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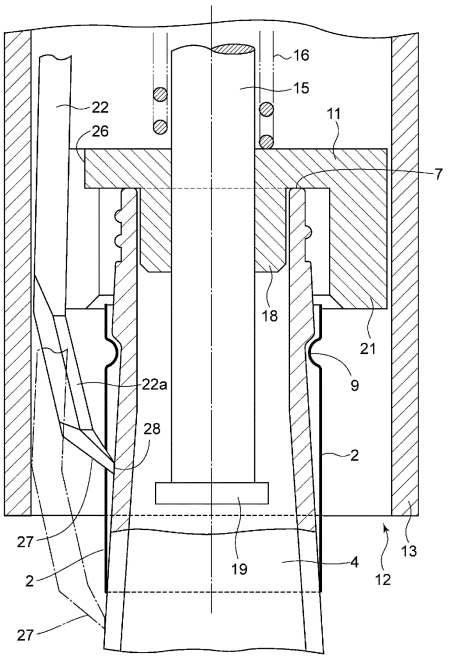
(54) SEALING RING REMOVAL DEVICE FOR BOTTLE

(57) A sealing ring removal device is used to remove a sealing ring remaining on a neck of a wine bottle. The sealing ring removal device includes a restriction body (11) coming into contact with the top surface (7) of a bottle (3), and a pusher (12) mounted on the restriction body (11) in a slidable manner. The pusher (12) is provided with a cutter (22). Pushing down the pusher (12) against a spring (16) causes a cutting edge (27) of the cutter (22) to cut or tear a sealing ring (2). As a result, the sealing ring (2) can be easily removed. The restriction body (11) is held by a boss portion (18) or an outer cylindrical portion (21) in a non-displaceable manner.

FIG.4



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Description

TECHNICAL FIELD

[0001] The present invention relates to a device configured to remove a sealing ring remaining on a neck of a wine bottle or the like.

BACKGROUND ART

[0002] One type of cap devices, which are made from a metallic plate and configured to seal a bottle, has a threaded cap and a sealing ring integrated with the threaded cap for keeping virginity of the bottle. Specifically, as shown in Fig. 10, a sealing ring 2 is integrated to a lower end of the threaded cap 1. The threaded cap and the sealing ring are connected to each other via a bridge portion 6 that is provided at the position of a flange 5 provided on a narrow neck 4 of a bottle 3.

[0003] A packing (not shown) is provided on an inner surface of the top of the threaded cap 1. After a predetermined content is loaded in the bottle 3, the threaded cap 1 is pressed downwardly to compress the packing. In this state, inward threading 8 is formed by rolling, and an inward protrusion 9 is formed immediately under the flange 5 by rolling, thereby sealing the bottle 3. In general, the neck 4 of the bottle 3 has a tapered shape that has an increasing diameter toward a bottom of the neck. The lower end of the sealing ring 2 is held in contact with or adjacent to an outer periphery of the neck 4.

[0004] As the threaded cap 1 is unscrewed, the bridge portion 6 is torn off to open the bottle, but the sealing ring 2 remains on the neck 4 of the bottle 3. The remaining sealing ring 2 causes a problem, i.e., it hinders the recycling of the bottle 3. Specifically, the material of the bottle 3 is different from the material of the sealing ring 2 and therefore the bottle 3 and the sealing ring 2 should be separately disposed of for the respective recycling. However, because separate disposal of the bottle and the sealing ring is cumbersome, both the bottle and the sealing ring are often disposed of together as waste. As a result, the recycling of the bottle 3 and the sealing ring 2 (in particular, the recycling of the bottle 3) is not achieved perfectly.

[0005] On the other hand, one type of pilfer-proof caps, which are made from resin, leaves a pilfer-proof ring on the neck of the bottle. Because the material of the bottle is different from the material of the pilfer-proof ring (or a pilfer-proof band), the pilfer-proof ring should be removed from the bottle upon recycling (especially, for the recycling of the bottle).

[0006] Thus, a device for removing the pilfer-proof ring has been proposed. One example of such device is a push-down cutter device disclosed in Patent Document 1. Specifically, the cutter device of Patent Document 1 includes a bottomed cylindrical cutter cover and a cutter provided in the cutter cover. The cutter cover can fit over a mouth of the bottle. As the cutter cover is fitted over the mouth of the bottle and pushed downwardly, the cutter cuts the pilfer-proof ring (end ring).

LISTING OF PRIOR ART REFERENCES

PATENT DOCUMENTS

[0007] PATENT DOCUMENT 1: JP-A-2013-159399

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0008] The pilfer-proof ring of the resin-made pilfer-proof cap is placed over the flange (more accurately, between two adjacent (or upper and lower) flange portions) formed at the neck of the bottle. In Patent Document 1, as the cutter is pressed downwardly against the pilfer-proof ring supported upwardly by the flange of the bottle, the pilfer-proof ring is pressed and cut such that the pilfer-proof ring has no longer a loop shape.

[0009] On the other hand, as shown Fig. 10, when the metallic (aluminum) threaded cap 1 is used for the wine bottle, the sealing ring 2 is elongated downwardly below the flange 5. Thus, a cutter that is simply attached to a cutter cover, as in Patent Document 1, cannot have a sufficient stroke and cannot cut the sealing ring 2. In other words, the cutter device disclosed in Patent Document 1 is not applicable to remove the metallic long sealing ring 2.

[0010] The present invention has been conceived to improve the above-described current status. It is therefore an object of the present invention to provide a device that can easily remove a sealing ring even if the sealing ring is long.

SOLUTION TO THE PROBLEMS

[0011] The present invention is directed to a device adapted to remove a sealing ring, which is left at a neck of a bottle. This sealing ring removal device includes a restriction body that comes downwardly into contact with a top surface of a mouth of the bottle, and a pusher mounted on the restriction body such that the pusher can be pressed downwardly despite a spring. The restriction body is provided with a positioning portion that is configured to engage with the mouth of the bottle from inside, outside or both inside and outside, and the pusher is provided with a cutter that is configured to cut the sealing ring in an axial direction of the bottle upon a downward movement of the cutter. It should be noted that the pusher may be referred to as a slider or a movable body.

[0012] The bottle is used in an upright posture in order to prevent its content from dropping from the bottle. In other words, it can be said that the upright posture is a standard posture of the bottle. In the present invention, therefore, the structure of the device is defined on the assumption that the bottle is used in the upright posture.

It should be noted, however, that this way of defining the structure of the device is used for the sake of easier understanding of the structure of the device, and does not exclude use of the device when the bottle is laid or takes a horizontal posture and when the bottle takes an upside-down posture.

[0013] The present invention has various aspects. Exemplary aspects of the present invention will be described below. In a first aspect, the pusher may have a cylindrical portion that surrounds the bottle from outside, and an end member disposed at an upper end of the cylindrical portion. The cutter is arranged in the pusher.

[0014] In a second aspect of the present invention, the cutter is pushed by an elastic body to bring a free end (tip) of the cutter toward or into contact with an outer peripheral face of the neck of the bottle. The second aspect may be employed independent of the first aspect. Alternatively, the second aspect may be employed together with the first aspect.

[0015] A third aspect of the present invention relates to safety equipment. Specifically, the third aspect includes a locking member that is configured to hold the pusher such that the pusher cannot move downwardly unless the restriction body is engaged into the bottle. The locking member serves as the safety equipment. The third aspect may be employed independently. Alternatively, the third aspect may be employed together with the first and second aspects in a suitable manner.

[0016] In a fourth aspect of the present invention, safety equipment (locking member) is applied to the second aspect. Specifically, the fourth aspect modifies the second aspect such that a locking member is arranged in the pusher at a position circumferentially spaced from the cutter, and the locking member is configured to hold and prevent the pusher from moving downwardly unless the restriction body is engaged into the mouth of the bottle. When the restriction body is not engaged into the mouth of the bottle, the locking member abuts on the restriction body to hold the pusher such that pushing down of the pusher is prohibited. When the restriction body is engaged into the mouth of the bottle, the locking member moves and escapes from the restriction body such that pushing down of the pusher is allowed.

