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(54) Locking device for a coldroom sliding door

(57) A fastener device (1) for a coldroom sliding door comprises a box-like body (2) presenting two components (3,4) removably coupled together, a first (3) of said components (3,4) being fixable to a wall relative to which the door moves, and supporting means (25) for restraining a fastening counter-means (11) associated with said door, the second component (4), removably coupled to the first (3), being hollow and being superposed on said restraining means, the body (2) presenting a hook-shaped portion (7) disposed parallel to a surface (9) thereof, to define a seat (10) for receiving said fastening counter-means (11). The body (2) comprises, within said seat (10) at the hook-shaped portion (7), a locking member (25) movable relative to a corresponding seat (29) and defining said restraining means.

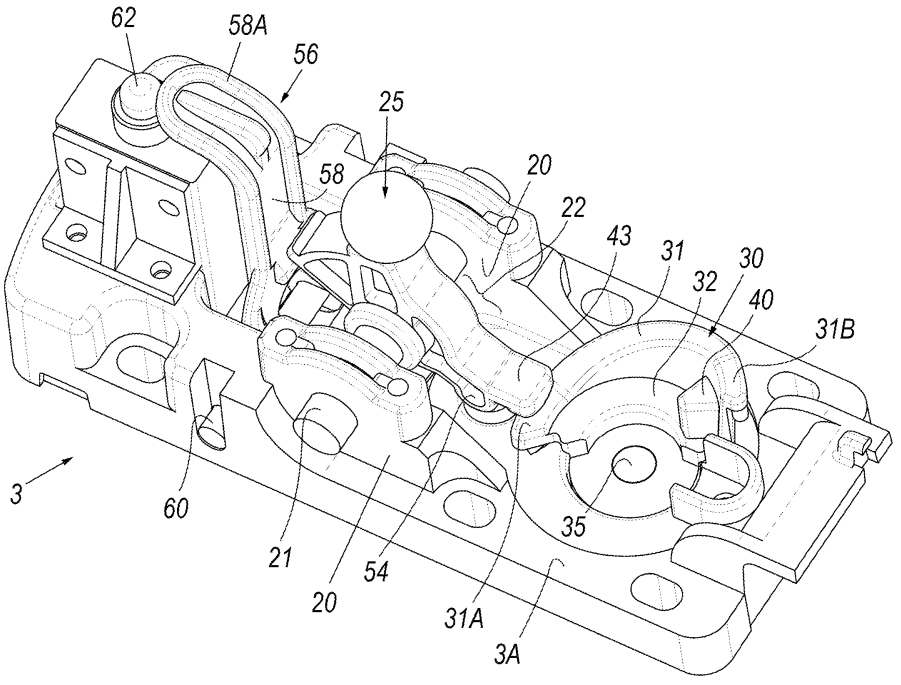

Fig. 3

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Description

[0001] The present invention relates to a fastener device in accordance with the introduction to the main claim.

[0002] Fastener devices for sliding doors have been known for some time, in particular for coldrooms. A known device, associated with a wall close to an opening in said coldroom relative to which the door moves (along a path parallel to a floor or lower surface), comprises a seat into which an element projecting from the door, such as a hook-like element or chain, penetrates. On penetrating into the corresponding seat, this projecting element is locked therein in order to fasten the door to the wall in its closed position.

[0003] With such a device, engagement between the projecting element and the seat is usually achieved by moving the door vertically parallel to the wall or opening along which it moves (and vertically to the floor): this movement or lowering of the door towards the surface along which it moves enables the projecting element to be inserted into the corresponding seat. However this solution has the drawback of requiring correct and precise relative positioning between the door and the device to enable the projecting element and the respective seat to be correctly coupled together, such positioning also enabling reliable sealing of the door to be achieved against the wall, such sealing being an absolute requirement if using the door in a coldroom.

[0004] Another known solution uses a device formed with two parts movable relative to each other in the manner of a sliding drawer to retain between them a projecting element, specifically a chain, of the sliding door. The two parts can be moved relative to each other if released by a key, whereas they are automatically locked when one is positioned on the other after receiving the projecting door element within them. Only when in this position can said key be removed from the known device. This solution is complicated in use because an operator has to use both hands to achieve coupling between the device and the projecting door element, this being extremely uncomfortable. Moreover the key is always associated with the known device when the door is open, hence lacking security.

[0005] An object of the present invention is to provide a fastener device which represents an improvement over known devices.

[0006] A particular object of the invention is to provide a fastener device for a coldroom sliding door which enables this latter to be fastened in its closed position totally automatically without the need for an operator to intervene on the device.

[0007] Another object is to provide a device of the stated type which does not require any vertical movement of the door relative to the surface along which it slides, and which therefore does not require particular means to ensure door sealing once it has been retained by said device.

[0008] These and other objects which will be apparent to the expert of the art are attained by a fastener device in accordance with the accompanying claims.

[0009] The invention will be more apparent from the accompanying drawings, which are provided by way of non-limiting example and in which:

Figure 1 is as perspective view of a device according to the invention;
Figure 2 is a perspective view of a part of the device of Figure 1 separated from another component of the device;
Figure 3 is a perspective view of the part of Figure 2, but with certain parts omitted for greater clarity;
Figure 4 shows the part of Figure 2 partially without components;
Figure 5 is a view of the device part of Figure 2 seen from below;
Figure 6 is a section on the line VI-VI of Figure 1;
Figure 7 is a view similar to Figure 2 but of a variant of the invention;
Figures 8 and 9 are views similar to Figure 6, but showing the variant of Figure 7 at two moments during the use of the invention; and
Figure 10 is a perspective view of certain components of the variant of the invention.

[0010] With reference to said figures, and in particular to Figures 1-6, a device of the invention is indicated overall by 1. It comprises a body 2 presenting two components 3 and 4, the first component 3 presenting a locking mechanism for a sliding door (not shown), said mechanism being protected by the second component 4 (being inserted into a cavity 5) when this latter is coupled to the first component.

[0011] The body 2 comprises a hook-shaped portion 7 presenting a first part 8 disposed parallel to and spaced from a portion 9 of the first component 3, to hence define an aperture 10 through which the projecting element, in this case a ring 11 of a chain (not shown) associated with the sliding door, is inserted to lock the movement of said door after it has closed an opening provided in a wall (not shown). The device 1 is positioned on this wall, in proximity to the opening.

[0012] More specifically, the hook-shaped element is defined by an L-shaped portion 15 presenting a first part 16 perpendicular to a base 3A of the component 3, and a second part 17 parallel to this base, this latter being disposed above the portion 9 of the first component 3 of the body 2. Sideways from the first part 16 of the portion 15 there project, from the base 3A of said component 3, two external opposing parallel shoulders 18 close to internal shoulders 20 and supporting a shaft 21 (rotating on the shoulders 18 and 20 about its longitudinal axis) on which a lever element 22 is disposed torsionally rigid therewith, this latter element (and said shaft) being movable relative to the shoulders 18 and 20 against a spring 23 fixed about the shaft and having its free arm 23A facing the base 3A of the component 3. The lever element 22

presents a free end 26, preferably carrying a locking member 25 for the projecting door element 11. This member is defined in the illustrated example by a spherical body associated freely with (or glued to) said end 26, and emerges from an aperture or seat 29 provided in the portion 9 of the component 3 of the body 2. This portion 9 is an element coupled to the shoulders 18 and 20 of said component 3.

