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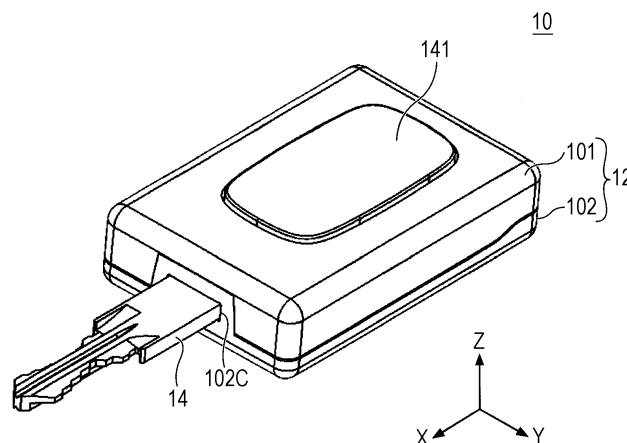
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(54) **PORTABLE DEVICE**

(57) A portable device (10) has: a case (12); a circuit board (130) disposed in the case (12); and an extending member (14) extending toward the outside of the case (12) in a first direction, the extending member (14) having a rear end part (14B) on the same side as the end in a second direction opposite to the first direction, the rear end part (14B) being held in a holding part (102D) in the

case (12). The case (12) has a wall (102Ba) disposed opposite to the rear end part (14B). The portable device further has an elastic contact (143) that is held between the wall (102Ba) and the rear end part (14B) and urges the extending member (14) in the first direction with an elastic force.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a portable device.

2. Description of the Related Art

[0002] Japanese Unexamined Patent Application Publication No. 2010-77618, for example, discloses the structure of an electronic key having a key plate that is inserted into the locking mechanism of a door of a vehicle or into the engine start mechanism of a vehicle and is then rotated, the key plate being fixed to a lower case with a bolt.

SUMMARY OF THE INVENTION

[0003] With the technology disclosed in Japanese Unexamined Patent Application Publication No. 2010-77618, however, there is always a clearance between the key plate and the case, the clearance being formed due to manufacturing error or being intentionally provided as a requirement needed in an assembly process. Looseness may also occur between the key plate and the case because fixing by the bolt is surely loosened as time elapses. In the technology disclosed in Japanese Unexamined Patent Application Publication No. 2010-77618, the case is formed from a synthetic resin raw material. Therefore, in a case as well in which a dimension of the case changes as time elapses, a clearance may be formed between the key plate and the case and looseness may thereby occur therebetween. If looseness occurs, when vibration caused during the travel of the vehicle is transmitted to the electronic key, a collision may occur between the key plate and the case and may thereby generate an undesired sound.

[0004] A portable device according to an embodiment has: a case; a circuit board disposed in the case; and an extending member extending toward the outside of the case in a first direction, the extending member having a rear end part on the same side as the end in a second direction opposite to the first direction, the rear end part being held in a holding part in the case. The case has a wall disposed opposite to the rear end part. The portable device further has an elastic contact that is held between the wall and the rear end part and urges the extending member in the first direction with an elastic force.

[0005] The portable device according to the embodiment can suppress the looseness of the extending member at a comparatively low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

Fig. 1 is a perspective view illustrating the outside shape of an electronic key according to an embodiment;

Fig. 2 is a plan view of the electronic key according to the embodiment;

Fig. 3 is an exploded perspective view of the electronic key according to the embodiment;

Fig. 4 is an enlarged view of part of a structure around a holding part in a lower case according to the embodiment in a state in which a key blade is not held; Fig. 5 is an enlarged view of part of the structure around the holding part in the lower case according to the embodiment in a state in which the key blade is held;

Fig. 6 is a perspective view illustrating the cross section of the electronic key illustrated in Fig. 2 as taken along line VI-VI;

Fig. 7 is a sectional view taken along the XY plane, illustrating a first variation of an elastic contact included in the electronic key according to the embodiment;

Fig. 8 is a sectional view taken along the XY plane, illustrating a second variation of the elastic contact included in the electronic key according to the embodiment;

Fig. 9 is a sectional view taken along the XY plane, illustrating a third variation of the elastic contact included in the electronic key according to the embodiment; and

Fig. 10 is a sectional view taken along the XY plane, illustrating a fourth variation of the elastic contact included in the electronic key according to the embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0007] An embodiment will be described below with reference to the drawings.

40 Outline of an electronic key 10

[0008] Fig. 1 is a perspective view illustrating the outside shape of an electronic key 10 according to an embodiment. Fig. 2 is a plan view of the electronic key 10 according to the embodiment. Fig. 3 is an exploded perspective view illustrating the structure of the electronic key 10 according to the embodiment. In the description below, the X-axis direction (long-side direction of a case 12) in the drawings will be taken as the front-back direction, the Y-axis direction (short-side direction of the case 12) in the drawings will be taken as the left-right direction (an example of a third direction), and the Z-axis direction (thickness direction of the case 12) in the drawings will be taken as the up-down direction (an example of a fourth direction), for convenience of explanation. Also for convenience of explanation, the positive X-axis direction in the drawings will be taken as the forward direction (an example of a first direction), the negative X-axis direction

in the drawings will be taken as the backward direction (an example of a second direction), the positive Y-axis direction in the drawings will be taken as the left direction, the negative Y-axis direction in the drawings will be taken as the right direction, the positive Z-axis direction in the drawings will be taken as the upward direction, and the negative Z-axis direction in the drawings will be taken as the downward direction.

[0009] The electronic key 10 illustrated in Figs. 1 and 2 is an example of a portable device. The electronic key 10 is a portable key device carried by the user. The electronic key 10 and a vehicle-mounted device (not illustrated) mounted in an automobile or another vehicle constitute an electronic key system. When the electronic key 10 wirelessly communicates with the vehicle-mounted device in response to the user's manipulation, the electronic key 10 can perform a remote operation for, for example, the locking or unlocking of the lock mechanism of a door of the vehicle.

[0010] As illustrated in Figs. 1 and 2, the electronic key 10 has the case 12 and a key blade 14. The case 12 is a thin vessel-like part in a substantially rectangular parallelepiped shape. The case 12 is formed from an acrylonitrile-butadiene-styrene (ABS) resin, a polycarbonate (PC) resin, or another resin raw material. The case 12 is formed by combining an upper case 101 and a lower case 102 together. That is, the case 12 is structured so that the case 12 can be separated into the upper case 101 and lower case 102.

[0011] An opening 101A illustrated in Fig. 3 is formed on the upper side of the upper case 101. As illustrated in Fig. 1, a knob 141 is provided so as to be exposed. The knob 141 has a plateau shape protruding upward from an elastic sheet 140 provided at the lower portion of the upper case 101 so as to be in contact with the upper case 101. The knob 141, which has a substantially rectangular shape in plan view, can be pressed by the user. When the knob 141 is pressed by the user, the electronic key 10 transmits a manipulation signal to lock or unlock the lock mechanism of the door of the vehicle to the vehicle-mounted device through wireless communication with the vehicle-mounted device.

[0012] The key blade 14 is an example of an extending member. The key blade 14 is a metallic elongated plate-like part linearly extending toward the front from an opening 102C formed in a side surface on the front side (positive X-axis side) of the lower case 102. When a portion of the key blade 14 on the rear end side (on the negative X-axis side) is passed through the opening 102C in the lower case 102, the key blade 14 is held in the opening 102C. The key blade 14 is a member formed as a key so that when a portion of the key blade 14 on the front side (on the positive X-axis side) is inserted into a key cylinder provided in the vehicle, the key blade 14 enables the key cylinder to be mechanically rotated. The key blade 14 has a rear end part 14B provided at the rear end and also has an opposing surface 14Ba (see Fig. 6) formed as the rear surface of the rear end part 14B. The

opposing surface 14Ba is formed so as to face a front wall 102Ba (an example of a wall described in Claim 1), which will be described later in detail, of the lower case 102. The opposing surface 14Ba is formed so as to extend in the left-right direction and up-down direction. The key blade 14 has a through-hole 14A passing through the key blade 14 in the up-down direction (in the Z-axis direction). The through-hole 14A is formed in front of the rear end part 14B so as to be adjacent to the rear end part 14B. The through-hole 14A is shaped as an element having a snap-fit structure that can be snapped into a protrusion 102Ea, which will be described later in detail, of the lower case 102. Due to the snap-fit structure, the front portion of the key blade 14 is fixed to and held in a holding part 102D in the case 12.

