of the base plate. The safety catch (3) and the reset lever (4) are arranged in a rear side of the base plate.

[0015] The base plate (6) comprises a "U"-shaped slot (60) suitable for accommodating a striker pin (S) (Fig. 2). The lock (100) can be integral with the vehicle body and the striker pin (S) can be integral with the hood lid or vice versa.

[0016] With reference to Fig. 2, a first pivoting pin (P1) and a second pivoting pin (P2) are arranged in respective holes (61, 62) of the base plate (6) to pivot the catch (1) around a first pivoting axis and the pawl (2) around a second pivoting axis. The two pivoting axes are parallel to each other and orthogonal to the base plate (6).

[0017] With reference to Fig. 2A, a third pivoting pin (P3) is disposed in a hole (63) of the base plate (6) to pivot the safety catch (3) around a third pivoting axis. A fourth pivoting pin (P4) is disposed in a hole (16) of the catch and passes through a slot (64) of the base plate to pivot the reset lever (4) around a fourth pivoting axis. The third and fourth pivoting axes are parallel to each other and orthogonal to the base plate (6).

[0018] With reference to Fig. 2A, a locking pin (7) is mounted in the base plate and protrudes rearwardly from

the base plate, at a peripheral position with respect to the slot (64), in order to lock the reset lever (4).

[0019] With reference to Fig. 1A, the catch (1) comprises a plate (10) with a hole (11) wherein the first pivoting pin (P1) is inserted.

[0020] A fastening seat (12) is formed in the plate (10). The fastening seat (12) has a "U" shape suitable for engaging the striker pin (S) when it is in the slot (60) of the base plate, in order to close the lock as shown in Fig. 2.

[0021] A first stop tooth (13) is disposed above the fastening seat (12) and protrudes in upper position from the plate of the catch. The first stop tooth (13) has a cam surface (13a).

[0022] A second stop tooth (14) is disposed under the fastening seat (12) and protrudes in lower position from the plate of the catch.

[0023] A housing (15) is obtained behind the second stop tooth (14).

[0024] The hole (16) for the fourth pivoting pin (4) is obtained in a central position of the plate of the catch. Instead, the hole (11) for the first pivoting pin (P1) is obtained in a peripheral position of the plate of the catch.

[0025] The catch (1) can rotate around the first pivoting pin (P1) to go from a closed position (Fig. 2), wherein it locks the striker pin (S), to an open position (Fig. 6), wherein it releases the striker pin (S).

[0026] An ejection spring (5) pushes the striker pin (S) so that the striker pin (S) can push the catch (1) towards the open position.

[0027] The ejection spring (5) is arranged in the base plate (6). The ejection spring (5) has an arm (50) that is arranged on the slot (60) of the base plate, below the striker pin (S), so as to push the striker pin (S) outwards when it is in the slot (60) of the base plate. So, the ejection spring (5) acts as an ejector for the striker pin (S).

[0028] The ejection spring (5) comprises a helical portion (51) connected to the arm (50), in such a way that the arm (50) tangentially protrudes from the helical portion (51). The helical portion (51) of the ejection spring is disposed around the first pivoting pin (P1).

[0029] The pawl (2) comprises a plate (20) having a central hole (21) wherein the second pivoting pin (P2) is disposed, so as to generate a first arm (20a) and a second arm (20b) that extend in opposite directions.

[0030] A first stop tooth (22) is provided on the first arm (20a) of the pawl. The first stop tooth (22) of the pawl is suitable for abutting against the first stop tooth (13) of the catch disposed above the fastening seat (12) of the catch in order to lock the catch (1) in closed position. The first stop tooth (22) of the pawl has a cam surface (22a) suitable for cooperating with the cam surface (13a) of the first stop tooth of the catch.

[0031] A second stop tooth (23) is provided on the second arm (20b) of the pawl. The second stop tooth (23) of the pawl is suitable for cooperating with the second stop tooth (14) of the catch disposed below the fastening seat (12) of the catch.

[0032] A seat (25) is provided behind the second stop tooth (23) of the pawl.

[0033] The pawl (2) can rotate around the second pivoting pin (P2) to go from a locked position (Fig. 1), wherein it locks the catch (1), to an unlocked position (Fig. 3), wherein it releases the catch (1).

[0034] The pawl (2) is stressed in the locked position by a spring (M2).

[0035] The pawl (2) has a flange (24) disposed in the first arm (20a), behind the first stop tooth (22). The flange (24) is suitable for accommodating a ball of a Bowden cable connected to actuation means (not shown), such as a manually-operated actuation lever or an electrically-operated actuator. The Bowden cable exits to the left from the base plate (6), as shown in Fig. 2.

[0036] The safety catch (3) has an "L"-plate shape having a first horizontal arm (30) and a second vertical arm (31).

[0037] A hole (32) is arranged in the center of the first arm to accommodate the third pivoting pin (P3).

[0038] A first actuation pin (33) and a second actuation pin (34) protrude orthogonally from the first arm toward the base plate (6) and are arranged in diametrically opposite positions with respect to the hole (32) of the safety catch.

[0039] The first actuation pin (33) and the second actuation pin (34) of the safety catch (3) penetrate respective slots (65, 66) formed in the base plate (6) to protrude anteriorly from the base plate, and engage the slots (25, 15) of the pawl and of the catch, respectively. The slots (65, 66) of the base plate have a curved cam shape and are located on either side of the hole (63) for the third pivoting pin (P3). The actuation pins (33, 34) of the safety catch act as followers for the cams formed by the slots (65, 66) of the base plate.

[0040] The safety catch (3) has a stop tooth (35) that protrudes at the end of the second arm (31) parallel to the first arm (30). The stop tooth (35) is disposed on the slot (60) of the base plate and is used to lock the striker pin (S).

[0041] The safety catch (3) can be moved from a closing position (Fig. 2A), wherein the stop tooth (35) is disposed on the slot (10) of the base plate to lock the striker pin (S), to an open position (Fig. 6A), wherein the stop tooth (35) clears the slot (10) of the base plate to allow the striker pin (S) to exit.

[0042] The safety catch (3) is stressed to the open position by a spring (M3). One end of the spring (M3) is connected to an attachment (36) of the safety catch, behind the stop tooth (35) and another end of the spring (M3) is connected to the base plate.

[0043] The reset lever (4) consists in an "L"-shaped plate with a hole (41), disposed at the corner of the "L", to accommodate the fourth pivoting pin (P4) that penetrates the slot (64) of the base plate, passes through the base plate (6) and engages the center hole (16) of the catch (1). The reset lever (4) has a first arm (42) arranged vertically and a second arm (43) arranged horizontally.

[0044] The reset lever (4) has a fastening seat (44)

suitable for engaging the second actuation pin (34) of the safety catch (3). The fastening seat (44) is located at one end of the first arm of the reset lever.

[0045] The fourth pivoting pin (P4) of the reset lever (4) can be moved in the slot (64) of the base plate, so that the reset lever (4) can be in a non-operating position (Fig. 2A), wherein it does not interfere with the safety catch, and in an operating position (Fig. 6A), wherein the fastening seat (44) of the reset lever engages the second actuation pin (34) of the safety catch.

[0046] The second arm (43) of the reset lever is suitable for resting on the locking pin (7) to lock the reset lever in the non-operating position.

[0047] A traction spring (M4) stresses the reset lever (4) towards the operating position. Otherwise said, the spring (M4) tends to rotate the reset lever (4) clockwise, as shown in Fig. 2A.

[0048] A first end of the spring (M4) is connected to a protrusion (45) of the reset lever near the corner of the "L", and a second end of the spring (M4) is connected to a seat (67) of the base plate.

[0049] When the catch (1) is moved to the closing position, the reset lever (4) rotates clockwise due to the presence of the locking pin (7) of the base plate that locks the second arm (43) of the reset lever.

[0050] Instead, when the catch (1) is moved to the open position, the reset lever (4) is pushed to rotate counterclockwise. The reset lever (4) is triggered when the second arm (43) passes the locking pin (7), that is to say only when the catch has passed an intermediate closing position (pop up) in order to fasten the safety catch (3).

[0051] Therefore, the spring (M4) also serves to rotate the safety catch (3) to its open position.

[0052] The spring (M4) is essential for the function of the mechanism. In view of the fact that the catch (1) and the reset lever (4) assembly has two degrees of freedom, without the spring (M4) the fastening seat (44) of the reset lever might not engage the second actuation pin (34) of the safety catch.

[0053] The operation of the lock (100) is described below.

[0054] Referring to Figs. 2 and 2A, the lock (100) is in the fully closed position.

[0055] The striker pin (S) is locked in the fastening seat (12) of the catch. The catch (1) is in closed position, blocked by the pawl (2) that is in locked position. The first stop tooth (22) of the pawl locks the first stop tooth (13) of the catch.

[0056] The ejection spring (5) has its arm (50) under the striker pin (S) and pushes the striker pin (4) to eject it from the slot (60) of the base plate.

[0057] The safety catch (3) is in closed position and the actuation pins (33, 34) of the safety catch (3) are in their respective seats (25, 15) of the pawl and of the safety catch. In particular, the pawl (2) holds the safety catch (3) in closed position, since the first actuation pin (33) of the safety catch is in the seat (25) of the pawl.

[0058] The second arm (43) of the reset lever is on the locking pin (7) and therefore the reset lever (4) does not interfere with the safety catch (3).

[0059] In order to open the lock (100), the user performs a first actuation by pulling the Bowden cable of the pawl (2) in the direction of arrow F1. As a result, the pawl (2) rotates counterclockwise around the second pivoting pin (P2), going from the locked position to the unlocked position shown in Fig. 3. The first stop tooth (22) of the pawl disengages the first stop tooth (13) of the catch. In the meantime the spring (M2) of the pawl is loaded.

[0060] Being disengaged from the pawl (2), the catch (1) can rotate around the first pivoting pin (P1) in the direction of the arrow F2, because of the action of the ejection spring (5) that pushes the striker pin (S), which in turn pushes the catch (1) in such a way as to partially disengage the striker pin (S) from the fastening seat (12) of the catch.

[0061] During the rotation of the catch (1) around the first pivoting pin (P1), the second stop tooth (14) of the catch abuts against the second stop tooth (23) of the pawl, thus preventing the catch (1) from going to its fully open position.

