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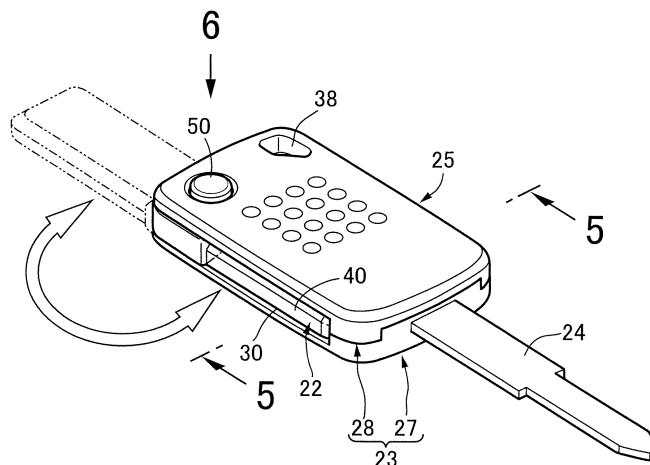
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(54) **KEY UNIT**

(57) A key unit is provided in which a magnet key (22) is mounted on a portable case (23) so that the magnet key (22) can operate between a projecting position in which the magnet key (22) projects from the case (23)

and a storage position in which the magnet key (22) is stored in the case (23). Thus, it is possible to enhance the degree of freedom in the design of the key unit having the magnet key.

FIG.2



Description

TECHNICAL FIELD

[0001] The present invention relates to a key unit having a magnet key that can unlock a magnet lock.

BACKGROUND ART

[0002] A magnet key formed by disposing a plurality of magnets on a magnet retaining part that is provided integrally with a key main body and that projects from the key main body is known from Patent Document 1.

RELATED ART DOCUMENTS

PATENT DOCUMENTS

[0003] Patent Document 1: Japanese Patent No. 3914043

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0004] In an arrangement disclosed in Patent Document 1 above the degree of freedom in the design of the key main body is restricted, and there is a desire for increasing the degree of freedom in the design

[0005] The present invention has been accomplished in light of such circumstances, and it is an object thereof to enhance the degree of freedom in the design of a key unit having a magnet key.

MEANS FOR SOLVING THE PROBLEMS

[0006] In order to attain the above object, according to a first aspect of the present invention, there is provided a key unit comprising a magnet key that can unlock a magnet lock, characterized in that the magnet key is mounted on a portable case so that the magnet key can operate between a projecting position in which the magnet key projects from the case and a storage position in which the magnet key is stored in the case.

[0007] Further, according to a second aspect of the present invention, in addition to the first aspect, the key unit comprises an elastic member urging the magnet key toward the projecting position, an operation restriction member that is supported on the case so that the operation restriction member can operate between a restriction position in which the magnet key is held at the storage position and a restriction release position in which operation of the magnet key from the storage position to the projecting position is allowed and that is elastically urged toward the restriction position side, and a push button that is disposed on the case so that the push button can be pushed in so as to forcibly move the operation restriction member to the restriction release position.

[0008] According to a third aspect of the present invention, in addition to the first or second aspect, the magnet key unlocks the magnet lock, which holds a shutter plate at a closed position, the shutter plate opening and closing a key hole of a cylinder lock.

[0009] Moreover, according to a fourth aspect of the present invention, in addition to the third aspect, a mechanical key that unlocks the cylinder lock is fixed to the case so as to project from the case.

EFFECTS OF THE INVENTION

[0010] In accordance with the first aspect of the present invention, since the key unit is formed by mounting the magnet key on the portable case so that the magnet key can operate between the projecting position in which it projects from the case and the storage position in which it is stored in the case, it is possible to enhance the degree of freedom in the design of the key unit.

[0011] Furthermore, in accordance with the second aspect of the present invention, the magnet key can be moved from the storage position to the projecting position merely by pushing in the push button, thus improving the ease of operation.

[0012] In accordance with the third aspect of the present invention, the ease of operation of opening the shutter plate protecting the key hole of the cylinder lock can be enhanced.

[0013] Furthermore, in accordance with the fourth aspect of the present invention, since the mechanical key is fixed to the case, the portability of the case can be enhanced.

BRIEF DESCRIPTION OF DRAWINGS

[0014]

[FIG. 1] FIG. 1 is a perspective view of a key unit and a protection device of a cylinder lock. (first embodiment)

[FIG. 2] FIG. 2 is a perspective view of the key unit. (first embodiment)

[FIG. 3] FIG. 3 is an exploded perspective view of the key unit. (first embodiment)

[FIG. 4] FIG. 4 is an exploded perspective view of a case. (first embodiment)

[FIG. 5] FIG. 5 is a sectional view along line 5-5 in FIG. 2. (first embodiment)

[FIG. 6] FIG. 6 is a view in the direction of arrow 6 in FIG. 2. (first embodiment)

[FIG. 7] FIG. 7 is a sectional view along line 7-7 in FIG. 6. (first embodiment)

[FIG. 8] FIG. 8 is a sectional view along line 8-8 in FIG. 6. (first embodiment)

[FIG. 9] FIG. 9 is a sectional view along line 9-9 in FIG. 6. (first embodiment)

[FIG. 10] FIG. 10 is a sectional view along line 10-10 in FIG. 7. (first embodiment)

[FIG. 11] FIG. 11 is a sectional view along line 11-11 in FIG. 7. (first embodiment)

[FIG. 12] FIG. 12 is a sectional view along line 12-12 in FIG. 7. (first embodiment)

EXPLANATION OF REFERENCE NUMERALS AND SYMBOLS

[0015]

15 Cylinder lock
 18 Key hole
 19 Shutter plate
 20 Magnet lock
 22 Magnet key
 23 Case
 24 Mechanical key
 25 Key unit
 48 Torsion spring, which is elastic member
 49 Operation restriction member
 50 Push button

MODES FOR CARRYING OUT THE INVENTION

[0016] An embodiment of the present invention is explained below by reference to the attached FIG. 1 to FIG. 12.

FIRST EMBODIMENT

[0017] First, in FIG. 1, a protection device 17 is mounted on a cylinder body 16 of a cylinder lock 15 used for a vehicle such as for example a two-wheeled motor vehicle so that it is possible to switch between switching modes of an ignition switch and to switch between locked and unlocked states of steering.

