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(54) **ROTATING INPUT DEVICE**

DREHEINGABEVORRICHTUNG

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EP 3 133 629 B1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a rotary type input device having a function which returns a rotary member operating a rotation detection unit from an input rotation position at which the rotary member has rotated by a predetermined angle to a return rotation position.

BACKGROUND ART

[0002] Patent Document 1 discloses a rotary switch which includes a return push button.

[0003] In the rotary switch, the return push button is supported to be movable forward and backward at the center portion of a rotary knob. Multiple cam ridges are formed on an outer circumferential surface of the return push button in a circumferential direction at a constant pitch, and a leaf spring which is fitted to the cam ridges is provided in the rotary knob. If the rotary knob is rotated, the rotary knob is held at a rotation position at which the leaf spring and the cam ridge are fitted to each other, and a switch contact can be switched to states corresponding to each of the holding position.

[0004] A return spring member configured of a spiral spring is provided between a case and the rotary knob. The return push button can be pressed, and a compression coil spring by which the return push button is returned when a pressing force is released is provided in the return push button. If the rotary knob rotates, the rotary knob is held in a state where the leaf spring and the cam ridge are fitted to each other, and if the return push button is pressed, the fitting between the leaf spring and the cam ridge is released, and the rotary knob is returned to an original position by a force of the return spring member. In addition, the return push button is returned to a posture before the return push button is pressed by an elastic force of the compression coil spring.

[0005] Patent Document 1: Japanese Unexamined Utility Model Registration Application Publication No. H4-8331 (Microfilm of Japanese Utility Model Registration Application No. H2-48103)

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0006] In the rotary switch of the related art disclosed in Patent Document 1, three kinds of spring member such as the return spring member for returning the rotary knob rotated to a predetermined switching position to an original position, the leaf spring which is fitted to the cam ridge, and the compression coil spring for returning the return push button are provided. Accordingly, the number of parts increases, and an assembly cost increases.

[0007] JP S59 59430 U discloses a rotary input device according to the preamble of claim 1 and shows a rotary

switch consisting of a rotor and a dished housing, wherein the rotor has a rotor shaft supported in the housing. The rotor shaft comprises a cam portion. A projection faces the cam portion and a spring presses the projection to the cam portion.

[0008] In addition, as described in Patent Document 1, in the structure in which the return push button having the cam ridge is returned by the compression coil spring, when the return push button is returned, the cam ridge is not positioned at the leaf spring provided in the rotary knob and is not easily fitted to the leaf spring, and there is a problem that it is not possible to return the return push button to the original position.

[0009] The present invention is for solving the above-described problem of the related art, and an object thereof is to provide a rotary type input device in which a rotary member can be reliably returned to a return rotation position using fewer spring members.

MEANS FOR SOLVING THE PROBLEMS

[0010] According to the present invention, there is provided a rotary type input device which includes: a housing; a rotary member which is rotatably supported by the housing and is rotatable from a return rotation position to an input rotation position; and a rotation detection unit which changes a detection state according to the rotation of the rotary member,

in which a cam portion which is formed in the rotary member, a follower which faces the cam portion, and a holding spring member which presses the follower to the cam portion are provided, and a holding recessed portion which is fitted to the follower to hold the rotary member when the rotary member rotates to the input rotation position is formed in the cam portion,

a hold release member which releases the fitting between the follower and the holding recessed portion, and a return spring member which returns the rotary member to the return rotation position when the fitting is released are provided, and

the hold release member is provided to be movable from an initial posture to a hold release posture at which the fitting is released, and is returned to the initial posture by the holding spring member.

[0011] In the rotary type input device of the present invention, the rotary member is held at the input rotation position by the holding spring member, and the hold release member is returned to an initial posture by the same holding spring member. It is possible to reduce the number of spring members by providing two functions to the holding spring member.

[0012] In the present invention, preferably, the follower or the holding spring member is pushed by the hold release member when the hold release member moves to the hold release posture, and the fitting between the follower and the holding recessed portion is released.

[0013] In the above means, since the follower or the holding spring member is directly pushed by the hold

release member, it is possible to reliably separate the follower from the holding recessed portion of the cam portion, and it is possible to reliably return the rotary member to the return rotation position.

[0014] In the present invention, a return recessed portion may be formed in the cam portion, the follower may face a bottom portion of the return recessed portion or an inclined portion adjacent to the bottom portion when the rotary member is returned to the return rotation position by return spring member, and the follower may be fitted to the return recessed portion by a biasing force of the holding spring member.

[0015] In the present invention, the return spring member is set such that a fitting force between the follower and the holding recessed portion is stronger than a force which returns the rotary member positioned at the input rotation position to the return rotation position.

[0016] In the present invention, a shaft portion which extends along a rotation center line and an extension portion which extends in a circumferential direction from the shaft portion may be integrally formed with each other in the rotary member, and the cam portion may be formed on the extension portion.

[0017] In the present invention, the cam portion may be formed on an extension surface side which is an upper surface or a lower surface of the extension portion, and the follower may be biased in a direction intersecting the extension surface by the holding spring member, and may be pressed to the cam portion.

[0018] In this case, the hold release member is supported to be movable forward and backward in the direction intersecting the extension surface.

[0019] Alternatively, in the present invention, the cam portion may be formed along a circumferential end of the extension portion, and the follower may be biased toward the rotation center line by the holding spring member and may be pressed to the cam portion.

[0020] In this case, the hold release member may be rotatably supported in a plane intersecting the rotation center line.

[0021] In the present invention, preferably, the rotation detection unit includes a fixed contact and a sliding contact which slides on the fixed contact, the fixed contact is fixed to the housing, and the sliding contact is fixed to the extension portion.

[0022] As described above, in the structure in which the cam portion is formed on the extension portion of the rotary member and the sliding contact is fixed to the extension portion, it is possible to decrease the size of the rotary member, and it is possible to simplify the entire structure.

[0023] In the rotary type input device, preferably, a shaft hole which extends along the rotation center line is formed in the shaft portion, a cylindrical rotary support portion is formed in the housing, and the shaft hole is rotatably supported on an outer circumferential surface of the rotary supporting portion.

[0024] In the present invention, preferably, the inside

of the housing is partitioned by a partition wall, the cam portion, the follower, the holding spring member, and the hold release member are provided in one space partitioned off by the partition wall, and the return spring member is provided in the other space.

[0025] Since the holding spring member and the return spring member are provided in different spaces which are separated from each other in the state where the partition wall is interposed therebetween, two spring members do not come into contact with each other and do not interfere with each other, and it is possible to reliably perform operations with both springs.

[0026] According to the present invention, since the hold release member is returned to the initial posture by the holding spring member which presses the follower to the cam portion, it is possible to reduce the number of springs.

[0027] In addition, since the follower or the holding spring member is pushed by the hold release member and the fitting between the follower and the holding recessed portion is released, it is possible to reliably release the fitting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028]

Fig. 1 is a vertical sectional view showing a rotary type input device of a first embodiment of the present invention.

Fig. 2 is an exploded perspective view of the rotary type input device of the first embodiment.

Fig. 3 is a cross sectional view taken along line III-III shown in Fig. 1.

Fig. 4 is a front view showing a state where a rotary member is stabilized at a return rotation position and a housing is removed.

Fig. 5 is a front view showing a state where the rotary member rotates to an input rotation position, a follower is fitted to a holding recessed portion, and the housing is removed.

Fig. 6 is a front view showing a state where a hold release member moves to a hold release position, the fitting between the follower and the holding recessed portion is released, the rotary member is returned to the return rotation position, and the housing is removed.

Fig. 7 is a vertical sectional view showing a rotary type input device of a second embodiment of the present invention.

Fig. 8 is a perspective view showing the rotary type input device of the second embodiment in a state where an upper housing is removed.

Fig. 9 is a perspective view showing a state where fitting between a follower and a holding recessed portion is released and the upper housing is removed in the rotary type input device of the second embodiment.

BEST MODE FOR CARRYING OUT THE INVENTION

[0029] As shown in Figs. 1 and 2, a rotary type input device 1 of a first embodiment of the present invention includes a housing 10. The housing 10 is configured of a lower housing 11, an upper housing 15, and a holding metal fitting 18. The lower housing 11 and the upper housing 15 are formed of synthetic resin materials, and the holding metal fitting 18 is formed of a metal plate material.

[0030] As shown in Fig. 2, the lower housing 11 includes an annular bottom portion 12, and a lower circumferential wall portion 13 which integrally extends upward (Y1 direction) from the outer circumferential edge of the bottom portion 12. A rotary supporting portion 14 which extends upward (Y1 direction) from the inner circumferential edge of the bottom portion 12 is integrally formed. The rotary supporting portion 14 has a cylindrical shape, a cylindrical hole 14a thereof is formed to penetrate the lower housing 11 in a vertical direction (Y1-Y2 direction), and as shown in Fig. 1, the cylindrical hole 14a is formed to penetrate vertically the entire housing 10. A center line which is positioned at the center of the rotary supporting portion 14 and extends vertically is a rotation center line O.

[0031] As shown in Fig. 2, the upper housing 15 includes a partition wall 16 which is formed in a plane orthogonal to the rotation center line O, and a circular opening portion 16a is formed in the partition wall 16. An upper circumferential wall portion 17 is integrally formed upward (Y1 direction) from the outer circumferential edge of the partition wall 16.

[0032] As shown in Fig. 1, the lower housing 11 and the upper housing 15 vertically overlap each other, and are combined to be positioned to each other by recession/protrusion fitting or the like. The outer surfaces of the lower circumferential wall portion 13 and the upper circumferential wall portion 17 have the same shape as each other, and the outer surface of the lower circumferential wall portion 13 is approximately coincident with the outer surface of the upper circumferential wall portion 17 in a state where the lower housing 11 and the upper housing 15 are combined to each other.

