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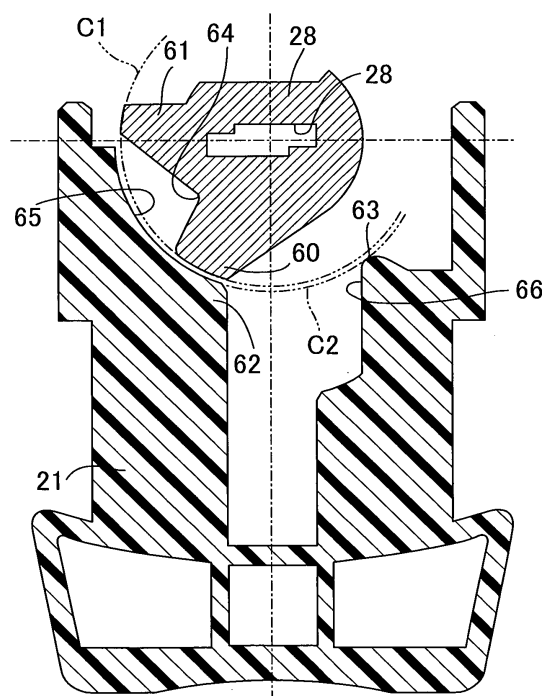
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(54) **LID OPENING OPERATION DEVICE**

(57) A lid opening operation device is provided in which pivoting of a rotor of a cylinder lock to an open position in response to a pushing-in operation of an operating knob is enabled in a state in which the rotor is at an unlocked position and the pushing-in operation of the operating knob is disabled in a state in which the rotor is at a locked position, the rotor (28) is provided with a pressure-receiving portion (60) against which a pressing portion (62, 63) of the operating knob (21) abuts in response to a pushing-in operation of the operating knob (21), and the pressing portion (62, 63) and the pressure-receiving portion (60) are formed so that when the operating knob (21) is pressed at the locked position a pressing force directed toward the pivot center side of the rotor (28) acts from the operating knob (21) on the rotor (28), and when the operating knob (21) is pushed in at the unlocked position, a force pivoting the rotor (28) to the open position side acts from the operating knob (21) on the rotor (28). This can prevent a large load from acting on a tumbler by a simple structure even when a pushing-in operation of the operating knob is carried out in a state in which the rotor is at the locked position.

FIG.9

LOCKED POSITION



Description

TECHNICAL FIELD

[0001] The present invention relates to a lid opening operation device that includes a cylinder lock formed by inserting a rotor into a body fixed to a lid openably and closably mounted on a box-forming member, the rotor being capable of being pivoted between a locked position and an unlocked position by operation of a key and being capable of pivoting to an open position opposite the locked position with respect to the unlocked position; an operating knob that enables pivoting of the rotor to the open position in response to a pushing-in operation when the rotor is at the unlocked position and that disables the pushing-in operation in a state in which the rotor is at the locked position; and a lid lock mechanism provided between the lid and the box-forming member so as to release engagement with the lid side in order to enable an opening operation of the lid in response to the rotor pivoting to the open position.

BACKGROUND ART

[0002] A lid opening operation device in which, when a rotor of a cylinder lock is at an unlocked position the rotor is pivoted to an open position by pushing in an operating knob, and when the rotor is at a locked position the pushing-in operation of the operating knob is disabled so as to maintain a closed state for a lid is known from Patent Publication 1.

Patent Publication 1: Japanese Utility Model Publication No. 61-17154

DISCLOSURE OF INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0003] However, in the arrangement disclosed in the above-described Patent Publication 1, when the rotor of the cylinder lock is at the locked position, although a pressing force due to the pushing-in operation of the operating knob acts on the rotor as a pivoting force, since a plurality of tumblers disposed on the rotor engage with a body, the pushing-in operation of the operating knob and the pivoting of the rotor to the open position are prevented, and there is a possibility of a large load acting on the tumblers and the tumblers cutting into the body side, which is undesirable.

[0004] The present invention has been accomplished in the light of such circumstances, and it is an object thereof to provide a lid opening operation device that can prevent a large load from acting on a tumbler by a simple structure even when a pushing-in operation of an operating knob is carried out when a rotor of a cylinder lock is at a locked position.

MEANS FOR SOLVING THE PROBLEMS

[0005] In order to attain the above object, according to an aspect of the present invention, there is provided a lid opening operation device comprising a cylinder lock formed by inserting a rotor into a body fixed to a lid openably and closably mounted on a box-forming member, the rotor being capable of being pivoted between a locked position and an unlocked position by operation of a key and being capable of pivoting to an open position opposite the locked position with respect to the unlocked position; an operating knob that enables pivoting of the rotor to the open position in response to a pushing-in operation when the rotor is at the unlocked position and that disables the pushing-in operation in a state in which the rotor is at the locked position; and a lid lock mechanism provided between the lid and the box-forming member so as to release engagement with the box-forming member side in order to enable an opening operation of the lid in response to the rotor pivoting to the open position, characterized in that the rotor is provided with a pressure-receiving portion against a pressing portion provided on the operating knob abuts in response to a pushing-in operation of the operating knob, and the pressing portion and the pressure-receiving portion are formed so that when the rotor is at the locked position and the operating knob is pressed, a pressing force directed toward the pivot center side of the rotor acts from the operating knob on the rotor, and when the rotor is at the unlocked position and the operating knob is pushed in, a force pivoting the rotor from the unlocked position to the open position side acts from the operating knob on the rotor.

[0006] A leg shield 17 of an embodiment corresponds to the box-forming member of the present invention.

EFFECTS OF THE INVENTION

[0007] In accordance with the above-mentioned arrangement of the present invention, when the rotor of the cylinder lock is at the locked position, the pressing force due to the operating knob being pushed in acts on the rotor toward the pivot center of the rotor, a pivoting force from the operating knob is not transmitted to the rotor, and pushing in of the operating knob is prevented. Moreover, in accordance with a simple arrangement with few components, in which only the shapes of the pressure-receiving portion provided on the rotor and the pressing portion provided on the operating knob are designed, it is possible to prevent a large load from acting on tumblers even when a pushing-in operation of the operating knob is carried out when the rotor of the cylinder lock is at the locked position.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

[FIG. 1] FIG. 1 is a perspective view showing part of

a scooter type motorcycle (first embodiment).

[FIG. 2] FIG. 2 is a front view of a cylinder lock and an operating knob (first embodiment).

[FIG. 3] FIG. 3 is a view from arrow 3 in FIG. 2 (first embodiment).

[FIG. 4] FIG. 4 is a sectional view along line 4-4 in FIG. 2 (first embodiment).

[FIG. 5] FIG. 5 is an exploded perspective view of the cylinder lock, the operating knob, and a lid lock mechanism (first embodiment).

[FIG. 6] FIG. 6 is a sectional view along line 6-6 in FIG. 4 in a state in which a rotor is at a locked position (first embodiment).