[0062] In such a situation, the first actuation pin (33) of the safety catch is released from the seat (25) of the pawl, but the second actuation pin (34) of the safety catch is still blocked by the seat (15) of the catch. Therefore, in such an intermediate position, the catch (1) prevents a rotation of the safety catch (3) to its open position.

[0063] With reference to Fig. 4, when the Bowden cable of the pawl is released, the pawl (2) rotates in the direction of the arrow F3 because of the action of the spring (M2) of the pawl, returning to its locked position. The second stop tooth (23) of the pawl disengages the second stop tooth (14) of the catch. As a result, the catch (1) rotates in the direction of the arrow F4 because of the pushing action of the ejection spring (5) that pushes the striker pin (S) upwards, which in turn pushes and rotates the catch (1) in the direction of arrow F4.

[0064] In addition, the seat (25) of the pawl engages the first actuation pin (33) of the safety catch, preventing a rotation of the safety catch (3) in its opening direction, even if the seat (15) of the catch has disengaged the second actuation pin (34) of the safety catch.

[0065] With reference to Fig. 4A, one end (37) of the first arm (30) of the safety catch is abutting against the first arm (42) of the reset lever so as to prevent rotation of the reset lever (4) in a counterclockwise direction with reference to Fig. 4A.

[0066] In such a situation, the catch (1) is in an intermediate closing position, wherein the hood is raised to an intermediate position, the ejection spring (5) is abutting the pivoting pin (P2) of the pawl, and the preload of the ejection spring (5) is higher than the equivalent weight of the hood on the striker pin (S), in such a way that the striker pin (S) is resting on the ejection spring (5) when the catch (1) is in the intermediate closing position.

[0067] The striker pin (S) is free to move upward, pushed by the ejection spring (5) toward the stop tooth

(35) of the safety catch that is still in closed position.

[0068] At this point, the hood is in a partially closed condition. In fact, the striker pin (S) can travel upwards by a few millimeters, causing the hood to lift slightly, but the striker pin (S) will still be held by the stop tooth (35) of the safety catch. In such a case, the travel of the striker pin (S) from the intermediate closing position of the catch (1) to the stop tooth (35) of the safety catch is 15 mm.

[0069] With reference to Fig. 5, in order to obtain the complete opening of the hood, the user actuates the Bowden cable of the pawl for the second time in the direction of the arrow F5, rotating the pawl (2) anticlockwise around the second pivoting pin (P2). Such a rotation of the pawl causes the first actuation pin (33) of the safety catch to disengage from the seat (25) of the pawl. At this point, both the first actuation pin (33) and the second actuation pin (34) of the safety catch are free. So, as shown in Fig. 5A, the safety catch (3) can rotate around the third pivoting pin (P3) in the direction of arrow F6, towards its open position because of the action of its spring (M3). The actuation pins (33, 34) of the safety catch are moved into the slots (65, 66) of the base plate in the direction of the arrows Z1 and Z2.

[0070] One end (26) of the second arm (20b) of the pawl stops against the first actuation in (33) of the safety catch, preventing the pawl (2) from returning to the closed position.

[0071] With reference to Fig. 6, the lock is fully open. The catch (1) has been rotated around the first pin (P1) in the direction of the arrow (F7) so that the striker pin (S) is completely disengaged and can be brought out of the slot (60) of the base plate.

[0072] The movement of the catch (1) causes a movement of the reset lever (4) that is pivoted to the catch.

[0073] The configuration of the reset lever (4) is such that, when the fastening seat (44) of the reset lever engages with the second actuation pin (34) of the safety catch in combination with the rotation of the safety catch, the second arm (43) of the reset lever no longer has the opportunity to touch the locking pin (7) of the base plate.

[0074] The fastening seat (44) of the reset lever (4) engages the second actuation pin (34) of the safety catch (3).

[0075] With reference to Figs. 7 and 7A, the closure of the lock is obtained thanks to the weight of the hood that pushes the striker pin (S) in the direction of the arrow F8, making the catch (1) rotate in the direction of the arrow F9 against the action of the ejection spring (5).

[0076] The rotation of the catch (1) actuates the reset lever (4) that is moved in the direction of the arrow F10 and pulls the second actuation pin (34) of the safety catch. As a result, the safety catch (3) rotates in the direction of the arrow F11 and is arranged in closed position, wherein the stop tooth (35) of the safety catch closes the fastening slot (60) of the base plate.

[0077] The first actuation pin (33) of the safety catch disengages the end (26) of the second arm (20b) of the pawl. Thus, the pawl (2) is free and can return to its stop position because of the action of its spring (M2).

[0078] From the fully open position of Fig. 6, when closing the lid of the hood, as shown in Fig. 7, due to the weight of the lid of the hood, the striker pin (S) is rested on the ejection spring (5), which is preloaded. In the meantime, due to the movement of the reset lever (4) which is connected to the catch (1), the reset lever (4) closes the safety catch (3) and secures the lock (100). Such a function is essential, because if the user simply rests the lid of the hood on the vehicle body, without pushing the lid, the lock remains partially engaged because the catch (1) is in an intermediate position, but the safety catch (3) is closed, unlike the double-pull locks without safety catch of the prior art, wherein the verification of the closure of the lock is entrusted only to a microswitch.

[0079] Fig. 8 shows the situation in which the pawl (2) has rotated in the direction of the arrow (F12), returning to its stop position, wherein the first actuation pin (33) of the safety catch is in the seat (25) of the pawl.

[0080] As shown in Figs. 9 and 9A, by continuing to move the striker pin (S) in the direction of the arrow F13, due to the weight of the hood, the catch (1) continues to rotate in the direction of the arrow F14, consequently the fourth pin (P4) of the reset lever (4) moves into the slot (64) of the base plate and the fastening seat (44) of the reset lever releases the second actuation pin (34) of the safety catch. At this point the safety catch (3) is disengaged from the reset lever (4).

[0081] Fig. 10 illustrates the situation where, as the striker pin (S) continues to be lowered for a complete closure of the lid of the hood, the cam surface (13a) of the first stop tooth (13) of the catch (1) slides over the cam surface (22a) of the first stop tooth (22) of the pawl until the first stop tooth (13) of the catch is locked by the first stop tooth (22) of the pawl, as shown in Fig. 2.

[0082] Fig. 10A illustrates the situation where the second arm (43) of the reset lever passes the locking pin (7) of the base plate so as to lock the reset lever in the position of Fig. 2A, wherein the reset lever does not interfere with the safety catch.

Claims

1. Vehicle lock (100) comprising:

- a base plate (6) with a slot (60) suitable for receiving a striker pin (S) integral with the body or with a lid of the vehicle,
- a catch (1) having a fastening seat (12) suitable for fastening the striker pin (S) when it is disposed in the slot (60) of the base plate; said catch (1) being hinged to said base plate (6) around a first pivoting pin (P1) in order to go from a closing position, wherein said striker pin is locked, to an open position wherein said striker pin is unlocked,
- an ejection spring (5) with an arm (50) that acts

on said striker pin (S) to push the catch (1) towards said opening position,
- a pawl (2) suitable for locking said catch (1) in the closing position; said pawl (2) being hinged to said base plate (6) around a second pivoting pin (P2) in order to go from a locking position, wherein said catch is locked, to an unlocking position, wherein said catch is unlocked; said pawl (2) being suitable for being connected to a Bowden cable that moves the pawl (2) from the locking position to the unlocking position,
- a spring (M2) that pushes the pawl in the locking position,
- a safety catch (3) with a stop tooth (35) suitable for locking the striker pin (S) in the slot (60) of the plate; said safety catch (3) being hinged to said base plate (6) around a third pivoting pin (P3) in order to go from a closing position, wherein said striker pin is locked, to an open position, wherein said striker pin is unlocked,
- a spring (M3) that pushes the safety catch towards an opening position,
- a reset lever (4) hinged to said catch (1) around a fourth pivoting pin (P4); said reset lever (4) being suitable for moving with the catch (1) in order to go from a non-operating position, wherein it does not interfere with the safety catch (3), to an operating position, wherein the safety catch (3) is fastened, and
- a spring (M4) to push the reset lever (4) towards the operating position.

2. The lock (100) of claim 1, wherein said reset lever (4) is configured in such a way to:

- fasten the safety catch (3) when the safety catch (3) is in open position and the vehicle lid is closed, moving the catch (1) towards the closing position because of the weight of the lid,
- bring the safety catch (3) to the closing position, when the catch (1) is moved towards its closing position, and
- release the safety catch (3) when the catch (1) has reached the closing position.

3. The lock (100) of claim 1 or 2, wherein said catch (1) comprises a plate (20) with a hole (16) for the fourth pivoting pin (4) obtained in a central position of the plate and a hole (11) for the first pivoting pin (P1) obtained in a peripheral position of the plate.

4. The lock (100) of any one of the preceding claims, wherein said catch (1) and said pawl (2) are disposed in the front of the base plate (6) and said safety catch (3) and said reset lever are disposed in the back of said base plate;
said base plate (6) having a slot (64) crossed by said fourth pivoting pin (P4).

5. The lock (100) of claim 4, wherein said safety catch (3) is shaped like an L-shaped plate with a first arm (30), a second arm (31), and a hole (32) disposed in the center of the first arm to receive the third pivoting pin (P3);

wherein a first actuation pin (33) and a second actuation pin (34) protrude orthogonally from the first arm towards the base plate (6) and are disposed in diametrically opposite positions relative to the hole (32) of the safety catch;
wherein the first actuation pin (33) and the second actuation pin (34) of the safety catch (3) penetrate corresponding slots (65, 66) obtained in the base plate (6) in order to protrude frontally from the base plate and be engaged in seats (25, 15) of the pawl and of the catch, respectively.

6. The lock (100) of claim 5, wherein said reset lever (4) comprises a fastening seat (44) suitable for fastening said second actuation pin (34) of the safety catch (3).

7. The lock (100) of claim 6, wherein said reset lever (4) has an L-shape wherein the fourth pin (P4) is disposed in the corner of the "L", defining a first arm (42) with said fastening seat (44) and a second arm (43) suitable for being engaged on a locking pin (7) of the base plate when said reset lever (4) is in non-operating position.

8. The lock (100) of claim 7, wherein said slots (65, 66) of the base plate have a curved cam-like shape and are disposed on both sides relative to a hole (63) of the base plate that receives said third pivoting pin (P3).