[0033] The holding metal fitting 18 includes a cover plate portion 18a, and a circular opening portion 18b is formed in the cover plate portion 18a. The holding metal fitting 18 includes a pair of first holding pieces 19a which is bent downward (Y2 direction) from the circumferential edge portion of the cover plate portion 18a, and multiple second holding pieces 19b. The pair of first holding pieces 19a is fitted to holding grooves 17a which are formed on the outer surface of the upper housing 15, and is fitted to holding grooves 13a which are formed on the outer surface of the lower housing 11. The multiple second holding pieces 19b elastically press the outer surface of the upper housing 15 and the outer surface of the lower housing 11, and bent portions 19c positioned on the lower end thereof are locked to the lower surface of the lower

housing 11. The lower housing 11 and the upper housing 15 are elastically held by the holding metal fitting 18 to assemble the housing 10.

[0034] As shown in Fig. 1, in the state where the housing 10 is assembled, the inside of the housing 10 is divided into a lower space S1 and an upper space S2 by the partition wall 16 of the upper housing 15. The lower space S1 is surrounded by the bottom portion 12 and the lower circumferential wall portion 13 of the lower housing 11, and the partition wall 16. The upper space S2 is surrounded by the partition wall 16 and the upper circumferential wall portion 17 of the upper housing 15 and the cover plate portion 18a of the holding metal fitting 18.

[0035] A rotary member 20 is accommodated inside the housing 10. The rotary member 20 is formed of a synthetic resin material. As shown in Fig. 2, in the rotary member 20, a shaft portion 21, and a flanged extension portion 22 which spreads in the circumferential direction from the lower portion of the shaft portion 21 are integrally formed. The shaft portion 21 has a cylindrical shape, and a shaft hole 21a is formed to penetrate in the vertical direction (Y1-Y2 direction).

[0036] As shown in Fig. 1, the shaft hole 21a of the rotary member 20 is inserted into the outer side of the rotary supporting portion 14 of the lower housing 11. The upper portion of the shaft portion 21 of the rotary member 20 passes through the inside of the opening portion 16a formed in the partition wall 16 of the upper housing 15 and the inside of the opening portion 18b formed in the cover plate portion 18a of the holding metal fitting 18 to protrude upward, and the rotary member 20 slides on the outer circumferential surface of the rotary supporting portion 14 and can rotate about the rotation center line O. The extension portion 22 of the rotary member 20 is positioned inside the lower space S1 of the housing 10, and a lower surface 22a of the extension portion 22 is installed on a protrusion portion 12a which is formed to have a higher step (Y1 direction) upward than the bottom portion 12 of the lower housing 11 on the inner surface of the bottom portion 12.

[0037] As shown in Fig. 1, a rotation detection space S3 is formed on the outer circumferential side of the protrusion portion 12a, and a rotation detection unit 25 is accommodated inside the rotation detection space S3. The rotation detection unit 25 is configured of a fixed contact 26 and a sliding contact 27. The fixed contact 26 is fixed to the bottom portion 12 of the lower housing 11. The fixed contact 26 is embedded to the lower housing 11 by a so-called insert molding method, and the contact portion of the fixed contact 26 is exposed to the inner surface of the bottom portion 12. The contact portion is divided into multiple portions, and multiple terminals 26a continuous from the divided contact portions protrude downward from the lower housing 11.

[0038] As shown in Fig. 2, the sliding contact 27 is formed of a conductive metal plate having spring property, and in the sliding contact 27, a fixed ring portion 27a, and multiple sliders 27b which are branched from

the fixed ring portion 27a and are bent downward (Y2 direction) are integrally formed. As shown in Fig. 1, the fixed ring portion 27a is fixed to the extension portion 22 by caulking multiple fixation protrusions 28 which protrude from the lower surface 22a of the extension portion 22, and the sliders 27b can come into contact with the contact portion of the fixed contact 26.

[0039] If the rotary member 20 rotates around the rotary supporting portion 14, contact states between the sliders 27b and the contact portion of the fixed contact 26 are changed, and the state can be switched to electric detection state according to the rotation angle of the rotary member 20.

[0040] As shown in Fig. 2, a cam portion 30 is integrally formed with an extension surface 22b facing the top of the extension portion 22 of the rotary member 20. The extension surface 22b which is the upper surface of the extension portion 22 is a surface intersecting the rotation center line O. The cam portion 30 includes a cam surface which faces upward (Y1 direction). The cam surface includes a return recessed portion 31, and includes a first holding recessed portion 32 and a second holding recessed portion 33 in this order in a $\alpha 2$ direction from the return recessed portion 31. A third holding recessed portion 34 is formed in a $\alpha 1$ direction from the return recessed portion 31. In addition, the lower surface of the extension portion 22 becomes an extension surface, and the cam portion 30 is formed on the lower surface.

[0041] As shown in Figs. 2 and 4, the return recessed portion 31 is configured of a bottom portion 31a, and inclined portions 31b and 31b which are continuous to be adjacent to both sides of the bottom portion 31a in the rotation direction. The first holding recessed portion 32 is also configured of a bottom portion 32a, and inclined portions 32b and 32b which are continuous to be adjacent to both sides of the bottom portion 32a. Similarly, each of the second holding recessed portion 33 and the third holding recessed portion 34 is configured of a bottom portion and inclined portions which are continuous to be adjacent to both sides of the bottom portion. Moreover, a boundary portion between the inclined portion 31b of the return recessed portion 31 and the inclined portion 32b of the first holding recessed portion 32 is a protrusion portion. Similarly, a boundary portion between the first holding recessed portion 32 and the second holding recessed portion 33 also is a protrusion portion, and a boundary portion between the return recessed portion 31 and the third holding recessed portion 34 also is a protrusion portion.

[0042] As shown in Fig. 1, a holding spring member 35 and a follower 36 which is fixed to the holding spring member 35 are accommodated in the lower space S1 below the partition wall 16 of the housing 10. As shown in Fig. 2, the holding spring member 35 is formed of a metal spring material and has a ring shape. In the holding spring member 35, a fixation portion 35a, and an elastic pressure portion 35c in which a portion of the ring is deformed downward (Y2 direction) are integrally formed.

Attachment holes 35b are formed on the fixation portion 35a, and the fixation portion 35a is fixed to the lower surface 16b of the partition wall 16 of the upper housing 15 by caulking fixation protrusion (not shown) integrally formed with the upper housing 15 to the attachment holes 35b.

[0043] The follower 36 facing the cam portion 30 is fixed to the center portion of the elastic pressure portion 35c of the holding spring member 35. The follower 36 is formed of a synthetic resin material, and in the follower 36, a sliding protrusion portion 36a which slides on the cam portion 30, and a pressing portion 36b which further extends in the direction separated from the rotation center line O than the sliding protrusion portion 36a and has a recessed portion facing downward are integrally formed.

[0044] As shown in Figs. 1 and 4, the follower 36 is biased in a downward direction which is the direction intersecting the extension surface 22b by an elastic force of the elastic pressure portion 35c of the holding spring member 35, and the follower 36 is pressed by the cam portion 30. In addition, the lower surface 22a of the extension portion 22 of the rotary member 20 is pressed to the protrusion portion 12a formed on the bottom portion 12 of the lower housing 11 by the elastic force of the elastic pressure portion 35c, and thus, rattling of the rotary member 20 inside the housing 10 in the direction along the rotation center line O is prevented.

[0045] As shown in Fig. 1, a pin-shaped (shaft-shaped) hold release member 37 is provided inside the lower space S1 of the housing 10. A sliding hole 12b which penetrates vertically is formed on the bottom portion 12 of the lower housing 11, and the hold release member 37 is inserted into the sliding hole 12b and is slidingly supported in the vertical direction (Y1-Y2 direction) which is the direction (the direction parallel to the rotation center line O) intersecting the extension surface 22b.

[0046] As shown in Figs. 1 and 4, when an external force is not applied to the hold release member 37, the pressing portion 36b of the follower 36 presses a head portion 37a of the hold release member 37 downward (Y2 direction) by the elastic force of the holding spring member 35, and the posture becomes an initial posture in which the hold release member 37 is lowered in the sliding hole 12b. As shown in Fig. 2, a stopper 37b is integrally formed on the upper portion of the hold release member 37, and when the hold release member 37 is lowered to the initial posture shown in Fig. 1, the stopper 37b comes into contact with the inner surface of the bottom portion 12 of the lower housing 11, and downward extraction of the hold release member 37 is prevented. When the hold release member 37 is in the initial posture, a pressing operation portion 37c on the lower end portion of the hold release member 37 protrudes downward from the bottom portion 12 of the lower housing 10.

[0047] As shown in Fig. 1, a return spring member 40 and a spring support member 45 are accommodated inside the upper space S2 of the housing 10. The spring

support member 45 is formed of a synthetic resin material and has a ring shape. A circular opening portion 46 is formed in the spring support member 45, and as shown in Fig. 1, the opening portion 46 is inserted into the outer circumferential portion of the shaft portion 21 of the rotary member 20. Engagement protrusions 47 protruding from three locations toward the opening portion 46 are integrally formed on the spring support member 45. Each engagement protrusion 47 engages with an engagement groove 21b which is formed upward (Y1 direction) in the shaft portion 21 of the rotary member 20, and the spring support member 45 can rotate along with the rotary member 20.

[0048] As shown in Fig. 2, in the spring support member 45, a pair of spring hook portions 48a and 48b which protrudes upward are integrally formed at two locations. In the upper housing 15, spring support protrusions 17b and 17c are integrally formed at two locations on the inner surface of the circumferential wall portion 17.

[0049] The return spring member 40 is a torsion spring, and includes a winding main body 41 around which a spring wire is wound, and locking arm portions 42a and 42b which are both end portions of the spring wire. As shown in Fig. 3, the winding main body 41 of the return spring member 40 is installed on the outer circumferential portion of the shaft portion 21 of the rotary member 20 inside the upper space S2. One locking arm portion 42a of the return spring member 40 is hooked to one spring hook portion 48a of the spring support member 45, and is hooked to the spring support protrusion 17b formed on the upper housing 15. The other locking arm portion 42b is hooked to the other spring hook portion 48b and is hooked to the spring support protrusion 17c.