ADVANTAGES OF THE INVENTION

[0017] In the present invention, when the restriction body is engaged into the mouth of the bottle from above, with the bottle being placed in the upright posture, and the pusher is moved downwardly, for example, then the cutter attached to the pusher cuts (tears) the sealing ring. In this case, the stroke of the pusher may be decided arbitrarily, and therefore it is possible to cut the sealing ring without causing any problems even if the sealing ring is long. In addition, because the restriction body is positioned, the position of the pusher is accurately maintained. Thus, misalignment or displacement of the cutter is restricted, and the sealing ring is cut in a desired manner.

[0018] When the first aspect is employed, the pusher has a cylindrical shape so that the pusher is maintained in a stable posture that causes no lateral displacement. Accordingly, there is an advantage that it is possible to cut the sealing ring in a more reliable manner. There is another advantage that the cutter is hidden in the pusher and therefore the safety is enhanced.

[0019] If the free end of the cutter contacts the outer periphery of the sealing ring, the sealing ring may not be cut upon pressing down the pusher, or the sealing ring may not be cut sufficiently upon pressing down the pusher. In view of such concern, when the second aspect is employed, the free end (lower end) of the cutter is brought into contact with the upper end face of the sealing ring in a reliable manner as the free end of the cutter contacts or comes close to the outer peripheral surface of the neck of the bottle. Thus, the cutting of the sealing ring is achieved more securely.

[0020] The sealing ring removal device of the present invention has no problems with regard to safety if the device is appropriately kept and used. However, the pusher and the restriction body may be caused to move relative to each other for some reason while the sealing ring removal device is not being used with a bottle. This may cause a situation in which a finger of a human contacts the cutter. In contrast, when the third and fourth aspects are used, the pusher cannot be pushed and moved unless the device is used with the bottle. Thus, the third and fourth aspects have an advantage that improved safety is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

Fig. 1 is a set of views that show a first embodiment of the present invention. Specifically, Fig. 1(A) is an outside perspective view of an entire device, with a pusher being indicated by a single dot chain line, Fig. 1(B) is an exploded perspective view, Fig. 1(C) is a perspective view of a cutter from its outside, and Fig. 1(D) is a perspective view of the cutter from its inside.

Fig. 2 shows a cross-sectional view, taken along the line II-II in Fig. 1, to show the device of the first embodiment in use.

Fig. 3 is a vertical cross-sectional view that shows major parts of the device of the first embodiment at an early stage in use.

Fig. 4 is a vertical cross-sectional view that shows the major parts of the device of the first embodiment at an ending stage in use.

Fig. 5(A) is a horizontal cross-sectional view after cutting, and Fig. 5(B) shows another example.

Fig. 6 is a set of views to show a second embodiment of the present invention. Specifically, Fig. 6(A) shows an exploded perspective view of the entire device, and Fig. 6(B) shows an exploded perspective view

to show some parts of the device.

Fig. 7 is a set of views to show the second embodiment of the present invention. Specifically, Fig. 7(A) is a vertical cross-sectional view of major parts of the device of the second embodiment, and Fig. 7(B) is a perspective view of a cutter.

Fig. 8 is a cross-sectional view to show some parts of the device of the second embodiment in use.

Fig. 9 is a set of views to show a third embodiment of the present invention. Specifically, Fig. 9(A) is an exploded perspective view of major parts of the device of the third embodiment, and Fig. 9(B) is a vertical cross-sectional view of major parts of the device of the third embodiment.

Fig. 10 is a set of views to show a bottle and a threaded cap.

MODE FOR CARRYING OUT THE INVENTION

(1) Configuration of the First Embodiment

[0022] Now, embodiments of the present invention will be described with reference to the drawings. Firstly, a configuration of a first embodiment, which is illustrated in Fig. 1 to Fig. 6, will be described. A sealing ring removal device includes a restriction body 11, which is made from resin (or metal) and comes into contact with a top face 7 of a bottle 3, and a pusher 12, which will be fitted over a neck 4 of the bottle 3.

[0023] The pusher 12 has a cylindrical portion 13 and an end member 14 fitted to the cylindrical portion 13. A rod 15 is fixedly secured to the end member 14 by screwing. The restriction body 11 slidably fits on the rod. From a different view point, it can be said that the pusher 12 is slidably mounted to the restriction body 11 via the rod 15. The outer periphery of the cylindrical portion 13 and the outer periphery of the end member 14 have the same diameter (align with each other).

[0024] The cylindrical portion 13 and end member 14 of the pusher 12 may be made of resin or metal, such as aluminum in case of aluminum die casting. If the cylindrical portion 13 is made from resin, the cylindrical portion 13 may be transparent or semi-transparent. The cylindrical portion 13 may be united to the end member 14 by screwing.

[0025] A spring 16 is engaged over the rod 15 to biases the restriction body 11 away from the end member 14 of the pusher 12. In this case, in order to allow the restriction body 11 to move into abutment with the end member 14, the end member 14 includes a recess 17 that has a depth to receive the spring 16.

[0026] The restriction body 11 is integrally provided with a boss portion 18 fitting in the mouth of the bottle 3 to serve as a positioning member for holding the restriction body at the mouth 5 of the bottle 2 against lateral shift. The rod 15 is also slidably fitted in the boss portion 18. A discal stopper plate 19 is fixedly secured to an end face (lower end face) of the rod 15 by a screw 20 for coming into abutment with the end face of the boss portion 18 to prevent the restriction body 11 from removing.

[0027] Instead of using the stopper plate 19 for preventing removal of the restriction body, use may be made of the screw 20 having a diametrically enlarged flange head (i.e., the head of the screw 20 may be utilized for preventing removal of the restriction body). Alternatively, the rod 14 may have an integral head (or flange) that prevents removal of the restriction body.

[0028] The restriction body 11 is integrally provided with an outer cylindrical portion 21 that surrounds and covers the mouth of the bottle 3. The positioning of the restriction body 11 may be achieved by the boss portion 18 alone, or by the outer cylindrical portion 21 alone. When the outer cylindrical portion 21 is provided, the vertical length of the restriction body 11 becomes longer. This brings about an advantage that the pusher 12 can slide smoothly.

[0029] The sealing ring removal device includes a metallic cutter 22 to cut the sealing ring 2 in an axial direction of the bottle 3. The cutter 22 is in the form of a bar (cross-sectionally square or rectangular column), which is elongated in the axial direction of the rod 15 to extend along the inner peripheral surface of the cylindrical portion 13 of the pusher 12.

[0030] As shown in Fig. 1(B) and Fig. 2, the end member 14 of the pusher 12 is formed with a recess 23 that receives an upper end (one end) of the cutter 22. An upper portion of the cutter 22 is coupled to the end member 14 by a pin 24 that extends perpendicularly to the rod 15. Also, the recess 23 is provided with a hole 23 in which a rubber 25 as an example of an elastic (resilient) body is placed to bias (push) the cutter 22 outwardly at a position above the pin 24. The rubber 25 may be replaced with a spring such as a coil spring or a plate spring.

[0031] A lower end (a free end or an opposite end) of the cutter 22 defines a beak portion 22a that bends to enter a cut-out groove 26 formed in the restriction body 11. The beak portion 22a tapers toward its tip. The beak portion 22a is formed with a ridge-like cutting edge 27 extending toward the axis of the rod 15 on a side opposite the rod 15. The cutting edge 27 inclines relative to the axis of the rod 15 in side view as seen axially of the pin 24. As illustrated in Fig. 1(D), the tip of the beak portion 22a is formed with a triangle end face 28 that is directed inward to face the outer periphery of the neck 4 of the bottle 3.

[0032] Of the entire cutter 22, at least the beak portion 22a is heat-treated by quenching. On the other hand, a cutting edge portion that is made of special steel or superhard material may be fixedly attached to a main body of the cutter 22 by brazing. In this case, the main body of the cutter 22 may be made of steel which has not been subjected to quenching. Further, the beak portion 22a may be a cartridge type element for enabling replacement. It should be noted that hidden arrangement of the tip (free end) of the cutter 22 within the pusher 12 provides enhanced safety.

(2) Concluding Description of First Embodiment

[0033] Fig. 3 illustrates a state in which the restriction body 11 simply rests on the top surface 7 of the bottle 3 while the tip of the cutter 22 is positioned at an upper end of the flange 5 of the bottle 3. The neck 4 of the bottle 3 has a tapered shape that flares downwardly, and the lower end of the sealing ring 2 is held in contact with the neck 4. As a result, the sealing ring 2 is held not to descend.