Structure of the electronic key 10

[0013] As illustrated in Fig. 3, the electronic key 10 has the upper case 101, the elastic sheet 140, a circuit board 130, and the lower case 102, and the key blade 14 in that order from the top of the drawing.

[0014] The upper case 101 is a member forming the upper portion of the case 12. The lower case 102 is a member forming the lower portion of the case 12. When the upper case 101 and lower case 102 are combined together, they form the case 12 in a vessel shape illustrated in Fig. 1.

[0015] The opening 101A is formed in the upper surface of the upper case 101. The knob 141 formed on the elastic sheet 140 is placed in the opening 101A so as to pass through it upward from the bottom of the upper case 101. Thus, the knob 141 is exposed from the front surface of the upper case 101, enabling the knob 141 to be pressed. As illustrated in Fig. 6, the upper case 101 has a pressing surface 101D (an example of a pressing part) on a surface on the lower side, the pressing surface 101D being formed so as to be parallel to the outer circumference 142, which will be described later in detail, of the elastic sheet 140. The pressing surface 101D is a portion provided at a position at which the pressing surface 101D comes into contact with the outer circumference 142 after assembling and presses the outer circumference 142.

[0016] As illustrated in Fig. 3, the lower case 102 has a circumferential wall 102B in a tubular shape and a circular pressing part 102Bc (an example of another pressing part) protruding upward from an edge on the upper side of the circumferential wall 102B, the edge being referred to below as the upper edge. The lower case 102 further has an upper opening 102F, which is open upward, formed by the circumferential wall 102B. The lower case 102 further has a storage space 102A, which is formed inside the upper opening 102F when the lower side of the lower case 102 is closed. The circuit board 130 and a discal button battery 16, which supplies electric power to the circuit board 130, are placed in the storage space 102A. The upper opening 102F and circular pressing part 102Bc have a shape and dimensions by which

the upper opening 102F is closed when the elastic sheet 140 is placed on the circular pressing part 102Bc. The outlines of the circumferential wall 102B and storage space 102A are substantially rectangular in plan view from above.

[0017] The circuit board 130 is a flat plate-like member on which a plurality of electronic parts that operate with electric power supplied from the button battery 16 are mounted. The circuit board 130 has a wireless communication function. The circuit board 130 is placed in the storage space 102A in the lower case 102. As the circuit board 130, a printed wiring board (PWB) formed from an insulative raw material such as glass epoxy, for example, is used. A switch 131a and a switch 131b are mounted on the surface 130A of the circuit board 130 on the upper side.

[0018] When, the switch 131a is pressed by the knob 141, for example, the circuit board 130 generates a manipulation signal to unlock or lock the lock mechanism in the door of the vehicle and wirelessly transmits the manipulation signal to the vehicle-mounted device (not illustrated) through a communication circuit (not illustrated).

[0019] The elastic sheet 140 is a sheet-like member having elasticity. Since the elastic sheet 140 is overlaid on the surface 130A of the circuit board 130, the elastic sheet 140 covers the surface 130A of the circuit board 130. The elastic sheet 140 is placed on the circular pressing part 102Bc in the lower case 102. Since a pressed part 142A, which will be described later in detail, is provided at a position at which the pressed part 142A comes into contact with the circular pressing part 102Bc, when the pressed part 142A is pressed downward, the elastic sheet 140 seals the storage space 102A in the lower case 102. Thus, the elastic sheet 140 prevents water from entering the circuit board 130 and storage space 102A. The elastic sheet 140 is formed from, for example, silicone rubber or another synthetic resin raw material.

[0020] As illustrated in Fig. 3, the elastic sheet 140 is substantially rectangular in plan view from above. The elastic sheet 140 is slightly larger in size than the circumferential wall 102B of the lower case 102. Therefore, the elastic sheet 140 can cover the whole of the upper opening 102F formed by the circumferential wall 102B of the lower case 102. Since the elastic sheet 140 is placed in tight contact with the circular pressing part 102Bc to close the upper opening 102F, it is possible to prevent water from entering the storage space 102A from the outside of the case 12 after assembling.

[0021] The elastic sheet 140 has the outer circumference 142, which is substantially parallel to a plane formed by the circuit board 130, and also has the knob 141, which has a plateau shape protruding upward from the outer circumference 142 and is disposed substantially at the center of the outer circumference 142. When the knob 141, exposed from the front surface of the upper case 101, is pressed by the user, the knob 141 is elastically deformed and can thereby press the surface 130A of the circuit board 130 and the switch 131a or switch 131b

disposed on the rear side of the knob 141.

[0022] The outer circumference 142 is a horizontal plate-like portion that encloses the knob 141. As illustrated in Fig. 6, the outer circumference 142 has the pressed part 142A held between the pressing surface 101D disposed on the lower side of the upper case 101 and the circular pressing part 102Bc disposed on the upper edge of the circumferential wall 102B of the lower case 102. The thickness of the pressed part 142A is larger than the spacing between the pressing surface 101D and the circular pressing part 102Bc. In this structure, when the outer circumference 142 is pressed by the pressing surface 101D, the circular pressing part 102Bc and pressed part 142A are brought into tight contact with each other, eliminating a clearance between the outside of the electronic key 10 and the storage space 102A. Therefore, it is possible to prevent water from entering the storage space 102A.

Holding structure of the key blade 14

[0023] Fig. 4 is an enlarged view of part of a structure around the holding part 102D in the lower case 102 according to the embodiment in a state in which the key blade 14 is not held. Fig. 5 is an enlarged view of part of the structure around the holding part 102D in the lower case 102 according to the embodiment in a state in which the key blade 14 is held. Fig. 6 is a perspective view illustrating the cross section of the electronic key 10 illustrated in Fig. 2 as taken along line VI-VI.

[0024] As illustrated in Figs. 4 to 6, the holding part 102D is provided on the front side (positive X-axis side) of the circumferential wall 102B of the lower case 102 and at the center of the circumferential wall 102B in the left-right direction (Y-axis direction). The opening 102C, which has a horizontally oriented rectangular shape in plan view, is formed in the front wall 102Da of the holding part 102D. The holding part 102D holds a portion of the key blade 14 on the rear side (negative X-axis side) in a state in which the key blade 14 passes through the opening 102C. An arm 102E extending backward (in the negative X-axis direction) from the front wall 102Da is provided at the upper portion of the holding part 102D and at the center of the holding part 102D in the left-right direction (Y-axis direction). The arm 102E can be elastically deformed in the up-down direction. A protrusion 102Ea protruding downward (in the negative Z-axis direction) is formed at the end of the arm 102E on the rear side (negative X-axis side).

[0025] The protrusion 102Ea restricts the movement of the key blade 14 in the front-back direction (X-axis direction) by being fitted into the through-hole 14A formed at the rear of the key blade 14. The protrusion 102Ea has an inclined surface 102Eb on the front side. When the key blade 14 is inserted into the opening 102C, the rear end part 14B of the key blade 14 is pressed against the inclined surface 102Eb. This elastically deforms the arm 102E and raises the protrusion 102Ea upward. As a re-

sult, the rear end part 14B of the key blade 14 can move backward from the protrusion 102Ea. When the through-hole 14A in the key blade 14 is positioned immediately below the protrusion 102Ea, the protrusion 102Ea is moved downward due to the elastic force of the arm 102E and is then fitted into the through-hole 14A. With the electronic key 10, in the embodiment, having this structure, the key blade 14 can be held in the holding part 102D just by passing the rear portion of the key blade 14 into the opening 102C. That is, the key blade 14 can be easily attached.