[FIG. 7] FIG. 7 is a sectional view, corresponding to FIG. 6, in a state in which the rotor is at an unlocked position (first embodiment).

[FIG. 8] FIG. 8 is a sectional view, corresponding to FIG. 6, in a state in which the rotor is at an open position (first embodiment).

[FIG. 9] FIG. 9 is a sectional view along line 9-9 in FIG. 4 in a state in which the rotor is at the locked position (first embodiment).

[FIG. 10] FIG. 10 is a sectional view, corresponding to FIG. 9, in a state in which the rotor is at the unlocked position (first embodiment).

[FIG. 11] FIG. 11 is a sectional view, corresponding to FIG. 9, in a state in which the rotor is pivoted to the open position due to the operating knob being pushed in (first embodiment).

EXPLANATION OF REFERENCE NUMERALS AND SYMBOLS

[0009]

- 17 Leg shield, which is a box-forming member
- 18 Lid
- 20 Cylinder lock
- 21 Operating knob
- 22 Lid lock mechanism
- 27 Body
- 28 Rotor
- 60 Pressure-receiving portion
- 62, 63 Pressing portion
- P1 Locked position
- P2 Unlocked position
- P3 Open position

BEST MODE FOR CARRYING OUT THE INVENTION

[0010] A mode for carrying out the present invention is explained below by reference to one embodiment of the present invention shown in the attached drawings.

EMBODIMENT 1

[0011] FIG. 1 to FIG. 11 show one embodiment of the present invention.

[0012] The fore-and-aft and left-and-right directions in the embodiment are with respect to the traveling direction of a motorcycle.

[0013] First, in FIG. 1, a body cover 15 of, for example, a scooter type motorcycle includes a leg shield 17 as a box-forming member rising from the front end of a step floor 16, and a box portion 17a projecting rearward is formed integrally with the leg shield 17. A lower end part of a lid 18 for closing a rear end opening of the box portion 17a so that it can be opened and closed is supported on the box portion 17a so that it can pivot in the fore-and-aft direction, and a recess 19 is provided in an upper middle part of the lid 18 so as to open on the upper edge side of the lid 18. Disposed in the recess 19 are a cylinder lock 20 and an operating knob 21, the operating knob 21 releasing a closed locked state of the lid 18 by being pushed in when the cylinder lock 20 is subjected to an unlocking operation. A hook 23, which is positioned above the cylinder lock 20 when the lid 18 is in a closed state, is provided on the leg shield 17 so as to enable a shopping bag, etc. to be hung thereon, and a main switch 24 is disposed on an upper right part of the leg shield 17.

[0014] In FIG. 2 to FIG. 5, the cylinder lock 20 includes a body 27 fixed to the lid 18 and a rotor 28 pivotably inserted into the body 27. The body 27 integrally has a body main portion 27a formed into a substantially cylindrical shape, a collar portion 27b protruding outward from the rear end of the body main portion 27a, and a pair of guide portions 27c and 27c extending downward in parallel from the collar portion 27b when the lid 18 is in a closed state; a cylinder hole 29 having a circular cross-section is provided in a rear part of the body main portion 27a, a recess 30 is provided in a front part of the body main portion 27a so as to open on an upper side face of the body main portion 27a while communicating with the cylinder hole 29, and a body cover 31 for closing the recess 30 is mounted on a front side face of the body main portion 27a.

[0015] The rotor 28 is pivotably fitted into the cylinder hole 29 so that its rear part is disposed to the rear of the collar portion 27b and its front part is disposed in the recess 30; this rotor 28 is provided with an opening 32 having a substantially circular cross-section and opening at the rear end of the rotor 28, and with a key hole 33, into which a key (not illustrated) can be inserted, having its rear end communicating with the front end of the opening 32, and the front end of the key hole 33 is closed. A cap 35 is mounted at the rear end of the rotor 28, the cap 35 being formed into a dish shape with an insertion hole 34 corresponding to the key hole 33, and a shutter plate 36 disposed within the opening 32 is supported on the rotor 28 via a support shaft 38 while being urged by a spring 37 in a direction that closes the insertion hole 34. The key (not illustrated) can thus be inserted into the key hole 33 via the insertion hole 34 while pressing and pivoting the shutter plate 36 toward the opening side.

[0016] A pair of engagement grooves 41 and 41 are provided on an inside face of the cylinder hole 29, the

engagement grooves 41 and 41 extending in the axial direction of the cylinder hole 29, and a plurality of tumblers 42 are mounted on the rotor 28, the tumblers 42 being spring-biased in a direction in which they engage with the engagement grooves 41. In a state in which the key is not inserted into the key hole 33, the tumblers 42 engage with the engagement grooves 41, thus preventing the rotor 28 from pivoting within the cylinder hole 29, and when the key is inserted into the key hole 33, it operates so as to release the engagement of the tumblers 42 with the engagement grooves 41, thus allowing pivoting of the rotor 28 within the cylinder hole 29.

[0017] Referring to FIG. 2, the rotor 28 is at a locked position P1 in a state in which the tumblers 42 are engaged with the engagement grooves 41, can be pivoted to a unlocked position P2, which is spaced from the locked position P1 by an angle α in the anticlockwise direction, by a pivoting operation in a state in which the key is inserted into the key hole 33 so as to release the engagement of the tumblers 42 with the engagement grooves 41, and can be further pivoted from the unlocked position P2 to an open position P3, which is spaced from the unlocked position P2 by an angle β in the anticlockwise direction on the side opposite to the locked position P1 relative to the unlocked position P2.

[0018] Furthermore, a rear part of the body 27 is covered with a cover 43 having an outer shape substantially corresponding to the outer shape of the collar portion 27b of the body 27, and this cover 43 is mounted on the collar portion 27b. Moreover, a circular window 44 is provided in the cover 43, part of the cap 35 at the rear end of the rotor 28 being fitted into the circular window 44.

[0019] A lid lock mechanism 22 is provided between the box portion 17a of the leg shield 17 and the lid 18, that is, in this embodiment between the lid 18 and the rotor 28 supported on the body 27 fixed to the lid 18, the lid lock mechanism 22 releasing engagement with the box portion 17a side so as to enable the lid 18 to be opened in response to the rotor 28 of the cylinder lock 20 pivoting to the open position P3.

[0020] Referring in addition to FIG. 6, the lid lock mechanism 22 includes a slider 45 running slidably through a through hole 50 provided in the body cover 31 and having at the outer end an engagement portion 45a detachably engaging with the box portion 17a side of the leg shield 17, a spring 46 provided in a compressed state between the slider 45 and the body main portion 27a so as to spring-bias the engagement portion 45a so that it projects outward in the radial direction of the body main portion 27a, an abutment arm 47 that projects toward the rotor 28 side from an inner end part of the slider 45 and that is provided integrally with the slider 45, and a restricting projection 48 and a pressing projection 49 that are provided integrally with the front end of the rotor 28 and that can abut against the abutment arm 47.