[0050] A force by which the rotary member 20 is returned to the return rotation position shown in Fig. 3 is always applied to the rotary member 20 by the elastic force of the return spring member 40.

[0051] In an assembly operation of the rotary type input device 1 having the above-described structure, the shaft hole 21a of the rotary member 20 to which the sliding contact 27 is fixed is inserted into the rotary support portion 14 of the lower housing 11. In addition, the hold release member 37 is inserted into the sliding hole 12b, which is formed on the bottom portion 12 of the lower housing 11, from the top.

[0052] The fixation portion 35a of the holding spring member 35 is fixed to the lower surface 16b of the partition wall 16 of the upper housing 15, and the upper housing 15 is positioned on the lower housing 11 so as to be overlapped with each other. At this time, the follower 36 which is fixed to the holding spring member 35 is pressed to the cam portion 30 of the rotary member 20, and the rotary member 20 is pressed downward. In addition, the hold release member 37 is pressed downward by the follower 36.

[0053] The shaft portion 21 of the rotary member 20 protrudes upward from the opening portion 16a which is formed on the partition wall 16 of the upper housing 15.

The spring support member 45 and the return spring member 40 are mounted on the outer circumference of the shaft portion 21 which protrudes upward from the partition wall 16. Moreover, the holding metal fitting 18 is mounted from the top, and the lower housing 11 and the upper housing 15 are held by the holding metal fitting 18. At this time, the shaft portion 21 protrudes upward from the opening portion 18b which is formed in the holding metal fitting 18.

[0054] The rotary type input device 1 is provided inside a compartment of an automobile, and is used for switching of a shift lever or switching operations of various electrical components.

[0055] As shown in Fig. 1, the cylindrical hole 14a of the lower housing 11 is formed to penetrate vertically along the rotation center line O in the rotary type input device 1. If the rotary type input device is mounted on the compartment, an operation knob is fixed to the tip portion of the shaft portion 21 of the rotary member 20. An illumination display portion such as characters or symbols is provided on the operation knob. In the mounting state, a light source is provided below the lower housing 11, light emitted from the light source passes through the inside of the cylinder hole 14a and is applied to the operation knob, and the display portion is illuminated.

[0056] Next, an operation of the rotary type input device 1 will be described.

[0057] In Fig. 3, the elastic force of the return spring member 40 configured of a torsion spring is equally applied to the rotary member 20 in the $\alpha 1$ direction and the $\alpha 2$ direction, and the rotary member 20 is returned to the return rotation position by the elastic force of the return spring member 40. At this time, as shown in Fig. 4, the sliding protrusion portion 36a of the follower 36 is pressed to the return recessed portion 31 of the cam portion 30 formed on the rotary member 20 by the elastic force of the elastic pressure portion 35c of the holding spring member 35. As a result, the rotary member 20 is held at the return rotation position.

[0058] When the rotary member 20 is returned to the return rotation position (neutral position) by the return spring member 40, even though the center of the follower 36 and the bottom portion 31a of the return recessed portion 31 of the cam portion 30 do not correctly coincide with each other, if the follower 36 faces the inclined portions 31b positioned on both sides of the bottom portion 31a, the sliding protrusion portion 36a of the follower 36 which is pressed into the return recessed portion 31 by the elastic force of the holding spring member 35 is introduced from the inclined portion 31b to the bottom portion 31a. As a result, as shown in Fig. 4, the state is transferred to a state where the sliding protrusion portion 36a comes into pressure-contact with the bottom portion 31a, and the rotary member 20 is stabilized at the return rotation position.

[0059] When the rotary member 20 is positioned at the return rotation position, a switching output of the contact corresponding to the return rotation position is obtained

from the terminal 26a according to the contact state between the sliding contact 27 fixed to the rotary member 20 and the fixed contact 26 fixed to the lower housing 11.

[0060] Fig. 5 shows a state where the rotary member 20 positioned at the return rotation position rotates in the $\alpha 1$ direction and reaches a first input rotation position. In the first input rotation position, the first holding recessed portion 32 of the cam portion 30 formed in the rotary member 20 moves below the follower 36, the follower 36 is pressed to the cam portion 30 by the elastic force of the holding spring member 35, and the sliding protrusion portion 36a of the follower 36 is fitted into the bottom portion 32a of the first holding recessed portion 32. At this time, the rotary member 20 is stabilized at the first input rotation position shown in Fig. 5 regardless of a return elastic force generated by the return spring member 40.

[0061] If the rotary member 20 further rotates in the $\alpha 1$ direction from the first input rotation position of Fig. 5, the second holding recessed portion 33 of the rotary member 20 is fitted to the follower 36, and the rotary member 20 is held at a second input rotation position.

[0062] Meanwhile, if the rotary member 20 rotates in the $\alpha 2$ direction from the return rotation position shown in Fig. 4, the third holding recessed portion 34 provided in the rotary member 20 moves below the follower 36, and the sliding protrusion portion 36a of the follower 36 is fitted to the bottom portion of the third holding recessed portion 34. Accordingly, the rotary member 20 is held at the third input rotation position.

[0063] When the rotary member 20 is positioned at the first input rotation position, the second input rotation position, or the third input rotation position, the switching output of the contact corresponding to each input rotation position is obtained from the terminal 26a according to the contact state between the sliding contact 27 and the fixed contact 26.

[0064] When the rotary member 20 is positioned at the first input rotation position, the second input rotation position, or the third input rotation position, a return force is applied from the return spring member 40 to the rotary member 20. However, a resistance force generated from the contact force between the follower 36 and the holding recessed portions 32, 33, and 34 of the cam portion 30 by the holding spring member 35 is set to be stronger than the return force. Accordingly, it is possible to stabilize the rotary member 20 at each of input position/rotation positions.

[0065] As shown in Figs. 1, 4, and 5, when the sliding protrusion portion 36a of the follower 36 is fitted to the first holding recessed portion 32, the second holding recessed portion 33, or the third holding recessed portion 34 of the cam portion 30, the posture becomes the initial posture in which the hold release member 37 is pressed downward by the elastic force of the holding spring member 35, and the pressing operation 37c positioned on the lower end of the hold release member 37 protrude downward from the lower surface of the lower housing 11.

[0066] When the sliding protrusion portion 36a of the follower 36 is fitted to the first holding recessed portion 32, the second holding recessed portion 33, or the third holding recessed portion 34 of the cam portion 30, if the pressing operation 37c of the hold release member 37 is pushed upward, the rotary type input device 1 is returned to the initial state. The pressing operation portion 37c is pushed upward by an operation mechanism having a solenoid or the like, or is manually pushed upward.

[0067] As shown in Fig. 6, if the hold release member 37 is pushed upward and reaches the hold release posture, the follower 36 is pushed upward by the head portion 37a of the hold release member 37, and the fitting between the follower 36 and the cam portion 30 is released. As a result, the rotary member 20 receives an elastic return force by the return spring member 40, and is returned to the return rotation position shown in Fig. 4.

[0068] In the rotary type input device 1, the hold release member 37 which release the fitting between the follower 36 and the cam portion 30 is lowered to reach the initial posture as shown in Fig. 4 or 5 by the holding spring member 35. Since the follower 36 is pressed to the cam portion 30 by the holding spring member 35 and the hold release member 37 is biased to the initial posture by the holding spring member 35, it is possible to reduce the number of springs, simplify the structure, and reduce a manufacturing cost.

[0069] In addition, since the follower 36 is directly pushed by the hold release member 37, it is possible to reliably release the fitting between the follower 36 and the cam portion 30, and after the fitting is released, it is possible to reliably return the rotary member 20 to the return rotation position shown in Fig. 4. Moreover, in the present invention, the holding spring member 35 may be pushed by the hold release member 37 to release the fitting between the follower 36 and the cam portion 30.

[0070] In the rotary type input device 1 of the first embodiment, since the cam portion 30 is formed on one extension surface 22b of the flanged extension portion 22 formed in the rotary member 20 and the sliding contact 27 is fixed to the other lower surface 22a, the rotary type input device 1 can be configured of the minimum number of components, and it is possible to decrease the size of the entire structure.

[0071] In addition, the inside of the housing 10 is divided by the partition wall 16, a holding mechanism including the holding spring member 35, the follower 36, and the hold release member 37 is disposed in one space S1, and a return mechanism including the return spring member 40 is disposed in the other space S2. Since a movable mechanism using springs is disposed in the space divided by the partition wall 16, the holding spring member 35 and the return spring member 40 do not come into contact with each other so as not to interfere with each other, and it is possible to reliably operate each mechanism.

[0072] Figs. 7 to 9 show a rotary type input device 101 of a second embodiment of the present invention. The structure of the rotary type input device 101 of the second

embodiment is different from the structure of the rotary type input device 1 of the first embodiment. However, hereinafter, the same names and the same reference numerals are assigned to the portions having the same functions as those of the rotary type input device 1 of the first embodiment.

[0073] As shown in Fig. 7, the housing 10 is configured of the lower housing 11, the upper housing 15, the partition wall 16, and the holding metal fitting 18. In the rotary type input device 101 of the second embodiment, the lower housing 11, the upper housing 15, and the partition wall 16 are configured of parts independent from each other. The rotary supporting portion 14 is formed in the lower housing 11, and the shaft hole 21a of the shaft portion 21 of the rotary member 20 is rotatably mounted on the outer circumferential portion of the rotary supporting portion 14.

[0074] The inside of the housing 10 is divided into a lower space Sa and an upper space Sb by the partition wall 16. The spring support member 45 and the return spring member 40 configured of a torsion spring are accommodated in the lower space Sa. The spring support member 45 is fitted to the rotary member 20 and rotates along with the rotary member 20. Similarly to the first embodiment, the rotary member 20 is returned to the return rotation position (neutral position) by the return spring member 40.

[0075] The extension portion 22 extending from the outer circumferential portion of the rotary member 20 is positioned inside the upper space Sb. The rotation detection unit 25 is configured between the lower surface 22a of the extension portion 22 and the partition wall 16. The fixed contact 26 configuring the rotation detection unit 25 is fixed to the partition wall 16, and the sliding contact 27 is fixed to lower surface 22a of the extension portion 22.