[0018] The protection device 17 can protect a key hole 18 of the cylinder lock 15 by closing it with a shutter plate 19, the shutter plate 19 being maintained at a closed position by means of a magnet lock 20 that is disposed at a position adjacent to the protection device 17 and linked to the protection device 17. The magnet lock 20 has a magnet key insertion hole 21, inserting the magnet key 22 into the magnet key insertion hole 21 enabling the shutter plate 19 to be operated from the closed position to an open position.

[0019] Referring in addition to FIG. 2, the magnet key 22 is mounted on a portable case 23 so that it can operate between a projecting position in which the magnet key 22 projects from the case 23 (position shown by chain line in FIG. 2) and a storage position in which the magnet key 22 is stored in the case 23 (position shown by solid line in FIG. 2), and part of a key unit 25 is formed from the magnet key 22, the case 23, and a mechanical key 24 fixed to the case 23 so as to project from the case 23, the mechanical key 24 being capable of unlocking the cylinder lock 15.

[0020] Referring in addition to FIG. 3 to FIG. 5, the case

23 is formed into a flattened rectangular shape that is long in one direction by joining first and second case members 27 and 28, made of a synthetic resin, to each other, the magnet key 22 is supported on the case 23 so that it can pivot through about 180 degrees between the projecting position in which it projects from one end part in the longitudinal direction of the case 23 and the housed position in which it is housed within the case 23, a base end part of the mechanical key 24 being inserted into and joined to the first case member 27 so that the mechanical key 24 projects from the other end part in the longitudinal direction of the case 23.

[0021] The first case member 27 is formed so as to integrally have a flat plate-shaped first case member main portion 27a, a one end first raised portion 27b rising from one side in the width direction of one end part in the longitudinal direction of the first case member main portion 27a toward the second case member 16 side, the other end first raised portion 27c rising from the other end part in the longitudinal direction of the first case member main portion 27a toward the second case member 28 side so as to have the base end part of the mechanical key 24 inserted into and joined thereto, a first side wall portion 27d linking the one end first raised portion 27b and the other end first raised portion 27c so as to rise from the one side in the width direction of the first case member main portion 27a toward the second case member 28 side, and an intermediate wall portion 27e rising from an intermediate part in the width direction of the first case member main portion 27a toward the second case member 28 side and linking the one end first raised portion 27b and the other end first raised portion 27c.

[0022] The amounts by which the one end first raised portion 27b and the first side wall portion 27d rise from the first case member main portion 27a are set smaller than the amount by which the other end first raised portion 27c rises from the first case member main portion 27a, and the maximum amount by which the intermediate wall portion 27e rises from the first case member main portion 27a is set larger than the amount by which the other end first raised portion 27c rises. Furthermore, a step part 29 is formed on each of opposite sides in the width direction of the other end first raised portion 27c.

[0023] The second case member 28 integrally includes a flat plate-shaped second case member main portion 28a, a one end second raised portion 28b rising from one side in the width direction of one end part in the longitudinal direction of the second case member main portion 28a toward the first case member 27 side, the other end second raised portion 28c rising from the other end part in the longitudinal direction of the second case member main portion 28a toward the first case member 27 side, a second side wall portion 28d rising from the one side in the width direction of the second case member main portion 28a toward the first case member 27 side and linking the one end second raised portion 28b and the other end second raised portion 28c, and a pair of projecting portions 28e having an arc-shaped cross-section

and projecting from opposite sides in the width direction of the other end second raised portion 28c toward the first case member 27 side.

[0024] The amounts by which the one end second raised portion 28b and the second side wall portion 28d rise from the second case member main portion 28a are set so as to be identical, and the amount by which the other end second raised portion 28c rises from the second case member main portion 27a is set smaller than the amounts by which the one end second raised portion 28b and the second side wall portion 28d rise from the second case member main portion 28a.

[0025] When such first and second case members 27 and 28 abut against each other, the one end first raised portion 27b abuts against the one end second raised portion 28b, the other end first raised portion 27c abuts against the other end second raised portion 28c, the first side wall portion 27d abuts against the second side wall portion 28d, and the projecting portion 28e of the second case member 28 is fitted into the step part 29 of the first case member 27. In a state in which the first and second case members 27 and 28 abut against each other as above, a storage recess part 30 is formed between the first and second case members 27 and 28 on the side opposite to the first and second side wall portions 27d and 28d with respect to the intermediate wall portion 27e so that the magnet key 22 can be stored therein, the storage recess part 30 opening to the outside between the other sides along the width direction of the first and second case members 27 and 28 and opening to the outside between the other sides in the width direction of one end part in the longitudinal direction of the first and second case members 27 and 28.

[0026] In order to determine the relative positions of the first and second case members 27 and 28, the first case member 27 has formed integrally therewith a rod-shaped first positioning projection 27f projecting from the first case member main portion 27a at a position adjacent to the one end first raised portion 27b, rod-shaped second positioning projections 27g projecting from two locations spaced in the width direction of the other end first raised portion 27c, and a third positioning projecting portion 27h having a substantially L-shaped cross section and projecting from the first case member main portion 27a via a portion corresponding to a part where the one end first raised portion 27c and the first side wall portion 27d are connected. On the other hand, the second case member 28 has formed therein a first positioning recess part 31 disposed on the one end second raised portion 28b so that the first positioning projection 27f is fitted thereinto, a pair of second positioning recess parts 32 disposed in the other end second raised portion 28c so that the second positioning projections 27g are fitted thereinto, and a third positioning recess part 33 disposed in the second side wall portion 28d so that the third positioning projection 27h is fitted thereinto.

[0027] Latching holes 34 are formed in the intermediate wall portion 27e of the first case member 27 so as to

be disposed at two locations spaced in the longitudinal direction of the first case member 27, and a pair of engagement claws 28f resiliently engaging with the latching holes 34 are projectingly provided integrally with the second case member 28 so as to project from the second case member main portion 28a toward the first case member 27 side. Furthermore, a cylindrical boss portion 28g positioned on an extension in the direction in which the pair of engagement claws 28f are arranged is provided integrally with the second case member 28 so as to project from the one end second raised portion 28b toward the first case member 27 side, a circular abutment seat 27i having an insertion hole 35 is formed integrally with the first case member main portion 27a of the first case member 27 so as to abut against the boss portion 28g, and a screw member 36 inserted through the insertion hole 35 from outside the first case member main portion 27 of the first case member 27 is screwed into the boss portion 28g. That is, the first and second case members 27 and 28 engage with each other at two locations spaced in the longitudinal direction of an intermediate part in the width direction of the case members 27 and 28, and are fastened by means of the screw member 36 and joined to each other at one location aligned with the engaged locations.