[0021] The slider 45 is slidably fitted into a guide recess 51 provided in an inner face at the front end of the body main portion 27a along one diameter of the body main

portion 27a, and the spring 46, which is in a coiled form, is provided in a compressed state between the body main portion 27a and the slider 45 so as to surround a pin 52 projectingly and integrally provided on the body main portion 27a while facing the inner end of the slider 45.

[0022] The restricting projection 48 is projectingly provided on the rotor 28 so as to be coaxial therewith, and in a state in which the rotor 28 is at the locked position P1 as shown in FIG. 6 and in a state in which the rotor 28 is at the unlocked position P2 as shown in FIG. 7, the restricting projection 48 abuts against the abutment projection 47 of the slider 45 from a direction opposite to that in which it is urged by the spring 46, thus determining a projection end position for the slider 45.

[0023] Furthermore, the pressing projection 49 is projectingly provided at the rear end of the rotor 28 at a position offset from the pivot center of the rotor 28; when the rotor 28 is at the locked position P1 shown in FIG. 6, the pressing projection 49 does not abut against the abutment projection 47, but when the rotor 28 is pivoted to the unlocked position P2 shown in FIG. 7 the pressing projection 49 abuts against the abutment projection 47 from a direction opposite to that in which it is urged by the spring 46, and when the rotor 28 is pivoted from the unlocked position P2 shown in FIG. 7 to the open position P3 shown in FIG. 8 a pressing force acts on the abutment projection 47, thus making the slider 45 slide toward the side on which the slider 45 is housed within the body main portion 27a against the spring bias force of the spring 46, and thereby releasing an engaged state of the lid 18 with the box portion 17a and enabling the lid 18 to be opened.

[0024] A notch 53 is provided in a lower part of the cover 43 mounted on the rear part of the body 27, and an upper part of the operating knob 21 is inserted within the cover 43 via the notch 53 so that it can slide in a direction perpendicular to the axis of the rotor 28.

[0025] A pair of guide grooves 54 and 54 are provided in a face of the collar portion 27b of the body 27 on the cover 43 side, the guide grooves 54 and 54 extending vertically on opposite sides of the cylinder hole 29, and stoppers 55 and 55 are integrally provided so as to project rearward from the lower ends of the guide grooves 54. The operating knob 21 can slide in a vertical direction perpendicular to the pivot center of the rotor 28 while being guided by the guide grooves 54 and the two guide portions 27c of the body 27, and a return spring 56 is provided in a compressed state between the body 27 and the operating knob 21, the return spring 56 exhibiting a spring force in a direction in which the operating knob 21 is pushed downward. The downwardly moving end of the operating knob 21 is restricted by the operating knob 21 abutting against the two stopper portions 55 from above.

[0026] Referring in addition to FIG. 9, a pressure-receiving portion 60 and a restricting portion 61 are projectingly provided on the rotor 28, the pressure-receiving portion 60 and the restricting portion 61 being spaced in the peripheral direction and projecting radially outward

so as to be in sliding contact with the collar portion 27b of the body 27 from the rear, and first and second pressing portions 62 and 63 are provided with a gap therebetween on the operating knob 21 in a portion corresponding to the outer periphery of the rotor 28.

[0027] The pressure-receiving portion 60 and the restricting portion 61 therefore have outer peripheral faces that follow a first imaginary circle C1 with the same radii and the center at the pivot center of the rotor 28, and when the rotor 28 is at the unlocked position P2, the restricting portion 61 extends substantially horizontally from the rotor 28 to the left-hand side in FIG. 9, and the pressure-receiving portion 60 is disposed at a position extending obliquely from the rotor 28 to the lower left-hand side at a position spaced from the restricting portion 61 in the anticlockwise direction in FIG. 9. A substantially V-shaped valley portion 64 is thus formed on the outer periphery of the rotor 28 between the pressure-receiving portion 60 and the restricting portion 61.

[0028] The first pressing portion 62 of the operating knob 21 is disposed beneath the rotor 28 on the left-hand side so as to face the pressure-receiving portion 60 when the rotor 28 is at the locked position P1, and an arc-shaped pressing face 65 is formed at the extremity of the first pressing portion 62; this pressing face 65 is formed so as to follow a second imaginary circle C2 having its center at the pivot center of the rotor 28 when the operating knob 21 is in a non-pushing-in operation state, and the radius of the second imaginary circle C2 is set so as to be slightly larger than the radius of the first imaginary circle C1. Furthermore, the second pressing portion 63 of the operating knob 21 is disposed at a position that faces the rotor 28 from the lower right so that the extremity of the second pressing portion 63 is on the second imaginary circle C2 when the operating knob 21 is in the non-pushing-in operation state, and a side face of the second pressing portion 63 on the first pressing portion 62 side is formed as a flat restricting face 66 against which the restricting portion 61 of the rotor 28 can abut.

[0029] Pushing in the operating knob 21 when the rotor 28 is at the locked position P1 makes the pressing face 65 at the extremity of the first pressing portion 62 of the operating knob 21 abut against the outer periphery of the extremity of the pressure-receiving portion 60 of the rotor 28, thus preventing a pushing-in operation of the operating knob 21 and making a pressing force directed toward the pivot center side of the rotor 28 act on the rotor 28. Pivoting the rotor 28 from the locked position P1 to the unlocked position P2 by operation of the key moves the pressure-receiving portion 60 of the rotor 28 to a position slightly beyond the second pressing portion 63 of the operating knob 21 as shown in FIG. 10, and moves the restricting portion 61 to a position between the first and second pressing portions 62 and 63 of the operating knob 21. In this state, when the operating knob 21 is pushed in, the pressure-receiving portion 60 is pushed by the second pressing portion 63 and the rotor 28 is pivoted to the open position P3 shown in FIG. 11; when

the rotor 28 pivots to the open position P3, the restricting portion 61 of the rotor 28 abuts against the restricting face 66 of the operating knob 21, thus preventing the rotor 28 from pivoting further than this.

[0030] That is, the rotor 28 is provided with the pressure-receiving portion 60, against which the first and second pressing portions 62 and 63 provided on the operating knob 21 abut in response to a pushing-in operation of the operating knob 21; the first pressing portion 62, the second pressing portion 63, and the pressure-receiving portion 60 are formed so that, when the rotor 28 is at the locked position P1 and the operating knob 21 is pressed, a pressing force directed toward the pivot center side of the rotor 28 acts from the operating knob 21 on the rotor 28, and when the rotor 28 is at the unlocked position P2 and the operating knob 21 is pushed in, a force pivoting the rotor 28 from the unlocked position P2 to the open position P3 side acts from the operating knob 21 on the rotor 28.

[0031] Furthermore, the rotor 28 can be pivoted in one step from the locked position P1 via the unlocked position P2 to the open position P3 by operation of the key, and by so doing the lid 18 can be opened.