9. The lock (100) of any one of the preceding claims, wherein said catch (1) comprises:

- a first stop tooth (13) disposed above the fastening seat (12) and protruding in upper position from the plate of the catch, and
- a second stop tooth (14) disposed under the fastening seat (12) and protruding in lower position from the plate of the catch; and

wherein said pawl (2) comprises:

- a plate (20) with a central hole (21) wherein the second pivoting pin (P2) is disposed, in such a way to generate a first arm (20a) and a second arm (20b) that extend in opposite directions,
- a first stop tooth (22) provided on the first arm (20a) of the pawl, suitable for being stopped against the first stop tooth (13) of the catch to lock the catch (1) in closed position, and

- a second stop tooth (23) provided on the second arm (20b) of the pawl, suitable for cooperating with the second stop tooth (14) of the catch.

10. The lock (100) of claim 9, wherein the first stop tooth (13) of the catch has a cam surface (13a), and the first stop tooth (22) of the pawl has a cam surface (22a) suitable for cooperating with the cam surface (13a) of the first stop tooth of the catch.

Patentansprüche

1. Schloss (100) für Fahrzeug, umfassend:

- eine Basisplatte (6) mit einem Schlitz (60), der dazu geeignet ist, einen Anschlagbolzen (S) aufzunehmen, der mit einer Karosserie oder Tür des Fahrzeugs einstückig ist,
- einen Schließhaken (1) mit einem Kupplungssitz (12), der dazu geeignet ist, an dem Anschlagbolzen (S) anzukuppeln, wenn er sich in dem Schlitz (60) der Basisplatte befindet; wobei der Schließhaken (1) an der Basisplatte (6) um einen ersten Drehzapfen (P1) herum angelenkt ist, um aus einer Schließstellung, in der der Anschlagbolzen verriegelt ist, in eine Offenstellung überzugehen, in der der Anschlagbolzen entriegelt ist,
- eine Auswurffeder (5) mit einem Arm (50), der auf den Anschlagbolzen (S) wirkt, um den Schließhaken (1) in die Offenstellung zu drücken,
- eine Sperrklinke (2), die dazu geeignet ist, den Schließhaken (1) in der Schließstellung zu verriegeln, wobei die Sperrklinke (2) an der Basisplatte (6) um einen zweiten Drehzapfen (P2) herum angelenkt ist, um aus einer Verriegelungsstellung, in der der Schließhaken verriegelt ist, in eine Entriegelungsstellung überzugehen, in der der Schließhaken entriegelt ist; wobei die Sperrklinke (2) dazu geeignet ist, mit einem Bowdenzug verbunden zu werden, um die Sperrklinke (2) aus der Verriegelungsstellung in die Entriegelungsstellung zu bringen,
- eine Feder (M2), die die Sperrklinke in die Verriegelungsstellung drückt,
- einen Sicherheitshaken (3) mit einem Arretierzahn (35), der dazu geeignet ist, den Anschlagbolzen(S) in dem Schlitz (60) der Platte zu verriegeln; wobei der Sicherheitshaken (3) an der Basisplatte (6) um einen dritten Drehzapfen (P3) herum angelenkt ist, um von einer Schließstellung, in der der Anschlagbolzen verriegelt ist, in eine Offenstellung überzugehen, in der der Anschlagbolzen entriegelt ist,
- eine Feder (M3), die den Sicherheitshaken in eine Offenstellung drückt,
- einen Rückstellhebel (4), der an dem Schließhaken (1) um einen vierten Drehzappfen (P4) herum angelenkt ist; wobei der Rückstellhebel (4) dazu geeignet ist, sich zusammen mit dem Schließhaken (1) zu bewegen, um aus einer Ruhestellung, in der er nicht mit dem Sicherheitshaken (3) interferiert, in eine Arbeitsstellung überzugehen, in der er an den Sicherheitshaken (3) ankuppelt, und
- eine Feder (M4), die den Rückstellhebel (4) in die Arbeitsstellung drückt.

2. Schloss (100) nach Anspruch 1, wobei der Rückstellhebel (4) so konfiguriert ist, dass:

- er an den Sicherheitshaken (3) ankuppelt, wenn der Sicherheitshaken (3) sich in der Offenstellung befindet und die Tür des Fahrzeugs geschlossen wird, so dass der Schließhaken (1) aufgrund des Gewichts der Tür in die Schließstellung bewegt wird,
- er den Sicherheitshaken (3) in die Schließstellung mitzieht, wenn der Schließhaken (1) in seine Schließstellung bewegt wird, und
- er den Sicherheitshaken (3) freigibt, wenn der Schließhaken (1) in der Schließstellung angekommen ist.

3. Schloss (100) nach Anspruch 1 oder 2, wobei der Schließhaken (1) eine Platte (20) mit einem Loch (16) für den vierten Drehzapfen (4) umfasst, der in einer zentralen Stellung der Platte herausgearbeitet ist, und mit einem Loch (11) für den ersten Drehzapfen (P1), der in einer peripheren Stellung der Platte herausgearbeitet ist.

4. Schloss (100) nach einem der vorstehenden Ansprüche, wobei der Schließhaken (1) und die Sperrklinke (2) vorn an der Basisplatte (6) angeordnet sind und wobei der Sicherheitshaken (3) und der Rückstellhebel hinten an der Basisplatte angeordnet sind; wobei die Basisplatte (6) einen Schlitz (64) aufweist, durch den der vierte Drehzapfen (P4) hindurchgeht.

5. Schloss (100) nach Anspruch 4, wobei der Sicherheitshaken (3) wie eine L-förmige Platte geformt ist, mit einem ersten Arm (30), einem zweiten Arm (31), und einem Loch (32), das im Mittelpunkt des ersten Armes angeordnet ist, um den dritten Drehzapfen (P3) aufzunehmen;

wobei ein erster Betätigungsstift (33) und ein zweiter Betätigungsstift (34) rechtwinklig aus dem ersten Arm zu der Basisplatte (6) hin vorstehen und in diametral gegenüberliegenden Stellungen in Bezug auf das Loch (32) des Sicherheitshakens angeordnet sind;
wobei der erste Betätigungsstift (33) und der

zweite Betätigungsstift (34) des Sicherheitshakens (3) in jeweilige Schlitze (65, 66) einfallen, die in der Basisplatte (6) herausgearbeitet sind, um vorn aus der Basisplatte vorzustehen und Sitze (25, 15) in der Sperrklinke bzw. in dem Schließhaken in Eingriff zu nehmen.

6. Schloss (100) nach Anspruch 5, wobei der Rückstellhebel (4) einen Kupplungssitz (44) umfasst, der dazu geeignet ist, an den zweiten Betätigungsstift (34) des Sicherheitshakens (3) anzukuppeln.

7. Schloss (100) nach Anspruch 6, wobei der Rückstellhebel (4) eine L-förmige Form aufweist, wobei der vierte Zapfen (P4) in der Ecke des "L" angeordnet ist und einen ersten Arm (42) mit dem Kupplungssitz (44) definiert, und einen zweiten Arm (43), der dazu geeignet ist, auf einem Verriegelungsstift (7) der Basisplatte einzurasten, wenn der Rückstellhebel (4) sich in Ruhestellung befindet.

8. Schloss (100) nach Anspruch 7, wobei die Schlitze (65, 66) der Basisplatte eine kurvenförmige Form aufweisen und auf beiden Seiten in Bezug auf ein Loch (63) der Basisplatte angeordnet sind, das den dritten Drehzapfen (P3) aufnimmt.

9. Schloss (100) nach einem der vorstehenden Ansprüche, wobei der Schließhaken (1) umfasst:

- einen ersten Arretierzahn (13), der über dem Kupplungssitz (12) angeordnet ist und oben aus der Platte des Schließhakens vorsteht, und
- einen zweiten Arretierzahn (14), der unter dem Kupplungssitz (12) angeordnet ist und unten aus der Platte des Schließhakens vorsteht; und

wobei die Sperrklinke (2) umfasst:

- eine Platte (20) mit einem zentralen Loch (21), wobei der zweite Drehzapfen (P2) so angeordnet ist, dass er einen ersten Arm (20a) und einen zweiten Arm (20b) erzeugt, die sich in entgegengesetzte Richtungen erstrecken,
- einen ersten Arretierzahn (22), der auf dem ersten Arm (20a) der Sperrklinke vorgesehen ist und dazu geeignet ist, gegen den ersten Arretierzahn (13) des Schließhakens in Anschlag zu gehen, um den Schließhaken (1) in Schließstellung zu verriegeln, und
- einen zweiten Arretierzahn (23), der auf dem zweiten Arm (20b) der Sperrklinke vorgesehen ist und dazu geeignet ist, mit dem zweiten Arretierzahn (14) des Schließhakens zusammenzuwirken.

10. Schloss (100) nach Anspruch 9, wobei der erste Arretierzahn (13) des Schließhakens eine Kurvenfläche (13a) aufweist und der erste Arretierzahn (22) der Sperrklinke eine Kurvenfläche (22a) aufweist, die dazu geeignet ist, mit der Kurvenfläche (13a) des ersten Arretierzahn des Schließhakens zusammenzuwirken.

Revendications

1. Serrure (100) pour véhicule comprenant :

- une plaque de base (6) munie d'une fissure (60) apte à accueillir un percuteur (S) solidaire à une carrosserie ou à une porte du véhicule,
- un loquet (1) muni d'un emplacement d'accrochage (12) apte à accrocher le percuteur (S) quand il se trouve dans la fissure (60) de la plaque de base ; ledit loquet (1) étant pivoté sur ladite plaque de base (6) autour d'un premier axe de pivotement (P1) pour passer d'une position de fermeture, où il bloque ledit percuteur, à une position d'ouverture, où il libère ledit percuteur,
- un ressort d'éjection (5) muni d'un bras (50) qui agit sur ledit percuteur (S) qui pousse le loquet (1) vers ladite position d'ouverture,
- un cliquet (2) apte à bloquer ledit loquet (1) sur la position de fermeture ; ledit cliquet (2) étant pivoté sur ladite plaque de base (6) autour d'un deuxième axe de pivotement (P2) pour passer d'une position de blocage, où il bloque ledit loquet, à une position de déblocage, où il débloque ledit loquet ; ledit cliquet (2) étant destiné à être relié à un câble Bowden pour déplacer le cliquet (2) de la position de blocage à la position de déblocage,
- un ressort (M2) qui pousse le cliquet sur la position de blocage,
- un cran de sûreté (3) muni d'une dent d'arrêt (35) apte à bloquer le percuteur (S) dans la fissure (60) de la plaque de base ; ledit cran de sûreté (3) étant pivoté sur ladite plaque de base (6) autour d'un troisième axe de pivotement (P3) pour passer d'une position de fermeture, où il bloque ledit percuteur, à une position d'ouverture, où il libère ledit percuteur,
- un ressort (M3) qui sollicite le cran de sûreté vers une position d'ouverture,
- un levier de réarmement (4) pivoté sur ledit loquet (1) autour d'un quatrième axe de pivotement (P4) ; ledit levier de réarmement (4) se déplaçant avec le loquet (1) pour passer d'une position non opérationnelle, où il n'interfère pas avec le cran de sûreté (3), à une position opérationnelle, où il accroche le cran de sûreté (3), et
- un ressort (M4) qui sollicite le levier de réar-

mement (4) vers la position opérationnelle.