[0013] In other words, the spherical body or locking member 25 of the lever element 22 can assume two working positions relative to the corresponding seat 29: in a first position (shown in Figures 1, 2 and 6) it projects therefrom to enter the aperture 10 of the body 2, while in the second position it retracts into said seat to free the aperture 10. The retraction movement into the seat occurs totally automatically when the projecting door element 11 is inserted into the aperture 10, by its pressure on said spherical body 25. This pressure is transferred to the lever element 22, which rotates with the shaft 21 against the spring 23 (or equivalent elastic element) to hence enable the sphere to retract into the corresponding seat. When the projecting element 11 has passed beyond the locking member 25 within the aperture 10 and has reached in proximity to the first part 16 of the portion 15, the spring 23 returns the spherical body 25 to the outside of its seat 29, to lock the projecting element or chain ring 11 within the aperture 10 of the device 1 (to hence fasten the door to the device 1 in its closed position).

[0014] To enable the locking member 25 to again move such that it retracts into the corresponding seat (into its first working position) in order to release the door, a rotary element 30 is provided presenting an arch-shaped portion 31 rising gradually from a base 32 such that an end 31A of this portion 31 is sunken relative to a second end 31 B thereof. The element 30 is mounted about a pin 35 of the first component 3 of the body 2 and can rotate about it by the action of a usual door lock 38 (positioned on the base 32) having a known pawl 39 which cooperates with a tang 40 projecting laterally from the portion 31 of the element 30 and is integral therewith.

[0015] The end 31A of this element, when in the rest position, lies below a corresponding end 43 of the lever element 22, this latter being urged against and onto said element 31A and, in general, against the element 31 of the spring 23. By rotating a key (not shown) in the lock 38, the element 30 is made to rotate about the pin 35, with consequent relative movement of the end 43 on the curved element 31 of the element 30, this movement leading to the lifting of the end 43 from the base 3A of the first component 3 of the body 2, i.e. a rotation of the lever element 23 and of the shaft 21 against the spring 23. This rotation causes the spherical body 25 to retract into the corresponding seat 29 and enables the projecting element or ring 11 to be withdrawn from the aperture 10 of the device 1.

[0016] Advantageously the device 1 is mounted on the wall vertically, such as to present the aperture 10 facing the surface along which the door slides. In this manner, by simply rotating the key (with one hand by the user) the element 11 is allowed to escape by gravity from said aperture 10 when the spherical body 25 retracts into the corresponding seat.

[0017] Moreover, by virtue of the invention, there is absolutely no need for the key to remain always inserted in the lock 38 to enable the device 1 to be used, because the key serves only to force the spherical body 25 to retract into the respective seat, to release the element 11 from the device 1. This makes the use of the device of the invention more secure.

[0018] As shown in Figure 5, a cylindrical element 49 extends on one side 50 of the first component 3 of the body 2 of the device 1 (the side on which said first component 3 is fixed to a wall), and is associated with a rod 51 connected to a pushbutton (not shown) positioned inside the coldroom. This solution enables the door (when closed) to be opened from inside the coldroom, to enable a person present therein to leave. For this purpose, the rod cooperates with a portion 54 of the lever element 22; this cooperation results in lifting of the end 43 of the element 22 from the base 3A of the first component 3 of the device body 2, i.e. a rotation of the element 22 about the shaft 21, this rotation causing the spherical body 25 to retract into its seat and the subsequent release of the element 11 from the fastener device, making it possible to open the door from inside the coldroom.

[0019] Finally, the spring 23 cooperates with a lever 56 comprising a first arm 57 (acting on the spring 23) and a second arm 58, said lever being pivoted about a pin 60 associated with the component 3 of the device body 2. The arm 58 presents an end portion 58A cooperating with a switch 62 (associated with an electrical connection positioned within the component 3 of the body 2) operating an electric motor for automatically moving the door into its open position. In this manner, the operation of releasing the element 11 from the device 1 which causes the spring 23 to act on the arm 57 of the lever 56 following the rotation of the element 22, also results in the pressing of the end 58A of the arm 58 on the switch 62 and the resultant operation of an electric motor resulting in automatic door opening.

[0020] Preferably and advantageously, the spherical body 25 is freely supported by the end 26 of the lever element 22 and cooperates, urged by said element 22, with a stop element 65 rigid with the second part 17 of the L-shaped portion 15 rigid with the first component 3 of the device body 2.

[0021] The use of the device of the invention is apparent from the aforegoing description. The device is easy to use by the user in that in order to fasten the door in the closed position, the user does not have to act on the device 1, while to open the door the user has merely to rotate the key in the lock, leading to the simple release, advantageously by gravity, of the element 11 from the device 1. Hence the key serves only to open the door and can be removed after opening.

[0022] Figures 7 to 10 show a variant of the invention.

In these figures, in which parts corresponding to those already described are indicated by the same reference numerals, the lever element 22 can be seen provided with a (lateral) portion 100 facing the second arm 58 of the lever 56. The portion 100 comprises a recess 101 bounded by raised edges 102 and 103 with which a projecting tooth 104 associated with said second arm 58 cooperates. This tooth has an undercut and is arranged to rotate the lever element 22 about the shaft 21 when the ring element 11 is inserted into the aperture 10.

[0023] In this situation, the ring presses on a pin or pawl 110 associated with the part 16 of the portion 15 and movable within a seat 111 thereof. In this manner, the pin 110 penetrates into the seat until it contacts the lever 56 and makes it rotate about the pin 60. This rotation causes said tooth 104 to act on the end 102 of the recess 101, to rotate (by thrusting) the lever element 22 about the shaft 21. In this manner the spherical body or locking member 25 becomes positioned against the stop element 65 to lock the element 11 within the aperture 10.

[0024] Said element 11 is released by a key as in the case of the embodiment of Figures 1-6 or by the action of the rod 51 on the element 22. It should be noted that once the spherical body has been brought into its seat 29, it remains therein as the spring 23 tends to maintain the lever element 22 rotated such as to urge the spherical body 25 to the outside of said seat 29.

[0025] In the figures under examination, the spring 23 presents a second end 23K superposed on the end 43 of the lever element 22.

[0026] Preferred embodiments of the invention have been described. Others however are obtainable in the light of the aforegoing. For example, the lever element 22 can present an end body 25 integral with it or shaped differently from a sphere; this embodiment and others obtainable by the expert of the art are also to be considered as falling within the scope of the present invention.

Claims

1. A fastener device (1) for a door slidable along a surface or floor across a coldroom opening, said device comprising a box-like body (2) presenting two components (3, 4) removably coupled together, a first (3) of said components (3, 4) being fixable to a wall relative to which the door moves, and supporting means (25) for restraining a fastening counter-means (11) associated with said door, the second component (4), removably coupled to the first (3), being hollow and being superposed on said restraining means, the body (2) presenting a hook-shaped portion (7) disposed parallel to a surface (9) thereof, to define a seat (10) for receiving said fastening counter-means (11), **characterised in that** the body (2) comprises, within said seat (10) at the hook-shaped portion (7), a locking member (25) movable relative to a corresponding seat (29) and defining said restraining means, said member (25) being able to assume two working positions, in a first working position it projecting from its own seat (29) and into the seat (10) of the device body (2) such as to co-operate with the door fastening counter-means (11) and lock this latter to the wall, in a second working position it retracting into its seat (29) to enable said fastening counter-means (11) to be separated from the restraining means (25), passage of the locking member from the first to the second position being achieved by the movement of a key-operated member.