[0028] Through holes 37 and 38 are provided in the one end first raised portion 27b of the first case member 27 and the one end second raised portion 28b of the second case member 28, the through holes 37 and 38 communicating with each other in a state in which the first and second case members 27 and 28 are joined to each other and being utilized for mounting a strap, etc. on the case 23.

[0029] The magnet key 22 is formed by disposing a plurality of, for example three, magnets 41 on a magnet key main body 40 made of a synthetic resin, the magnet key main body 40 is formed so as to be long in the longitudinal direction of the case 23 so that it can be stored in the storage recess part 30, and one end part of the magnet key main body 40 is pivotably supported on the case 23.

[0030] A recess part 42, a circular projecting part 43 disposed in a central part of the recess part 42, and a plurality of, for example four, housing recess parts 44 disposed around the circular projecting part 43 within the recess part 42 are formed on a face, opposing the first case member main portion 27a of the first case member 27, of the other end part of the magnet key main body 40 in a state in which the magnet key main body 40 is stored in the storage recess part 30. In a state in which the magnets 41 are housed in three housing recess parts 44 selected from the four housing recess parts 44 so that one of the N pole and the S pole faces the outer end of the housing recess part 44, a lid member 46 having in its central part a circular hole 45 having the circular projecting part 43 fitted thereinto is fitted into the recess part 42 and glued, thus forming the magnet key 22.

[0031] Moreover, in order to achieve a constant atti-

tude of the magnet key 22 when inserted into the magnet key insertion hole 21 of the magnet lock 20, an inclined face 40a is formed on each of opposite sides in the width direction of a face, on the opposite side to the face on which the magnets 41 are disposed, of the magnet key main body 40. The magnet key insertion hole 21 is also formed into a shape corresponding to the cross-sectional shape of the magnet key main body 40.

[0032] The key unit 25 includes, in addition to the magnet key 22, the case 23, and the mechanical key 24, a torsion spring 48 as an elastic member elastically urging the magnet key 22 toward the projecting position, an operation restriction member 49 restricting operation of the magnet key 22, and a push button 50 disposed on the case 23 so that it can operate the operation restriction member 49.

[0033] Referring in addition to FIG. 6 to FIG. 12, a circular spring housing recess part 51 is formed in one end part of the first case member main portion 27a of the first case member 27, a rod-shaped projecting portion 27j being projectingly provided in a central part of the circular spring housing recess part 51, and a cylindrical guide tube portion 27k projecting from the peripheral edge of the spring housing recess part 51 toward the second case member 28 side being provided integrally with the one end part of the first case member main portion 27a. Furthermore, an arc-shaped pivoting restriction groove 52 disposed around the guide tube portion 27k is formed in the first case member main portion 27a.

[0034] The operation restriction member 49 integrally includes a cylindrical portion 49a having one end part inserted into the guide tube portion 27k, a pair of first engagement arm portions 49b projecting toward opposite sides from the outer periphery of the cylindrical portion 49a so as to be disposed on one diameter of the cylindrical portion 49a, and a pair of second engagement arm portions 49c projecting toward opposite sides from the outer periphery of the cylindrical portion 49a so as to be disposed on another diameter of the cylindrical portion 49a closer to the first case member main portion 27a than the first engagement arm portions 49b, the first engagement arm portions 49b and the second engagement arm portions 49c projecting from the cylindrical portion 49a so as to extend in directions orthogonal to each other. Furthermore the push button 50, which is formed into a bottomed cylindrical shape, is coaxially and connectedly provided integrally with the other end part of the cylindrical portion 49a.

[0035] One end part of the torsion spring 48 is housed within the spring housing recess part 51 so as to surround the projecting portion 27j of the first case member 27 and abuts against the first case member main portion 27a. The other end part of the torsion spring 48 is housed within the push button 50 and abuts against the push button 50. Moreover, a first engagement piece 48a formed on the one end part of the torsion spring 48 engages with a latching groove 58 formed in the first case member 27 so as to transect one location in the peripheral

direction of the guide tube portion 27k, and a second engagement piece 48b formed on the other end part of the torsion spring 48 engages with a latching projecting portion 50a formed in the interior of the push button 50. Due to such a torsion spring 48 the operation restriction member 49 and the push button 50 are spring-biased in a direction away from the first case member main portion 27a and are spring-biased in the clockwise direction in FIG. 6 and FIG. 10 to FIG. 12.

[0036] A through hole 53 is provided in one end part of the magnet key main body 40 of the magnet key 22 so that part of the guide tube portion 27k of the first case member 27 is inserted into the through hole 53, the cylindrical portion 49a of the operation restriction member 49 extending through the through hole 53. An insertion hole 54 having a smaller diameter than that of the through hole 53 is provided in one end part of the second case member main portion 48a of the second case member 28 coaxially with the through hole 53 so that the cylindrical portion 49a of the operation restriction member 49 and the push button 50 are inserted through the insertion hole 54.

[0037] A pair of fitting grooves 55 are provided in the magnet key main body 40 so as to open on an inner face of the through hole 53 and extend in the axial direction, the first engagement arm portion 49b of the operation restriction member 49 being slidably fitted into the fitting groove 55. On the other hand, a pair of first engagement recess parts 56 forming a step portion 56a opposing, from the side opposite to the magnet key main body 40, the first engagement arm portion 49b of the operation restriction member 49 urged in the axial direction by means of the torsion spring 48 are provided in the second case member main portion 28a of the second case member 28, the first engagement recess parts 56 opening on an inner face of the insertion hole 54 and toward the magnet key main body 40 side while communicating with the fitting groove 55 in a state in which the magnet key 22 is in the storage position.

[0038] Furthermore, a pair of second engagement recess parts 57 forming a step portion 57a capable of abutting, from the side opposite to the first case member main portion 27a, against the second engagement arm portion 49c of the operation restriction member 49 urged in the axial direction by means of the torsion spring 48 are provided in the magnet key main body 40, the second engagement recess part 57 opening on an inner face of the through hole 53 and toward the first case member main portion 27a. The second engagement arm portions 49c of the operation restriction member 49 are slidably engaged with the second engagement recess parts 57.