[0026] An elastic contact 143 of the elastic sheet 140 is disposed between the rear end part 14B of the key blade 14 and the front wall 102Ba of the circumferential wall 102B of the lower case 102. The rear end part 14B has an opposing surface 14Ba on the same side as the front wall 102Ba. The opposing surface 14Ba and front wall 102Ba are disposed so as to face each other. The opposing surface 14Ba extends in the left-right direction and up-down direction. The elastic contact 143 extends downward from an end 144 of the outer circumference 142 of the elastic sheet 140. The thickness of the elastic contact 143 in the front-back direction (X-axis direction) is larger than the spacing between the front wall 102Ba and the rear end part 14B of the key blade 14. Therefore, the elastic contact 143 is held by the front wall 102Ba and the rear end part 14B of the key blade 14. An elastic force generated at that time urges the key blade 14 forward (in the positive X-axis direction). Thus, the elastic contact 143 can press the inner wall surface of the through-hole 14A in the key blade 14 against the protrusion 102Ea. This can suppress looseness of the key blade 14 in the front-back direction (X-axis direction).

[0027] In this embodiment, the elastic contact 143 has a pair of protrusions 143A formed so as to be arranged in the left-right direction (Y-axis direction, which is an example of the third direction) in plan view from above (in the positive Z-axis direction), as an example. Each protrusion 143A has a convex shape that is sharp at the top in plan view and in which the protrusion 143A protrudes forward (in the positive X-axis direction) and extends in the up-down direction (Z-axis direction). The length of the protrusion 143A in the up-down direction is larger than the thickness of the key blade 14. Due to the pair of protrusions 143A, the elastic contact 143 can urge the rear end part 14B of the key blade 14 forward (in the positive X-axis direction) and evenly in the left-right direction. This enables the elastic contact 143 to suppress looseness in the direction of rotation around the through-hole 14A in the key blade 14.

[0028] As illustrated in Fig. 6, a convex part 102Bb protruding forward (in the positive X-axis direction) is formed on a surface of the front wall 102Ba, the surface facing the elastic contact 143. A concave part 143B having a shape matching the shape of the convex part 102Bb is formed on a surface of the elastic contact 143, the surface facing the front wall 102Ba. Thus, an engaging fastener 143C is formed at the lower part of the elastic contact

143. The engaging fastener 143C is an example of an engaging part. As illustrated in Fig. 6, when the engaging fastener 143C engages the convex part 102Bb of the front wall 102Ba, the movement of the elastic contact 143 in the upward direction (positive Z-axis direction, which is an example of the fourth direction) is restricted.

[0029] As described above, the electronic key 10 in the embodiment has: the case 12; the circuit board 130 disposed in the case 12; the elastic sheet 140 that covers the circuit board 130; and the key blade 14 provided so as to extend toward the outside of the case 12 in the positive X-axis direction, the rear end part 14B of the key blade 14 being held in the holding part 102D in the case 12. The elastic sheet 140 has the elastic contact 143 that extends downward from the end 144 and is held between the front wall 102Ba of the case 12 and the rear end part 14B of the key blade 14, the key blade 14 being urged in the positive X-axis direction by the elastic force of the elastic contact 143.

[0030] Thus, the electronic key 10 in the embodiment can press the key blade 14 in the positive X-axis direction. This can suppress the looseness of the key blade 14. In particular, with the electronic key 10 in the embodiment, the elastic contact 143 can be integrally formed as part of the elastic sheet 140, so the looseness of the key blade 14 can be suppressed at a comparatively low cost. Even if vibration is applied to the electronic key 10 in the embodiment, the elastic contact 143 can prevent a contact between the front wall 102Ba of the case 12 and the rear end part 14B of the key blade 14. Furthermore, with the electronic key 10 in the embodiment, the elastic contact 143 can eliminate an impact force generated when vibration is applied. This can suppress the case 12, circuit board 130, and the like from being damaged.

[0031] In the electronic key 10 in the embodiment, the holding part 102D has the opening 102C; when the rear end part 14B of the key blade 14 is passed through the opening 102C in the negative X-axis direction, the holding part 102D holds the rear end part 14B of the key blade 14 by a snap-fit structure.

[0032] Thus, with the electronic key 10 in the embodiment, the key blade 14 can be easily attached.

[0033] In the electronic key 10 in the embodiment, the elastic contact 143, provided so as to protrude in the positive X-axis direction, has the protrusion 143A that abuts the rear end part 14B of the key blade 14 and urges the key blade 14 in the first direction.

[0034] Thus, with the electronic key 10 in the embodiment, the rear end part 14B of the key blade 14 can be locally pressed by the protrusion 143A. In addition, with the electronic key 10 in the embodiment, a force with which the rear end part 14B of the key blade 14 is urged can be easily adjusted by changing the shape of the protrusion 143A.

[0035] In the electronic key 10 in the embodiment, the elastic contact 143 has the engaging fastener 143C that engages the front wall 102Ba and restricts the movement of the elastic contact 143 in the Z-axis direction.

[0036] Thus, the electronic key 10 in the embodiment can make the elastic contact 143 less likely to cause positional displacement with respect to the front wall 102Ba.

Variations of the elastic contact 143

[0037] Next, variations of the elastic contact 143 will be described with reference to Figs. 7 to 10. Fig. 7 is a sectional view taken along the XY plane, illustrating a first variation of the elastic contact 143 included in the electronic key 10 according to the embodiment. Fig. 8 is a sectional view taken along the XY plane, illustrating a second variation of the elastic contact 143 included in the electronic key 10 according to the embodiment. Fig. 9 is a sectional view taken along the XY plane, illustrating a third variation of the elastic contact 143 included in the electronic key 10 according to the embodiment.

[0038] The number of protrusions 143A of the elastic contact 143 and their shape are not limited to the number and shape illustrated in Figs. 4 and 5. That is, the elastic contact 143 is not limited to an aspect in which two protrusions 143A are arranged in the left-right direction (Y-axis direction). For example, the elastic contact 143 may have only one protrusion 143A as illustrated in Fig. 7 or may have three protrusions 143A arranged in the left-right direction (Y-axis direction) as illustrated in Fig. 9.

[0039] In addition, the protrusion 143A is not limited to a shape that is sharp at the top in plan view in the Z-axis direction. For example, the protrusion 143A may have a convex portion curved in a semicircular shape at the top in plan view in the Z-axis direction, as illustrated in Figs. 8 and 9. Alternatively, for example, the protrusion 143A may have a convex portion protruding forward (in the positive X-axis direction) in plan view in the Y-axis direction.

[0040] Fig. 10 is a sectional view taken along the XY plane, illustrating a fourth variation of the elastic contact 143 included in the electronic key 10 according to the embodiment.

[0041] In the variation in Fig. 10, the upper case 101 has a perpendicular wall 101C provided between the rear end of the arm 102E and the convex part 102Bb of the front wall 102Ba so as to extend downward from a ceiling surface 101B. The rear surface 101Ca of the perpendicular wall 101C is inclined downward at a certain inclination angle.

[0042] The convex part 102Bb of the front wall 102Ba has a front surface 101Bc that faces the rear surface 101Ca of the perpendicular wall 101C. The front surface 101Bc is inclined upward at a certain inclination angle, which is the same as the inclination angle of the rear surface 101Ca.

[0043] As illustrated in Fig. 10, the rear surface 101Ca of the perpendicular wall 101C and the front surface 101Bc of the convex part 102Bb are parallel to each other and are spaced apart from each other by a certain distance. Thus, a gap A inclined along the rear surface 101Ca and front surface 101Bc is formed between the

rear surface 101Ca and the front surface 101Bc. The elastic contact 143 has an inclined part 143D inclined in the gap A along the rear surface 101Ca and front surface 101Bc. In the variation in Fig. 10, the inclined part 143D is in tight contact with the front surface 101Bc, but is spaced apart from the rear surface 101Ca by a certain distance. However, the inclined part 143D may be in tight contact with the rear surface 101Ca.

[0044] So far, an embodiment of the present invention has been described. However, the present disclosure is not limited to the embodiment. Various variations and modifications are possible without departing from the intended scope, described in the claims, of the present disclosure.