2. A device as claimed in claim 1, **characterised in that** said locking member is rigid with a lever element (22) associated with a shaft (21) within the first component (3) and rotating relative to lateral supports (18, 20), said lever element and said shaft (21) rotating about the longitudinal axis of this latter against an elastic abutment element (23).

3. A device as claimed in claim 2, **characterised in that** the shaft supports are shoulders (18, 20) positioned laterally to the first component with their sides opposing.

4. A device as claimed in claim 3, **characterised in that** two lateral shoulders (18) are located on the sides of a first part (16) of an L-shaped portion of the first component (3) which rises from a base (3A) of this latter, said first part (16) being associated with a second part (17) parallel to the base (3A), the locking member (25) being positioned to the front of said second part, said second part pertaining to the hook-shaped portion (7) of the device body (2) and defining an aperture (10) to receive the door fastening counter-means (11).

5. A device as claimed in claim 4, **characterised in that** said second part (17) of the L-shaped portion (15) cooperates with the locking member (25) to close said aperture (10).

6. A device as claimed in claim 5, **characterised in that** said second part (17) supports a stop element (65) for said locking member, on said element (65) there resting said member (25) when it closes the aperture (10) of said device.

7. A device as claimed in claim 1, **characterised in that** the locking member is a spherical body (25).

8. A device as claimed in claim 1 or claims 1 and 7, **characterised in that** said locking member (25) is separate from the lever element (22).

9. A device as claimed in claim 1, **characterised in that** said seat for the locking member (25) is provided

within a portion (9) of the first component (3) of the device body (2).

10. A device as claimed in claim 2, **characterised in that** the elastic stop element is a spring (23) mounted about the shaft (21) of the lever element (22) and having a free arm (23A) facing the base (3A) of the first component (3) of the device body (2).

11. A device as claimed in claim 10, **characterised in that** said free arm (23A) of said spring (23) or elastic abutting element cooperates with a first arm (57) of a lever (56) which rotates about a pin (60) and has a second arm (58) provided with an end (58A) cooperating with a switch (62) rigid with the first component (3) of the device body (2), said switch (62) being connected to an electrically powered member.

12. A device as claimed in claim 11, **characterised in that** said electrically powered member is a motor which drives the coldroom door.

13. A device as claimed in claim 11, **characterised in that** said second arm (58) of the lever (56) cooperates with a movable pin (110) slidably inserted into a seat (111) of the first part (16) of the L-shaped portion (15) and projecting into the seat (10) of the device body (2), said pin retracting into the seat (111) of said first part (16) and cooperating with said second arm (58) to cause the lever (56) to rotate about its pin (60) and cause the lever element (22) to rotate relative to the lateral supports (18, 20) of the shaft (21) with which it is associated, hence causing the locking member (25) to leave its seat (29) and enter the seat (10) of the device body (2).

14. A device as claimed in claim 13, **characterised in that** said second arm (58) of the lever (56) presents a projection (104) arranged to cooperate with ends (102, 103) of a recess (101) in said lever element (22) and cause it to rotate.

15. A device as claimed in claim 2, **characterised in that** the lever element (22) presents an end (43) arranged to cooperate with release means (30) provided to forcibly displace the locking member (25) from the aperture (10) of the device body (2), in which it cooperates with the fastening counter-means (11) associated with the door, in order to release these means.

16. A device as claimed in claim 15, **characterised in that** said release means are a rotary element (30) secured to the base (3A) of the first component (3) of the device body (2), said element (30) comprising an arched portion (31) rising from a base (32) of the element (30), a first end (31 A) of said arched portion (31) being sunken relative to a second end (31 B) of that portion, said first end (31A) being positioned below the end (43) of said lever element (22) when this latter is in its first working position, the end (43) of said lever element moving relatively on said arched portion (31) towards its second end (31A) as a result of the rotation of the rotary element (30) about a pin (35) which secures it to the base (3A) of the first component (3) such as to bring the locking member (25) into its second working position, said rotary element (30) being key-operated.

17. A device as claimed in claim 16, **characterised in that** the key is insertable into a lock (38) positioned on said base (32) of the rotary element (30), the lock cooperating with a tang (40) rigid with the arched portion (31) and acting thereon to achieve said rotation of the rotary element (30) on the base (3A) of the first component (3) of the device body (2).

18. A device as claimed in claim 1, **characterised in that** the hook-shaped portion (7) of its body (2) opens towards the surface or floor along which the coldroom sliding door slides, this enabling the fastening counter-means (11) to be automatically detached from said body when the locking member (25) passes from its first to its second working position.

19. A device as claimed in claim 1, **characterised in that** the locking member (25) can be operated by a pusher member (51) connected to a pushbutton positioned within the coldroom.

20. A device as claimed in claim 19, **characterised in that** said pusher member (51) penetrates into the first component (3) of the device body (2) and cooperates with the lever element (22) to cause it to rotate and cause the locking member (25) to enter its own seat, in order to free the seat (10) for the fastening counter-means (11) of the box-like device body (2).