2. Serrure (100) selon la revendication 1, où ledit levier de réarmement (4) est configuré de manière à :

- accrocher le cran de sûreté (3) lorsque le cran de sûreté (3) est en position d'ouverture et que l'on ferme la porte du véhicule, en faisant déplacer le loquet (1) vers la position de fermeture, grâce au poids de la porte,
- entraîner le cran de sûreté (3) sur la position de fermeture, lorsque le loquet (1) se déplace vers sa position de fermeture, et
- dégager le cran de sûreté (3), lorsque le loquet (1) est arrivé sur la position de fermeture.

3. Serrure (100) selon la revendication 1 ou 2, où ledit loquet (1) comprend une plaque (20) munie d'un orifice (16), pour le quatrième axe de pivotement (4), réalisé sur une position centrale de la plaque et un orifice (11), pour le premier axe de pivotement (P1), réalisé sur une position périphérique de la plaque.

4. Serrure (100) selon l'une quelconque des revendications précédentes, où ledit loquet (1) et ledit cliquet (2) sont disposés antérieurement à la plaque de base (6) et ledit cran de sûreté (3) et ledit levier de réarmement sont disposés postérieurement à ladite plaque de base ;
ladite plaque de base (6) étant munie d'une fente (64) à travers laquelle passe ledit quatrième axe de pivotement (P4).

5. Serrure (100) selon la revendication 4, où ledit cran de sûreté (3) a une forme de plaque en « L » ayant un premier bras (30), un second bras (31), et un orifice (32) disposé au centre du premier bras pour accueillir le troisième axe de pivotement (P3) ;

où un premier axe d'activation (33) et un second axe d'activation (34) débordent orthogonalement du premier bras vers la plaque de base (6) et sont disposés en positions diamétralement opposées par rapport à l'orifice (32) du cran de sûreté ;
où le premier axe d'activation (33) et le second axe d'activation (34) du cran de sûreté (3) pénètrent dans des fissures correspondantes (65, 66) réalisées sur la plaque de base (6) pour déborder antérieurement de la plaque de base et s'engager respectivement dans des emplacements (25, 15) du cliquet et du loquet.

6. Serrure (100) selon la revendication 5, où ledit levier de réarmement (4) comprend un emplacement d'accrochage (44) apte à accrocher ledit second axe d'activation (34) du cran de sûreté (3).

7. Serrure (100) selon la revendication 6, où ledit levier de réarmement (4) a une forme en « L » où le quatrième axe (P4) est disposé à l'angle du « L » définissant un premier bras (42), où il y a ledit emplacement d'accrochage (44), et un second bras (43) destiné à aller en butée contre une goupille d'arrêt (7) de la plaque de base, lorsque ledit levier de réarmement (4) est en position non opérationnelle.

8. Serrure (100) selon la revendication 7, où lesdites fissures (65, 66) de la plaque de base ont une forme arquée à came et sont disposées d'une part et de l'autre par rapport à un orifice (63) de la plaque de base qui accueille ledit troisième axe de pivotement (P3).

9. Serrure (100) selon l'une quelconque des revendications précédentes, où ledit loquet (1) comprend :

- une première dent d'arrêt (13) disposée au-dessus de l'emplacement d'accrochage (12) et débordante supérieurement de la plaque du loquet, et
- une seconde dent d'arrêt (14) disposée au-dessous de l'emplacement d'accrochage (12) et débordante inférieurement de la plaque du loquet ; et

où ledit loquet (2) comprend :

- une plaque (20) munie d'un orifice central (21) dans lequel est disposé le deuxième axe de pivotement (P2), de manière à générer un premier bras (20a) et un second bras (20b) qui se déploient dans des directions opposées.
- une première dent d'arrêt (22) prévue sur le premier bras (20a) du cliquet, apte à aller en butée contre la première dent d'arrêt (13) du loquet pour bloquer le loquet (1) en position fermée, et
- une seconde dent d'arrêt (23) prévue sur le second bras (20b) du cliquet, apte à coopérer avec la seconde dent d'arrêt (14) du loquet.

10. Serrure (100) selon la revendication 9, où la première dent d'arrêt (13) du loquet a une surface à came (13a), et la première dent d'arrêt (22) du cliquet a une surface à came (22a) apte à coopérer avec la surface à came (13a) de la première dent d'arrêt du loquet.