[0034] Therefore, as a user manually pushes the pusher 12 downwardly while the restriction body 11 rests on the top surface 7 of the bottle 3, the sealing ring 2 is cut vertically (axially of the bottle 2) by the cutting edge 27 of the cutter 22, as shown in Fig. 4. When the pusher 12 is pushed fully downward, the cutting edge 27 of the cutter 22 moves beyond the lower end of the sealing ring 2, as indicated by the single-dot chain line in Fig. 4. Accordingly, the sealing ring 2 is cut into an incomplete loop.

[0035] As such, it is possible to expand and remove the sealing ring 2 from the neck 4 of the bottle 3, as indicated by the single-dot chain line in Fig. 5(B). It is possible to provide a pair of cutters 22 on opposite sides of the rod 15. In this case, the sealing ring 2 is cut into two pieces, as shown in Fig. 5(B). Thus, the sealing ring 2 comes off the neck 4 of the bottle 3 immediately upon cutting the sealing ring 2. In this case, it is not necessary to bend the sealing ring 2 upon every removal.

[0036] In the present embodiment, the beak portion 22a provided for the cutter 22 makes it possible to cause the cutting edge 27 to appropriately contact the sealing ring 2 while causing the main body of the cutter 22 to be located close to the inner peripheral surface of the cylindrical portion 13. Since the rubber 25 as an elastic body causes the cutting edge 27 of the cutter 22 to contact or approach the outer peripheral surface of the neck 4 of the bottle 3, it is possible to cause the cutting edge 27 to bite into the upper end face of the sealing ring 2 in a reliable manner, thereby ensuring the cutting of the sealing ring 2.

[0037] In the present embodiment, when the inward end face 28 is formed at the tip of the cutter 22 in facing relation to the outer peripheral surface of the bottle 3, the inward end face 28 can come into surface contact with the outer peripheral surface of the neck 4 of the bottle 3 to thereby provide smooth guide for the cutter 22.

[0038] As the cutting edge 27 cuts into the sealing ring 2, the sealing ring 2 is pulled along with the cutting edge 27. Thus, the gap between the sealing ring 2 and the outer peripheral surface of the neck 4 increases at the position of the cutting edge 27. Accordingly, the cutting-in of the cutter 2 into the sealing ring 2 is further ensured. Also, when the cutting edge 27 is inclined relative to the axis of the rod 15 as in this embodiment, the shearing of the sealing ring 2 by the cutting edge 27 proceeds in a reliable manner, and therefore there is an advantage that the sealing ring 2 is smoothly cut and opened.

[0039] The bottle 3 is manufactured by blow molding. As indicated by the single-dot chain line in Fig. 3, a nozzle 29 that fits in the mouth is used, and the air is blown into the parison from the nozzle 29. In this case, because the parison is forcedly pressed onto the inner wall of the mold by the air pressure, the outer diameter of the mouth is dimensionally more accurate than the inner diameter of the mouth.

[0040] Therefore, when the outer cylindrical portion 21 is provided as the positioning element for the restriction body 11 that fits over the mouth of the bottle 3 from outside as in the present embodiment, the sealing ring removal device can be advantageously placed at an accurate position. Of course, it may be possible to utilize, as positioning means, the boss portion 18 alone, or, as in the present embodiment, both the boss portion 18 and the outer cylindrical portion 21 together. Utilization of both is preferred in that positional restriction is provided from inside and outside.

[0041] The device of the present embodiment can be held by a single hand. Thus, a situation may be envisaged in which a user may, for some reason, grasp the pusher 12 by one hand while trying to push the restriction body 11 by a finger of the opposite hand. In such a situation, it is likely that the finger of the user contacts not only the restriction body 11 but also the stopper plate 19 and the screw 20. Thus, the restriction body 11 is not pushed into the pusher 12. Accordingly, the finger of the user does not contact the tip of the cutter 22, so that enhanced safety is provided.

(3) Second Embodiment

[0042] Now, a second embodiment, which is illustrated in Fig. 6 to Fig. 8, will be described. This embodiment is fundamentally similar to the first embodiment. A major difference between the second embodiment and the first embodiment lies in that the device of the second embodiment includes a lock body 31, which serves as a safety mechanism. As such, those parts which are common to the first and second embodiments are given the same reference numerals and signs, and such parts will not be described in the following unless necessary.

[0043] The device of this embodiment includes, as a safety device, a vertically elongate locking member 31 that is disposed in the pusher 12 at a position opposite the cutter 22 with respect to the axis of the pusher. The locking member 31 is cross-sectionally rectangular and generally equal in length to the cutter 22. The locking member has an upper end portion coupled to the pusher 12 by a pin 32 such that the lower end of the locking member can move toward and away from the axis of the pusher 12. To realize such movement, the end member 14 of the pusher 12 has a recess 33 for receiving the upper end portion of the locking member 31.

[0044] The recess 33 receiving the locking member 31 is provided with a rubber 34 at a position above the pin 32 for pushing the locking member 31 outward from the axis. The rubber 34 fits in a groove 35 and is held thereby

against falling off. The locking member 31 also has an upper recess 36 into which the rubber 34 fits. The rubber 34 is an example of a resilient element (elastic element). The locking member 31 is biased by the rubber 34 such that the lower end of the locking member is forced toward the axis of the pusher 12.

[0045] The lower end of the locking member 31 is loosely received in a cut-out groove 37 formed in the restriction body 11. The lower end of the locking member 31 is formed with a lower recess 39 that is open toward the axis of the pusher 12. The lower recess 39 has an upper end that serves as a stopper portion 40 for contact with an upper corner (stopper contact portion) 38 of the cut-out groove 37 from above. Although the stopper portion 40 is slightly inclined downwardly and radially outwardly, the stopper portion 40 may extend perpendicularly to the inner face of the locking member 31.

[0046] The connection between the lower end face and the inner face of the locking member 31 comprises a lower inclined face 41 formed by slant cutting. Similarly, the lower end of the lower recess 30 has an intermediate inclined face 42 that extends downwardly toward the axis. In the present embodiment, a socket bolt is used as the rod 15. The head of the bolt is received in a counter bore 18a formed in the boss portion 18 of the restriction body 11.

[0047] The tip of the cutter 22 is withdrawn into the pusher 12 by a certain amount. Therefore, even if a user's finger contacts the open edge of the pusher 12, the user would not be hurt. Also, even if a user's finger pushes the restriction body 11 alone for some reason, for example, the restriction body 11 is blocked by the locking member 31 and cannot move. Accordingly, the user's finger does not contact the tip of the cutter 22. Thus, enhanced safety is realized.

[0048] As shown in Fig. 8, on the other hand, when the pusher 12 is fitted over the mouth of the bottle 3, the inclined guide face 41 at the lower end of the locking member 31 contacts the outer peripheral edge at the upper end of the mouth of the bottle 3. Then, the guiding function of the lower inclination 41 causes the locking member 31 to pivot such that the lower end of the locking member 31 moves away from the axis of the pusher 12. As a result, the lock of the locking member 31 is automatically released, and the pusher 12 is allowed to be pushed downwardly for causing the sealing ring 2 to be cut by the cutter 22.

[0049] As the pusher 12 is pushed downwardly, the lower end of the locking member 31 abuts on the screw threads 43 of the bolt 3, but the lower inclined face 41 of the locking member 31 also serves as a guide to ride over the screw threads 44 of the bolt 3. When the pusher 12 is returned by the spring 16 after cutting the sealing ring 2, the intermediate inclined face 42 at the lower end of the lower recess 30 of the locking member 31 abuts on the screw threads 43 of the bolt 3, but the inclination of the intermediate inclined face 42 causes the locking member 31 to pivot in a ride-over manner so that the pusher 12 can smoothly return.