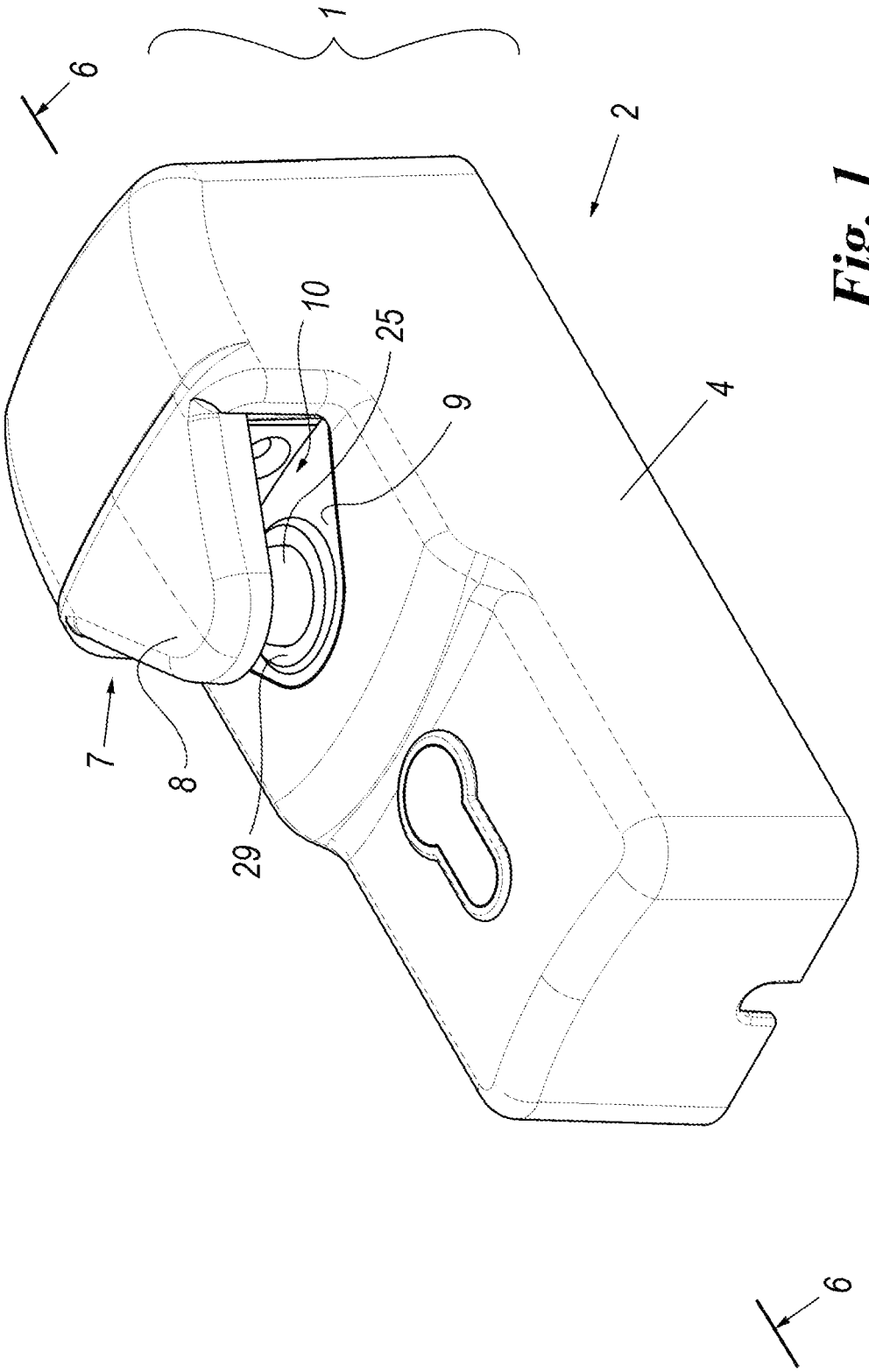

Fig. 1

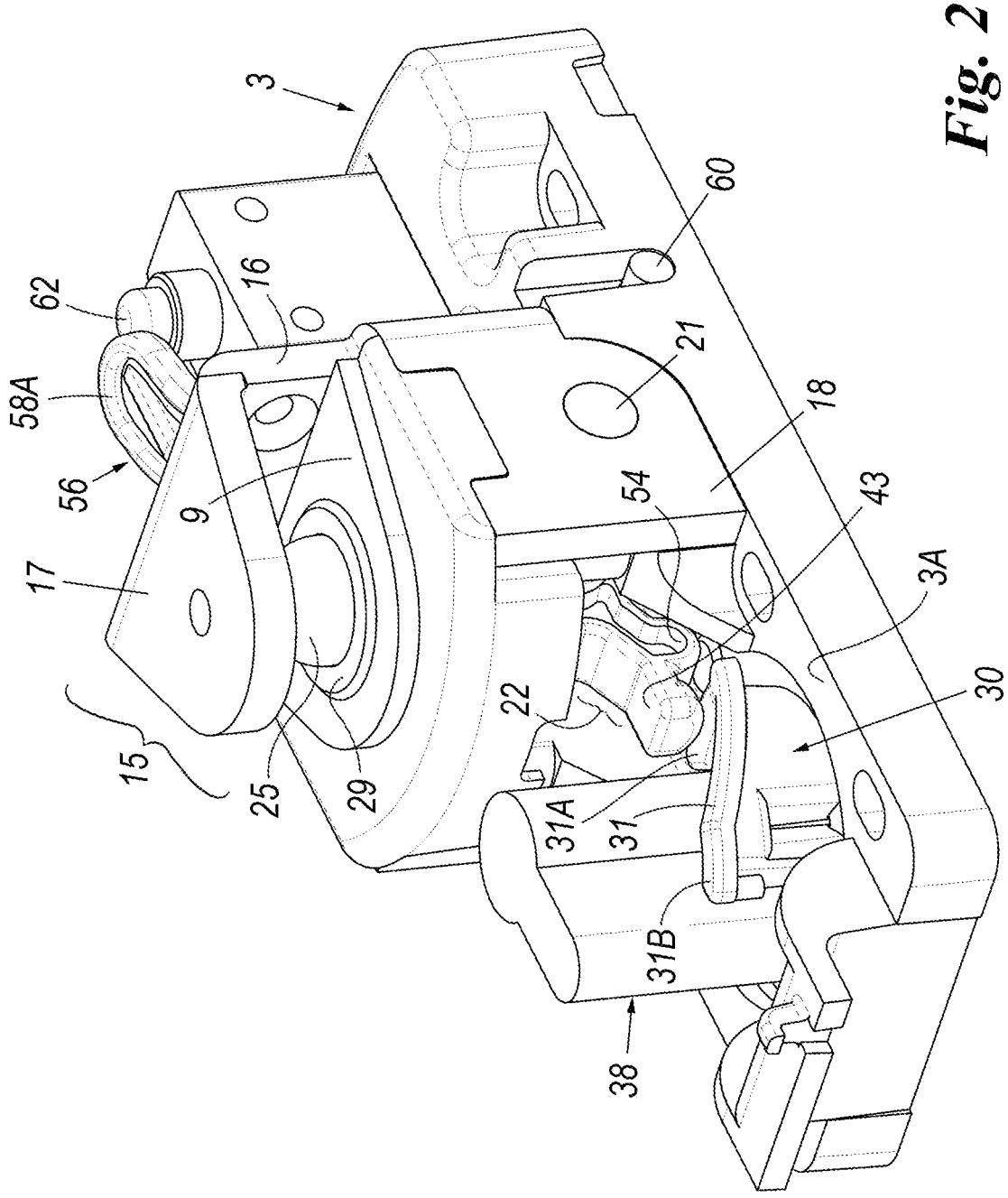

Fig. 2