[0045] For example, an example of an application to the electronic key 10 in the present invention has been described in the above embodiment. However, this is not a limitation. The present invention can be applied to any portable device if it has at least a structure in which an extending member, which is not limited to a key blade, is held by a case.

Claims

1. A portable device (10) comprising:

a case (12) having a holding part (102D);
a circuit board (130) disposed in the case (12);
an elastic contact (143); and
an extending member (14) extending toward an outside of the case (12) in a first direction, the extending member (14) having a rear end part (14B) on a same side as an end in a second direction opposite to the first direction, the rear end part (14B) being held in the holding part (102D) in the case (12); the portable device being **characterized in that**
the case (12) has a wall (102Ba) disposed opposite to the rear end part (14B), and
the elastic contact (143) is held between the wall (102Ba) and the rear end part (14B) and urges the extending member (14) in the first direction with an elastic force.

2. The portable device according to Claim 1, **characterized in that:**

the case (12) has an opening (102C) formed in the first direction; and
when the rear end part (14B) of the extending member (14) is passed through the opening (102C) in the second direction, the holding part (102D) holds the rear end part (14B) of the extending member (14) by a snap-fit structure.

3. The portable device according to Claim 2, **characterized in that:**

the rear end part (14B) has an opposing surface (14Ba) disposed on a same side as the wall (102Ba) so as to face the wall (102Ba); and the elastic contact (143) has a protrusion (143A) configured to abut the opposing surface (14Ba) and urge the extending member (14) in the first direction.

4. The portable device according to Claim 3, **characterized in that** the protrusion (143A) has a convex shape oriented in the first direction or the second direction in plan view from a third direction orthogonal to the first direction, the opposing surface (14Ba) extending in the third direction.
5. The portable device according to Claim 3 or Claim 4, **characterized in that** the protrusion (143A) has a convex shape oriented in the first direction or the second direction in plan view from a fourth direction orthogonal to the first direction, the second direction, and the third direction orthogonal to the first direction, the opposing surface (14Ba) extending in the third direction.
6. The portable device according to Claim 4 or Claim 5, **characterized in that** at least two protrusions (143A) are arranged in the third direction.
7. The portable device according to any one of Claim 1 to Claim 6, further comprising an elastic sheet (140) configured to cover the circuit board (130), the portable device being **characterized in that** the elastic contact (143) extends from an end (144) of the elastic sheet (140) in the first direction.
8. The portable device according to Claim 7, **characterized in that:**
 - the elastic sheet (140) has an outer circumference (142) having a plate-like shape, the elastic sheet (140) being disposed substantially parallel to the circuit board (130);
 - the case (12) has a plurality of pressing parts (101D, 102Bc) configured to hold the outer circumference (142) from both surfaces of the plate-like shape of the outer circumference (142);
 - a pressed part (142A) pressed by the pressing parts (101D, 102Bc) is provided at part of the outer circumference (142);
 - the end (144) is formed on a same side as an end of the pressed part (142A) in the first direction so as to be continuous to the pressed part (142A); and
 - the elastic contact (143) extends from the end (144) in a direction substantially a same as the fourth direction orthogonal to the first direction, the second direction, and the third direction.

9. The portable device according to Claim 8, **characterized in that** the elastic contact (143) has an engaging part (143C) configured to engage the wall (102Ba) and restrict movement of the elastic contact (143) in the fourth direction.