[0032] The operation of this embodiment is now explained. When the rotor 28 of the cylinder lock 20 is at the locked position P1, a pressing force due to the operating knob 21 being pushed in acts on the rotor 28 toward the pivot center of the rotor 28, a pivoting force from the operating knob 21 is not transmitted to the rotor 28, and pushing in of the operating knob 21 is prevented. Moreover, in accordance with a simple arrangement with few components, in which only the shapes of the pressure-receiving portion 60 provided on the rotor 28 and the first and second pressing portions 62 and 63 provided on the operating knob 21 are designed, it is possible to prevent a large load from acting on the tumblers 42 even when a pushing-in operation of the operating knob 21 is carried out when the rotor 28 of the cylinder lock 20 is at the locked position P1.

[0033] Although an embodiment of the present invention has been explained above, the present invention is not limited to the above-mentioned embodiment, and may be modified in a variety of ways as long as the modifications do not depart from the spirit and scope of the present invention described in Claims on the following page.

Claims

1. A lid opening operation device comprising a cylinder lock (20) formed by inserting a rotor (28) into a body (27) fixed to a lid (18) openably and closably mounted on a box-forming member (17), the rotor (28) being capable of being pivoted between a locked position (P1) and an unlocked position (P2) by operation of a key and being capable of pivoting to an open position (P3) opposite the locked position (P1) with re-

spect to the unlocked position (P2); an operating knob (21) that enables pivoting of the rotor (28) to the open position (P3) in response to a pushing-in operation when the rotor (28) is at the unlocked position (P2) and that disables the pushing-in operation in a state in which the rotor (28) is at the locked position (P1); and a lid lock mechanism (22) provided between the lid (18) and the box-forming member (17) so as to release engagement with the box-forming member (17) side in order to enable an opening operation of the lid (18) in response to the rotor (28) pivoting to the open position (P3),
characterized in that the rotor (28) is provided with a pressure-receiving portion (60) against which a pressing portion (62, 63) provided on the operating knob (21) abuts in response to a pushing-in operation of the operating knob (21), and the pressing portion (62, 63) and the pressure-receiving portion (60) are formed so that when the rotor (28) is at the locked position (P1) and the operating knob (21) is pressed, a pressing force directed toward the pivot center side of the rotor (28) acts from the operating knob (21) on the rotor (28), and when the rotor (28) is at the unlocked position (P2) and the operating knob (21) is pushed in, a force pivoting the rotor (28) from the unlocked position (P2) to the open position (P3) side acts from the operating knob (21) on the rotor (28).