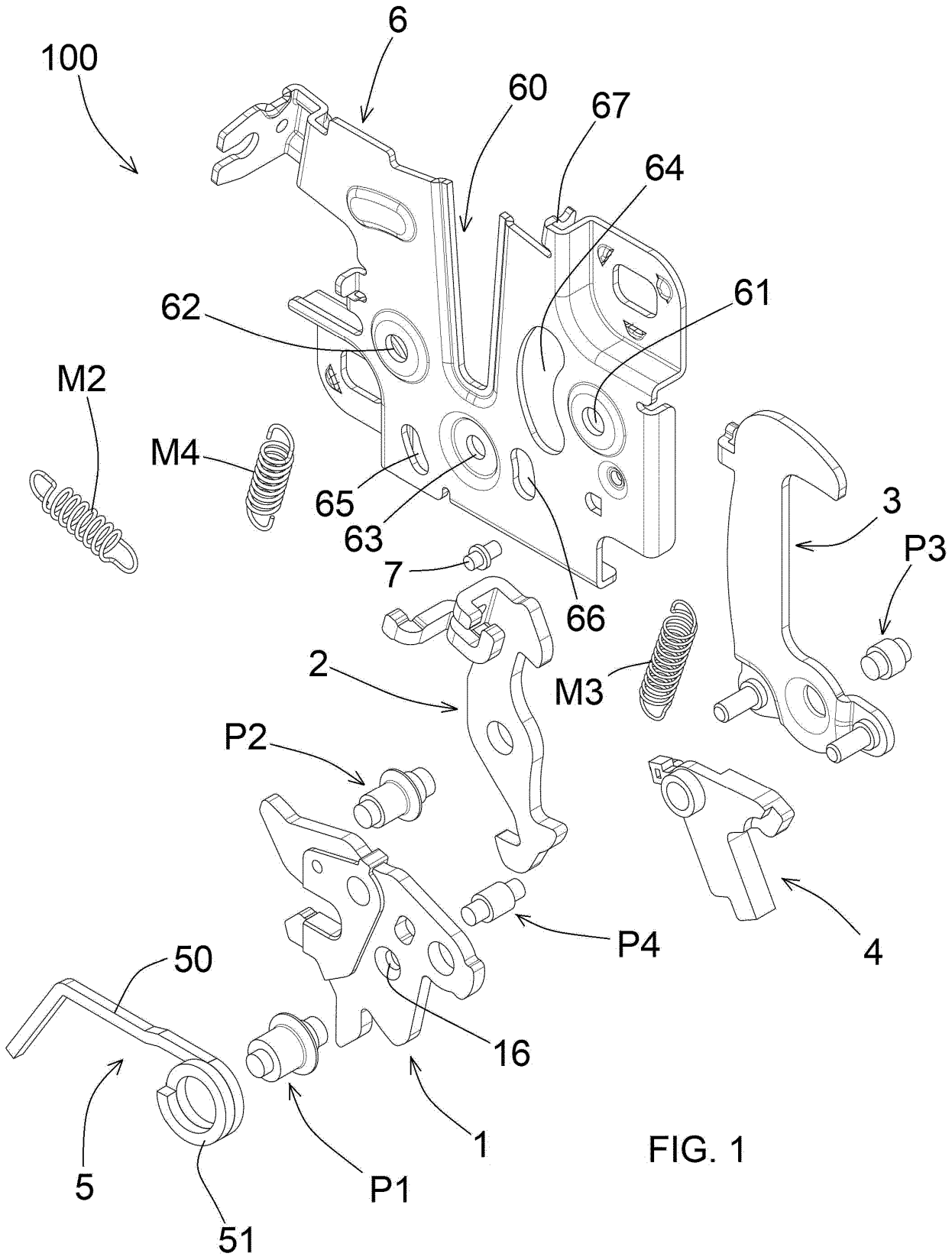

FIG. 1

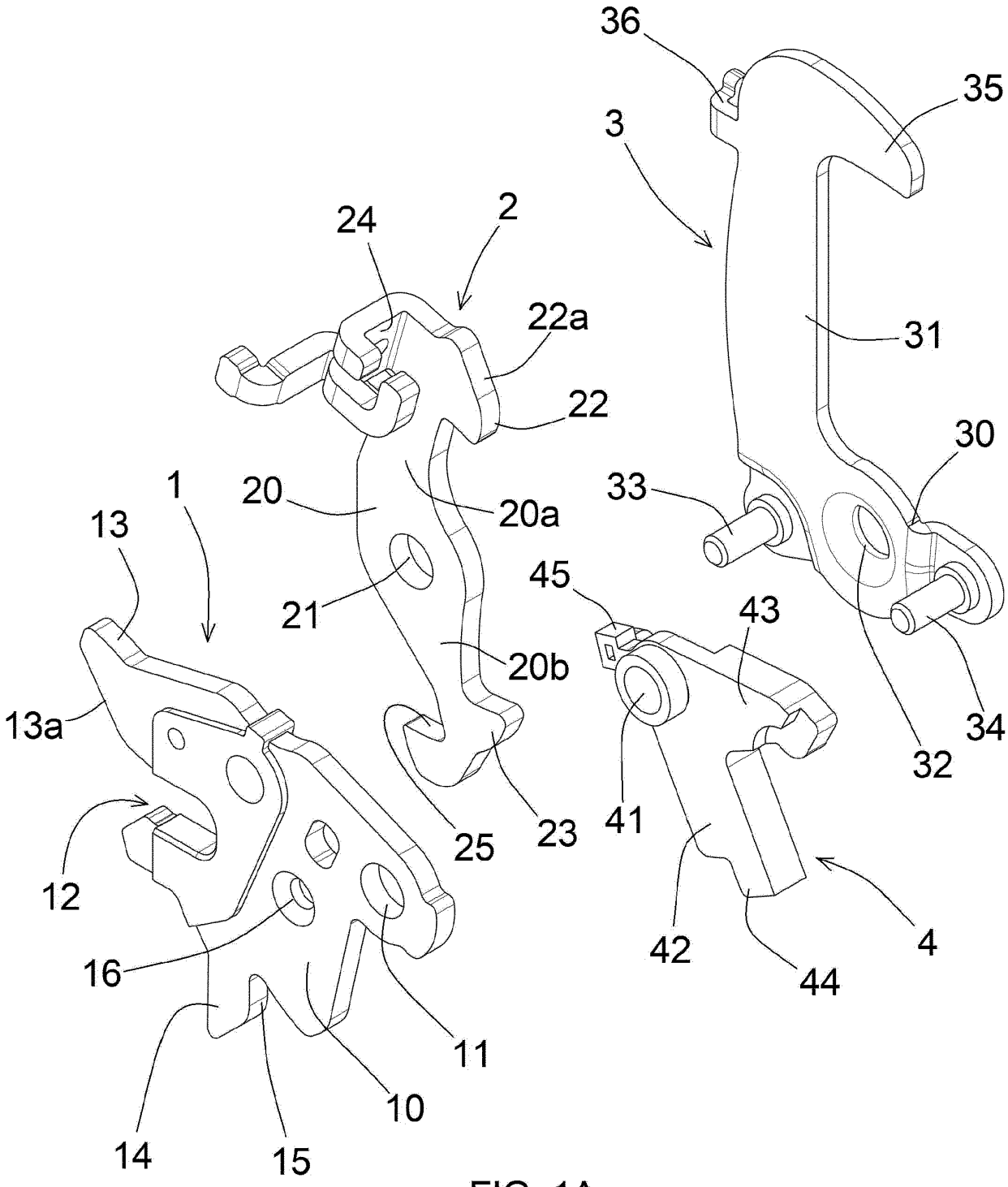
36
35
3
24
2
22a
31
22
30
33
1
20
20a
13
45
43
21
20b
13a
34
32
41
25
23
12
4
42
16
44
11
10
14
15

FIG. 1A

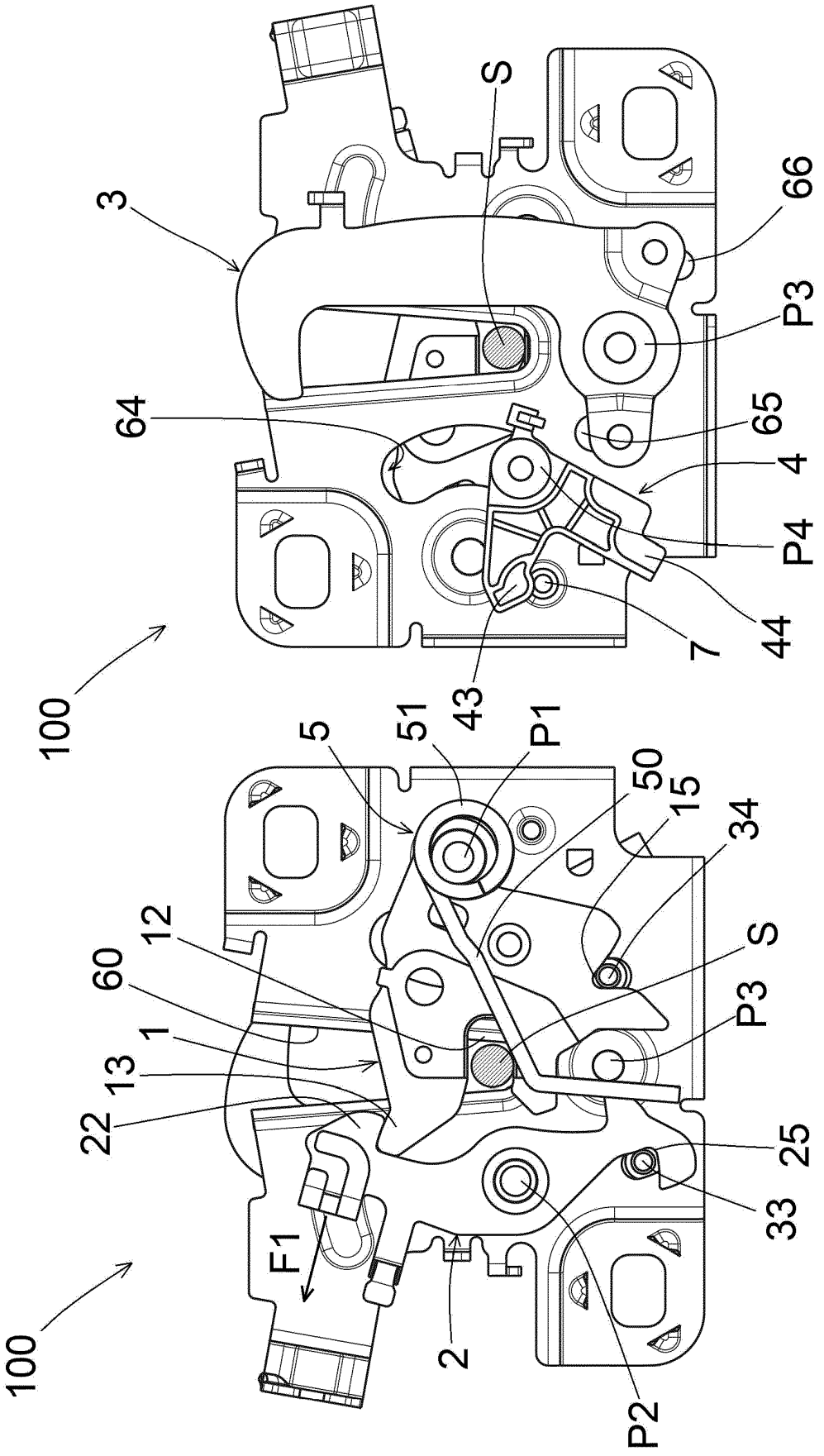
100
3
S
66
P3
64
65
4
P4
44
7
43
100
5
51
P1
50
15
34
12
60
1
13
22
S
P3
25
33
F1
2
P2
100