[0076] As shown in Figs. 8 and 9, the cam portion 30 is formed on the outer circumferential end of the flanged extension portion 22 formed on the rotary member 20. The cam portion 30 includes the return recessed portion 31, the first holding recessed portion 32, the second holding recessed portion 33, and the third holding recessed portion 34. The recessed portion of the cam portion 30 is recessed in the direction toward the rotation center line O, and the protrusion portion protrudes from the rotation center line O toward the outside in the radial direction.

[0077] As shown in Fig. 7, the follower 36 is provided in the upper space Sb of the housing 10. A sliding shaft 36d which protrudes upward is integrally formed on the follower 36, the sliding shaft 36d is inserted into a long guide hole 15b which is formed on a top plate portion 15a of the upper housing 15, and the follower 36 is guided to be movable in a $\beta 1$ - $\beta 2$ direction. The $\beta 1$ - $\beta 2$ direction is a radial direction (radiation direction) with the rotation center line O as a center, that is, a direction which approaches or is separated from the rotation center line O. If the follower 36 moves in the $\beta 1$ direction, a sliding protrusion portion 36e formed on the follower 36 is fitted to

the recessed portion of the cam portion 30.

[0078] The holding spring member 35 is accommodated in the upper space Sb of the housing 10. The holding spring member 35 is formed of a metal leaf spring material. As shown in Fig. 8, fixation portions 35d and 35e are positioned on both side of the holding spring member 35 and are supported by the partition wall 16 or the upper housing 15, and the follower 36 is biased in the $\beta 1$ direction by an intermediate elastic pressure portion 35e. The sliding protrusion portion 36e of the follower 36 comes into pressure-contact with the cam portion 30 by the elastic force.

[0079] The hold release member 37 is accommodated in the upper space Sb of the housing 10. As shown in Figs. 8 and 9, the hold release member 37 has a curved shape along an arc and is positioned on the outer circumference of the shaft portion 21 of the rotary member 20. An upward support shaft 37d is integrally formed in the center portion of the hold release member 37, the support shaft 37d is inserted into a support hole (not shown) of the top plate portion 15a of the upper housing 15, and the hold release member 37 is supported so as to be rotatable (swingable) in a $\phi 1$ - $\phi 2$ direction in a plane intersecting (orthogonal to) the rotation center line O.

[0080] One end of the hold release member 37 is a hold release portion 37e, and a connection recessed portion 37f which is formed on the hold release portion 37e is connected to the sliding shaft 36d of the follower 36. A pressing operation portion 37g is formed on the other end of the hold release member 37, and the pressing operation portion 37g protrudes toward the outside of the housing 10.

[0081] In the rotary type input device 101, the rotary member 20 is returned to the return rotation position shown in Fig. 8 by the elastic force of the return spring member 40. At this time, the follower 36 is biased in the $\beta 1$ direction by the elastic pressure portion 35e of the holding spring member 35, and the sliding protrusion portion 36e of the follower 36 is fitted to the return recessed portion 31 of the cam portion 30.

[0082] If the rotary member 20 rotates in the $\alpha 1$ direction, the sliding protrusion portion 36e of the follower 36 is fitted to the first holding recessed portion 32 of the cam portion 30, and the rotary member 20 is held at the first input rotation position. If the rotary member 20 further rotates in the $\alpha 1$ direction, the sliding protrusion portion 36e of the follower 36 is fitted to the second holding recessed portion 33 of the cam portion 30, and the rotary member 20 is held at the second input rotation position. If the rotary member 20 rotates in the $\alpha 2$ direction from the return rotation position of Fig. 8, the sliding protrusion portion 36e of the follower 36 is fitted to the third holding recessed portion 34 of the cam portion 30, and the rotary member 20 is held at the third input rotation position.

[0083] When the sliding protrusion portion 36e of the follower 36 is fitted to the return recessed portion 31 of the cam portion 30 or each of the holding recessed portions 32, 33, and 34 thereof, as shown in Fig. 8, the sliding

shaft 36d of the follower 36 rotates in the $\phi 1$ direction to reach the initial posture.

[0084] When the sliding protrusion portion 36e of the follower 36 is fitted to any one of the holding recessed portions 32, 33, and 34 of the cam portion 30 and the rotary member 20 is held at any one of the input rotation positions, if the pressing operation portion 37g of the hold release member 37 is pushed by an operation mechanism having a solenoid or the like or manually, as shown in Fig. 9, the hold release member 37 rotates in the $\phi 2$ direction with the support shaft 37d as a center to reach the hold release posture, the follower 36 moves in the $\beta 2$ direction, fitting between the sliding protrusion portion 36e of the follower 36 and any one of the holding recessed portions 32, 33, and 34 of the cam portion 30 is released, and the rotary member 20 is returned to the return rotation position shown in Fig. 8 by the biasing force of the return spring member 40.

[0085] In the rotary type input device 101 of the second embodiment, since both the follower 36 and the hold release member 37 are biased by the holding spring member 35, it is possible to reduce the number of springs. In addition, since the follower 36 is directly moved by the hold release member 37, it is possible to reliably release the fitting between the follower 36 and the holding recessed portions 32, 33, and 34.

[0086]

1, 101:	rotary type input device
10:	housing
14:	rotary supporting portion
16:	partition wall
20:	rotary member
21:	shaft portion
21a:	shaft hole
22:	extension portion
22b:	extension surface
25:	rotation detection unit
26:	fixed contact
27:	sliding contact
30:	cam portion
31:	return recessed portion
31a:	bottom portion
31b:	inclined portion
32, 33, 34:	holding recessed portion
35:	holding spring member
36:	follower
37:	hold release member
40:	return spring member
45:	spring support member
O:	rotation center line
S1:	lower space
S2:	upper space
Sa:	lower space
Sb:	upper space

Claims

1. A rotary type input device (1,101) comprising:

- 5 a housing (10);
 a rotary member (20) which is rotatably supported by the housing (10) and is rotatable from a return rotation position to an input rotation position; and
 10 a rotation detection unit (25) which changes a detection state according to the rotation of the rotary member (20),
 wherein a cam portion (30) which is formed in the rotary member (20), a follower (36) which faces the cam portion (30), and a holding spring member (35) which presses the follower (36) to the cam portion (30) are provided, and a holding recessed portion (32,33,34) which is fitted to the follower (36) to hold the rotary member (20) when the rotary member (20) rotates to the input rotation position is formed in the cam portion (30),

characterized by

- 25 a hold release member (37) which releases the fitting between the follower (36) and the holding recessed portion (32,33,34), and a return spring member (40) which returns the rotary member (20) to the return rotation position when the fitting is released are provided, and
 30 wherein the hold release member (37) is provided to be movable from an initial posture to a hold release posture at which the fitting is released, and is returned to the initial posture by the holding spring member (35).

35 **2.** The rotary type input device (1,101) according to claim 1,
 wherein the follower (36) or the holding spring member (35) is pushed by the hold release member (37) when the hold release member (37) moves to the hold release posture, and the fitting between the follower (36) and the holding recessed portion (32,33,34) is released.

40 **3.** The rotary type input device (1,101) according to claim 1 or 2,
 wherein a return recessed portion (31) is formed in the cam portion (30), the follower (36) faces a bottom portion (31a) of the return recessed portion (31) or an inclined portion (31b) adjacent to the bottom portion (31a) when the rotary member (20) is returned to the return rotation position by return spring member (40), and the follower (36) is fitted to the return recessed portion (31) by a biasing force of the holding spring member (35).

55 **4.** The rotary type input device (1,101) according to any one of claims 1 to 3,

wherein the return spring member (40) is set such that a fitting force between the follower (36) and the holding recessed portion (32,33,34) is stronger than a force which returns the rotary member (20) positioned at the input rotation position to the return rotation position.

5. The rotary type input device (1,101) according to any one of claims 1 to 4, wherein a shaft portion (21) which extends along a rotation center line (O) and an extension portion (22) which extends in a circumferential direction from the shaft portion (21) are integrally formed with each other in the rotary member (20), and the cam portion (30) is formed on the extension portion (22).
6. The rotary type input device (1,101) according to claim 5, wherein the cam portion (30) is formed on an extension surface (22b) side which is an upper surface or a lower surface of the extension portion (22), and the follower (36) is biased in a direction intersecting the extension surface (22b) by the holding spring member (35), and is pressed to the cam portion (30).
7. The rotary type input device (1,101) according to claim 6, wherein the hold release member (37) is supported to be movable forward and backward in the direction intersecting the extension surface (22b).
8. The rotary type input device (1,101) according to claim 5, wherein the cam portion (30) is formed along a circumferential end of the extension portion (22), and the follower (36) is biased toward the rotation center line (O) by the holding spring member (35) and is pressed to the cam portion (30).
9. The rotary type input device (1,101) according to claim 8, wherein the hold release member (37) is rotatably supported in a plane intersecting the rotation center line (O).
10. The rotary type input device (1,101) according to any one of claims 5 to 9, wherein the rotation detection unit (25) includes a fixed contact (26) and a sliding contact (27) which slides on the fixed contact (26), the fixed contact (26) is fixed to the housing (10), and the sliding contact (27) is fixed to the extension portion (22).
11. The rotary type input device (1,101) according to any one of claims 5 to 10, wherein a shaft hole (21a) which extends along the rotation center line (O) is formed in the shaft portion (21), a cylindrical rotary support portion (14) is

formed in the housing (10), and the shaft hole (21a) is rotatably supported on an outer circumferential surface of the rotary supporting portion (14).

- 5 12. The rotary type input device (1,101) according to any one of claims 1 to 11, wherein the inside of the housing (14) is partitioned by a partition wall (16), the cam portion (30), the follower (36), the holding spring member (35), and the hold release member (37) are provided in one space partitioned off by the partition wall (16), and the return spring member (40) is provided in the other space.