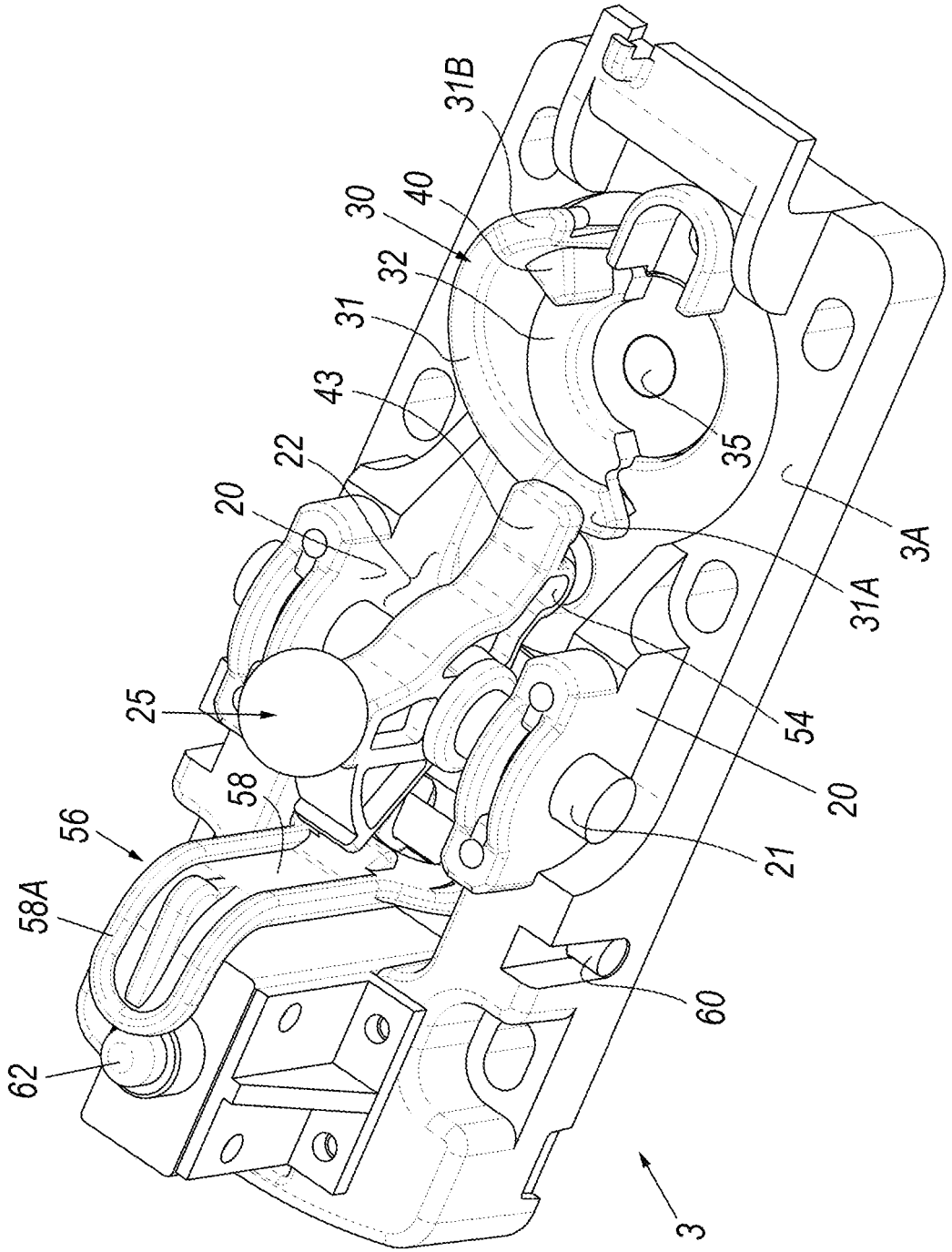

Fig. 3

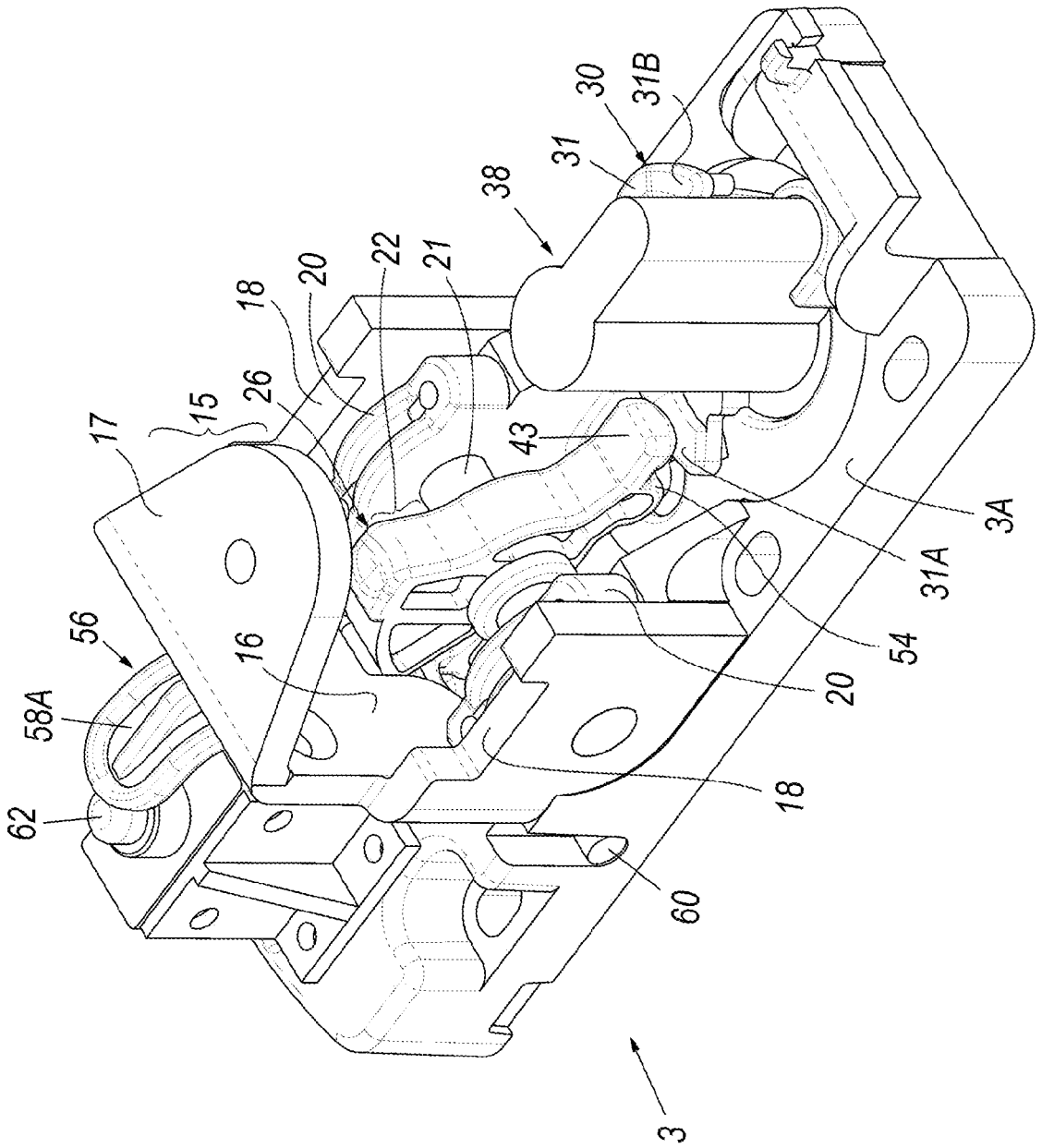

Fig. 4

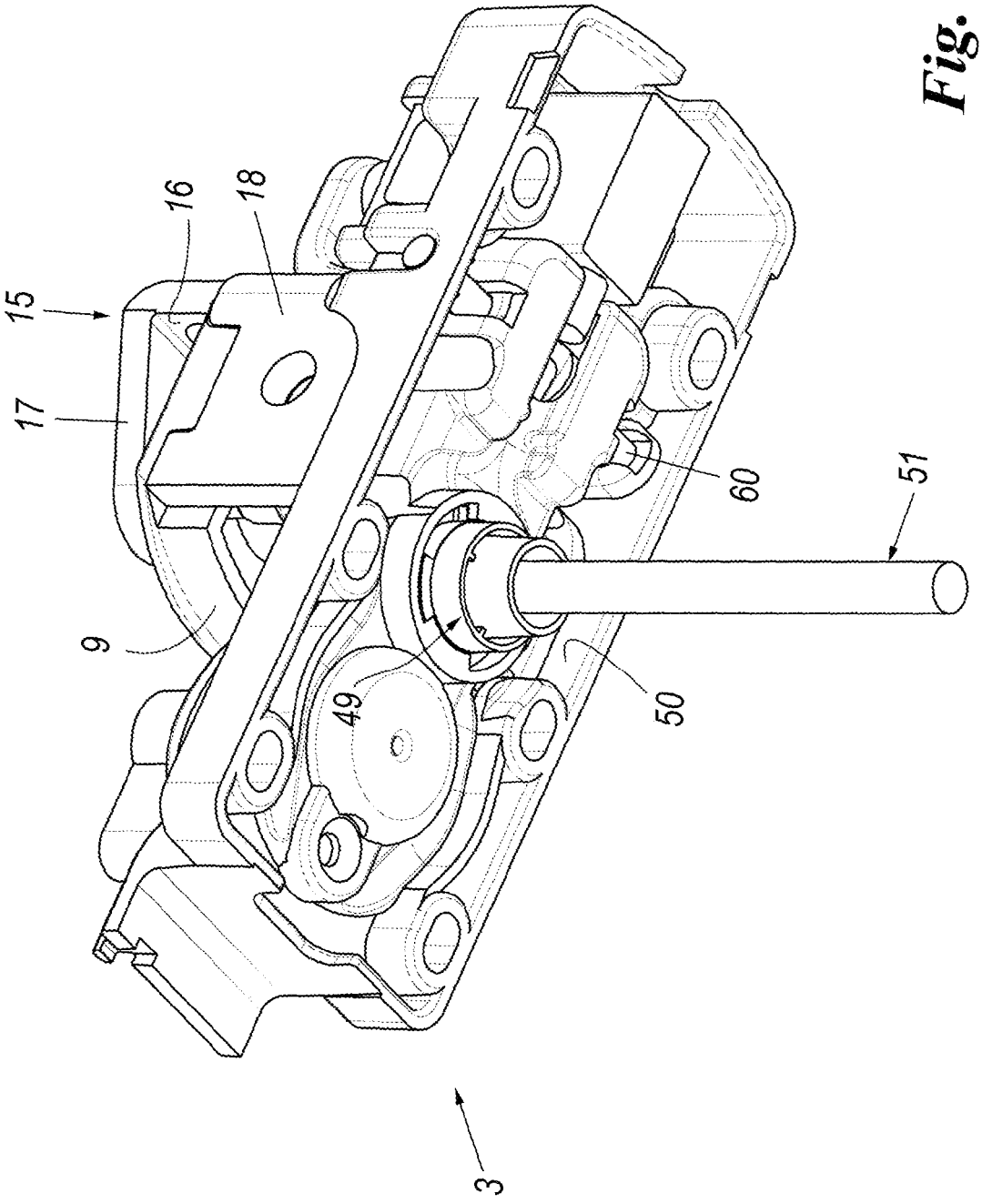