FIG. 1

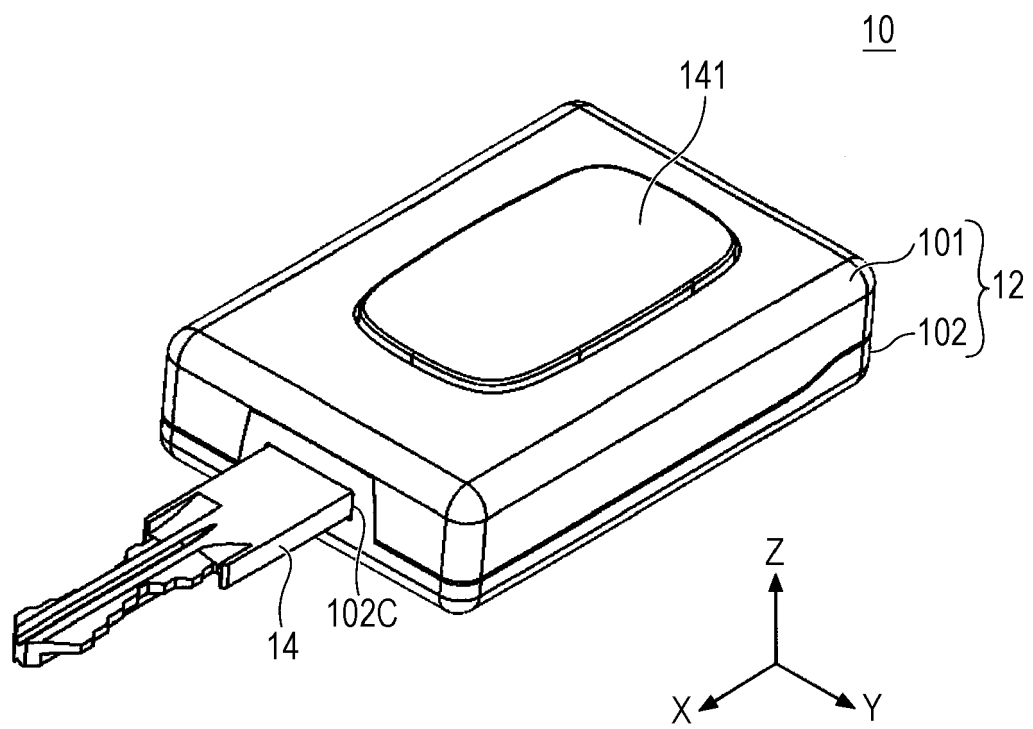


FIG. 2

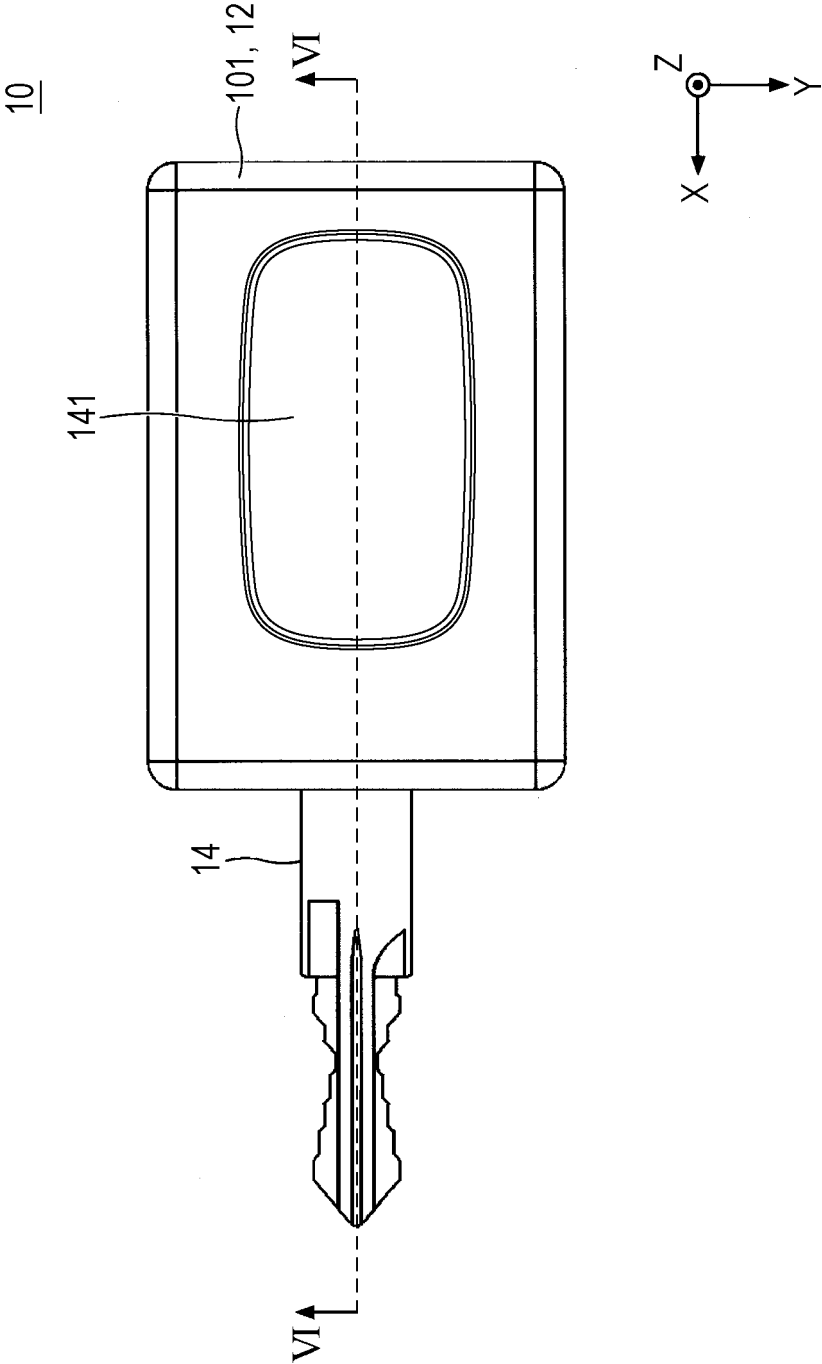


FIG. 3

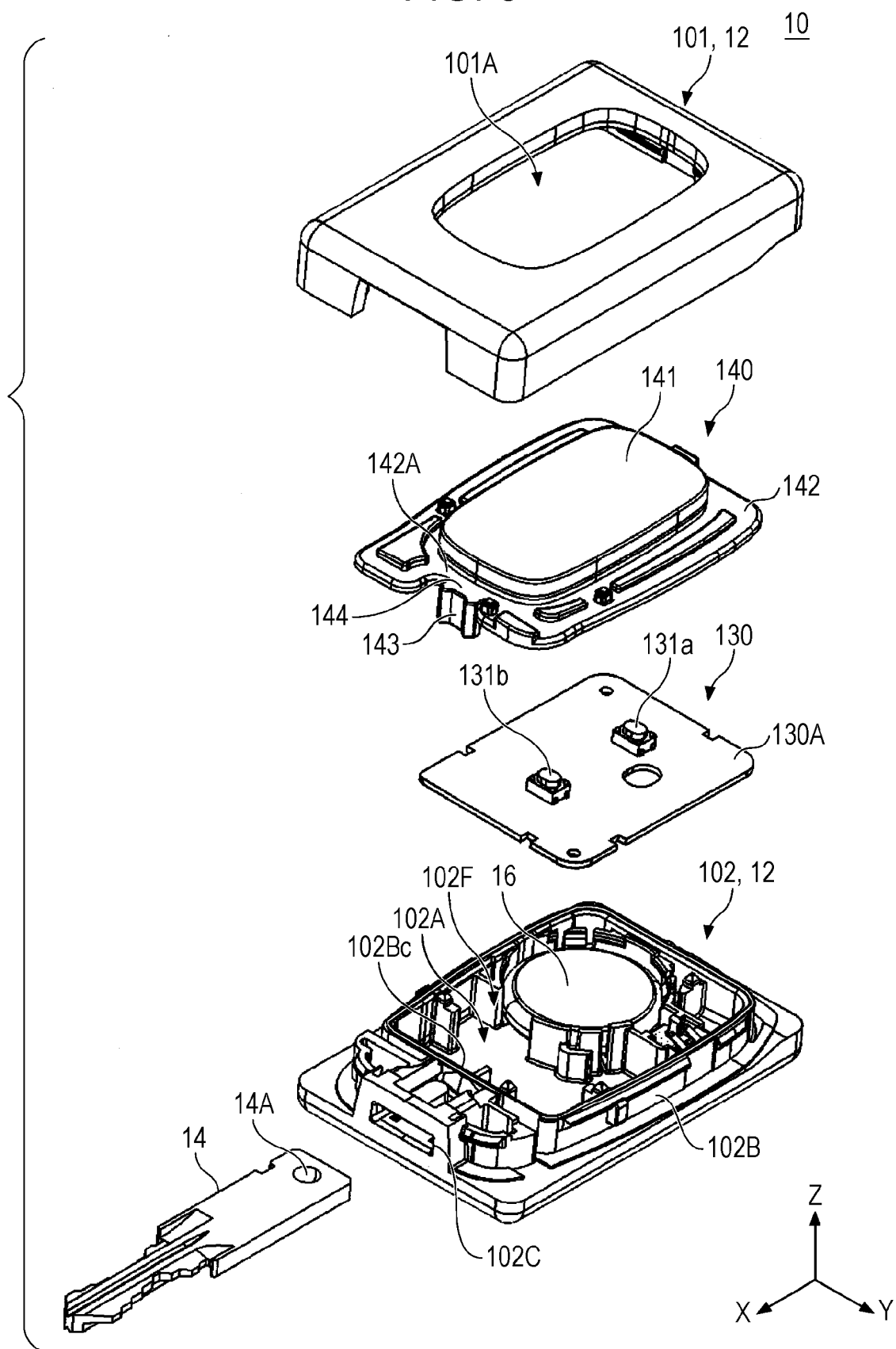