15 Patentansprüche

1. Eingabevorrichtung (1, 101) vom Rotations-Typ, aufweisend:
 - 20 ein Gehäuse (10);
 - ein Drehelement (20), das von dem Gehäuse (10) drehbar abgestützt ist und von einer Rückstell-drehposition in eine Eingabedrehposition drehbar ist; und
 - 25 eine Rotationserfassungseinheit (25), die einen Erfassungszustand in Abhängigkeit von der Rotation des Drehelements (20) ändert, wobei ein Steuerflächenbereich (30), der an dem Drehelement (20) gebildet ist, ein Folger (36), der dem Steuerflächenbereich (30) zugewandt ist, und ein Haltefederelement (35) vorgesehen sind, das den Folger (36) gegen den Steuerflächenbereich (30) drückt, und wobei in dem Steuerflächenbereich (30) ein Haltevertiefungsbereich (32, 33, 34) gebildet ist, der an den Folger (36) gepasst ist, um das Drehelement (20) zu halten, wenn sich das Drehelement (20) in die Eingabedrehposition dreht,
 - 30 **gekennzeichnet durch**
 - ein Haltefreigabeelement (37), das den Pässeingriff zwischen dem Folger (36) und dem Haltevertiefungsbereich (32, 33, 34) löst, und ein Rückstellfederelement (40), das das Drehelement (20) in die Rückstell-drehposition zurückbringt, wenn der Pässeingriff gelöst wird,
 - 45 wobei das Haltefreigabeelement (37) derart vorgesehen ist, dass es von einer Ausgangsstellung in eine Haltefreigabestellung bewegbar ist, in der der Pässeingriff gelöst wird, und durch das Haltefederelement (35) in die Ausgangsstellung zurückgestellt wird.
2. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 1,
 - 50 wobei der Folger (36) oder das Haltefederelement (35) durch das Haltefreigabeelement (37) mit Druck beaufschlagt wird, wenn sich das Haltefreigabeelement (37) in die Haltefreigabestellung bewegt, und

der Pässeingriff zwischen dem Folger (36) und dem Haltevertiefungsbereich (32, 33, 34) gelöst wird.

3. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 1 oder 2, wobei ein Rückkehrvertiefungsbereich (31) in dem Steuerflächenbereich (30) gebildet ist, wobei der Folger (36) einem Bodenbereich (31a) des Rückkehrvertiefungsbereichs (31) oder einem geneigten Bereich (31b) benachbart dem Bodenbereich (31a) zugewandt ist, wenn das Drehelement (20) durch das Rückstellfederelement (40) in die Rücksteldrehposition zurückgestellt wird, und wobei der Folger (36) durch eine Vorspannkraft des Haltefederelements (35) gegen den Rückkehrvertiefungsbereich (31) gepasst ist.
4. Eingabevorrichtung (1, 101) vom Rotations-Typ nach einem der Ansprüche 1 bis 3, wobei das Rückstellfederelement (40) derart eingestellt ist, dass eine Passkraft zwischen dem Folger (36) und dem Haltevertiefungsbereich (32, 33, 34) stärker ist als eine Kraft, die das in der Eingabedrehposition positionierte Drehelement (20) in die Rücksteldrehposition zurückstellt.
5. Eingabevorrichtung (1, 101) vom Rotations-Typ nach einem der Ansprüche 1 bis 4, wobei ein Wellenbereich (21), der sich entlang einer Rotationsmittellinie (O) erstreckt, und ein Fortsatzbereich (22), der sich in einer Umfangsrichtung von dem Wellenbereich (21) weg erstreckt, an dem Drehelement (20) einstückig miteinander ausgebildet sind und der Steuerflächenbereich (30) an dem Fortsatzbereich (22) ausgebildet ist.
6. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 5, wobei der Steuerflächenbereich (30) auf einer Seite einer Fortsatzfläche (22b) gebildet ist, bei der es sich um eine obere Oberfläche oder eine untere Oberfläche des Fortsatzbereichs (22) handelt, und wobei der Folger (36) durch das Haltefederelement (35) in einer Richtung vorgespannt ist, die die Fortsatzfläche (22b) schneidet, und gegen den Steuerflächenbereich (30) gedrückt ist.
7. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 6, wobei das Haltefreigabeelement (37) derart abgestützt ist, dass es in der die Fortsatzfläche (22b) schneidenden Richtung vor und zurück bewegbar ist.
8. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 5, wobei der Steuerflächenbereich (30) entlang eines Umfangsendes des Fortsatzbereichs (22) ausgebil-

det ist und der Folger (36) durch das Haltefederelement (35) in Richtung auf die Rotationsmittellinie (O) vorgespannt ist und gegen den Steuerflächenbereich (30) gedrückt ist.

9. Eingabevorrichtung (1, 101) vom Rotations-Typ nach Anspruch 8, wobei das Haltefreigabeelement (37) in einer die Rotationsmittellinie (O) schneidenden Ebene drehbar abgestützt ist.
10. Eingabevorrichtung (1, 101) vom Rotations-Typ nach einem der Ansprüche 5 bis 9, wobei die Rotationserfassungseinheit (25) einen feststehenden Kontakt (26) und einen Gleitkontakt (27) aufweist, der auf dem feststehenden Kontakt (26) gleitet, wobei der feststehende Kontakt (26) an dem Gehäuse (10) festgelegt ist und der Gleitkontakt (27) an dem Fortsatzbereich (22) festgelegt ist.
11. Eingabevorrichtung (1, 101) vom Rotations-Typ nach einem der Ansprüche 5 bis 10, wobei eine Wellenöffnung (21a), die sich entlang der Rotationsmittellinie (O) erstreckt, in dem Wellenbereich (21) gebildet ist, ein zylindrischer Rotationsabstützbereich (14) in dem Gehäuse (10) gebildet ist und die Wellenöffnung (21a) an einer Außenumfangsfläche des Rotationsabstützbereichs (14) drehbar abgestützt ist.
12. Eingabevorrichtung (1, 101) vom Rotations-Typ nach einem der Ansprüche 1 bis 11, wobei das Innere des Gehäuses (14) durch eine Trennwand (16) unterteilt ist, wobei der Steuerflächenbereich (30), der Folger (36), das Haltefederelement (35) und das Haltefreigabeelement (37) in einem durch die Trennwand (16) abgeteilten Raum vorgesehen sind und das Rückstellfederelement (40) in dem anderen Raum vorgesehen ist.

Revendications

1. Dispositif d'entrée de type rotatif (1, 101) comprenant :
 - un boîtier (10) ;
 - un élément rotatif (20) qui est supporté en rotation par le boîtier (10) et qui est apte à effectuer des rotations à partir d'une position de rotation de retour jusqu'à une position de rotation d'entrée ; et
 - une unité de détection de rotation (25) qui modifie un état de détection en fonction de la rotation de l'élément rotatif (20) ;
 - dans lequel on prévoit une portion (30) en forme de came qui est réalisée dans l'élément rotatif (20), un galet (36) qui fait face à la portion (30)

- en forme de came et un élément faisant office de ressort de maintien (35) qui comprime le galet (36) contre la portion (30) en forme de came, et une portion évidée de maintien (32, 33, 34), dans laquelle vient s'insérer le galet (36) dans le but de maintenir l'élément rotatif (20) lorsque l'élément rotatif (20) effectue des rotations pour prendre la position de rotation d'entrée, est réalisée dans la portion (30) en forme de came ;
- caractérisé par le fait que**
- l'on prévoit un élément de libération du maintien (37) qui libère l'insertion du galet (36) dans la portion évidée de maintien (32, 33, 34) et un élément (40) faisant office de ressort de rappel qui renvoie l'élément rotatif (20) dans la position de rotation de retour lorsque l'insertion est libérée ; et
- dans lequel l'élément de libération du maintien (37) est conçu pour pouvoir passer d'une position initiale à une position de libération de maintien à laquelle l'insertion est libérée, et est renvoyé à la position initiale via l'élément (35) faisant office de ressort de maintien.
2. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 1, dans lequel :
le galet (36) ou l'élément de ressort de maintien (35) est poussé par l'élément de libération du maintien (37) lorsque l'élément de libération du maintien (37) se déplace pour prendre la position de libération de maintien et l'insertion du galet (36) dans la portion évidée de maintien (32, 33, 34) est libérée.
 3. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 1 ou 2, dans lequel :
une portion évidée de retour (31) est réalisée dans la portion (30) en forme de came, le galet (36) fait face à une portion inférieure (31a) de la portion évidée de retour (31b) ou à une portion inclinée (31b) adjacente à la portion inférieure (31a) lorsque l'élément rotatif (20) est renvoyé à la position de rotation de retour par un élément (40) faisant office de ressort de rappel, et le galet (36) est inséré dans la portion évidée de retour (31) via une force de mise en état de précontrainte exercée par l'élément (35) faisant office de ressort de maintien (35).
 4. Dispositif d'entrée de type rotatif (1, 101) selon l'une quelconque des revendications 1 à 3, dans lequel l'élément (40) faisant office de ressort de rappel est réglé d'une manière telle qu'une force d'insertion du galet (36) dans la portion évidée de maintien (32, 33, 34) est supérieure à une force qui renvoie l'élément rotatif (20) se trouvant dans la position de rotation d'entrée à la position de rotation de retour.
 5. Dispositif d'entrée de type rotatif (1, 101) selon l'une quelconque des revendications 1 à 4, dans lequel
- une portion (21) en forme d'arbre qui s'étend le long d'une ligne médiane de rotation (O) et une portion d'extension (22) qui s'étend dans une direction circconférentielle à partir de la portion (21) en forme d'arbre sont réalisées en une seule pièce l'une avec l'autre dans l'élément rotatif (20), et la portion (30) en forme de came est réalisée sur la portion d'extension (22).
6. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 5, dans lequel :
dans lequel la portion (30) en forme de came est réalisée sur un côté d'une surface d'extension (22b) qui représente une surface supérieure ou une surface inférieure de la portion d'extension (22), et le galet (36) est mis en état de précontrainte dans une direction qui coupe la surface d'extension (22), via l'élément faisant office de ressort de maintien (35), et est pressé contre la portion (30) en forme de came.
 7. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 6, dans lequel :
l'élément de libération du maintien (37) est supporté pour pouvoir se déplacer vers l'avant et vers l'arrière dans la direction qui coupe la surface d'extension (22b).
 8. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 5, dans lequel :
la portion (30) en forme de came est réalisée le long d'une extrémité circconférentielle de la portion d'extension (22), et le galet (36) est mis en état de précontrainte en direction de la ligne médiane de rotation (O) par l'élément faisant office de ressort de maintien (35) et est pressé contre la portion (30) en forme de came.
 9. Dispositif d'entrée de type rotatif (1, 101) selon la revendication 8, dans lequel :
l'élément de libération de maintien (37) est supporté en rotation dans un plan qui coupe la ligne médiane de rotation (O).
 10. Dispositif d'entrée de type rotatif (1, 101) selon l'une quelconque des revendications 5 à 9, dans lequel l'unité de détection de rotation (25) englobe un contact fixe (26) et un contact coulissant (27) qui coulisse sur le contact fixe (26), le contact fixe (26) est fixé au boîtier (10) et le contact coulissant (27) est fixé à la portion d'extension (22).
 11. Dispositif d'entrée de type rotatif (1, 101) selon l'une quelconque des revendications 5 à 10, dans lequel un trou d'arbre (21a), qui s'étend le long de la ligne médiane de rotation (O), est réalisé dans la portion en forme d'arbre (21), une portion cylindrique (14) faisant office de support rotatif est réalisée dans le boîtier (10), et le trou d'arbre (21) est supporté en