FIG. 2A

FIG. 2

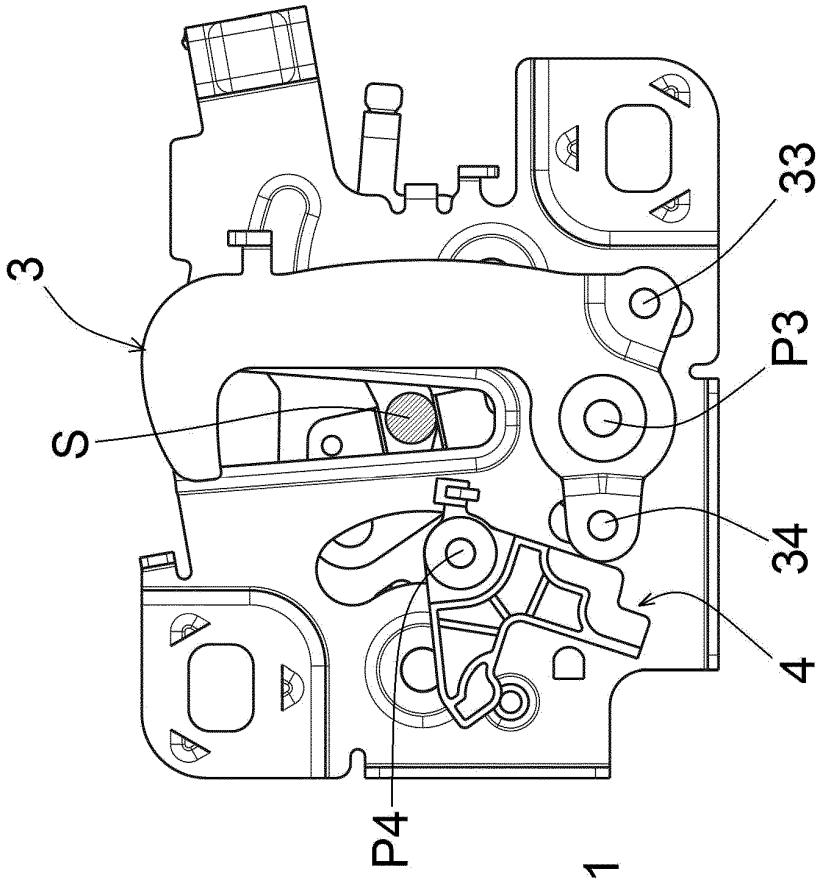

FIG. 3A

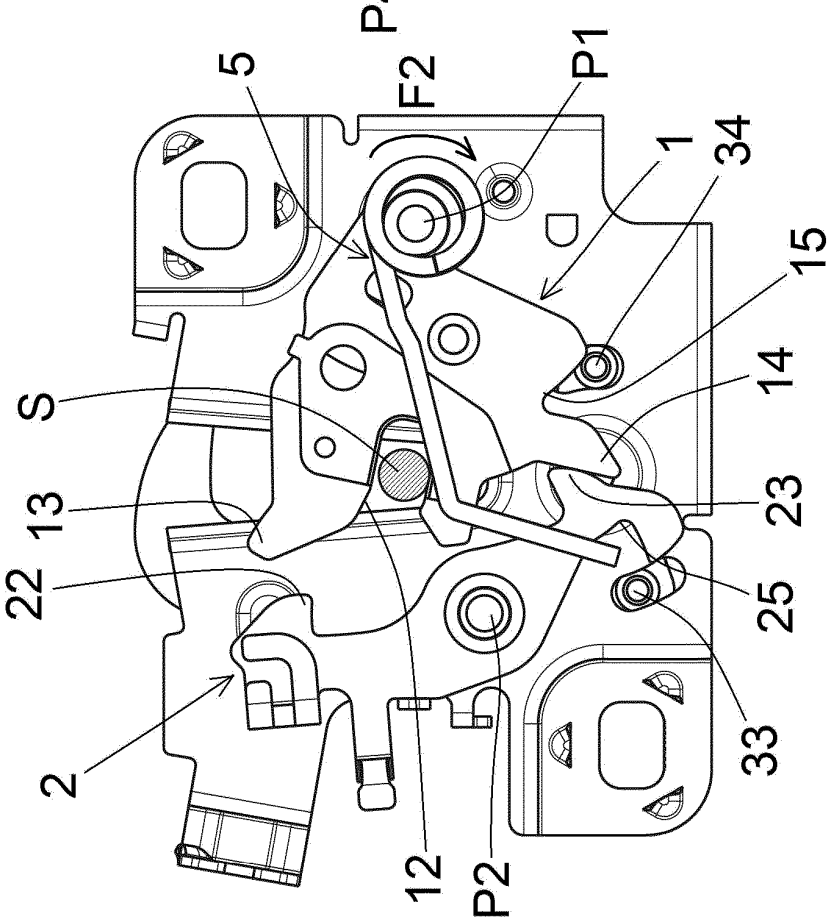

FIG. 3

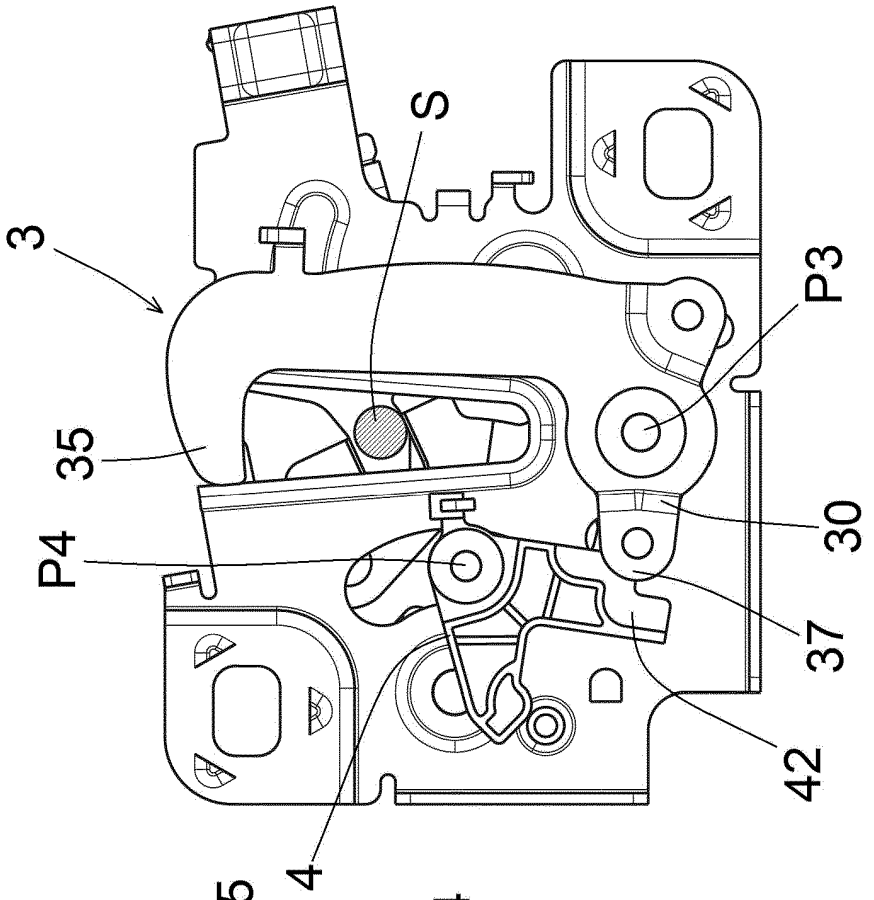

FIG. 4A

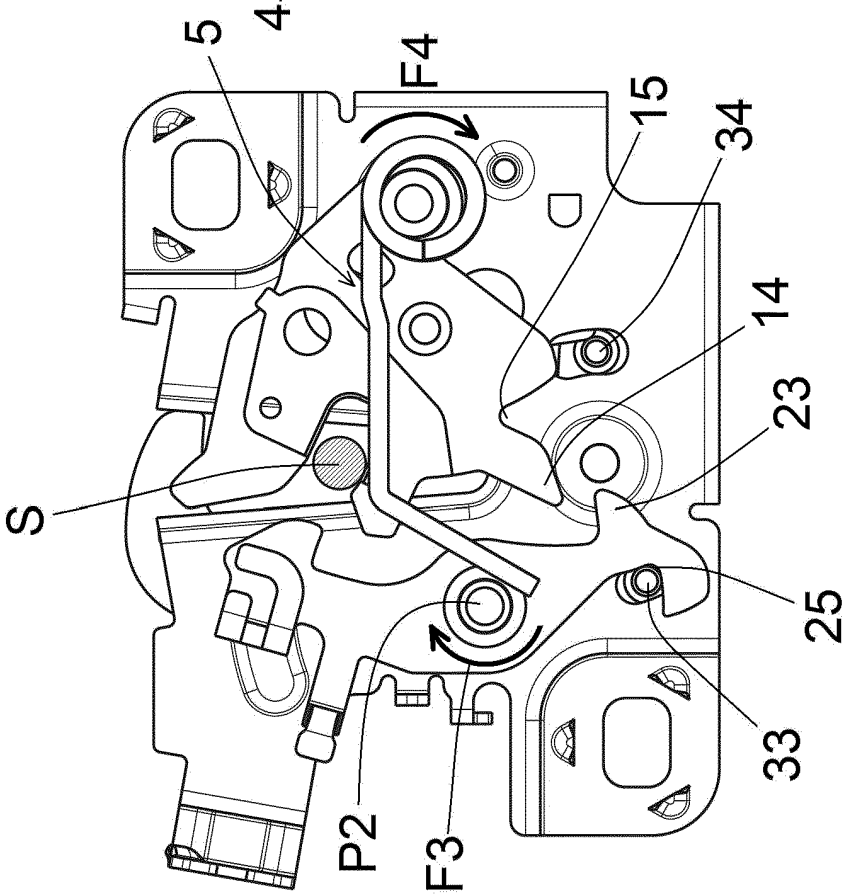

FIG. 4

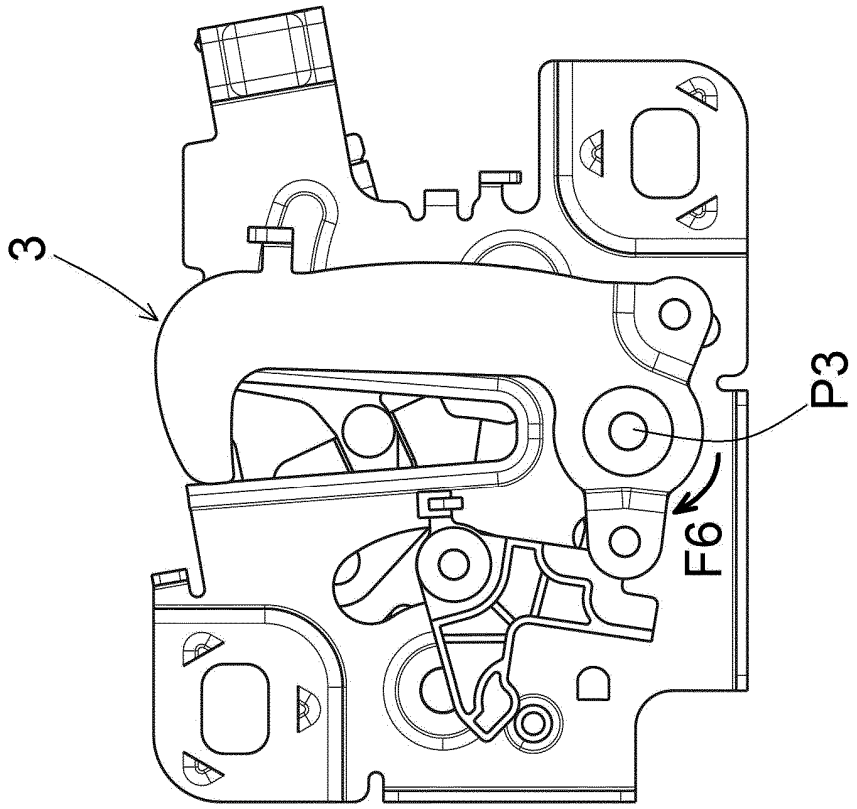