[0050] Similarly to the first embodiment, the cutter 22 of the present embodiment has the beak portion 22a. It should be noted, however, that the cutter of the second embodiment does not have the inward end face 28 of the first embodiment, and the inner face of the beak portion 22a of the second embodiment has inclined faces 45 and 46 above and below an intermediate face 44 that is generally parallel to the axis of the pusher 12. Therefore, the combination of the lower inclined face 46 and the cutting edge 27 forms a sharp tip having an acute angle. Also, the upper end of the cutting edge 27 of the present embodiment extends close to the inner face of the pusher 12. Therefore, the cutting edge 27 of the present embodiment is significantly longer than that of the first embodiment. It should be noted that the cylindrical portion 13 is fixedly secured to the end member 14 by the pin 49, as is also the case with the first embodiment).

[0051] In the present embodiment, the upper end of the cutter 22 has a recess 47 to receive the rubber 25. Although a single locking member 31 is used in this embodiment, a plurality of locking members 31 may be attached. A pair of cutters 22 may be disposed at opposite positions with respect to the axis of the pusher 12, and a locking member 31 may be arranged respectively between the adjacent cutters 22.

(4) Third Embodiment

[0052] Now, a third embodiment, which is illustrated in Fig. 9, will be described. This embodiment shows another example of the safety mechanism (locking element), and is similar to the second embodiment except for the configuration of the safety mechanism. In the present embodiment, a locking member 50 has an L shape that includes an inwardly directed horizontal portion and a downwardly directed vertical portion connected to the horizontal portion. The locking member 50 is disposed at a position opposite the cutter 22 with respect to the axis of the pusher 12.

[0053] The locking member 50 is received in an outwardly open housing hole 51 which is formed in the restriction body 11 for allowing the locking member to move radially of the pusher 12 within a small range. The free end of the inward horizontal portion of the locking member 50 serves as a stopper portion 52, whereas the rod 15 has an annular groove 53 as a stopper receiver for coming into and out of engagement with the stopper portion 52. Thus, when the stopper portion 52 engages in the annular groove 53 of the rod 15, the restriction body 11 and the pusher 12 are held against relative movement. When the stopper portion 52 disengages from the annular groove 53 of the rod 15, the restriction body 11 and the pusher 12 are allowed to move relative to each other.

[0054] The locking member 50 is biased inward (into a locking position) by a plate spring 54. The plate spring 54 is fixedly secured to a seat 55 by a screw 56. The seat 55 is positioned near a lower portion of the restriction

body 11, and the plate spring 54 extends obliquely inward from the seat 55 and has a free end in contact with the locking member 50.

[0055] The housing hole 51 is also open to the inner side of the outer cylindrical portion 21 of the restriction body 11, and the downward vertical portion of the locking member 50 is partly exposed to an inner annular groove of the outer cylindrical portion 21. The lower end of the downward vertical portion of the locking member 50 is formed with an oblique guide face 57 for coming into contact with the outer periphery of the top face of the mouth portion of the bottle 3. The oblique guide face 57 is inclined to become radially outwardly offset as it extends from an upper position to a lower position.

[0056] In the present embodiment, when the pusher 12 is held at a retreated position by the spring 16, the stopper portion 52 of the locking member 50 engages in the annular groove 53 of the rod 15, as described above, so that it is not possible to downwardly move the restriction body 11 even if a user's finger pushes the restriction body 11. Therefore, the contact of the user's finger to the tip of the cutter 22 is avoided, and the safety is ensured at a high level.

[0057] On the other hand, when the restriction body 11 is fitted onto the mouth of the bottle 3, the guiding function of the inclined guide face 57 causes the locking member 50 to move apart from the rod 15. As a result, the stopper portion 52 of the locking member 50 disengages from the annular groove 53 of the rod 15. In this way, the lock is released. Therefore, pushing down of the pusher 12 is allowed. A coil spring or a rubber may be used as an element for biasing the locking member 50.

(5) Other Embodiments

[0058] The present invention may be embodied in various configurations other than the above-described embodiments. For example, the pusher 12 is not limited to a two-part configuration that includes the cylindrical portion 13 and the end member 14, and may have a one-piece configuration. (It should be noted, however, that the two-part configuration is preferred for ease of attachment of the cutter 22.) The pusher 12 does not necessarily have the cylindrical portion 13. For example, one arm may hang from the end member 14, and a cutter may be attached to the free end of the arm.

[0059] A cylindrical portion that fits over the mouth of the bottle 3 may be provided as an element for positioning the restriction body 11. When the pusher 12 has a cylindrical portion 13 as in each of the above-described embodiments, the cutter 22 may be attached to the cylindrical portion 13. The locking member is not necessarily able to pivot although the locking member is able to pivot in the above-described embodiments. The locking member may be attached to the restriction body.

INDUSTRIAL APPLICABILITY

[0060] The present invention can be manufactured in practice and can practically be used. Therefore, the present invention possesses industry applicability.

REFERENCE NUMERALS AND SIGNS

[0061]

1:	Threaded cap
2:	Sealing ring
3:	Bottle
4:	Neck
5:	Flange portion
7:	Top surface
11:	Sealing ring removal device
12:	Restriction body
13:	Pusher
13:	Cylindrical portion
14:	End member
15:	Rod
16:	Spring
18:	Boss portion, which serves as a positioning element
21:	Outer cylindrical portion, which serves as a positioning element
22:	Cutter
22a:	Beak portion
24:	Pin
25:	Rubber, which is an example of an elastic body to bias the cutter
27:	Cutting edge
31, 50:	Locking member
40, 52:	Stopper portion

Claims

1. A sealing ring removal device for a bottle, configured to remove a sealing ring that remains at a neck of the bottle, the sealing ring removal device comprising:

a restriction body that comes into contact with a top face of a mouth of the bottle from above; and
a pusher that is attached to the restriction body such that the pusher can be pushed downwardly against a spring,
the restriction body being provided with a positioning portion that is configured to engage with the mouth of the bottle from inside, outside or both inside and outside, and
the pusher being provided with a cutter that is configured to cut the sealing ring in an axial direction of the bottle as the cutter is moved downwardly.

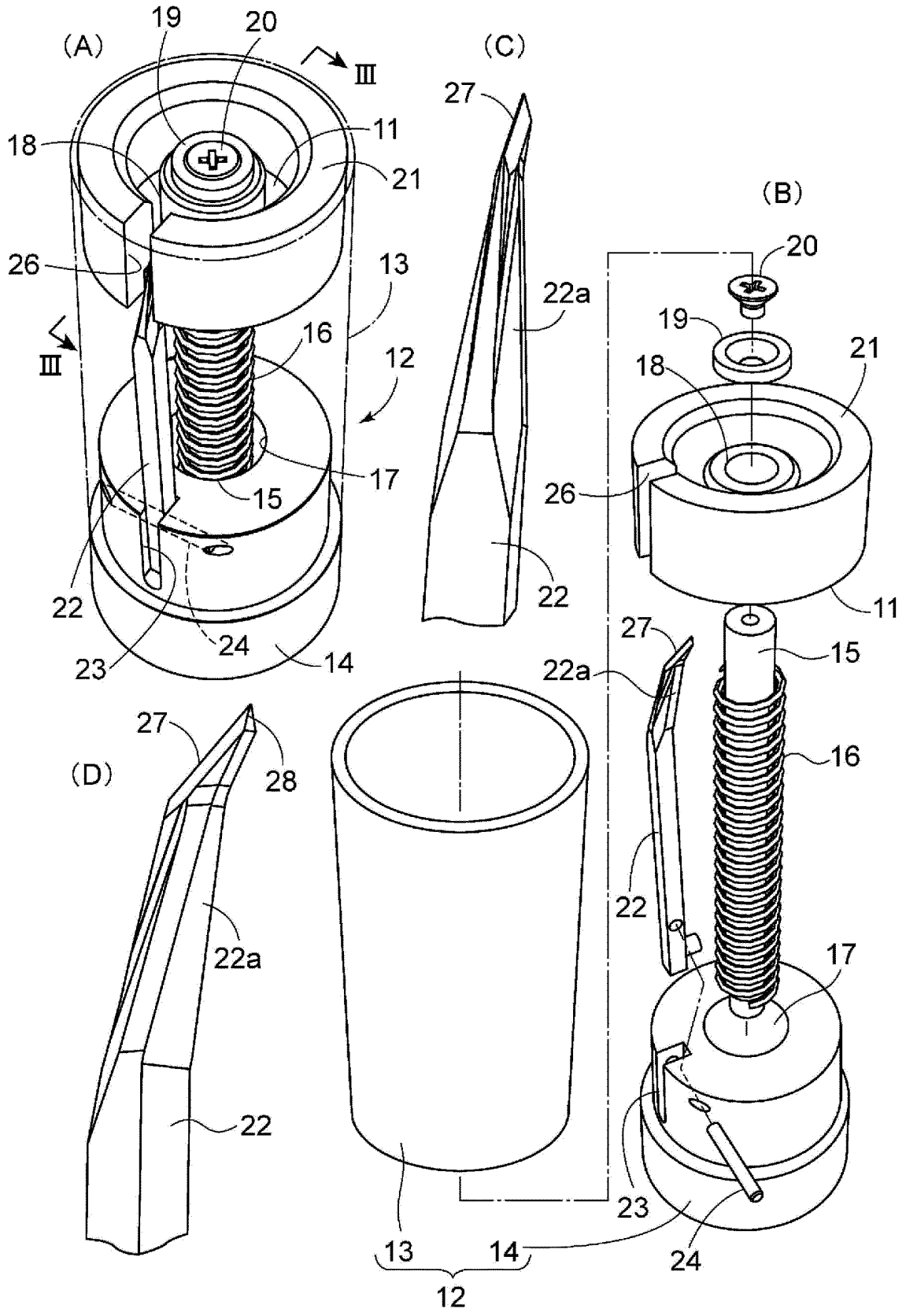
2. The sealing ring removal device for a bottle according to claim 1, wherein the pusher has a cylindrical portion that is configured to surround the bottle from outside, and an end member at an upper end of the cylindrical portion, and the cutter is arranged in the pusher.