rotation sur une surface circonférentielle externe de la portion faisant office de support rotatif (14).

12. Dispositif d'entrée de type rotatif (1, 101) selon l'une quelconque des revendications 1 à 11, dans lequel l'intérieur du boîtier (14) est partagé par une paroi de séparation (16) ; la portion (30) en forme de came, le galet (36), l'élément faisant office de ressort de maintien (35) et l'élément de libération du maintien (37) sont prévus dans un espace cloisonné par la paroi de séparation (16) ; et l'élément (40) faisant office de ressort de rappel est prévu dans l'autre espace.

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FIG. 1

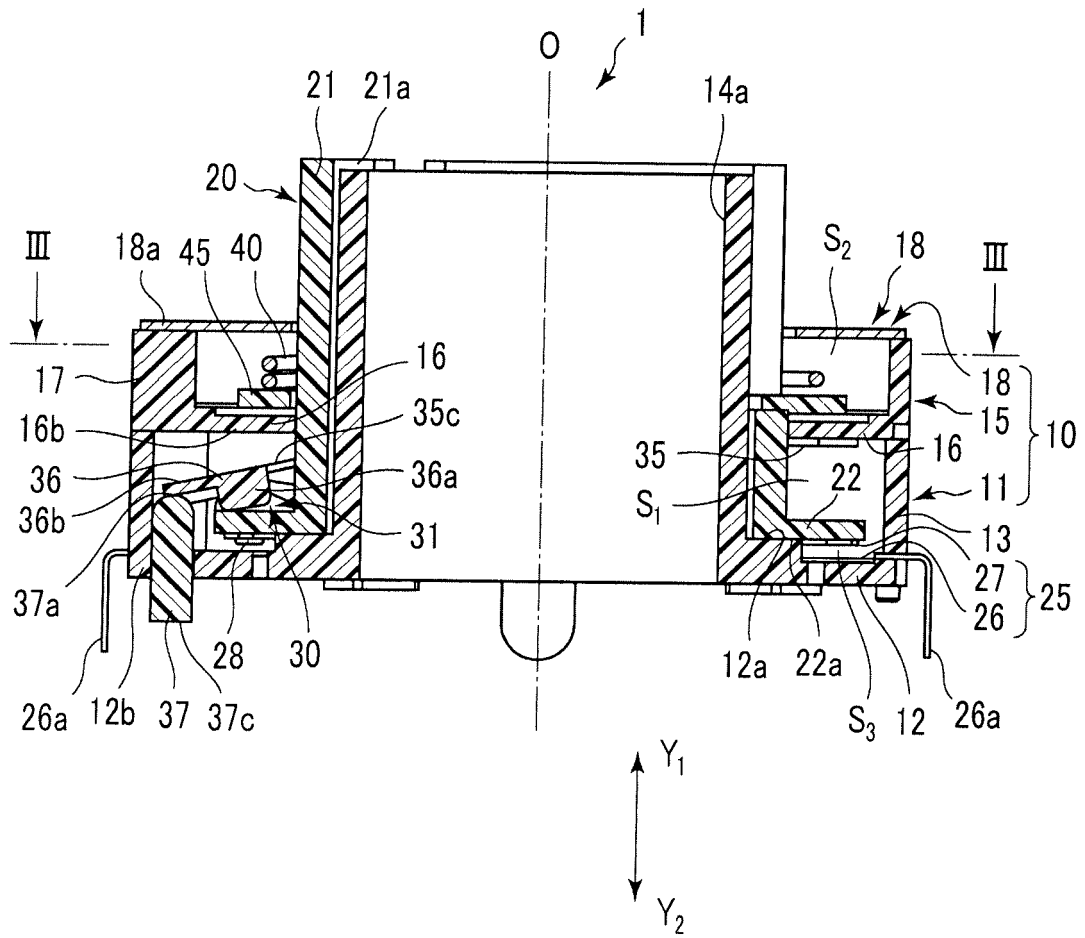


FIG. 2

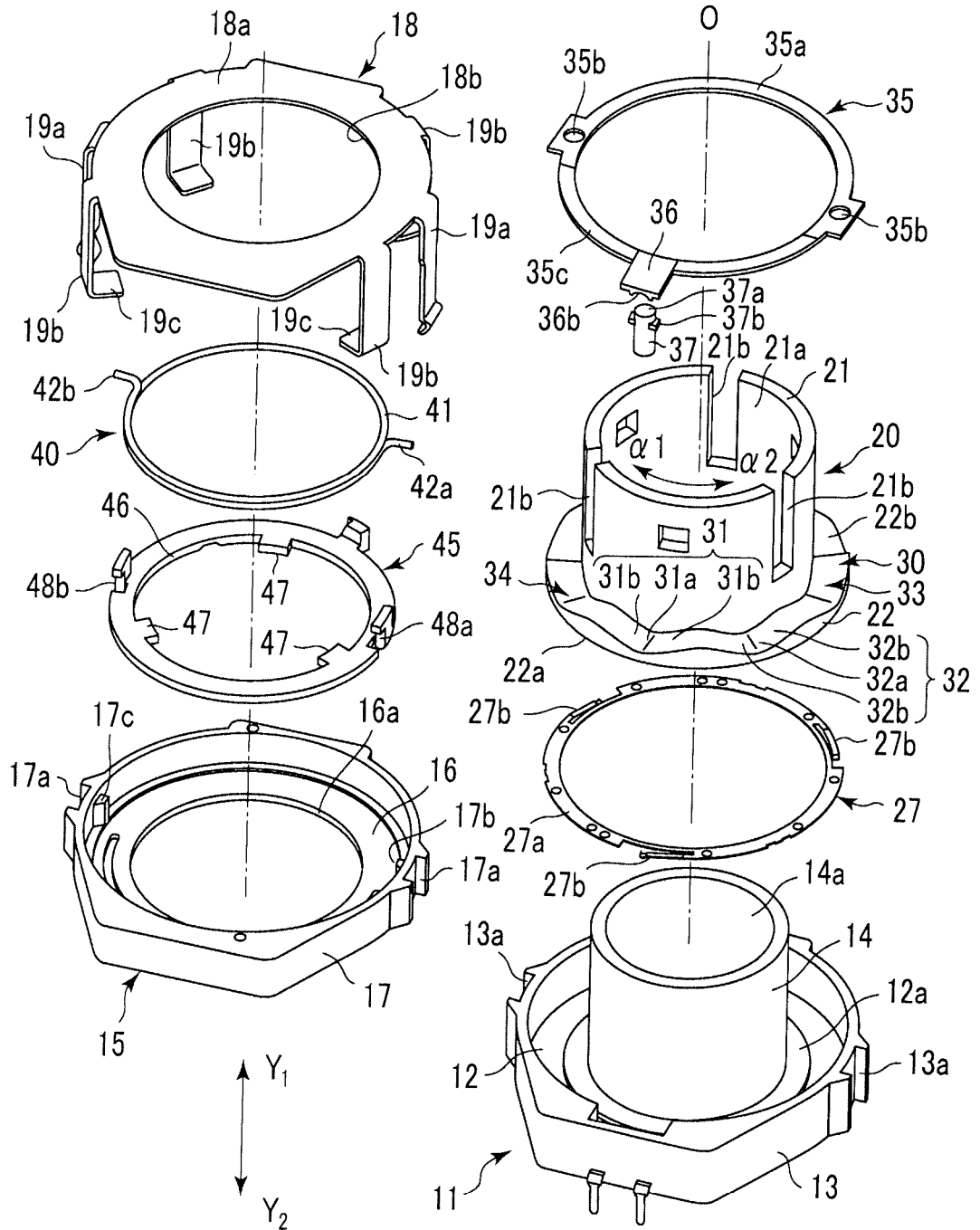


FIG. 3

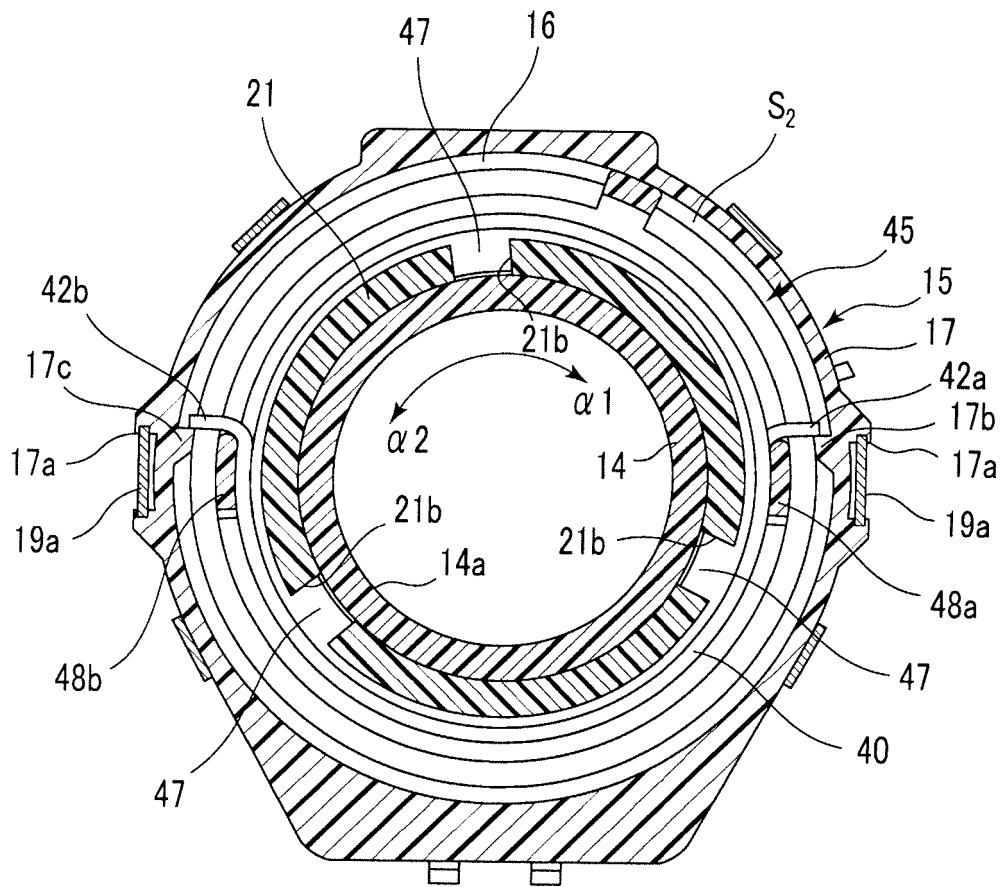