Fig. 5

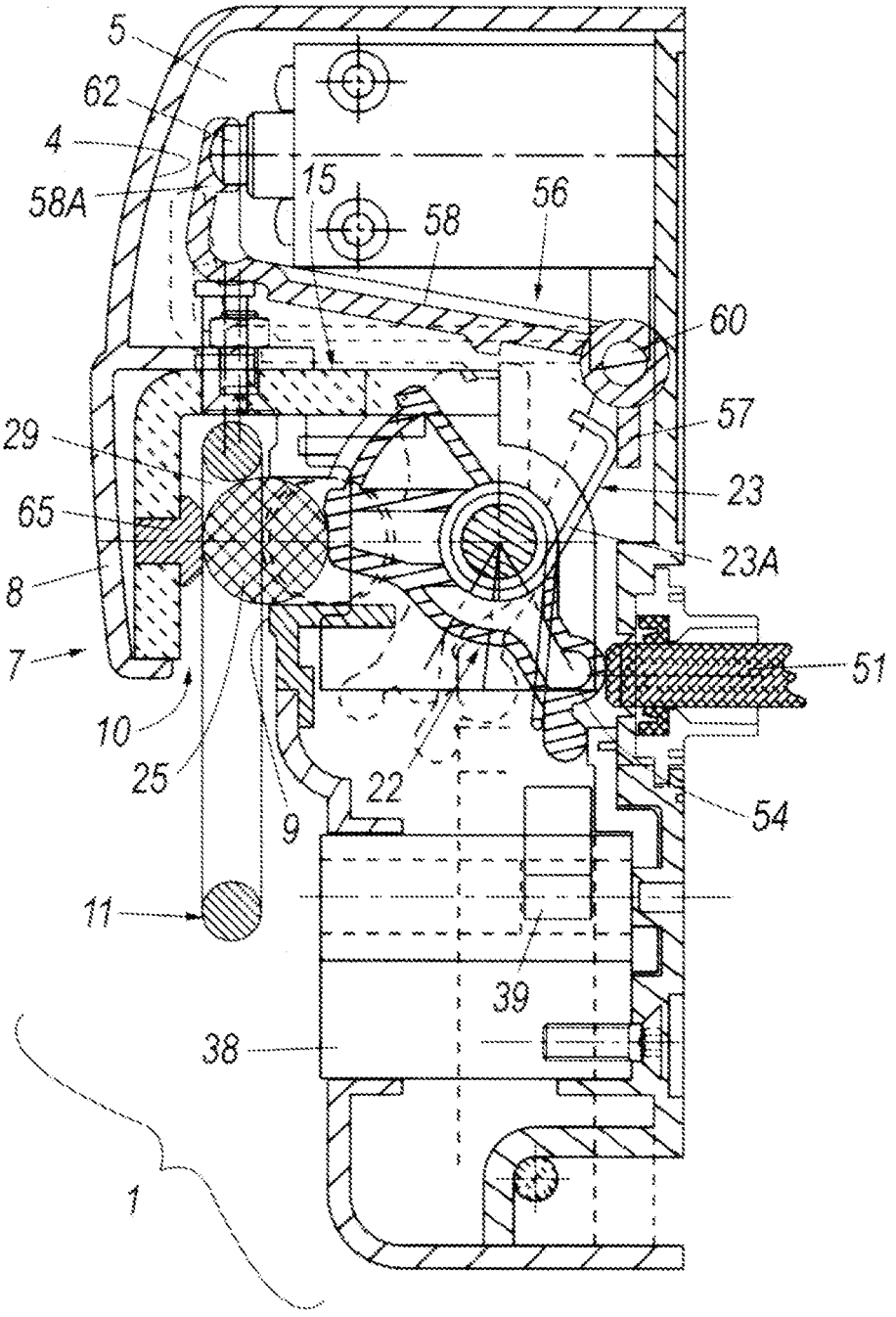

Fig. 6

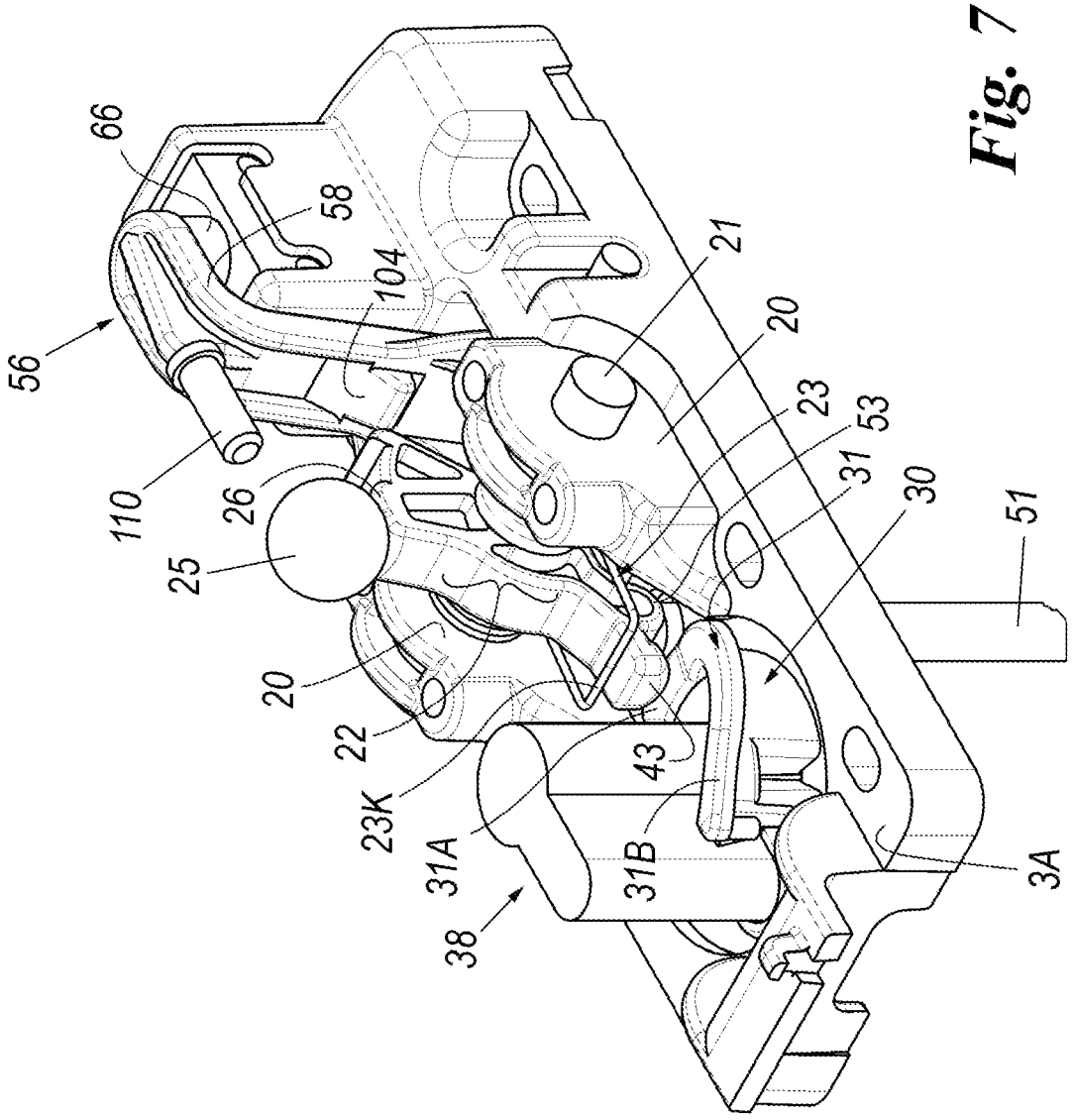