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FIG.1

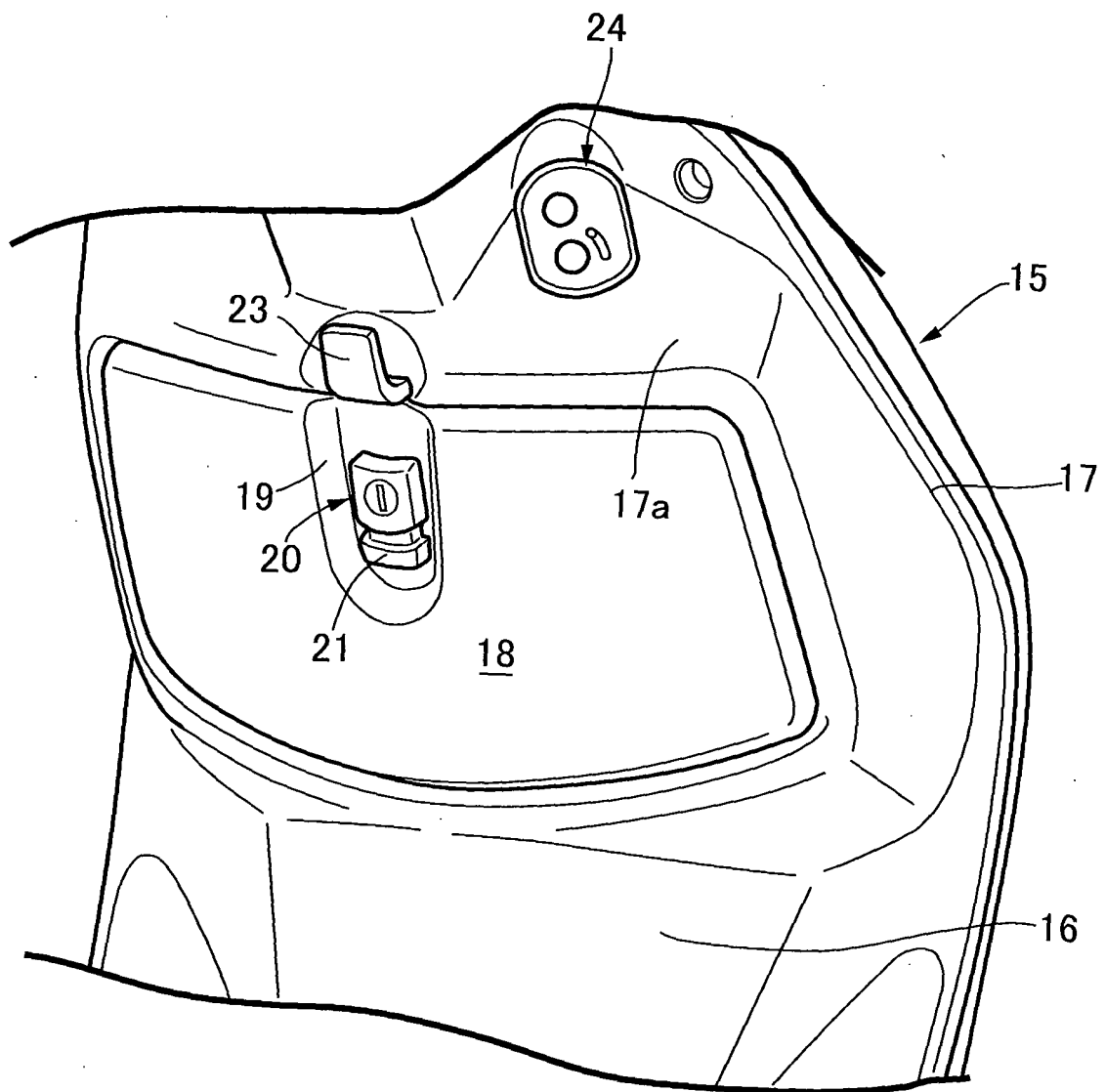


FIG.2

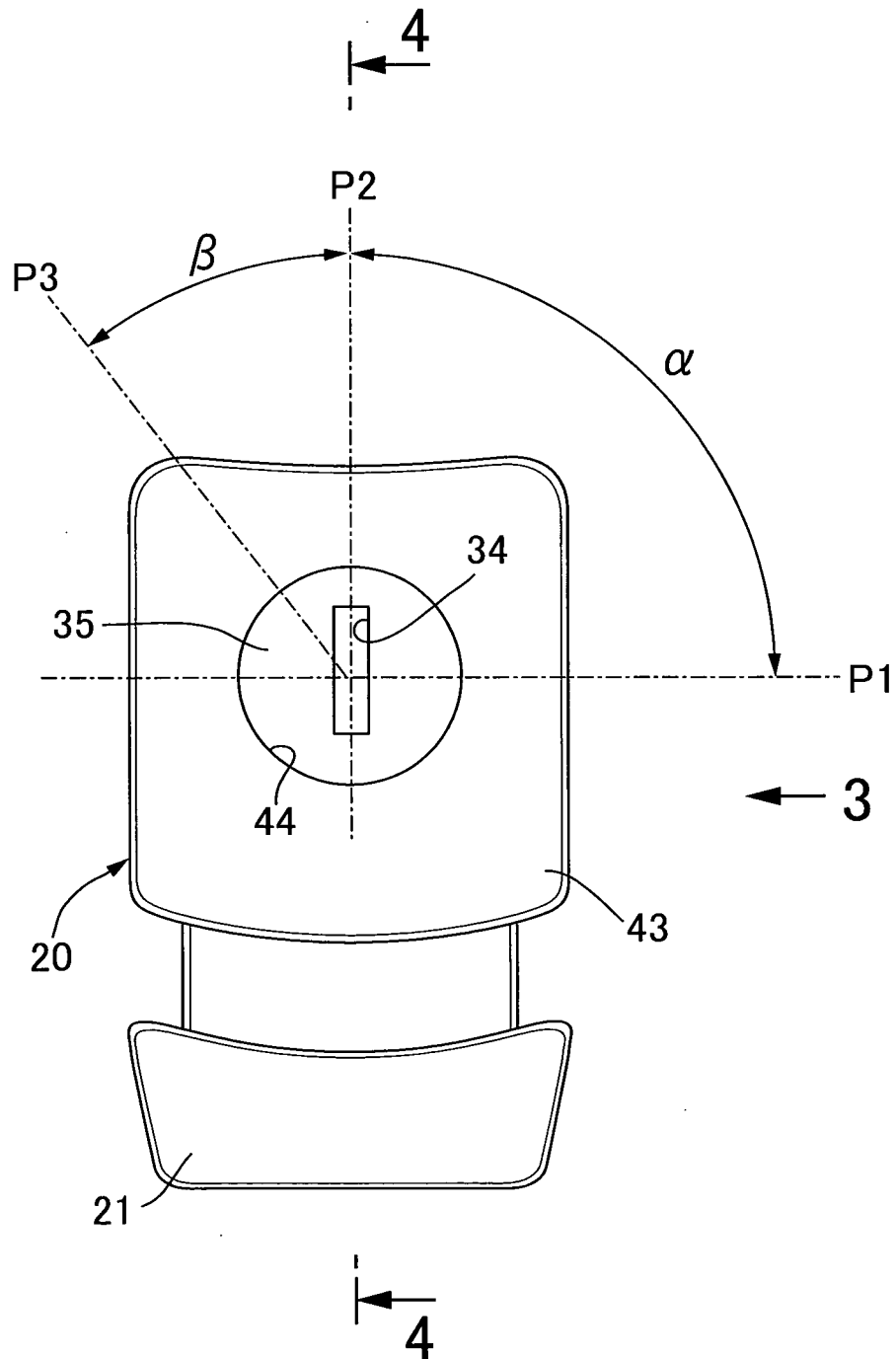


FIG.3

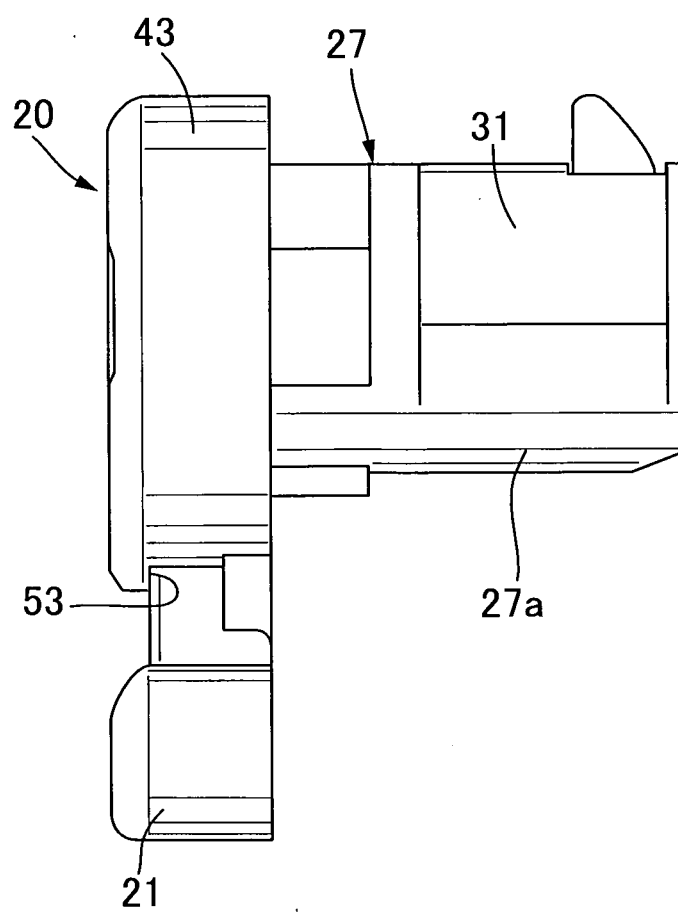


FIG.4

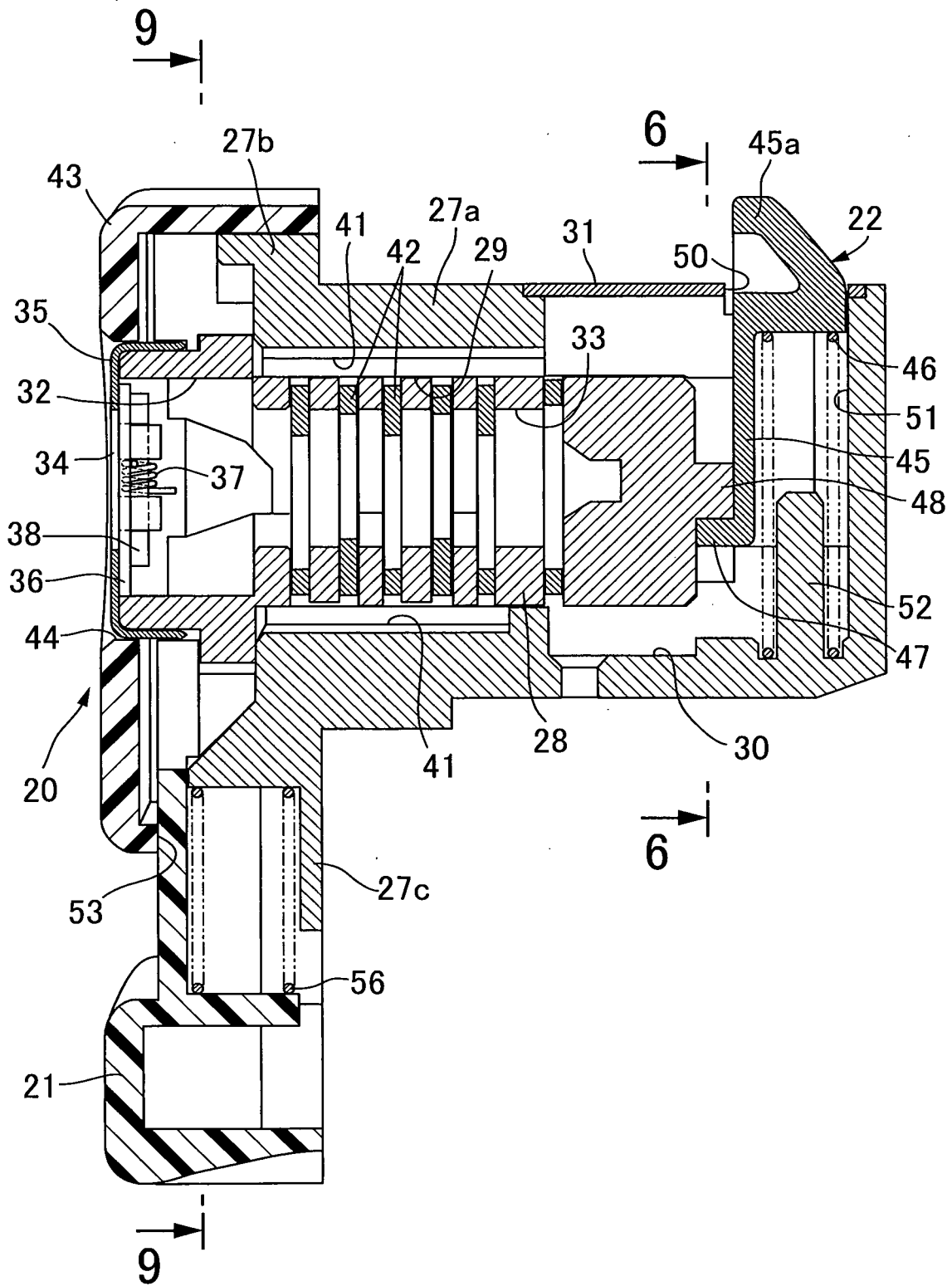


FIG.5

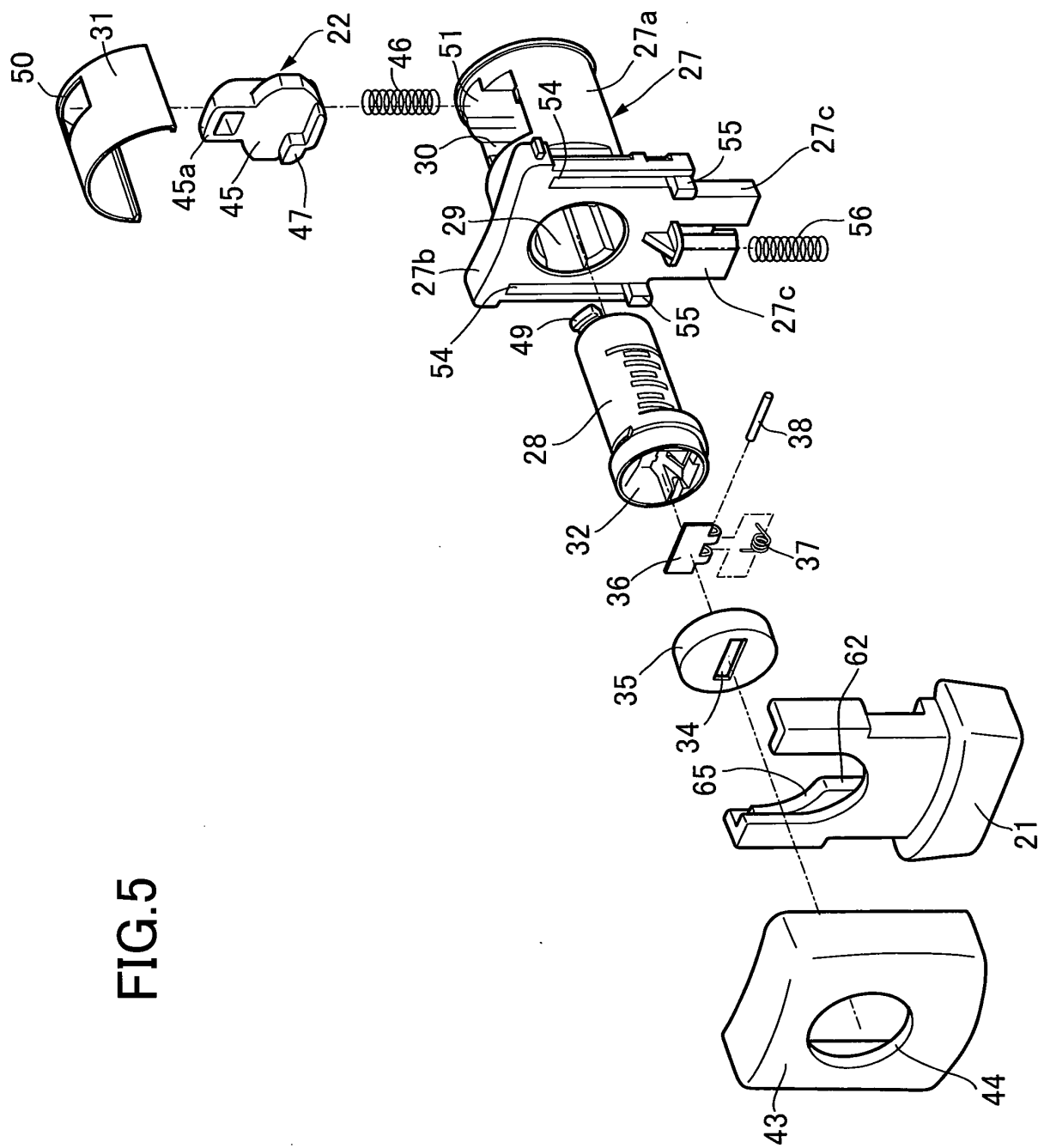


FIG.6

LOCKED POSITION

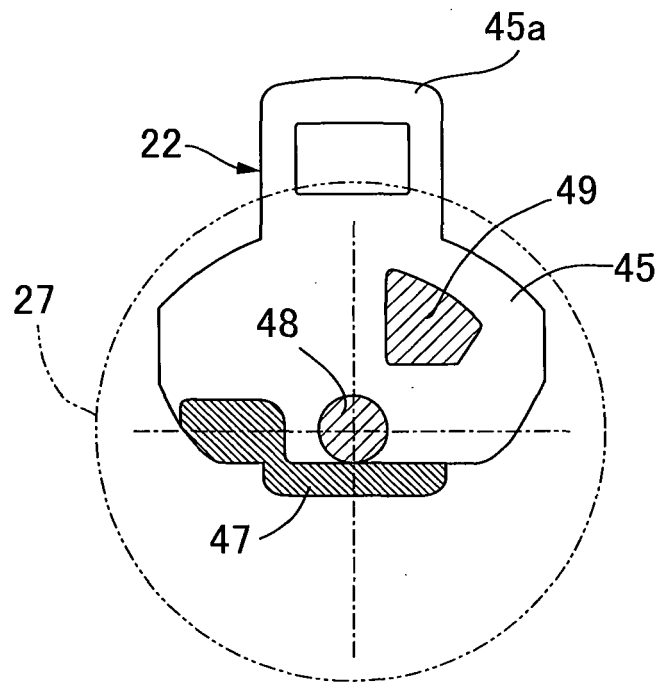


FIG.7

UNLOCKED POSITION

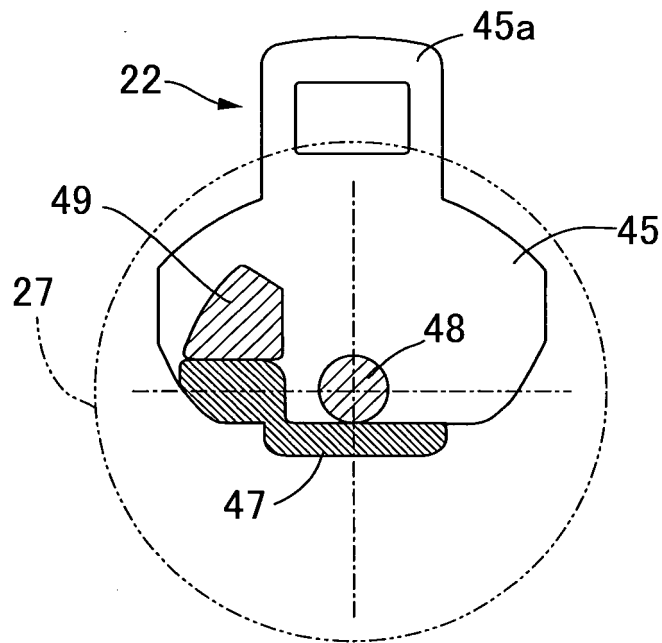


FIG.8

OPEN POSITION

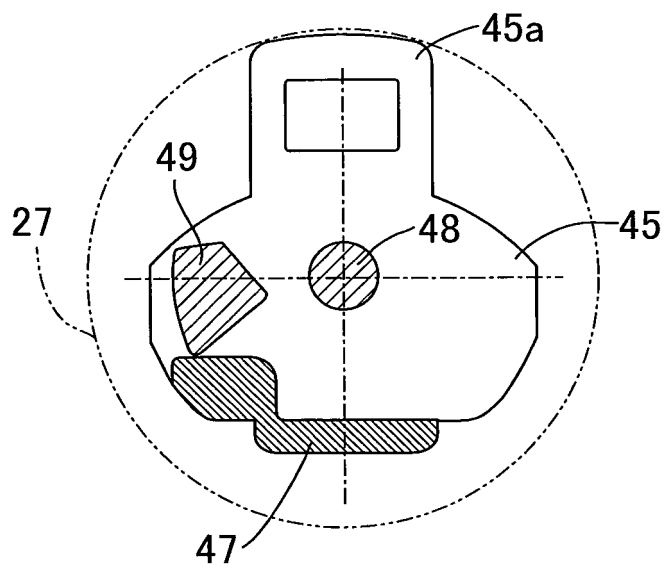


FIG.9

LOCKED POSITION

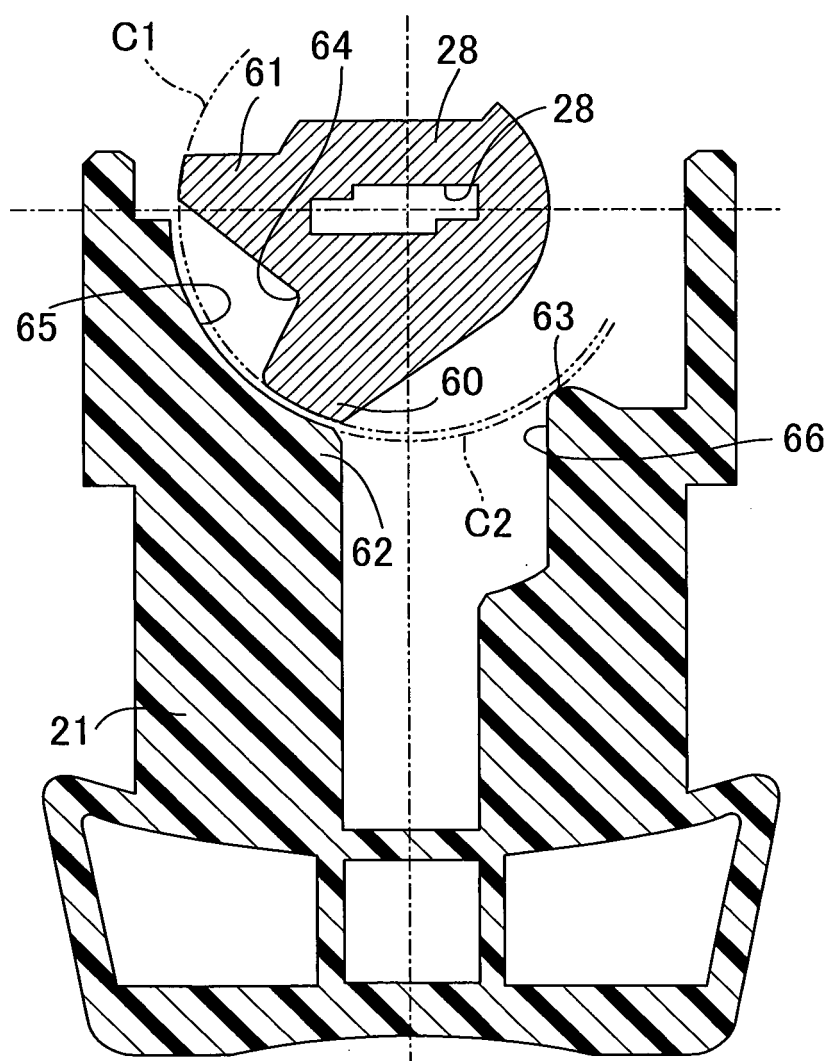