FIG. 4

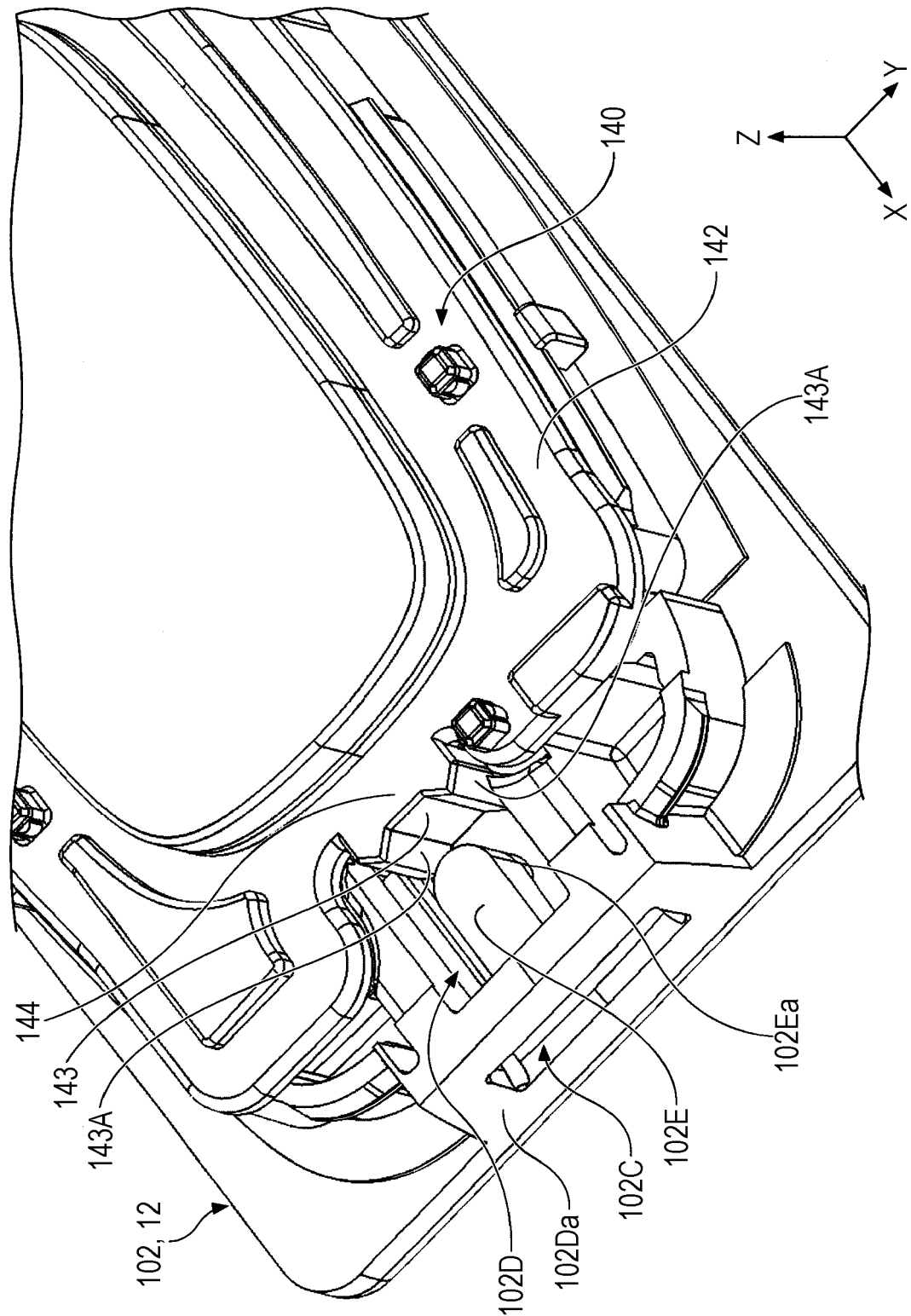


FIG. 5

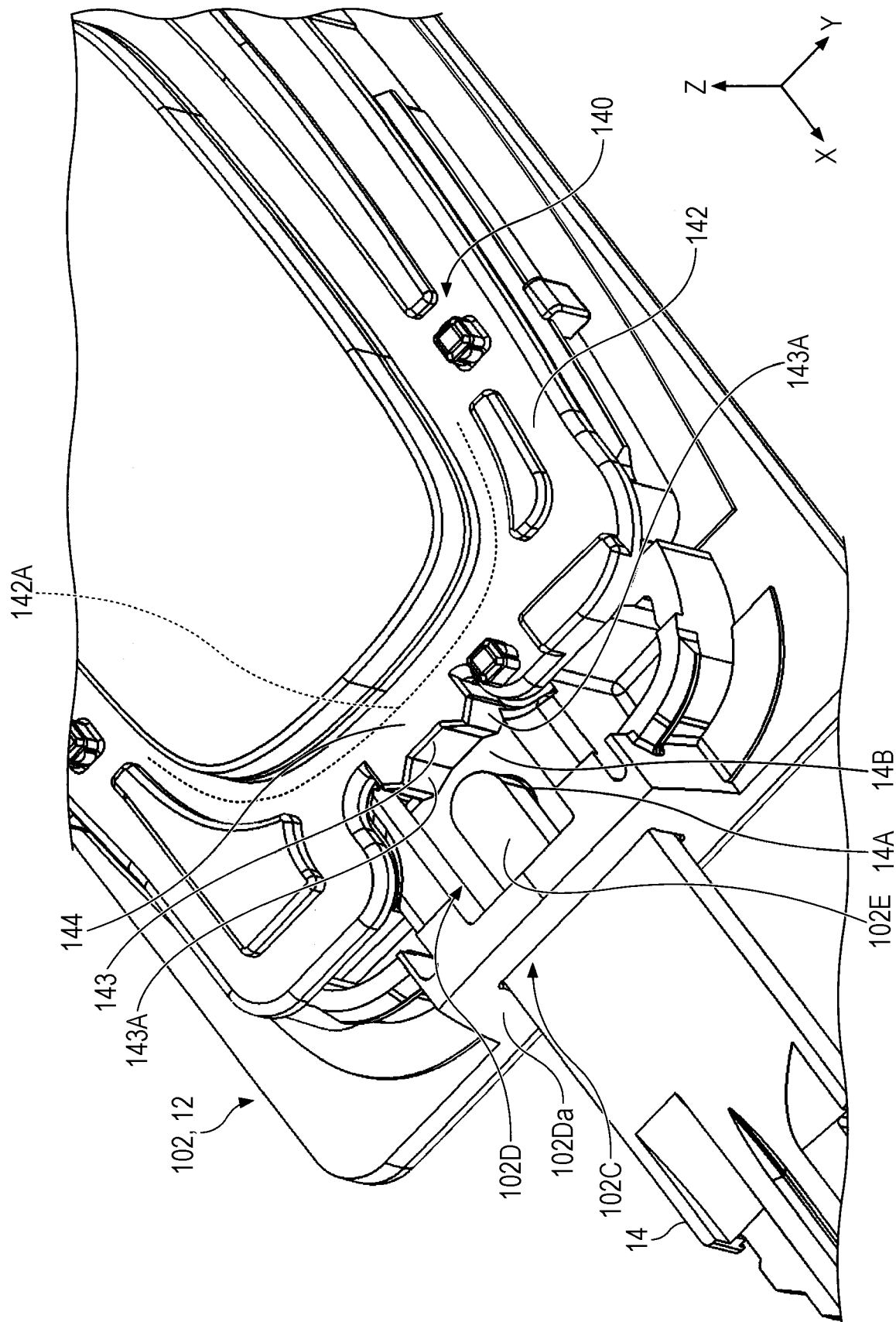


FIG. 6