FIG. 5A

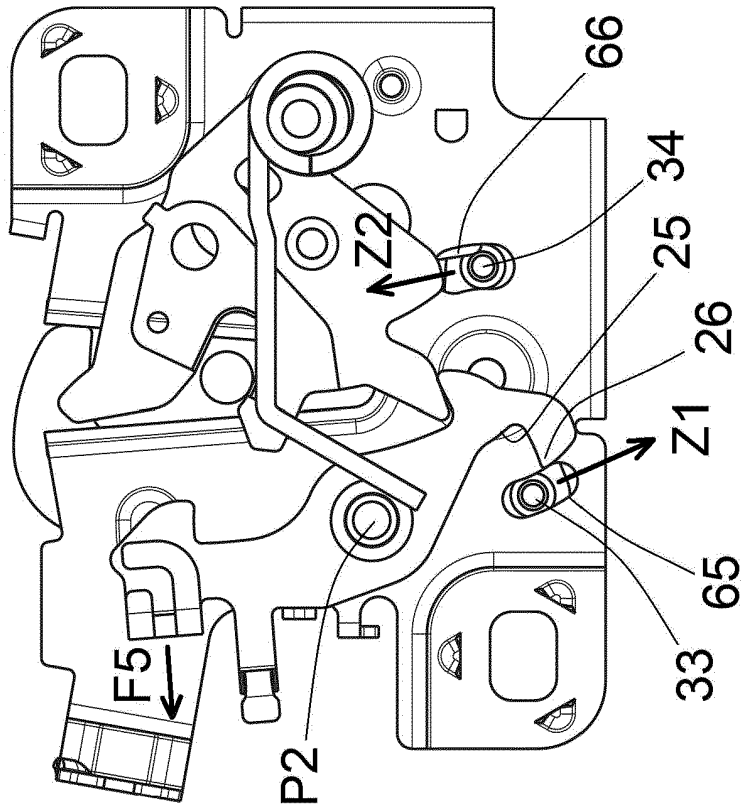

FIG. 5

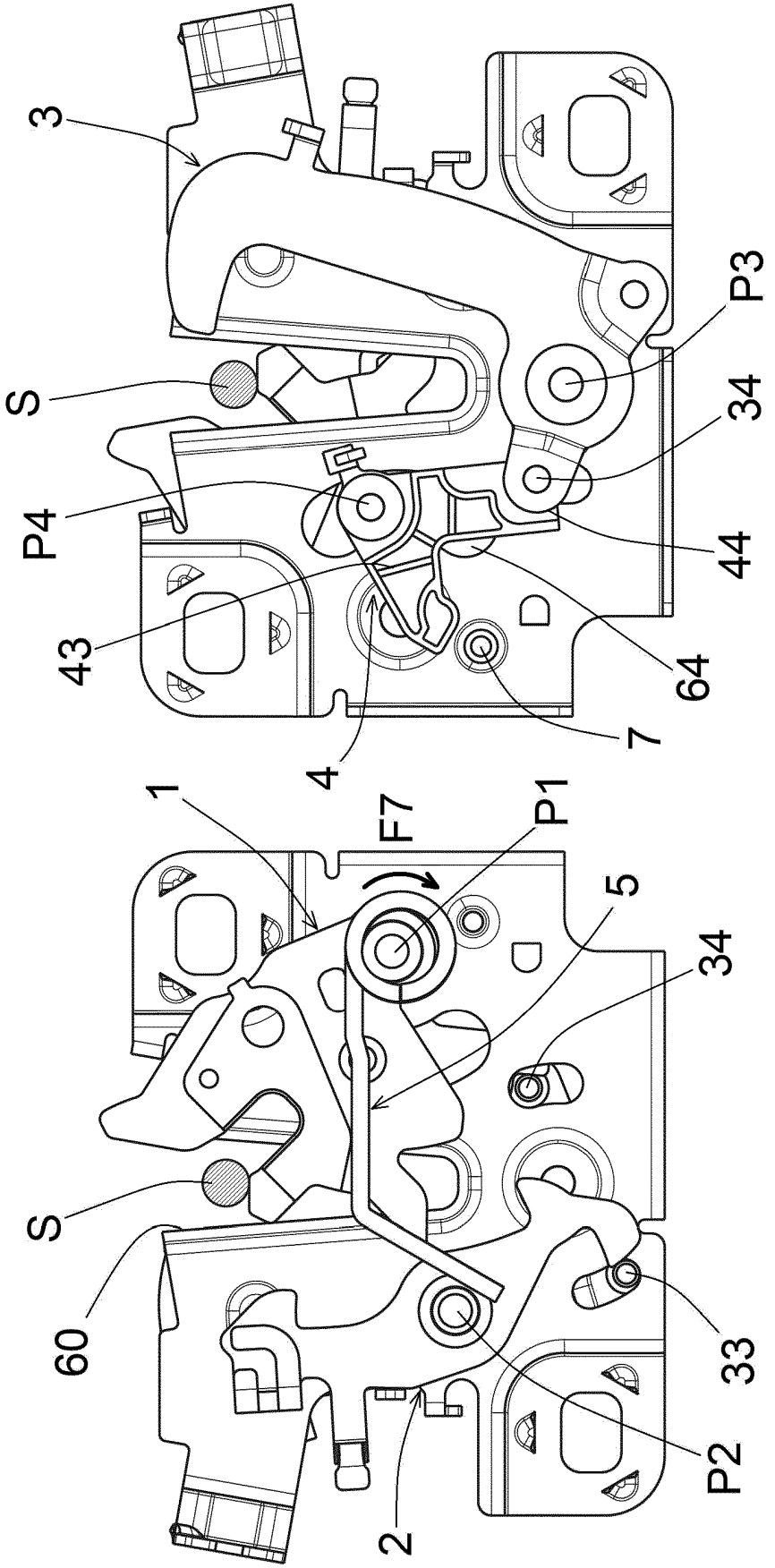

FIG. 6A

FIG. 6

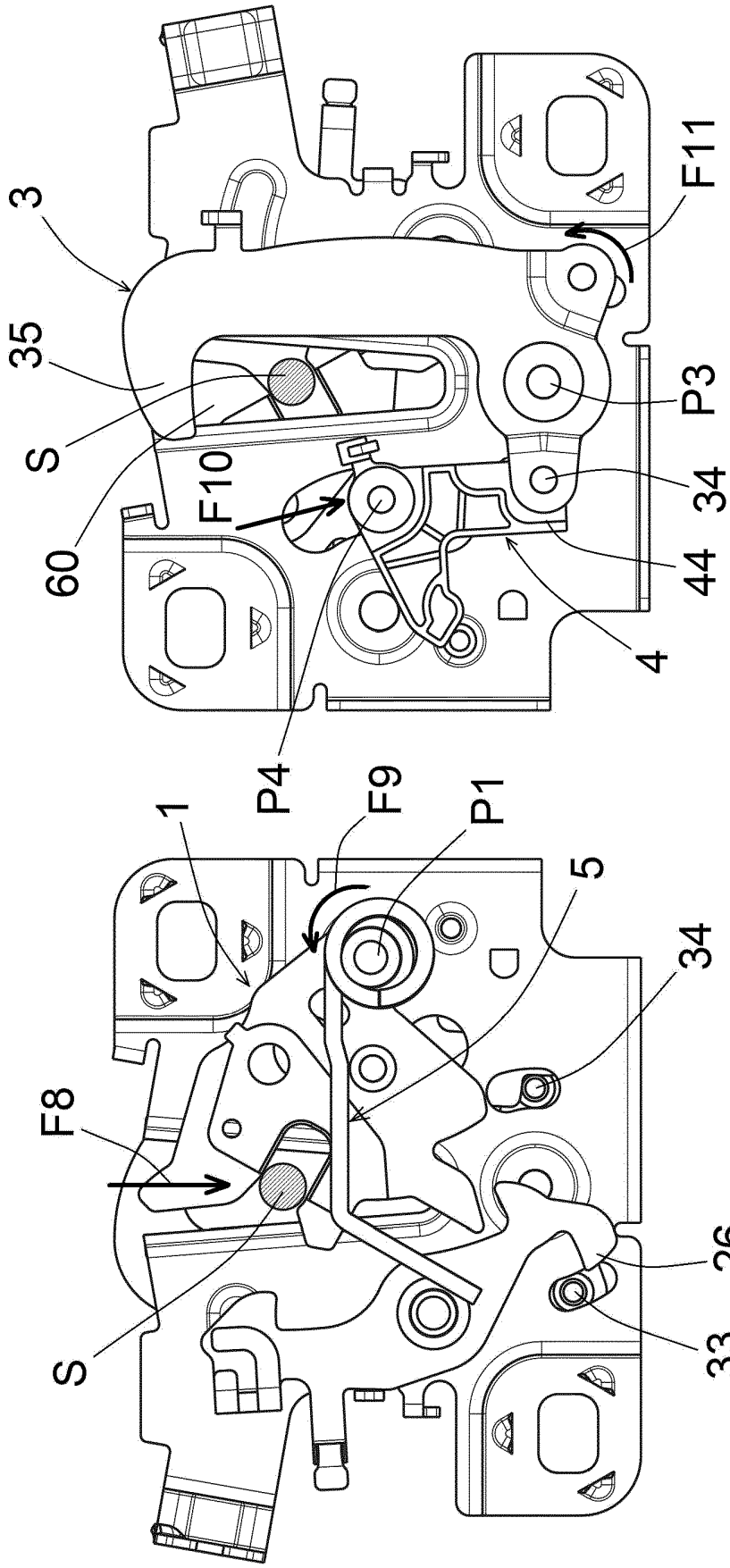

FIG. 7A

FIG. 7

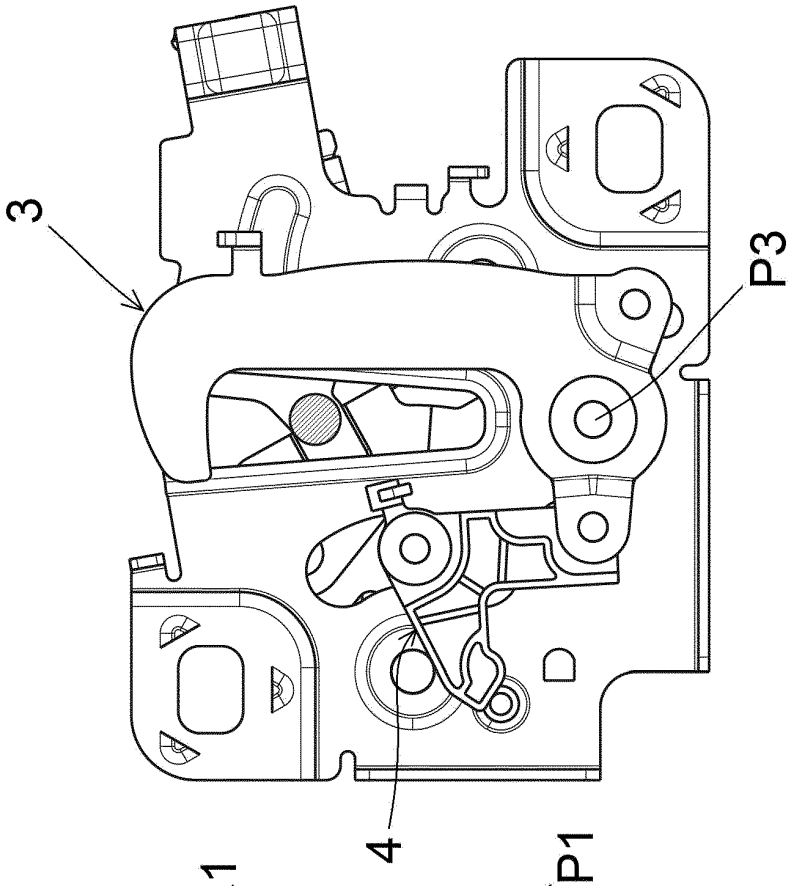

FIG. 8A

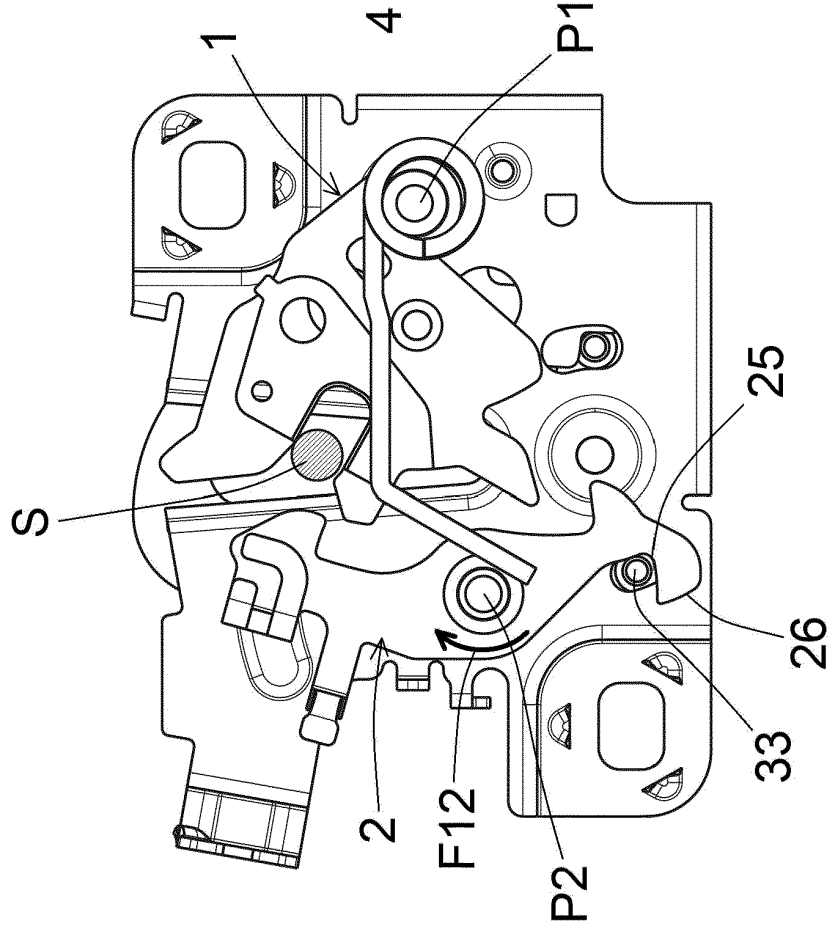

