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(57) A screw cap for a beverage bottle (1) mounted on a mouth portion (11) of a beverage bottle and made of metal; including a top board portion (3), a cylindrical portion (4), and a skirt portion (6). The cylindrical portion (4) is formable with a female-screw-shaped portion (4a). An upper region of the skirt portion (6) is formable with a throttle portion (60a). The skirt portion (6) is shaped so as to cover the neck portion (12) with a clearance at least between a lower region of the throttle portion (60a) and an outer peripheral face of the neck portion (12). A region of the skirt portion (6) in which the clearance (C) is formed has a handling portion (62) in a convex shape for breaking the skirt portion (6). The handling portion (62) includes a completely cut line portion (620) as a component portion of the convex shape and the skirt portion (6) has a break line extending upward from the handling portion (62) to an upper end portion (6d).

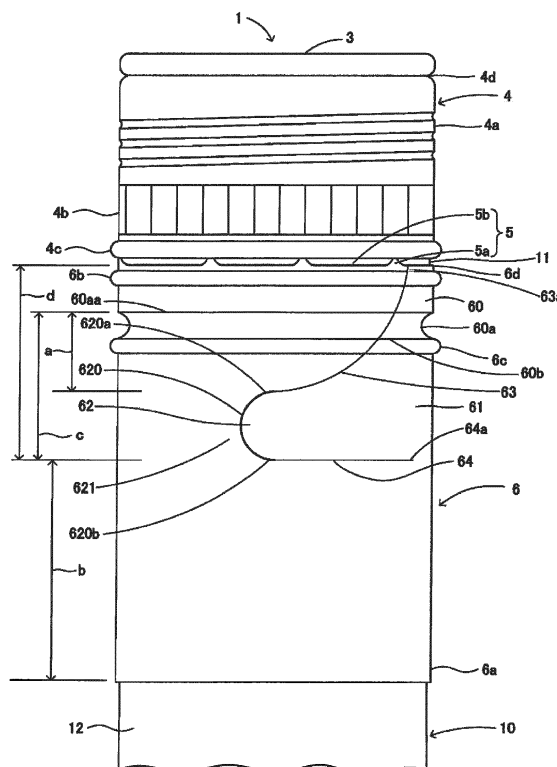


Fig.2

DescriptionBACKGROUND OF THE INVENTIONField of the Invention

[0001] The present invention relates to a screw cap for a beverage bottle mounted on a mouth portion and a neck portion of the beverage bottle such as wine, whisky, or Shochu (distilled spirits) bottle.

Description of the Related Art

[0002] Recently, for a beverage bottle such as a wine or whisky bottle, a screw cap made of metal such as aluminum has become widely used in place of a cork stopper (for instance, reference to Patent Literature 1). Such a screw cap made of metal is provided with a top board portion in a circular shape provided with a seal member on a rear face thereof, a cylindrical portion extending downward from an outer peripheral portion of the top board portion, and a skirt portion in a cylindrical shape connected to a lower end portion of the cylindrical portion through an unseal-break portion having a bridge portion being intermittent in the circumferential direction.

[0003] When the screw cap is mounted on a mouth portion and a neck portion of the beverage bottle, the screw cap is constituted in such a manner that the seal member is positioned so as to close an opening mouth portion of the mouth portion and also that the cylindrical portion is formed (shaped) in a female screw shape that engages with a male screw portion formed at the mouth portion immediately below the opening mouth portion. In a screwing state in accordance with matching between the male screw portion and a female-screw-shaped portion, the seal member adheres to an opening mouth edge portion and the opening mouth portion is sealed.

[0004] In a state in which the screw cap is mounted on the mouth portion and the neck portion of the beverage bottle, the skirt portion is constituted so as to cover an outer peripheral face of the neck portion that continues to the mouth portion. The skirt portion is provided in order to have an image of high quality for a beverage product filled in the beverage bottle and is constituted so as to remain on the beverage bottle after unsealing.

[0005] The unseal-break portion is provided in order to detach the cylindrical portion together with the top board portion in a state in which the skirt portion remains on the beverage bottle after breaking a bridge portion by shear force in releasing screwing by rotating the cylindrical portion screwed on the mouth portion of the beverage bottle.