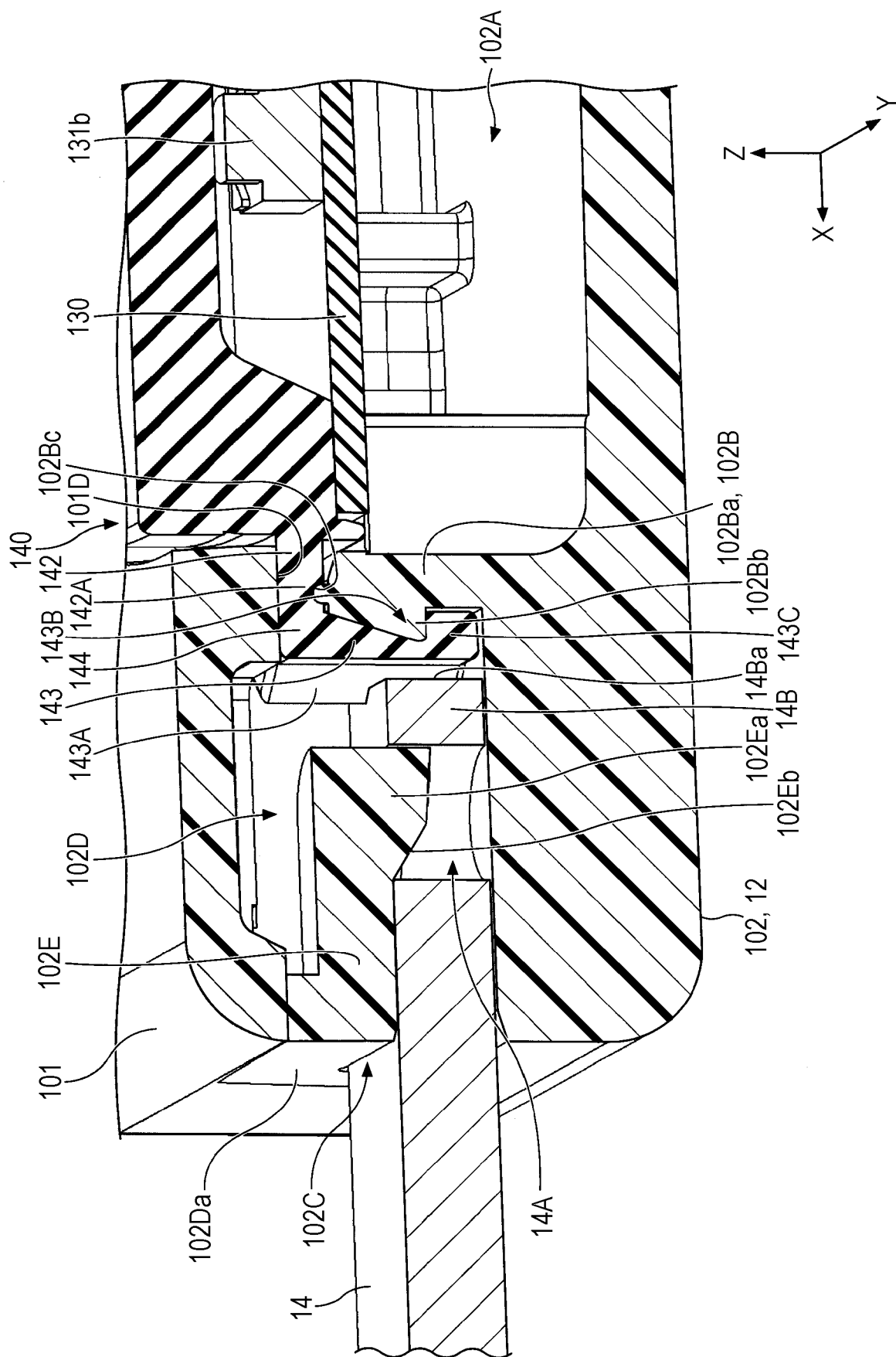


FIG. 7

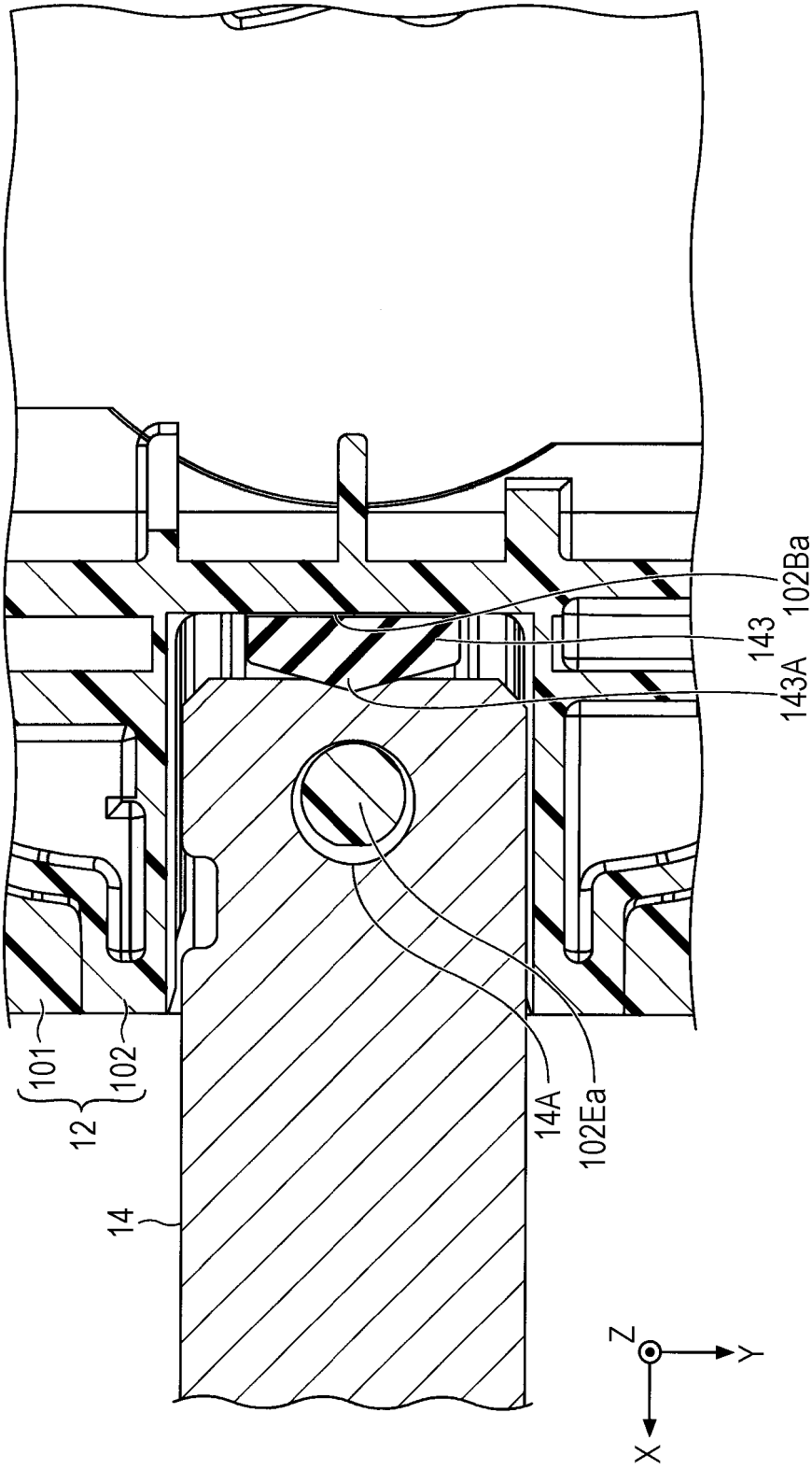


FIG. 8

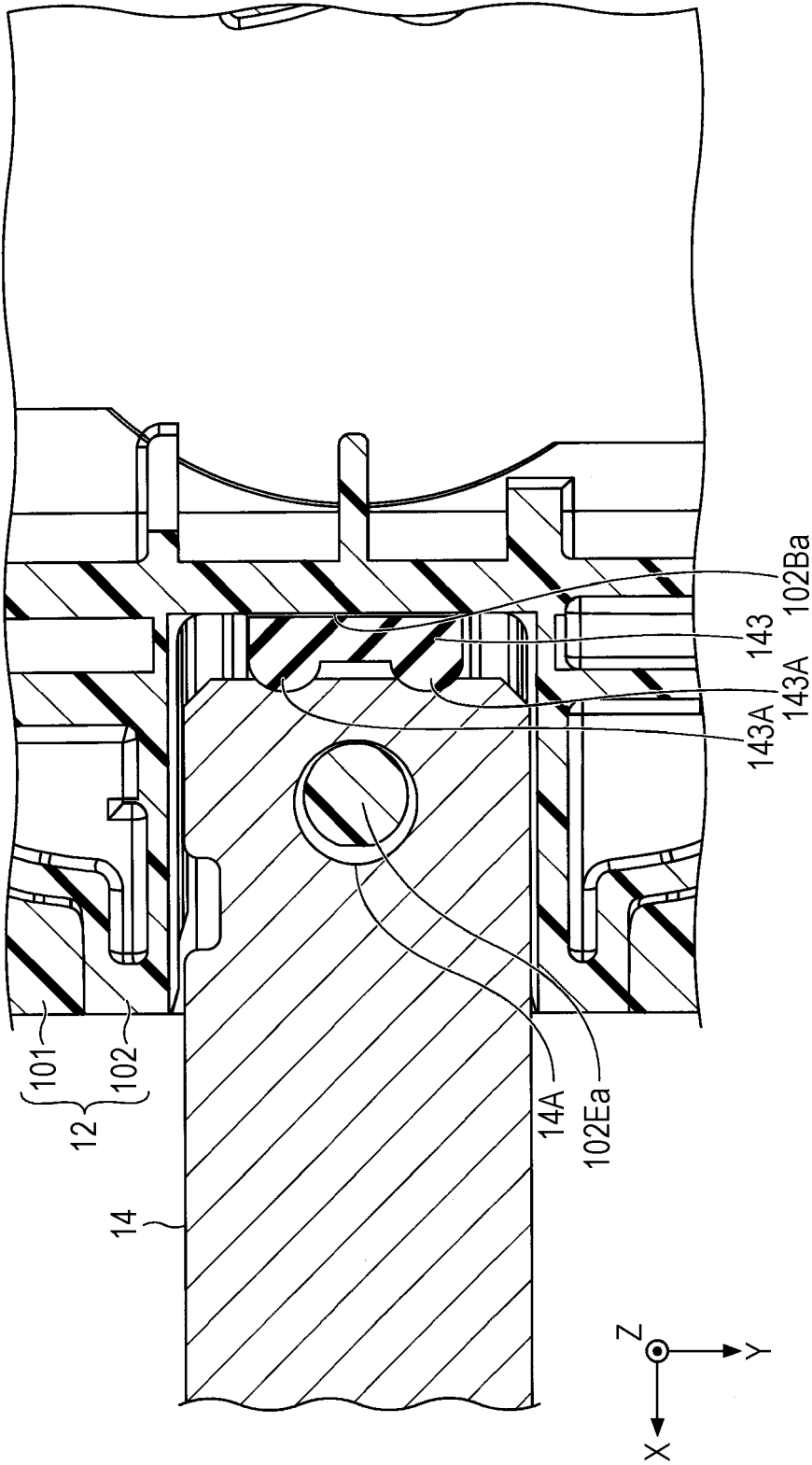


FIG. 9