FIG.10

UNLOCKED POSITION

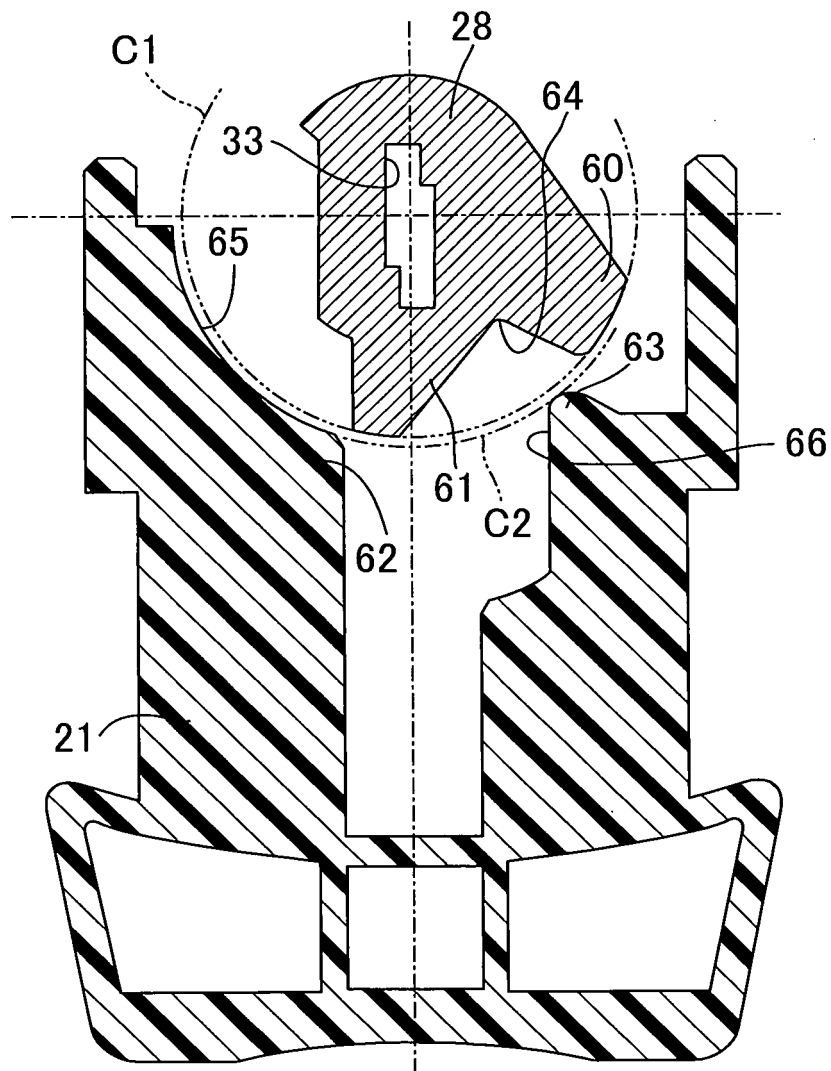
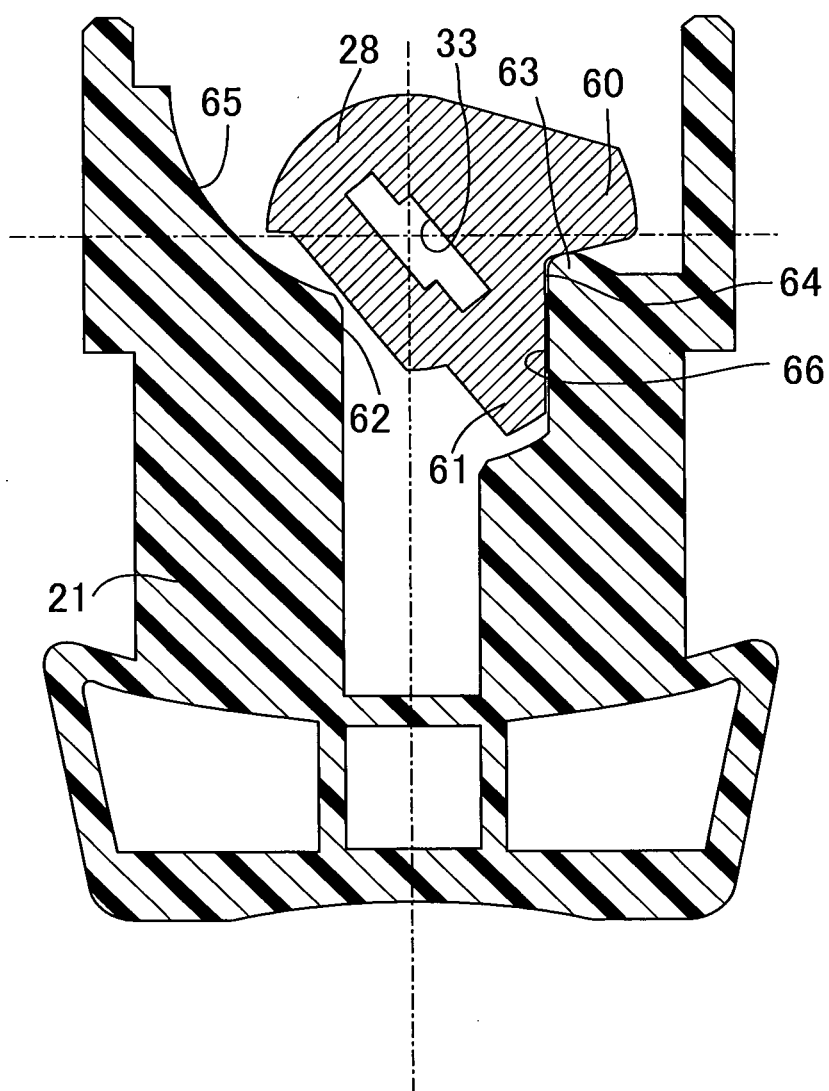


FIG.11

OPEN POSITION



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/072943

A. CLASSIFICATION OF SUBJECT MATTER <i>E05B65/12(2006.01)i, B62J9/00(2006.01)n, B62J17/06(2006.01)n</i>												
According to International Patent Classification (IPC) or to both national classification and IPC												
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) <i>E05B65/12, B62J9/00, B62J17/06</i>												
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <table border="0"> <tr> <td>Jitsuyo Shinan Koho</td> <td>1922-1996</td> <td>Jitsuyo Shinan Toroku Koho</td> <td>1996-2007</td> </tr> <tr> <td>Kokai Jitsuyo Shinan Koho</td> <td>1971-2007</td> <td>Toroku Jitsuyo Shinan Koho</td> <td>1994-2007</td> </tr> </table>			Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2007	Kokai Jitsuyo Shinan Koho	1971-2007	Toroku Jitsuyo Shinan Koho	1994-2007		
Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2007									
Kokai Jitsuyo Shinan Koho	1971-2007	Toroku Jitsuyo Shinan Koho	1994-2007									
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)												
C. DOCUMENTS CONSIDERED TO BE RELEVANT												
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.										
A	JP 2002-227492 A (Nifco Inc.), 14 August, 2002 (14.08.02), Par. Nos. [0010] to [0020]; all drawings & TW 000499536 B	1										
A	JP 61-17154 Y2 (Toyota Motor Corp., Tokai Rika Co., Ltd.), 26 May, 1986 (26.05.86), Full text; all drawings & US 004414828 A	1										
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