[0039] Due to the first engagement arm portion 49b of the operation restriction member 49 being fitted into the fitting groove 55 of the magnet key main body 40 and the second engagement arm portion 49c being engaged with the second engagement recess part 57 of the magnet key main body 40, the magnet key main body 40 is elastically urged toward the projecting position side by means

of the spring force of the torsion spring 48 acting on the operation restriction member 49. When the magnet key 22 is pivoted to the storage position against the spring force of the torsion spring 48, the fitting groove 55 of the magnet key main body 40 is made to communicate with the first engagement recess part 56 of the second case member 28, and the operation restriction member 49 urged in the axial direction by means of the torsion spring 48 moves in the axial direction to a position in which part of the first engagement arm portion 49b is engaged with the first engagement recess part 56. This makes the first engagement arm portion 49b engage while straddling the fitting groove 55 and the first engagement recess part 56, and the magnet key 22 is held at the storage position even when the magnet key 22 leaves the hand. In this arrangement, the second engagement arm portion 49c of the operation restriction member 49 abuts against the step portion 57a of the second engagement recess part 57, the magnet key main body 40 is pushed toward the second case member 28 side by means of the axial spring-biasing force of the torsion spring 48, rattling of the magnet key 22 within the case 23 is suppressed, and in this state part of the push button 50 projects from the second case member main portion 28a of the second case member 28.

[0040] That is, the operation restriction member 49 is disposed in the case 23 so as to operate between a restriction position in which it is engaged so as to straddle the fitting groove 55 and the first engagement recess part 56 when the magnet key 22 is at the storage position, thus holding the magnet key 22 at the storage position (position shown by solid line in FIG. 7 and FIG. 8) and a restriction release position in which the push button 50 is pushed in so as to release the engagement with the engagement recess part 56, thus allowing the magnet key 22 to pivot from the storage position to the projecting position (position shown by chain line in FIG. 7 and FIG. 8).

[0041] Furthermore, a restriction projecting portion 40b is projectingly provided integrally with the magnet key main body 40, the restriction projecting portion 40b being fitted into the pivoting restriction groove 52 formed in the first case member main portion 27a of the first case member 27, and due to the restriction projecting portion 40b abutting against opposite ends in the peripheral direction of the pivoting restriction groove 52 the end of pivoting of the magnet key 22 toward the storage position side and the end of pivoting thereof toward the projecting position side are restricted.

[0042] The operation of this embodiment is now explained; in the key unit 25 having the magnet key 22 that can unlock the magnet lock 20, since the magnet key 22 is mounted on the portable case 23 so that it can operate between the projecting position in which it projects from the case 23 and the storage position in which it is stored in the case 23, it is possible to enhance the degree of freedom in the design of the key unit 25.

[0043] Furthermore, since the key unit 25 includes the

torsion spring 48 elastically urging the magnet key 22 toward the projecting position, the operation restriction member 49 supported on the case 23 so that it can operate between the restriction position in which the magnet key 22 is held at the storage position and the restriction release position in which the magnet key 22 is allowed to operate from the storage position to the projecting position and being elastically urged toward the restriction position side, and the push button 50 disposed on the case 23 so that it can be pushed in so as to forcibly move the operation restriction member 49 to the restriction release position, it is possible, by merely pushing in the push button 50, to move the magnet key 22 from the storage position to the projecting position, thus improving the ease of operation.

[0044] Moreover, since the magnet key 22 unlocks the magnet lock 20 holding the shutter plate 19 at the closed position, the shutter plate 19 opening and closing the key hole 18 of the cylinder lock 15, it is possible to enhance the ease of opening of the shutter plate 19 protecting the key hole 18 of the cylinder lock 15.

[0045] Furthermore, since the mechanical key 24 unlocking the cylinder lock 15 is fixed to the case 23 so as to project from the case 23, it is possible to enhance the portability of the case 23.

[0046] An embodiment of the present invention is explained above, but the present invention is not limited to the above embodiment and may be modified in a variety of ways as long as the modifications do not depart from the spirit and scope thereof.

[0047] For example, in the above embodiment the torsion spring 48 elastically urges the magnet key 22 toward the projecting position and urges elastically urges the operation restriction member 49 toward the restriction position side, but a first elastic member elastically urging the magnet key 22 toward the projecting position and a second elastic member elastically urging the operation restriction member 49 toward the restriction position side may be provided.

Claims

1. A key unit comprising a magnet key (22) that can unlock a magnet lock (20), **characterized in that** the magnet key (22) is mounted on a portable case (23) so that the magnet key (22) can operate between a projecting position in which the magnet key (22) projects from the case (23) and a storage position in which the magnet key (22) is stored in the case (23).
2. The key unit according to Claim 1, comprising an elastic member (48) urging the magnet key (22) toward the projecting position, an operation restriction member (49) that is supported on the case (23) so that the operation restriction member (49) can operate between a restriction position in which the mag-

net key (22) is held at the storage position and a restriction release position in which operation of the magnet key (22) from the storage position to the projecting position is allowed and that is elastically urged toward the restriction position side, and a push button (50) that is disposed on the case (23) so that the push button (50) can be pushed in so as to forcibly move the operation restriction member (49) to the restriction release position.

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3. The key unit according to Claim 1 or 2, wherein the magnet key (22) unlocks the magnet lock (20), which holds a shutter plate (19) at a closed position, the shutter plate (19) opening and closing a key hole (18) of a cylinder lock (15).

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4. The key unit according to Claim 3, wherein a mechanical key (24) that unlocks the cylinder lock (15) is fixed to the case (23) so as to project from the case (23).