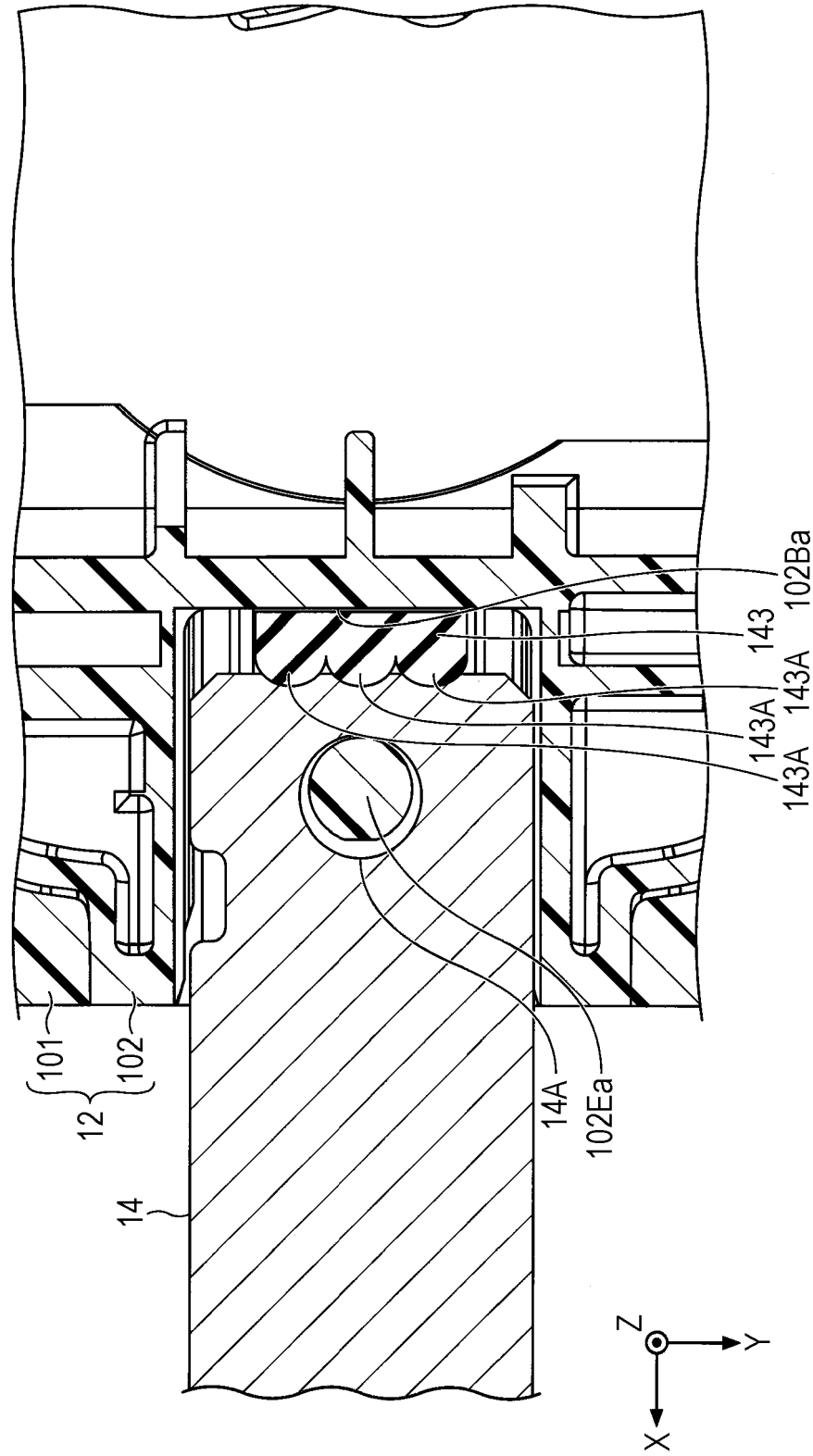
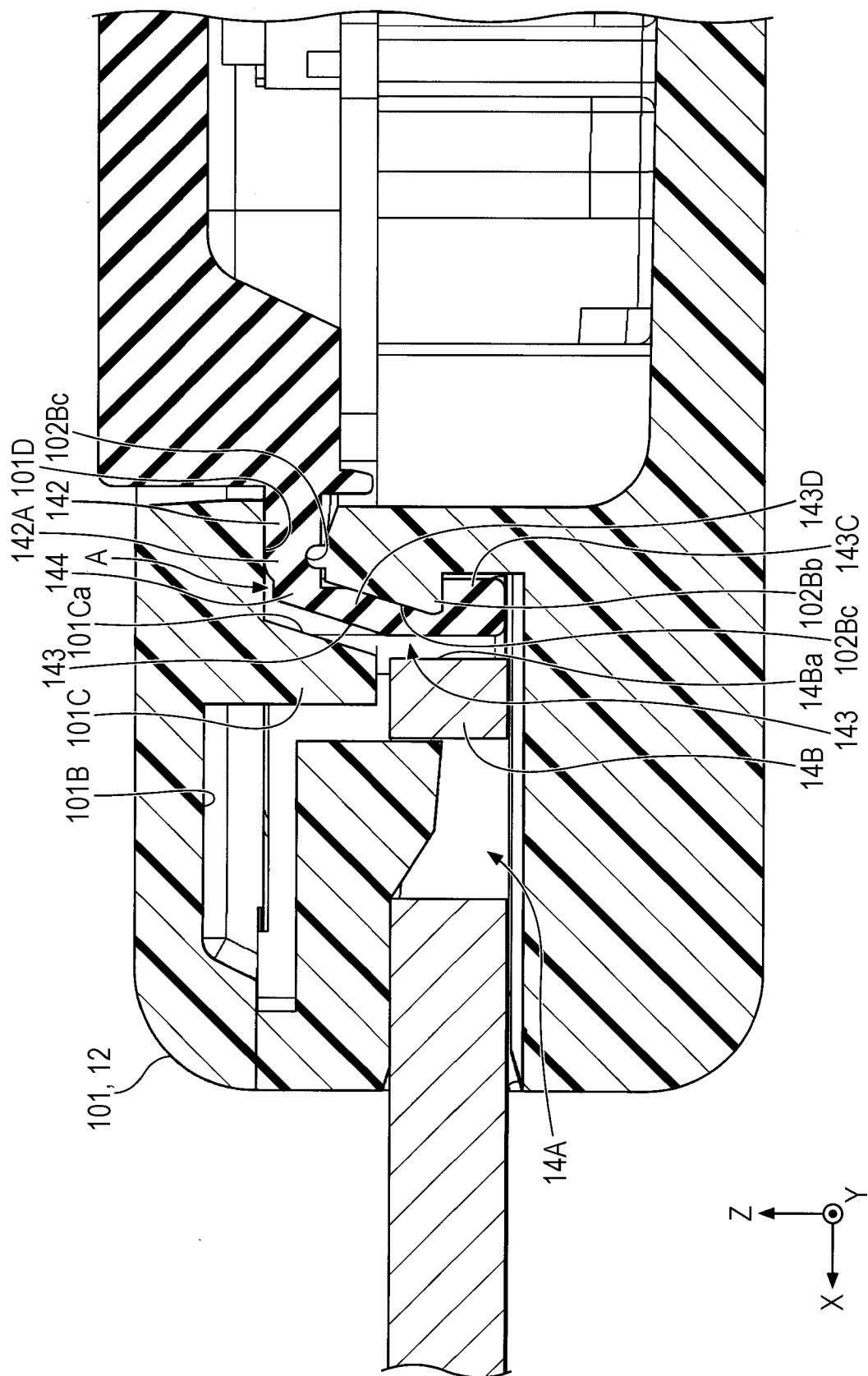


FIG. 10





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