Fig. 7

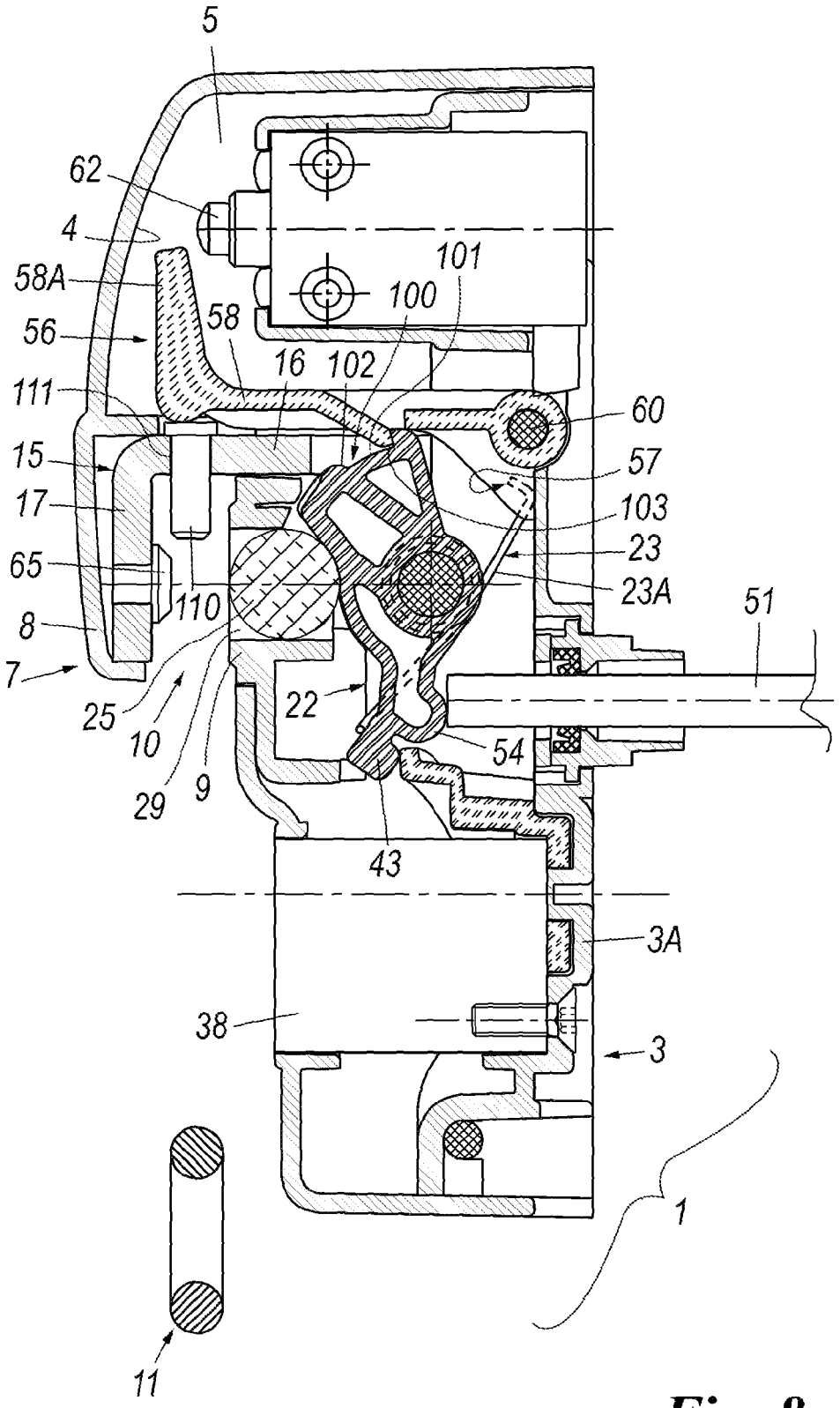
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Fig. 8