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FIG.1

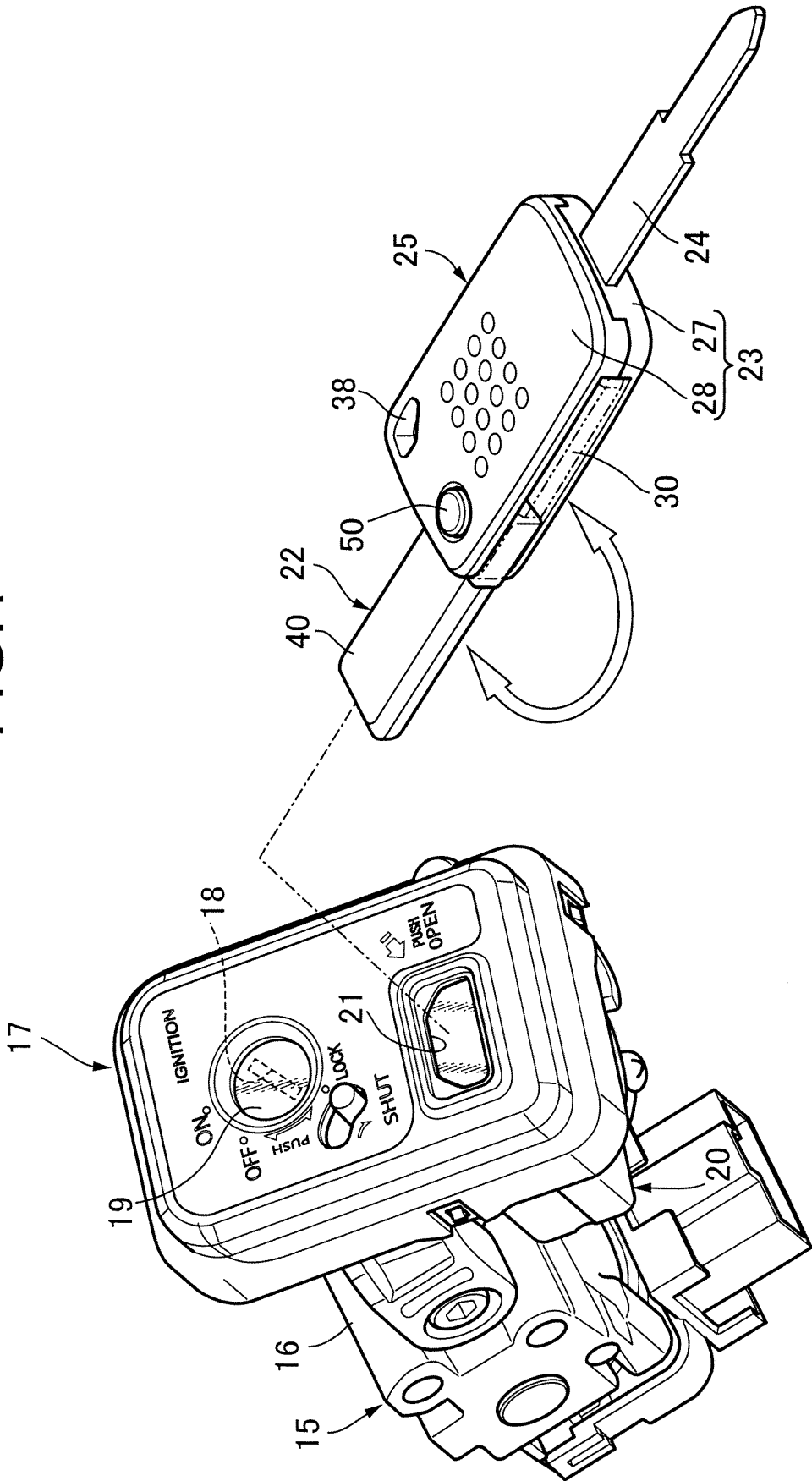


FIG.2

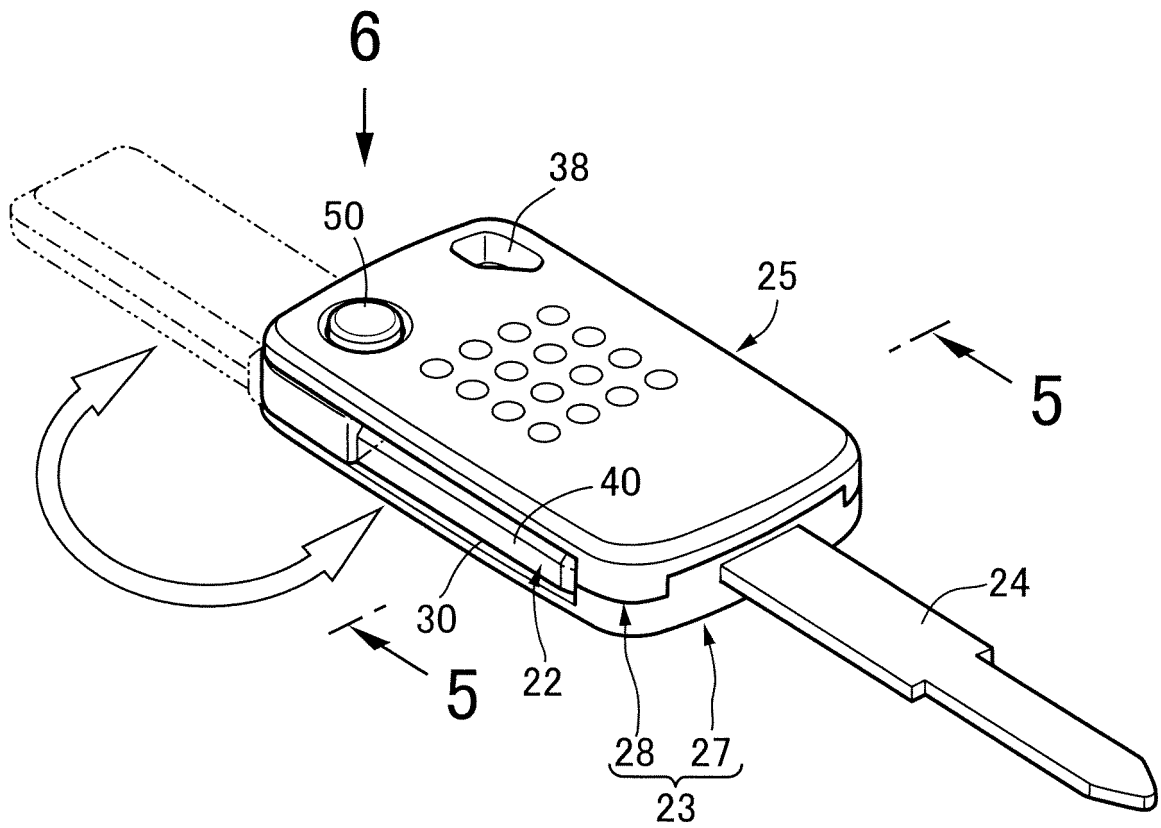


FIG.4

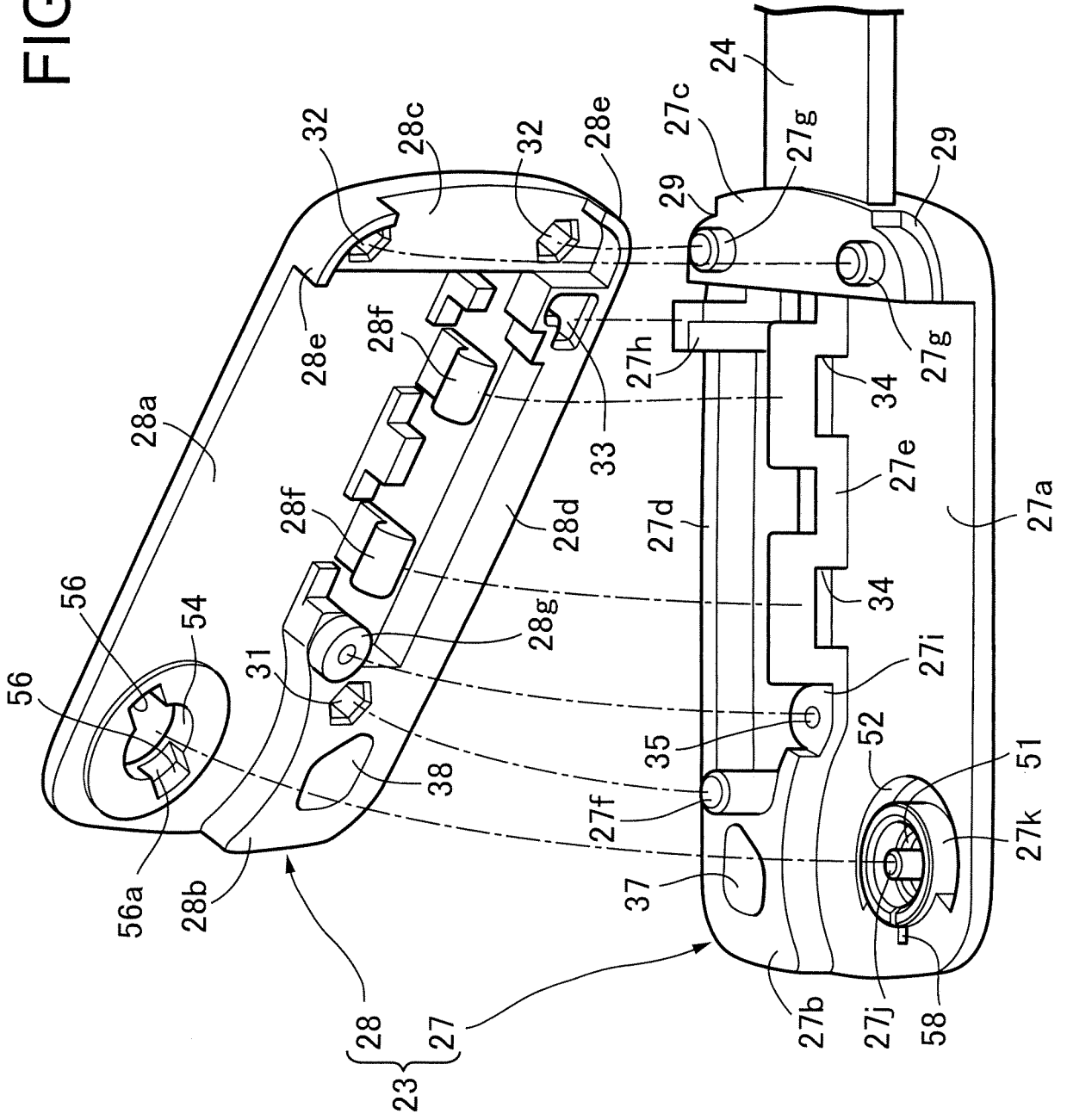


FIG.5

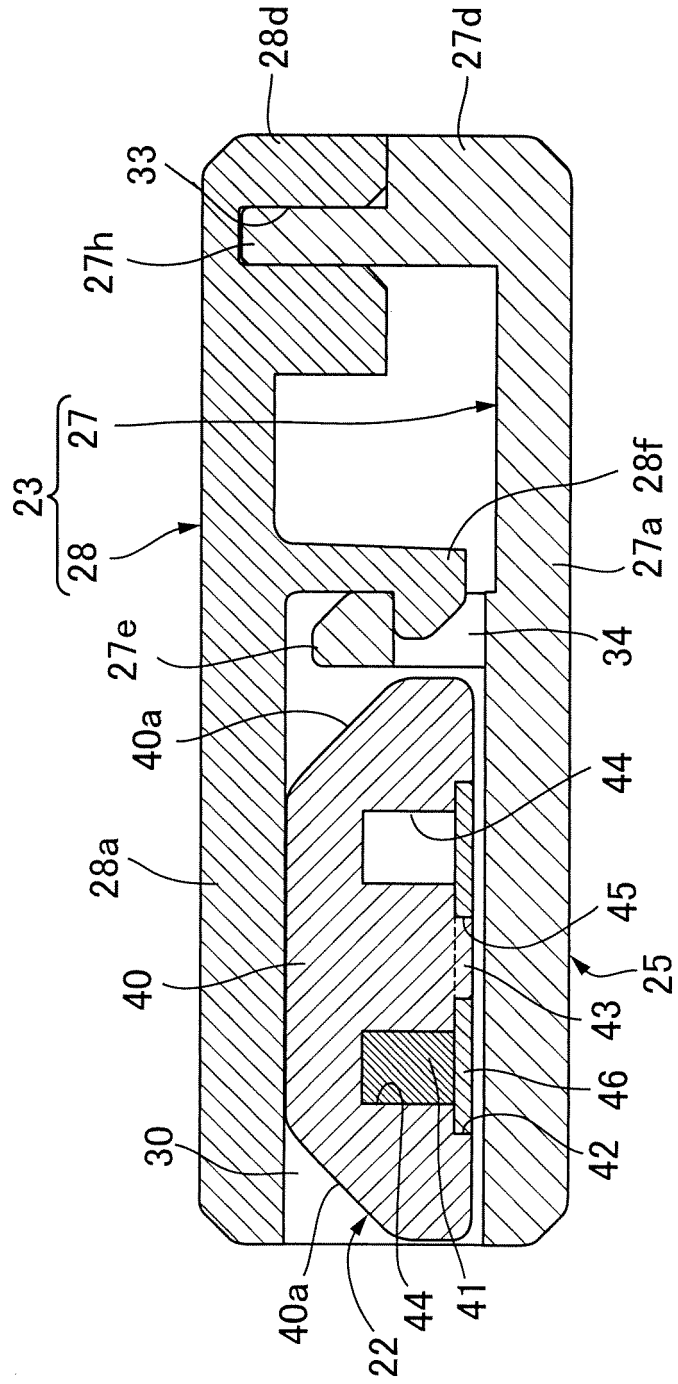


FIG.6

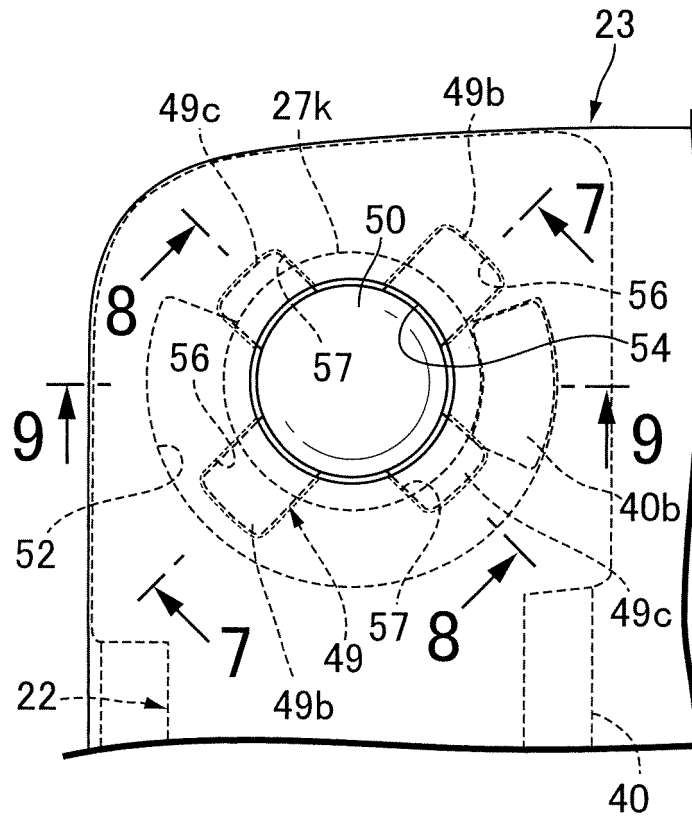


FIG.9

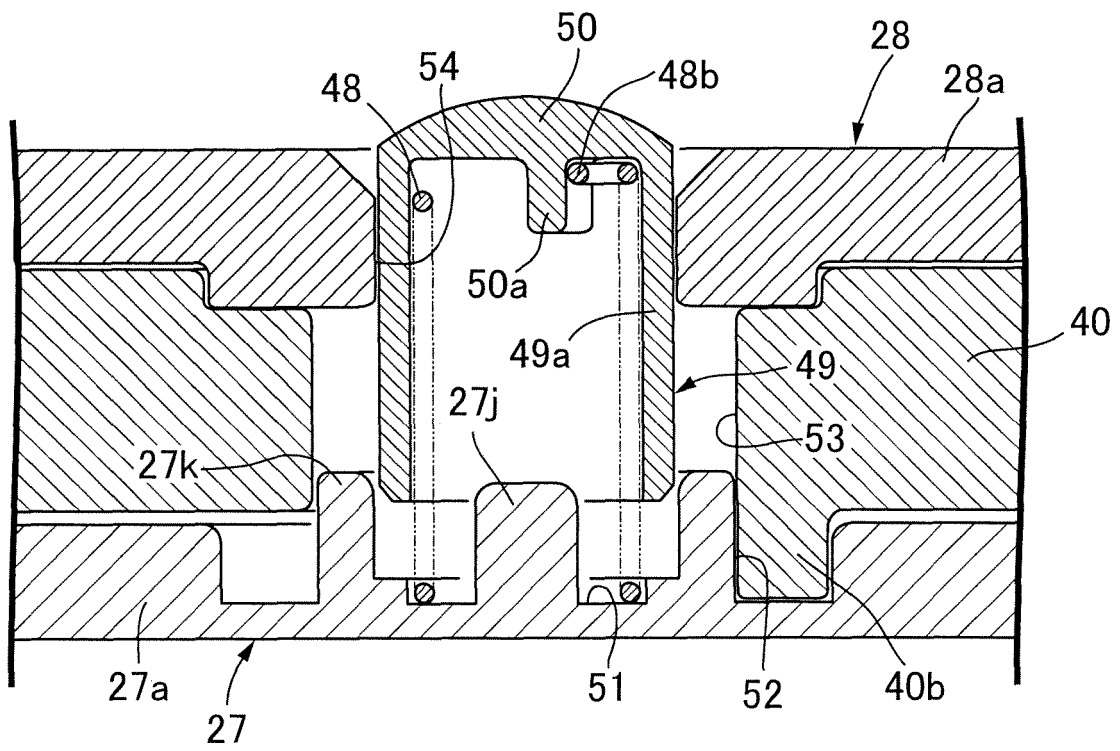


FIG.10

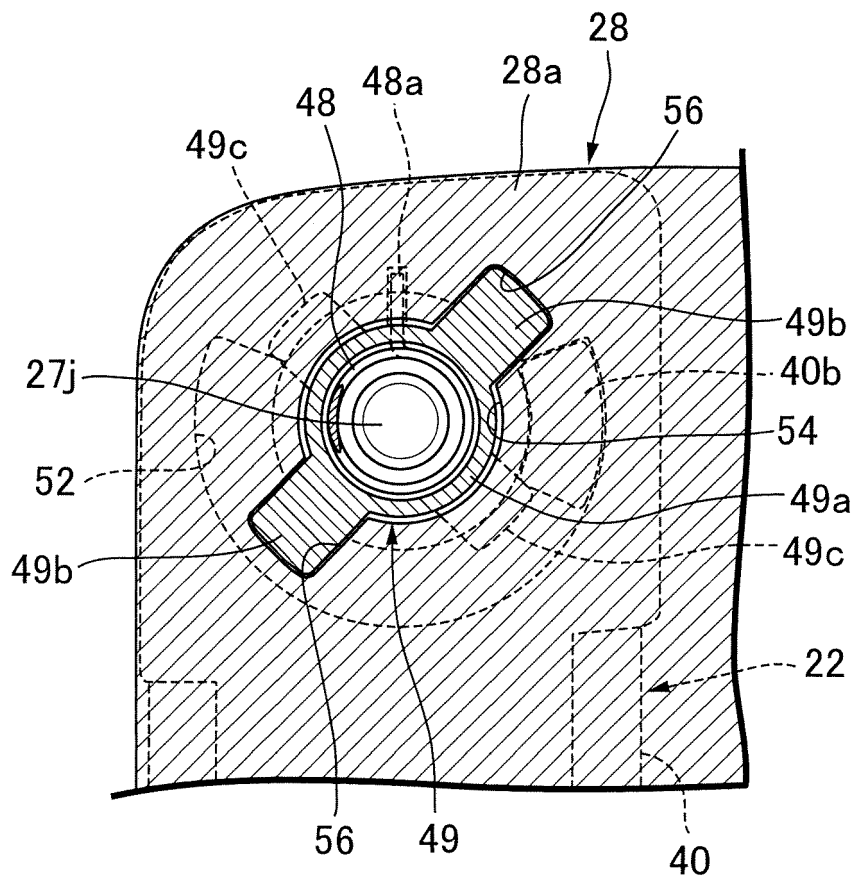


FIG.11

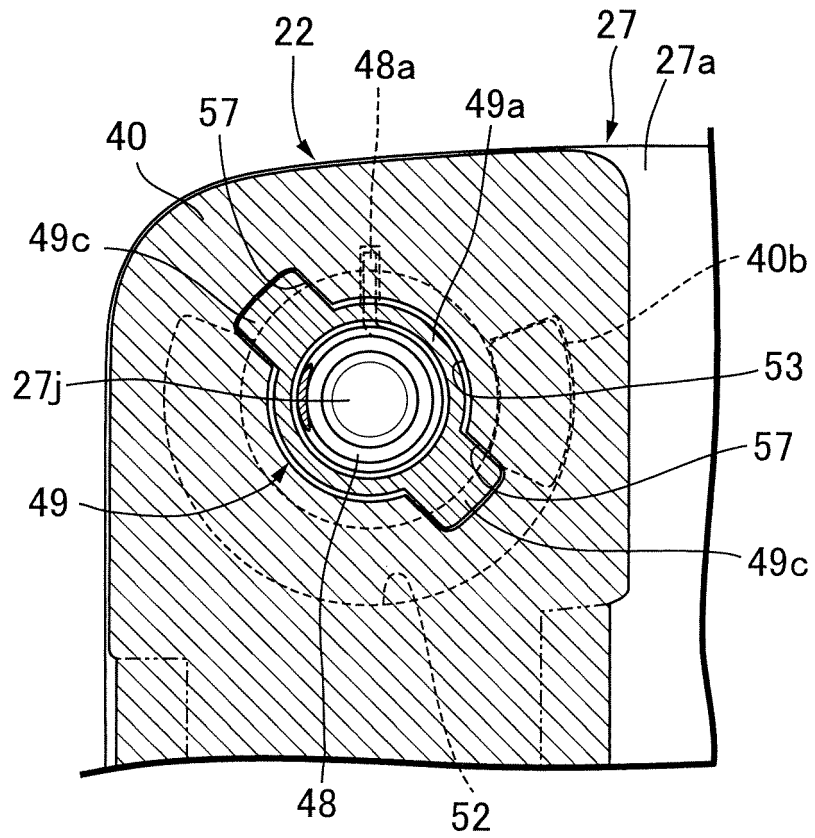