FIG. 4

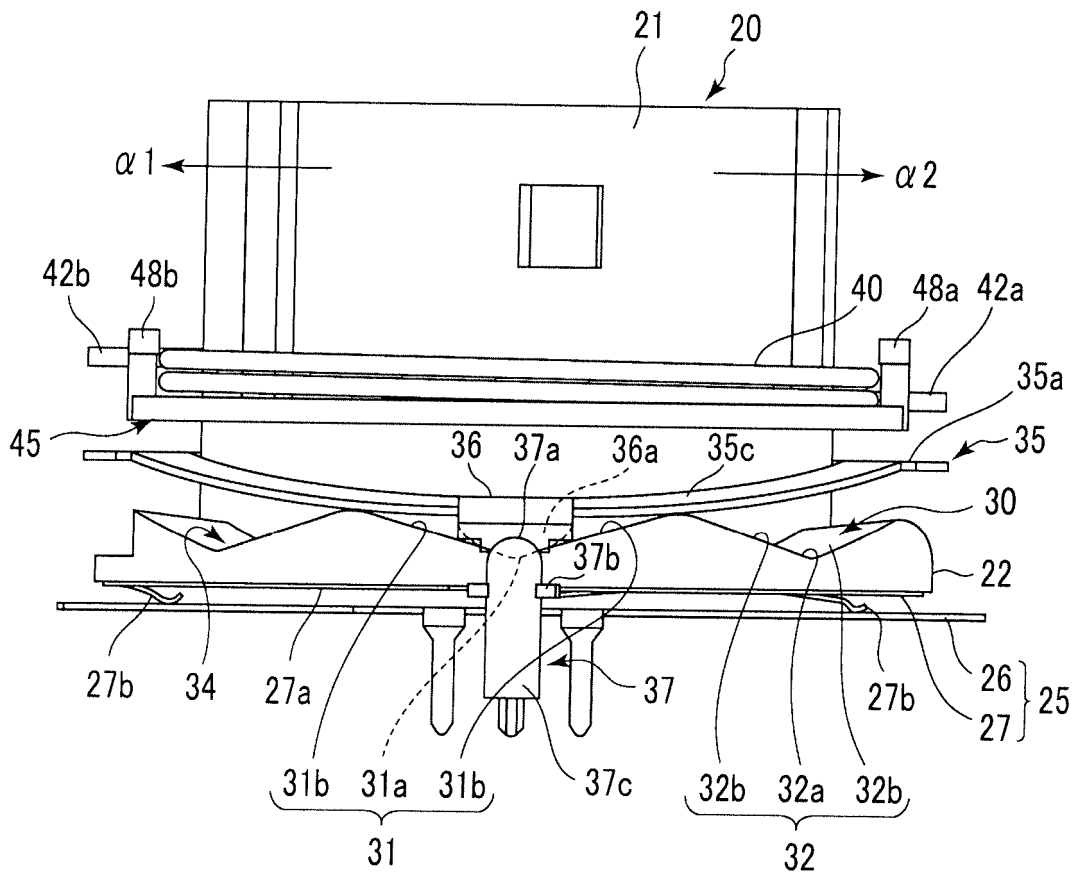


FIG. 5

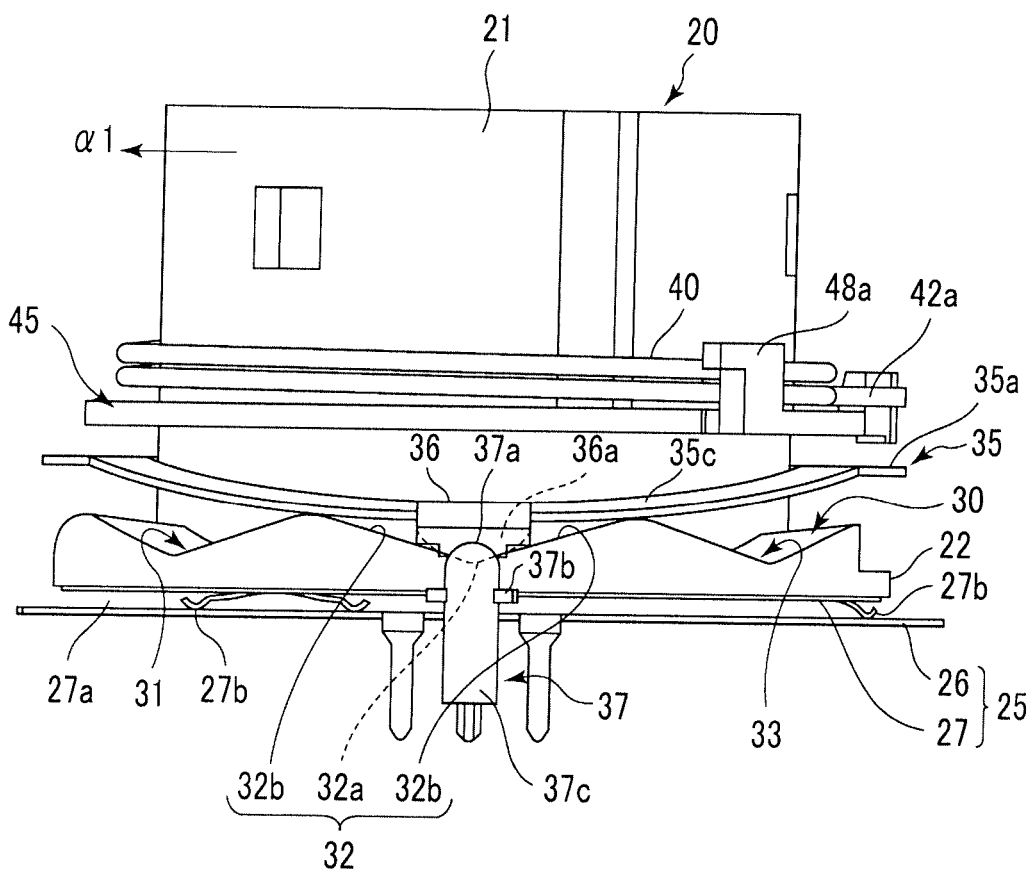


FIG. 6

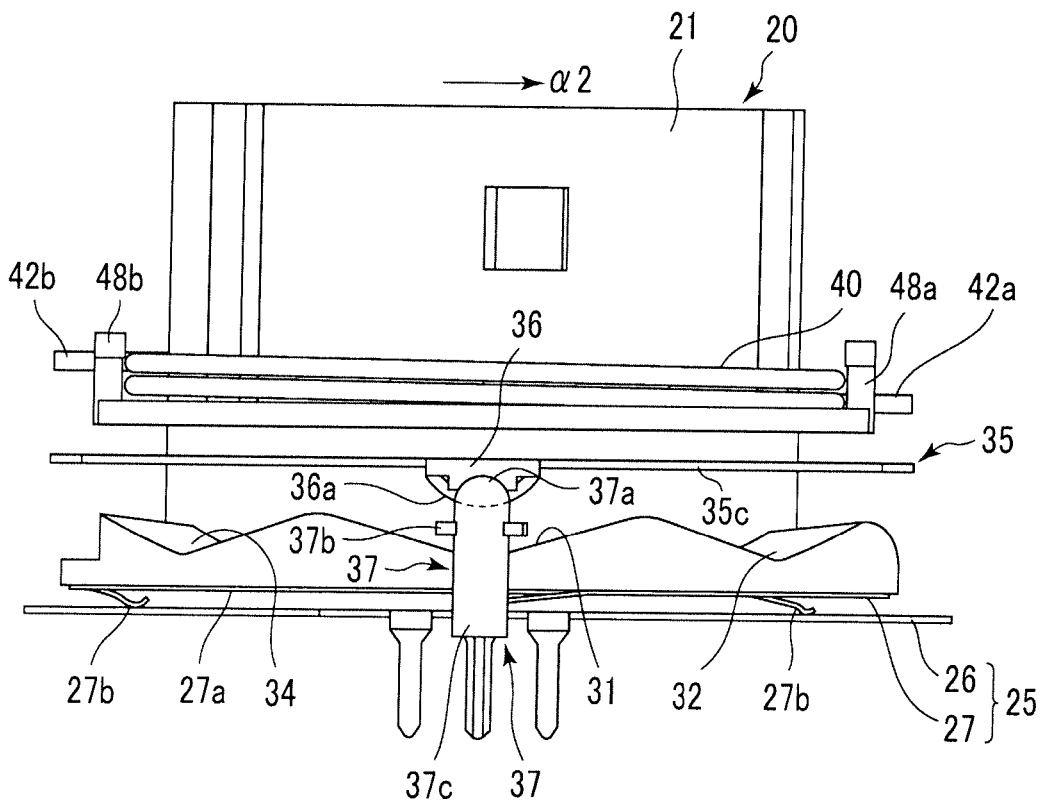


FIG. 7

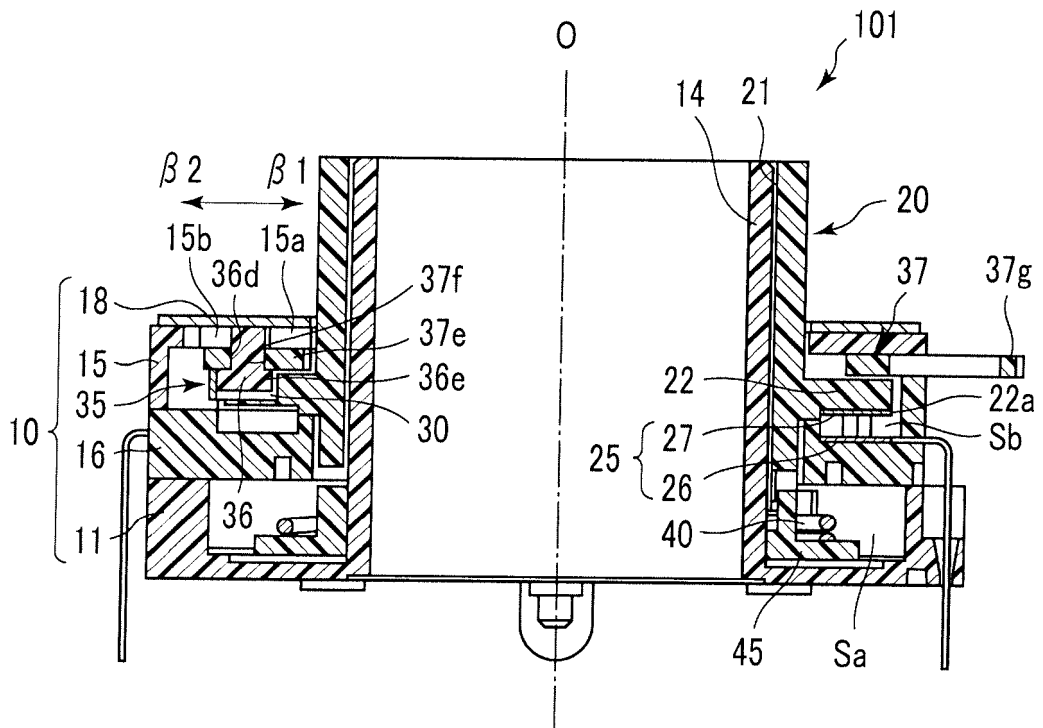


FIG. 8

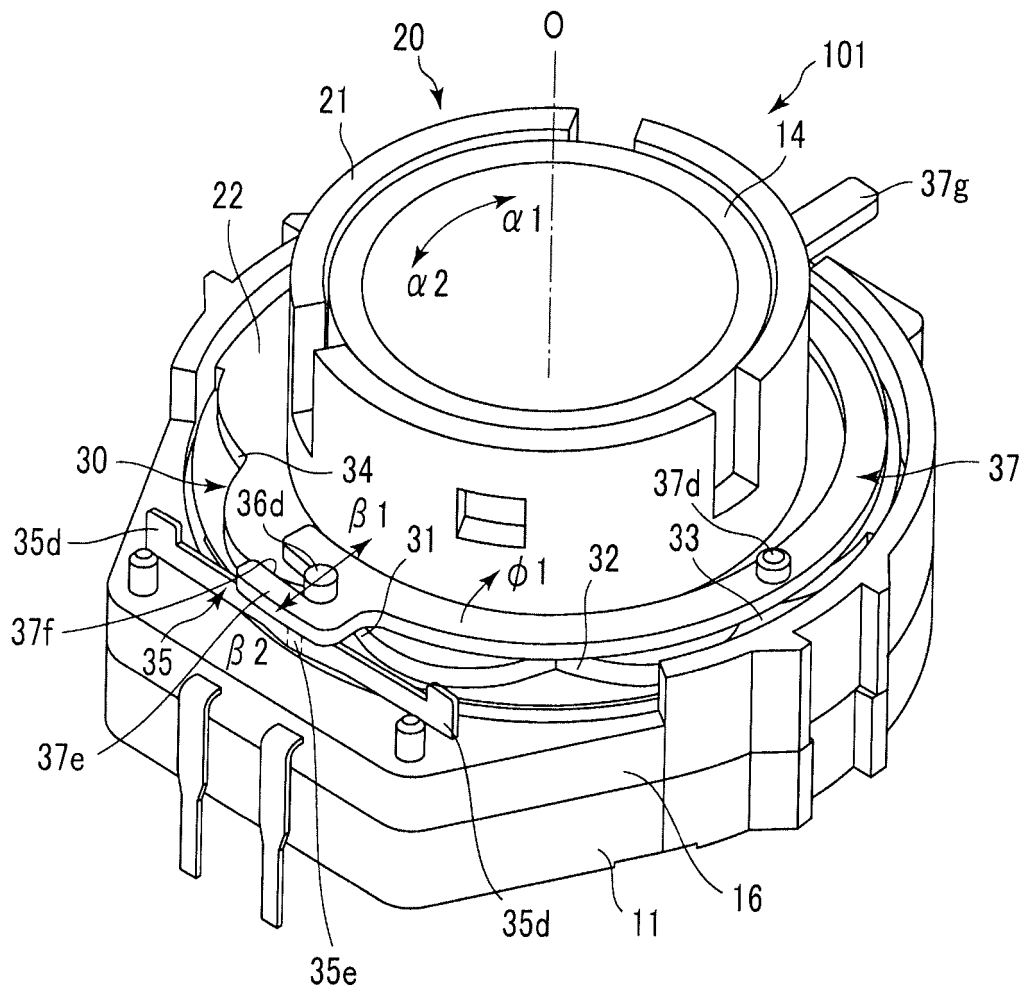
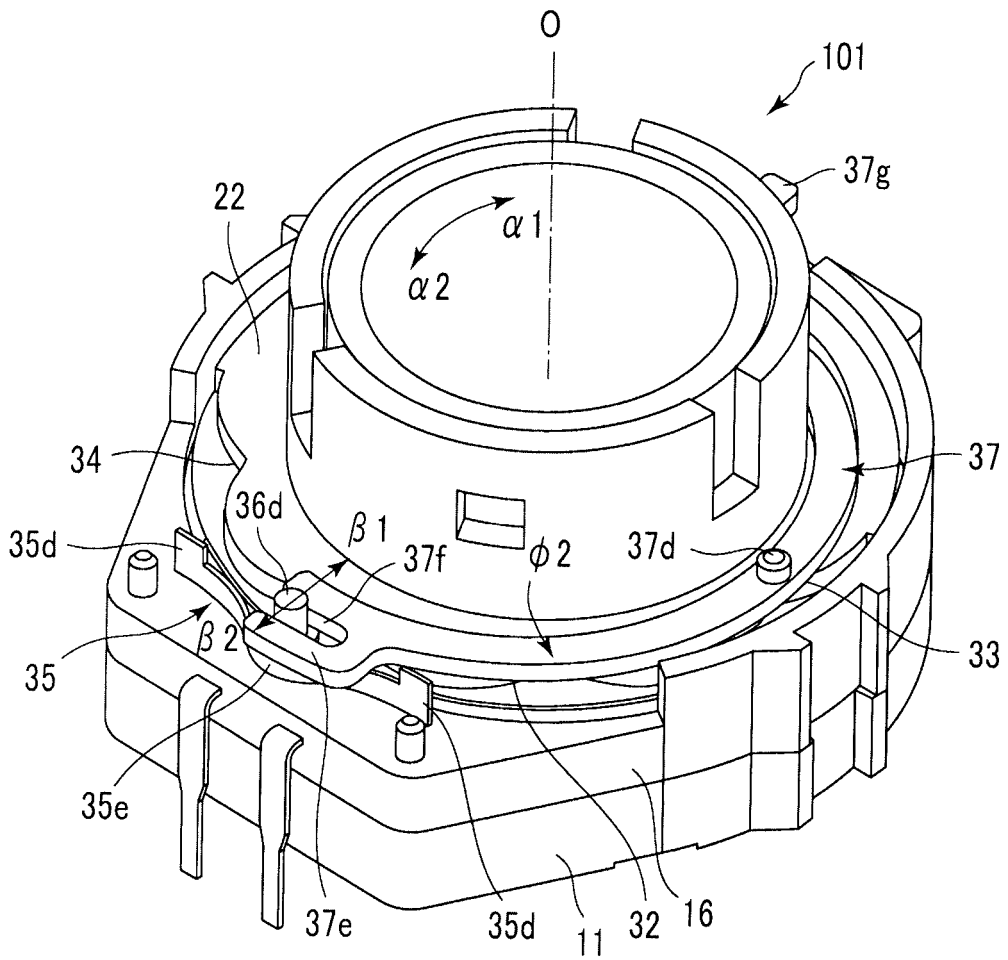


FIG. 9



REFERENCES CITED IN THE DESCRIPTION

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