3. The sealing ring removal device for a bottle according to claim 1 or 2, wherein the cutter is pushed by an elastic body to bring a free end of the cutter toward or into contact with an outer peripheral face of the neck of the bottle.

4. The sealing ring removal device for a bottle according to claim 1 or 2 further comprising a locking member that is configured to hold and prevent the pusher from moving downwardly unless the restriction body is engaged into the bottle.

5. The sealing ring removal device for a bottle according to claim 3, wherein a locking member is arranged in the pusher at a position circumferentially spaced from the cutter, and the locking member is configured to hold and prevent the pusher from moving downwardly unless the restriction body is engaged into the mouth of the bottle,
when the restriction body is not engaged into the mouth of the bottle, the locking member abuts on the restriction body to hold the pusher such that pushing down of the pusher is prohibited, and
when the restriction body is engaged into the mouth of the bottle, the locking member moves and escapes from the restriction body such that pushing down of the pusher is allowed.

FIG.1


(A)
19
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Ⅲ
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Ⅲ
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14
(C)
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22a
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(B)
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(D)
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22a
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FIG.2

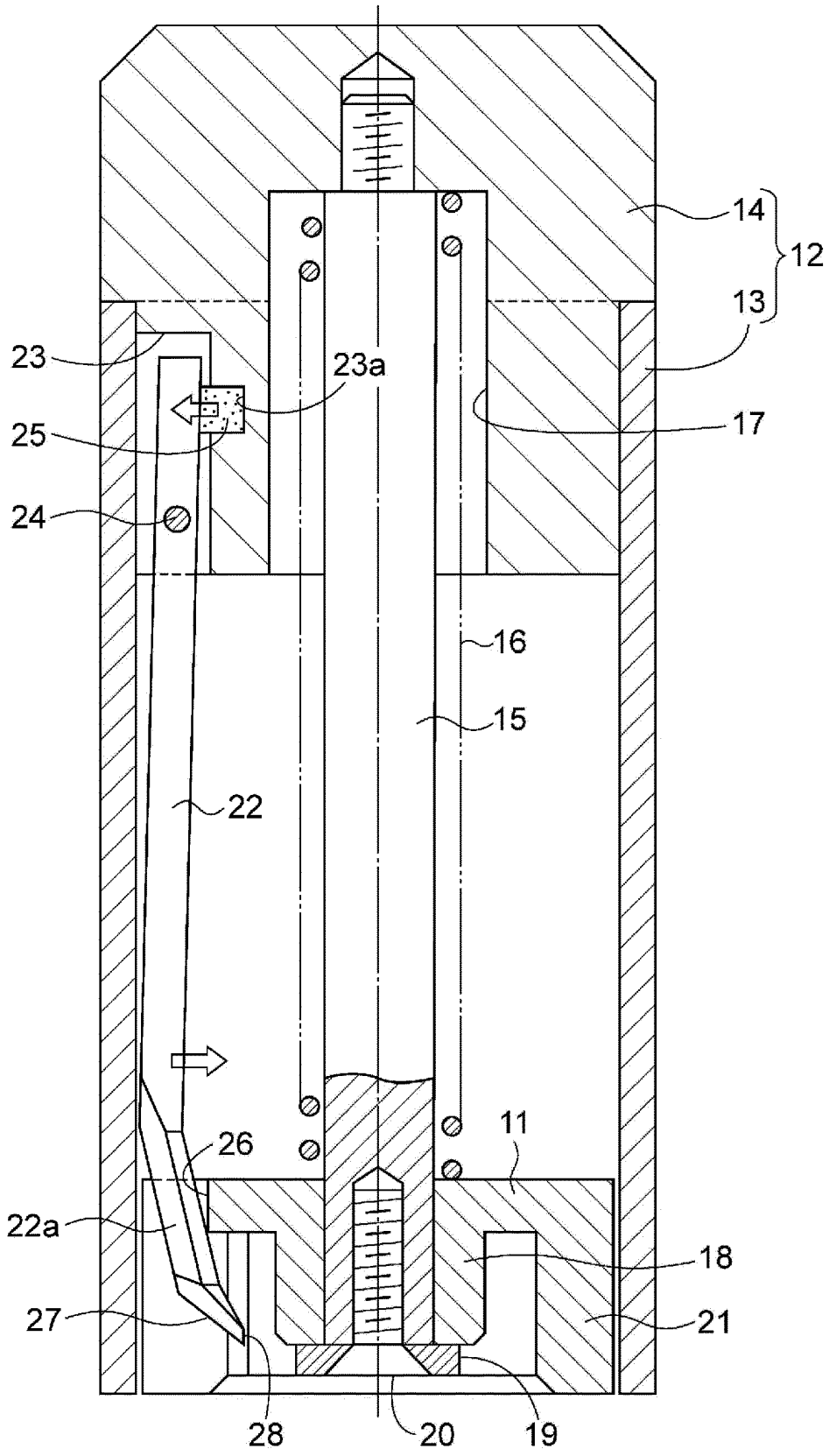

FIG.3

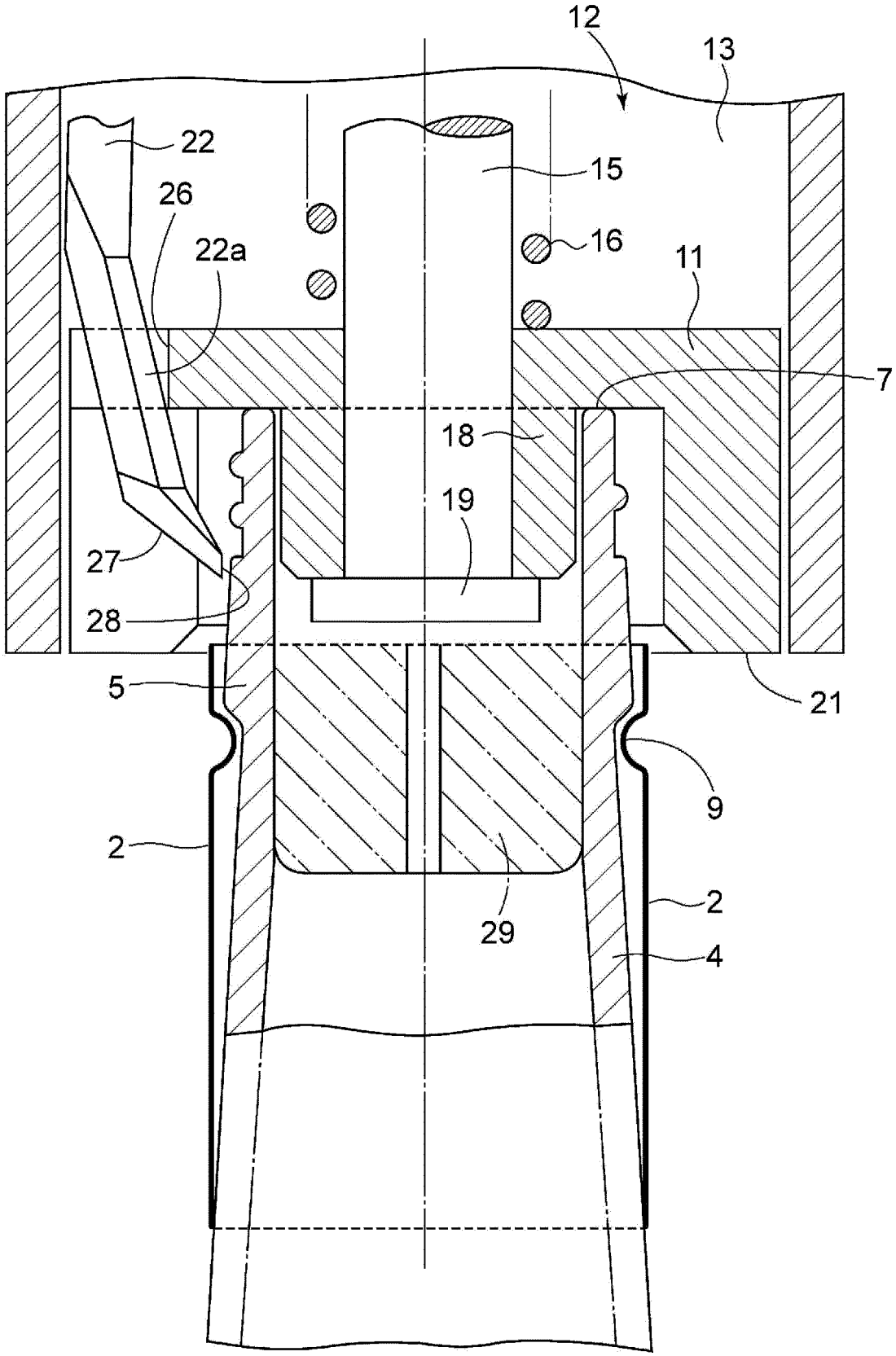

FIG.4

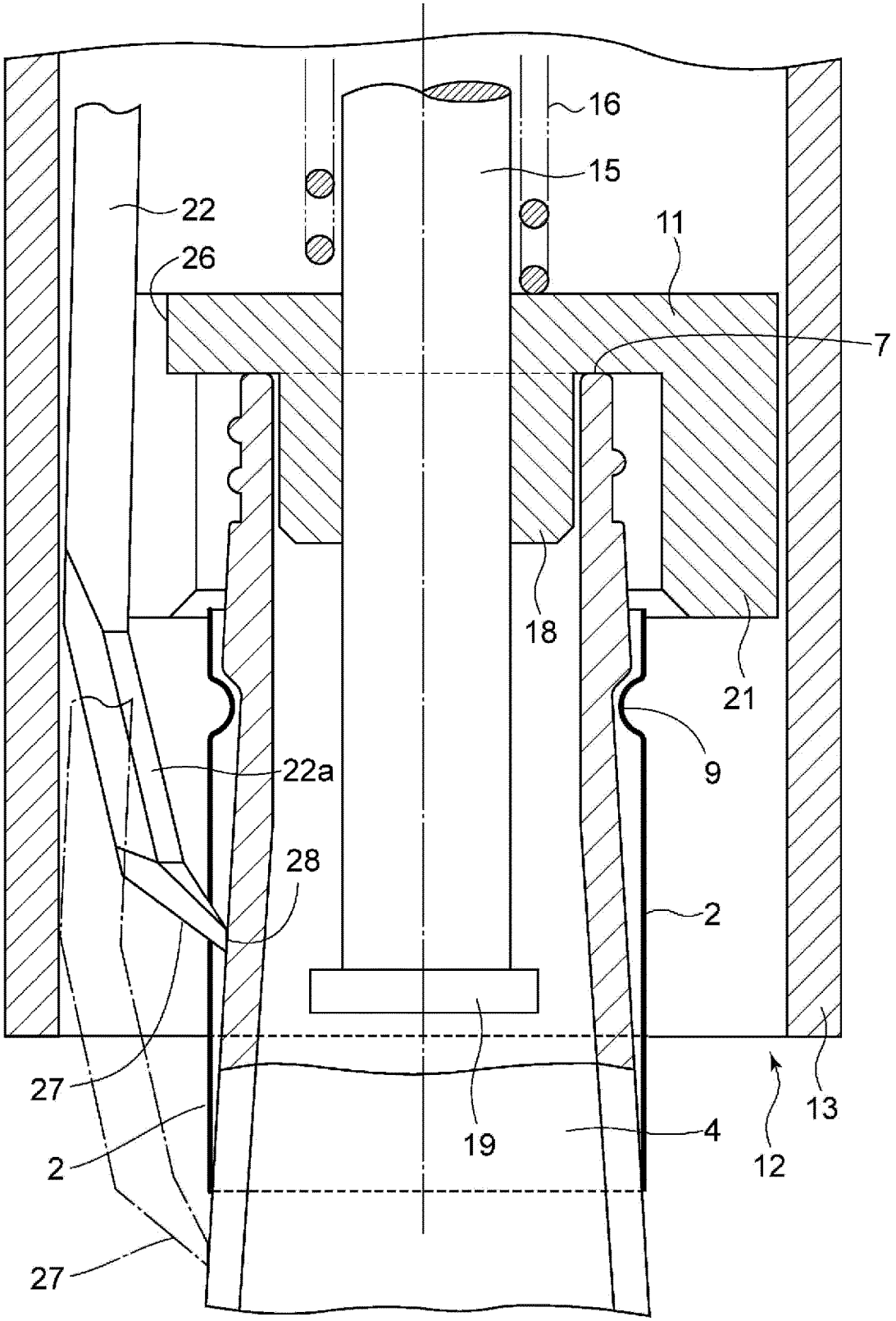

FIG.5

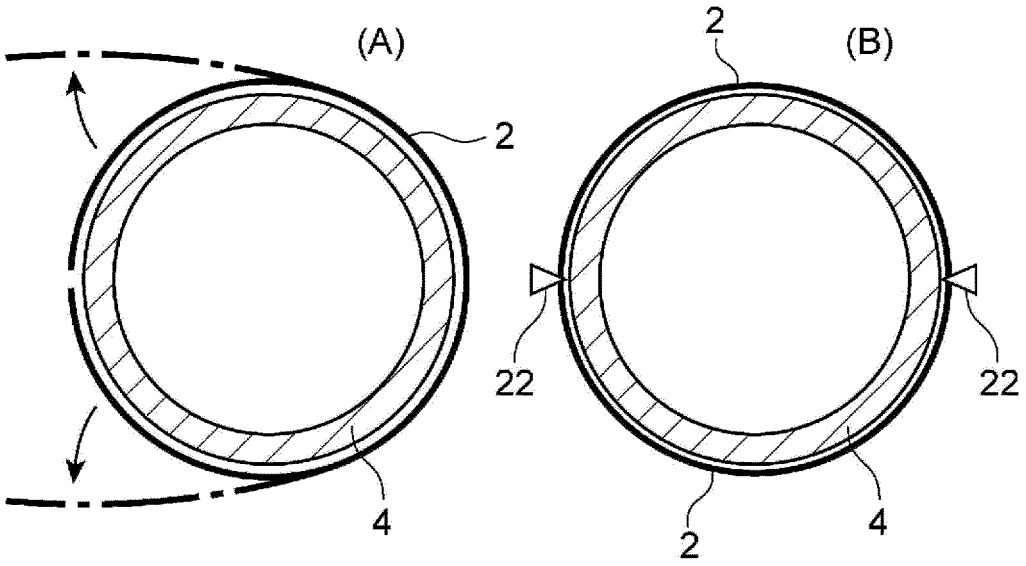
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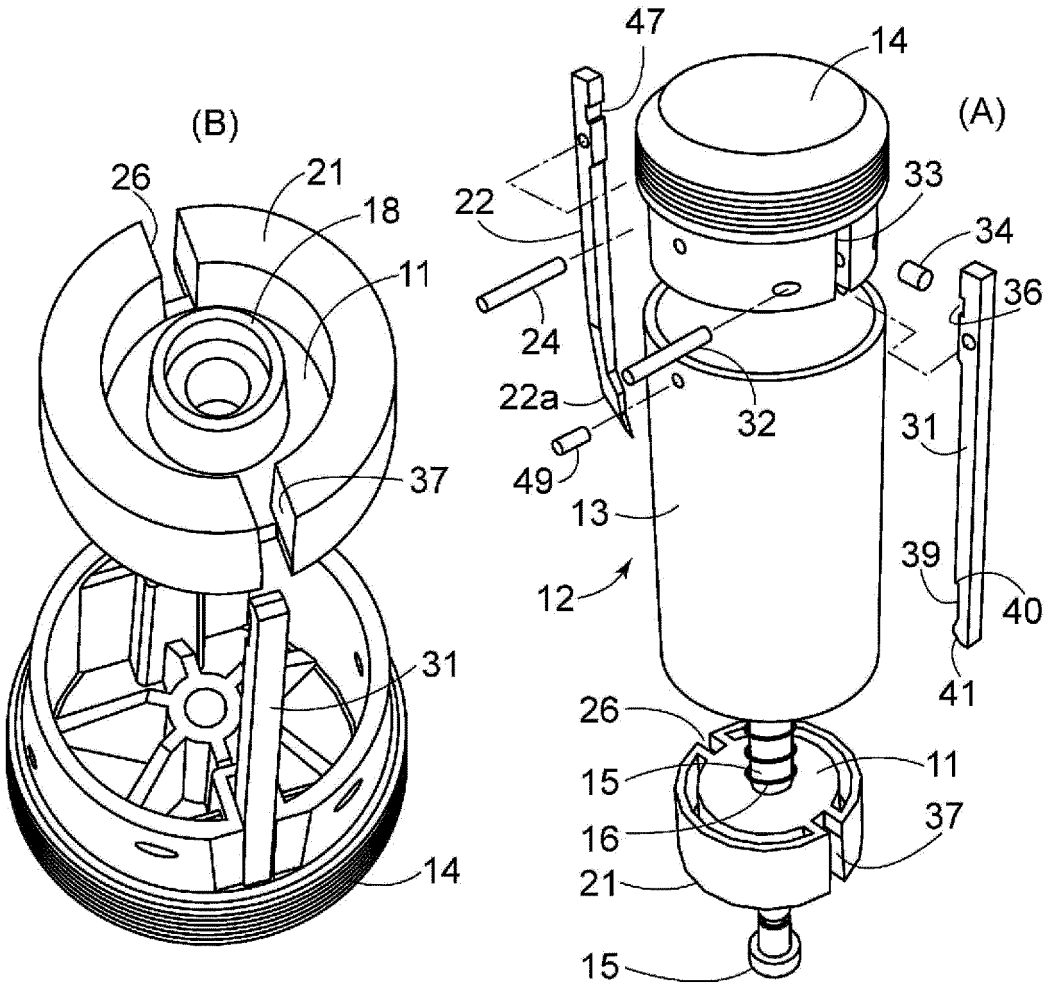
FIG.6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(A)
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FIG.7

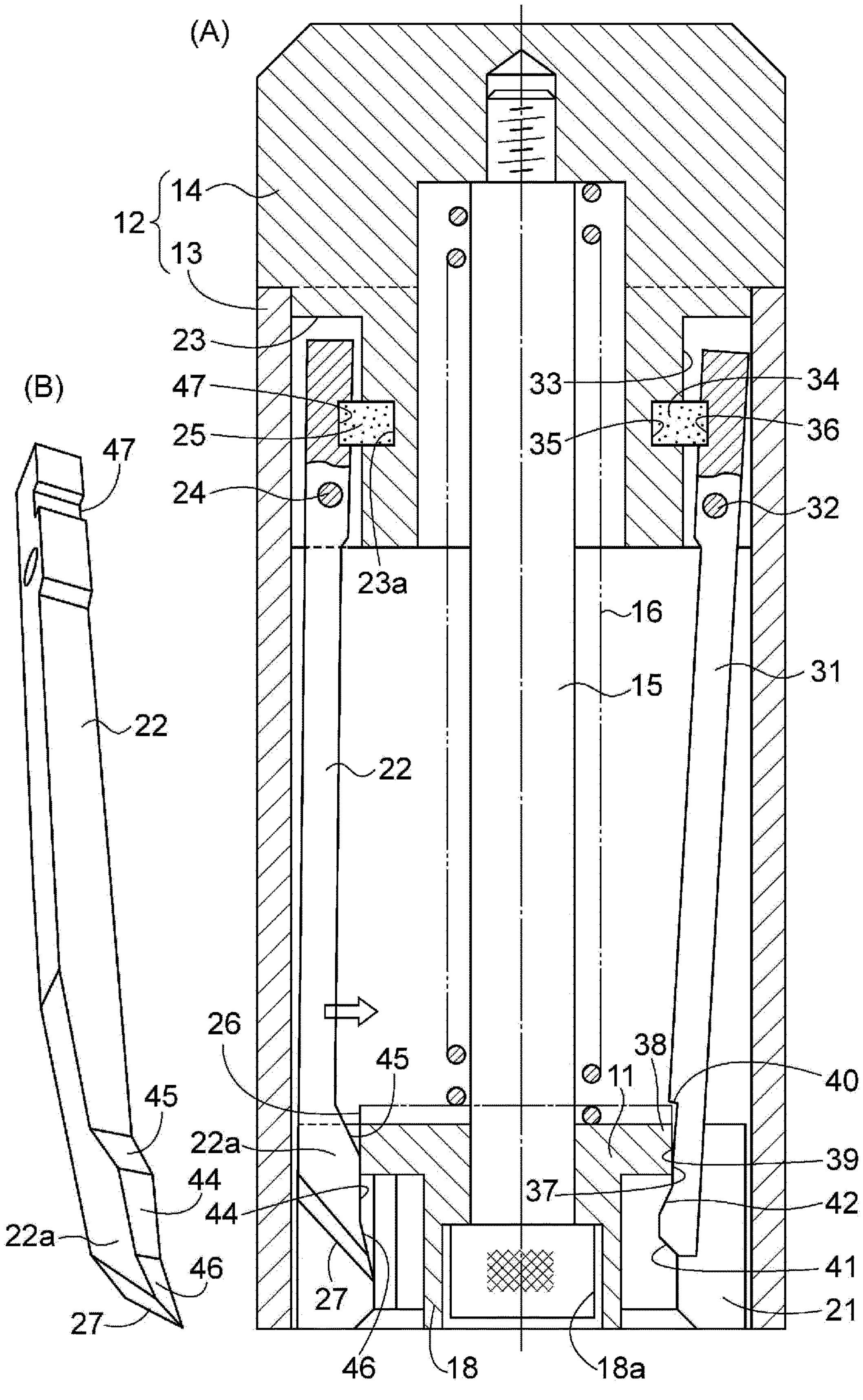
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FIG.8