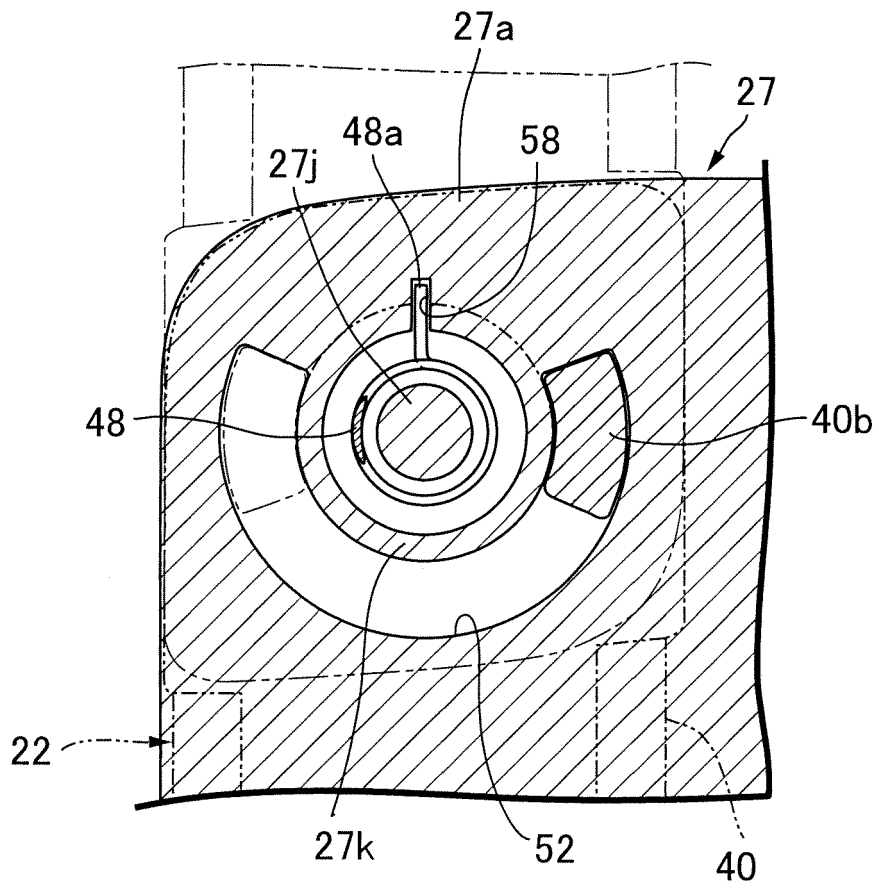


FIG.12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/079727

5	A. CLASSIFICATION OF SUBJECT MATTER E05B19/00(2006.01)i, E05B17/18(2006.01)i		
	According to International Patent Classification (IPC) or to both national classification and IPC		
10	B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) E05B19/00, E05B17/18		
15	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2016 Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016		
20	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
25	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	
		Relevant to claim No.	
25	X Y	JP 60-12056 Y2 (Matsukyu Co., Ltd.), 19 April 1985 (19.04.1985), column 3, lines 3 to 28; fig. 1 (Family: none)	1 2-4
30	Y	US 2006/0016231 A1 (KHOUNSOMBATH Saysamon et al.), 26 January 2006 (26.01.2006), paragraphs [0034] to [0035]; fig. 11 to 14 (Family: none)	2-4
35	Y	JP 9-317268 A (Suzuki Motor Corp.), 09 December 1997 (09.12.1997), paragraphs [0003] to [0004]; fig. 6 to 7 (Family: none)	3-4
40	<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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50	Date of the actual completion of the international search 15 January 2016 (15.01.16)	Date of mailing of the international search report 26 January 2016 (26.01.16)	
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Patent documents cited in the description

- JP 3914043 B [0003]