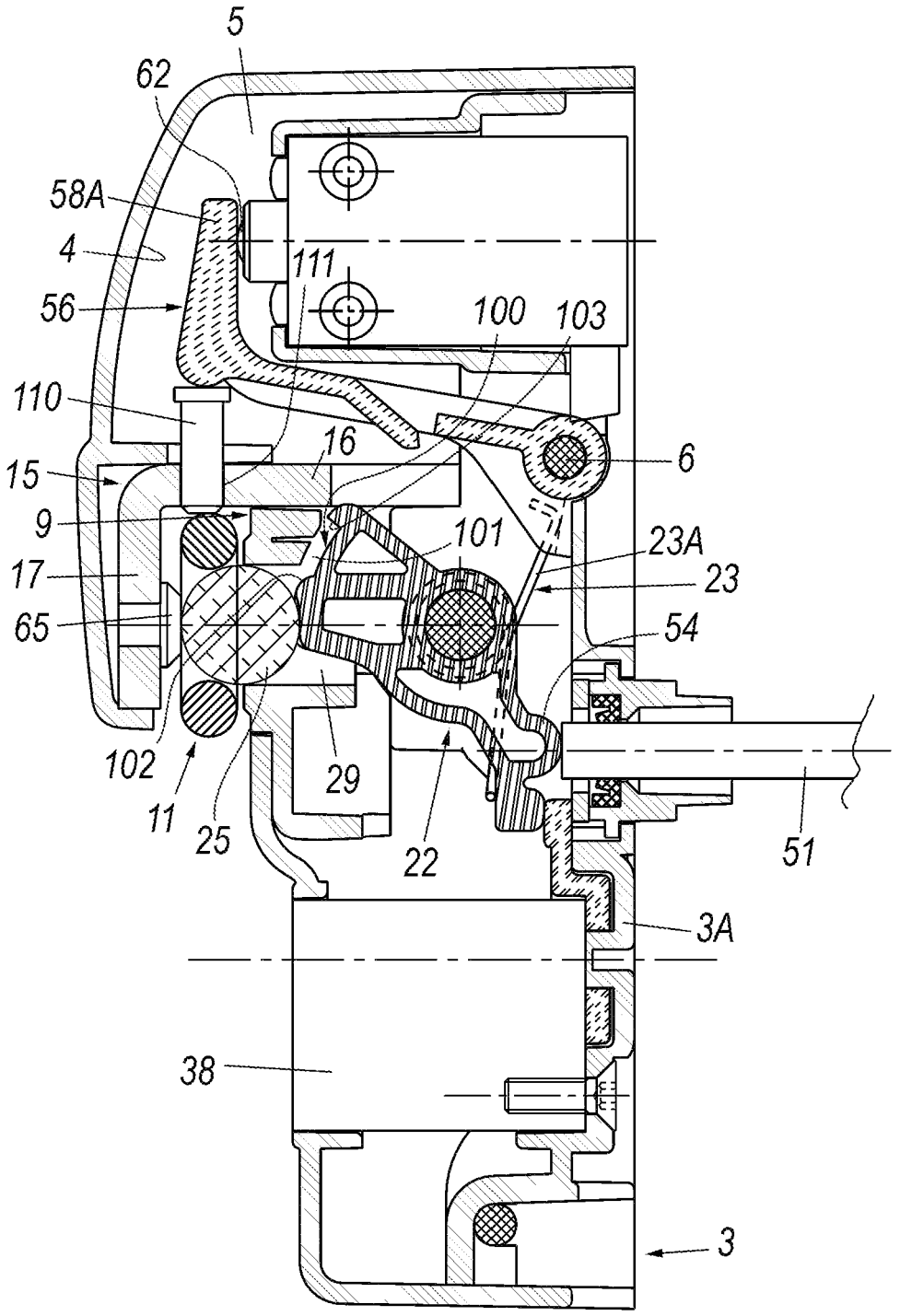
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Fig. 9

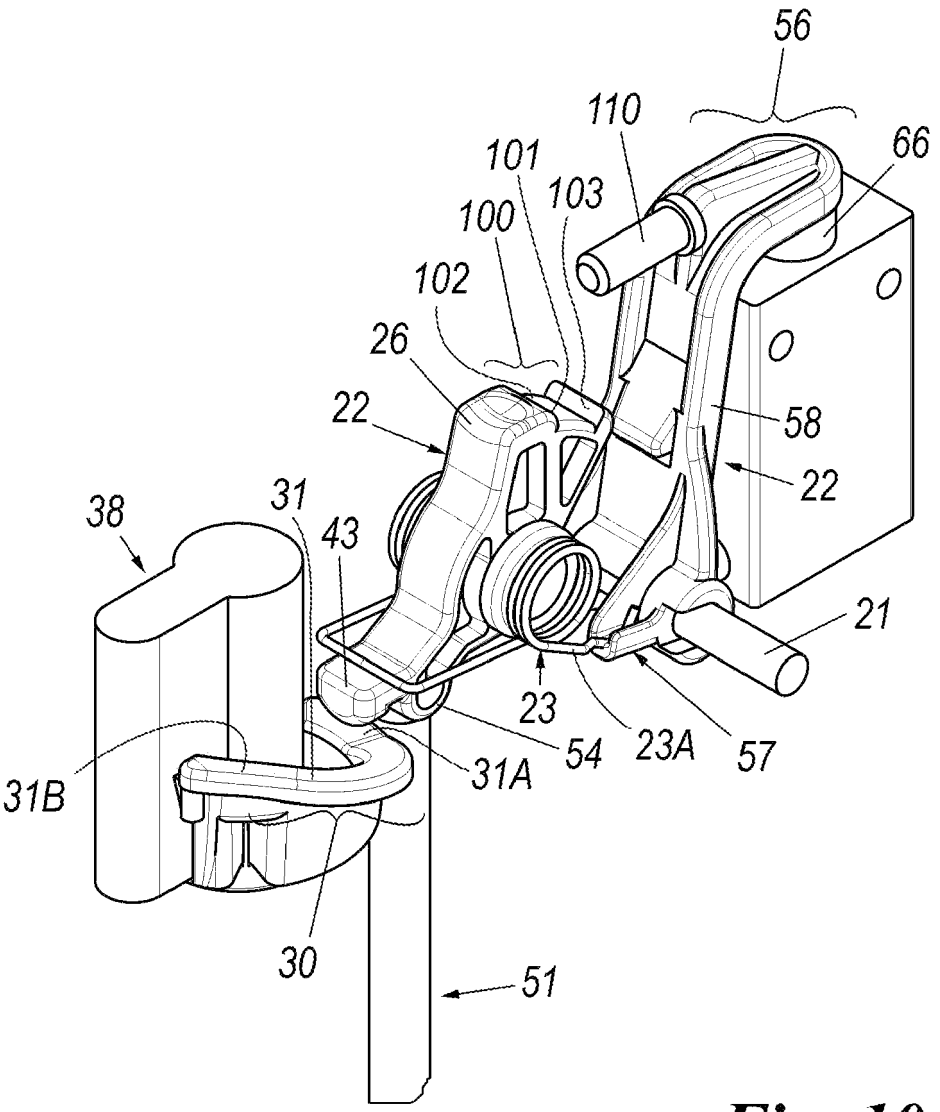
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Fig. 10