FIG. 8

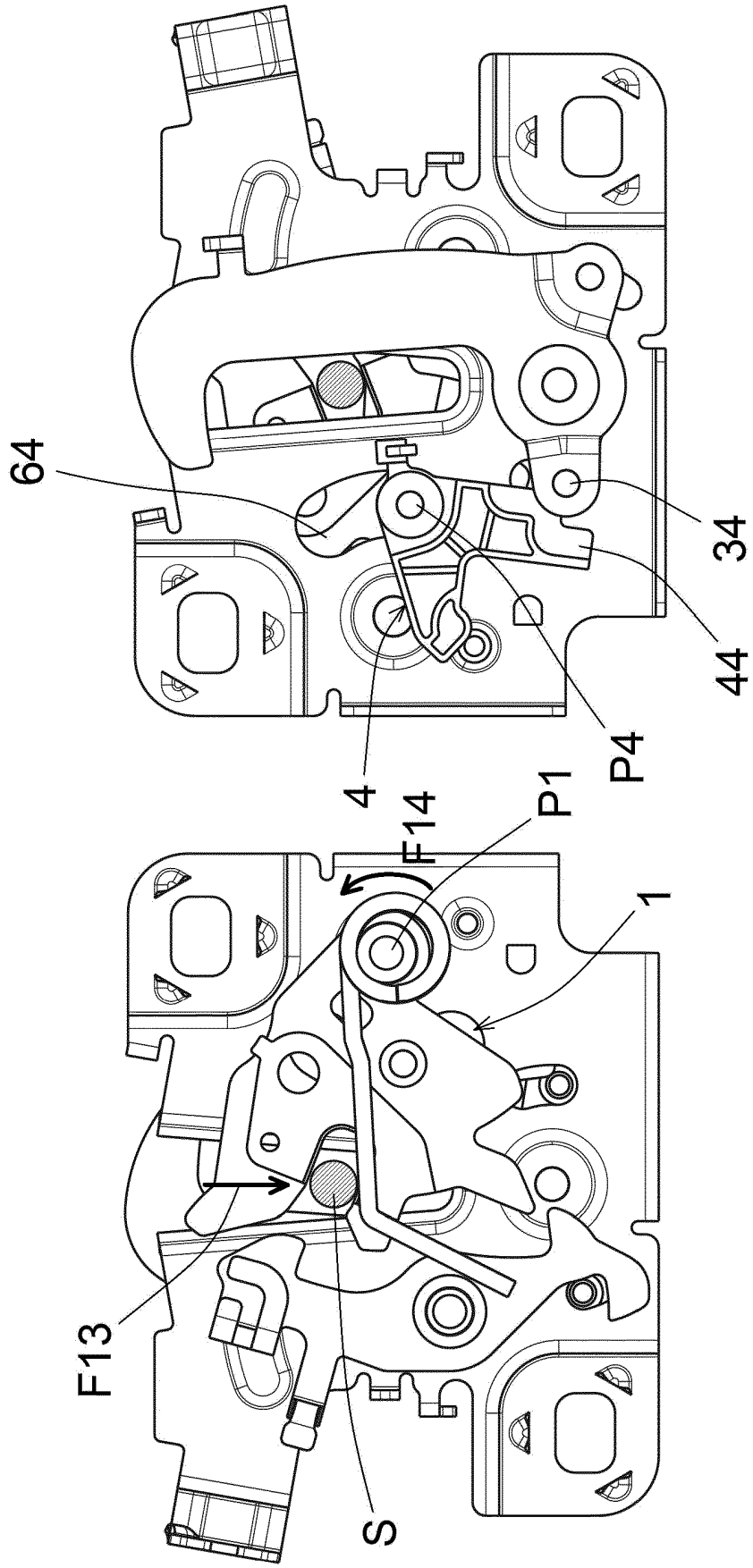

FIG. 9A

FIG. 9

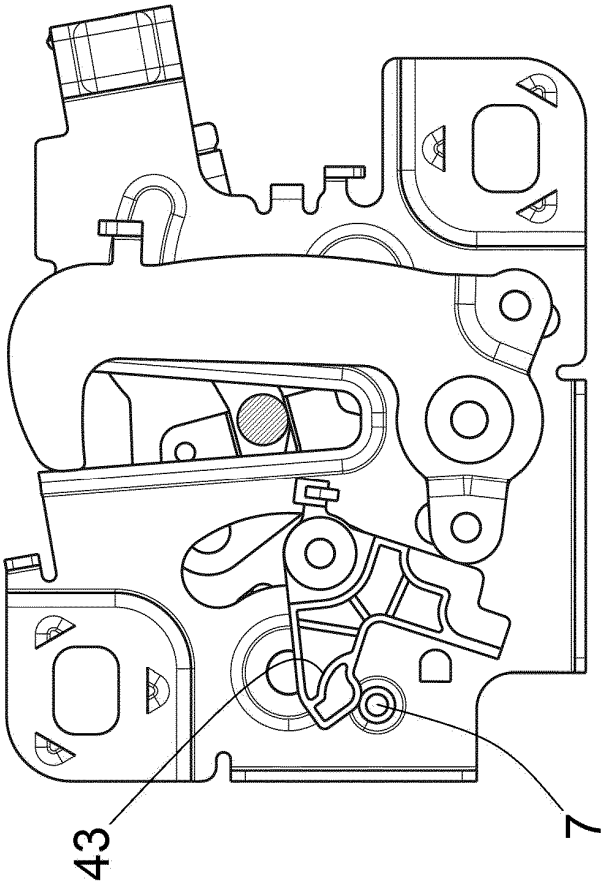

FIG 10A

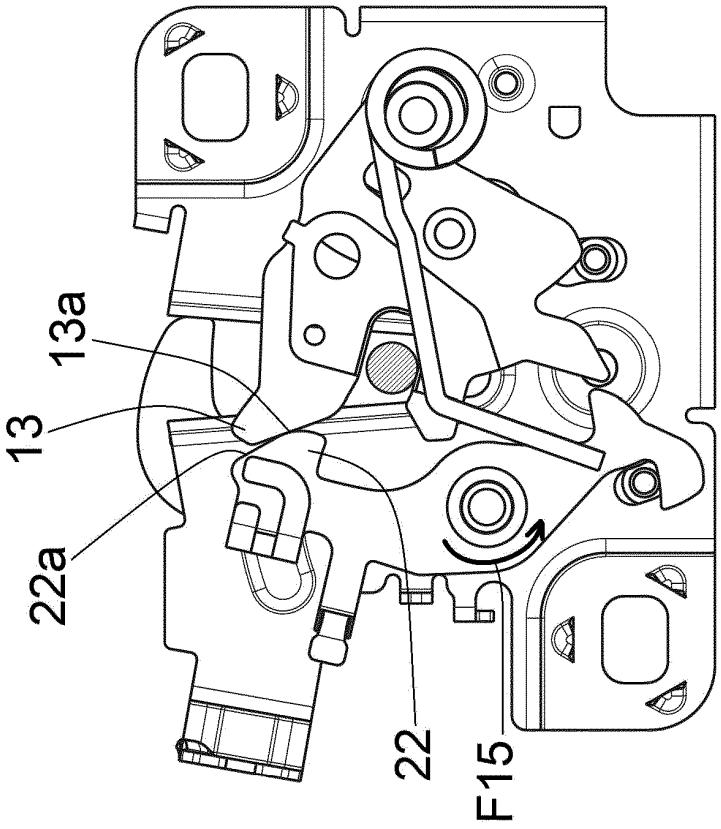

FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 8419114 B **[0004]**