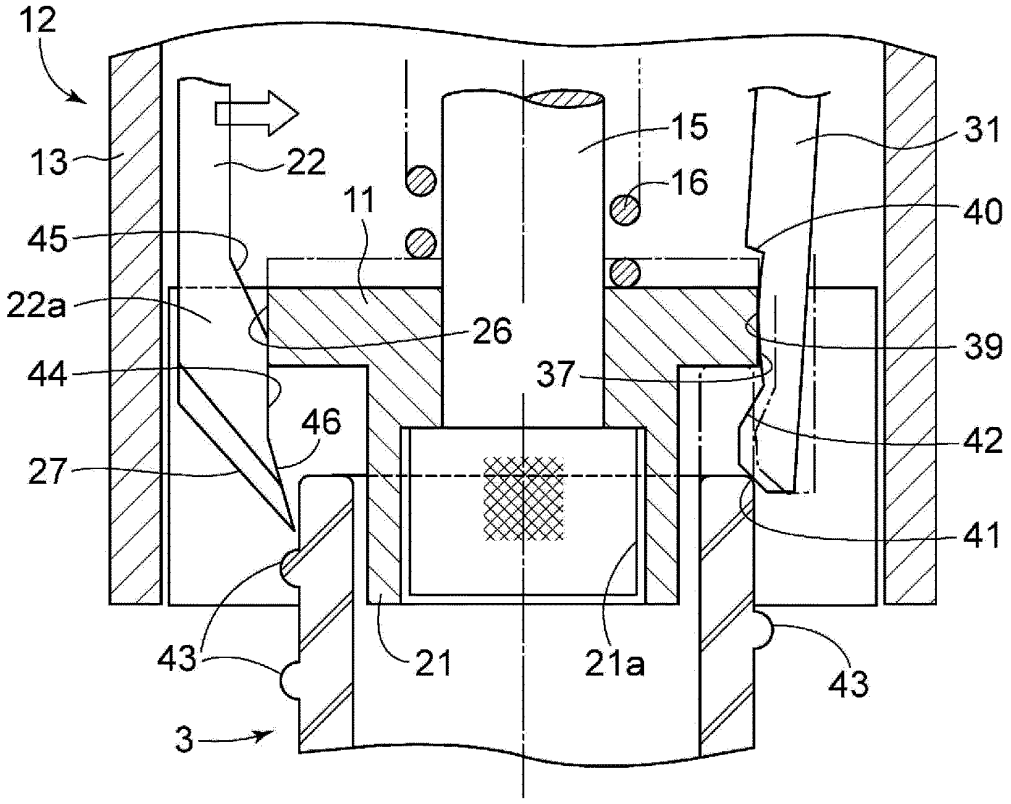
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FIG.9

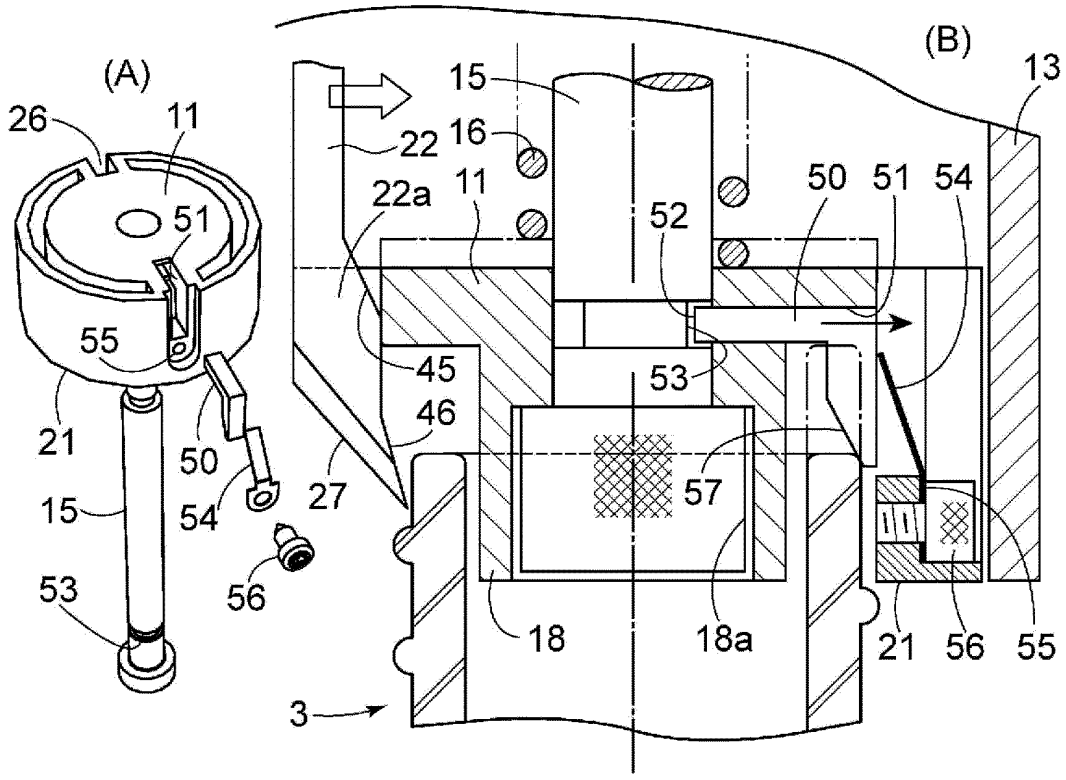
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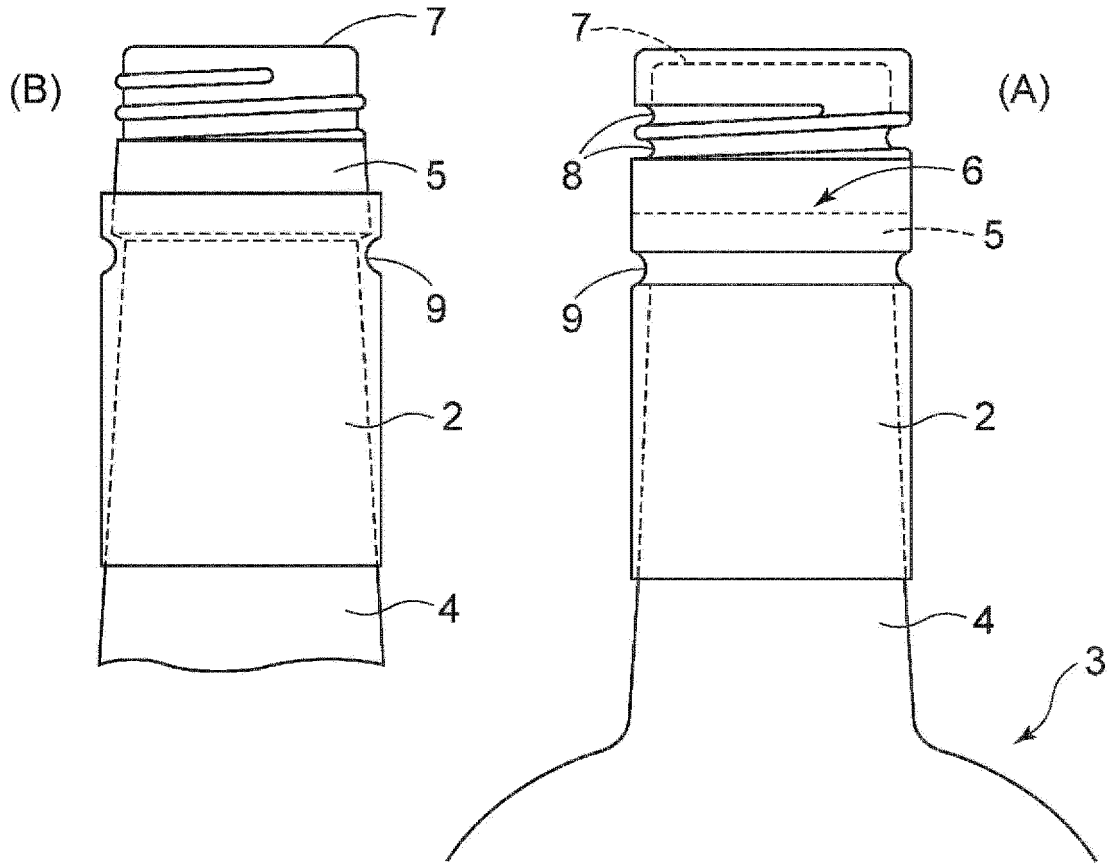
FIG.10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/057186

A. CLASSIFICATION OF SUBJECT MATTER
B67B7/48(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B67B7/48

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 1996-2015
Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE 1924399 A (Thiemich ALFRED), 12 November 1970 (12.11.1970), entire text; all drawings (Family: none)	1,3 2,4-5
A	JP 3122743 U (Tetsuya WATANABE), 29 June 2006 (29.06.2006), abstract; all drawings (Family: none)	1-5

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 April 2015 (07.04.15)	16 June 2015 (16.06.15)
Name and mailing address of the ISA/ Japan Patent Office 3-4-3,Kasumigaseki,Chiyoda-ku, Tokyo 100-8915,Japan	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

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Patent documents cited in the description

- JP 2013159399 A **[0007]**