[0006] The beverage bottle as above is disposed after consuming a beverage filled therein. Because it is undesirable to dispose the beverage bottle made of glass with the skirt portion made of metal remained in view of Containers and Packaging Recycling Act, a consumer is required to detach the skirt portion. Patent Literature 1 discloses that the skirt portion, i.e. a bottom portion in Patent Literature 1, is provided with a break line that starts from a lower end portion of the skirt portion and further with a break line grasping portion, the bottom portion is broken from the break line by operating the break line grasping portion, and thereby the bottom portion is easily detached from the beverage bottle.

Citation ListPatent Literature

[0007] PTL 1: Japanese Unexamined Patent Application Publication JP 2014-237 485 A

SUMMARY OF THE INVENTIONProblems to be Solved by the Invention

[0008] A processing margin of the break line becomes larger because the break line disclosed in Patent Literature 1 starts from the lower end of the bottom portion, which becomes a factor of impairing design performance. Because a start portion of the break line is provided on the lower end of the bottom portion, when mechanical external force by a mounting tool is added at the time of mounting on the beverage bottle, there is concern for progress in partial break from the start portion of the break line. Such progress is predicted at the time of packing, conveying, and displaying at a store. When the partial break as above makes progress, a start portion of break progress is turned up, which leads to concern for harming other product or obstructing handling.

[0009] In examples illustrated in FIG. 5 and FIG. 9 of PTL 1, there is concern for impairing design performance due to the large dimension of a notched portion. Because the notched portion is formed by punching, punching debris, i.e. a foreign substance, is generated in a manufacturing process and there is concern that the punching debris is mixed into the product. In the example illustrated in FIG. 9, a breakable grasping portion is formed in a tab shape with the

notched portion midway in the bottom portion. The breakable line grasping portion is likely to be turned up by mistake at the time of packing, conveying, and displaying at the store, there is concern for obstructing handling.

[0010] The present invention is proposed in view of the above-mentioned problems. An object of the present invention is to provide a screw cap for a beverage bottle in which the skirt portion is easily detached, the design performance is not impaired in a mounted state on the beverage bottle, and there is no concern for obstructing handling of the beverage bottle filled with the beverage.

Means of Solving the Problems

[0011] A screw cap for a beverage bottle of one aspect of the present invention mounted on a mouth portion of a beverage bottle and made of metal is provided with a top board portion in a circular shape provided with a seal member on a rear face thereof, a cylindrical portion extending downward from an outer peripheral portion of the top board portion, and a skirt portion in a cylindrical shape connected to a lower end portion of the cylindrical portion through an unseal-break portion having a bridge portion being intermittent in circumferential direction.

[0012] The screw cap for the beverage bottle is characterized in that the cylindrical portion is formable with a female-screw-shaped portion that matches with a male screw portion of the mouth portion when the screw cap for the beverage bottle is mounted on the mouth portion, an upper region of the skirt portion is formable with a throttle portion that is fitted into an engaging peripheral groove portion of a neck portion continuing to the mouth portion when the screw cap for the beverage bottle is mounted on the mouth portion, the skirt portion is shaped so as to cover the neck portion with a clearance at least between a lower region of the throttle portion and an outer peripheral face of the neck portion when the screw cap for the beverage bottle is mounted on the mouth portion, a region of the skirt portion in which the clearance is formed has a handling portion in a convex shape for breaking the skirt portion, and the handling portion includes a completely cut line portion as a component portion of the convex shape and the skirt portion has an upper break line extending upward from the handling portion to an upper end portion of the skirt portion.

[0013] When the screw cap for the beverage bottle of the above aspect of the present invention is mounted on the mouth portion of the filled beverage bottle, the seal member provided on the rear face of the top board portion adhesively abuts on an opening mouth edge portion of the mouth portion and the opening mouth portion is sealed. In the mounted state as above, the cylindrical portion is formed (shaped) in a female screw shape that matches with the male screw portion formed at the mouth portion; and in a screwing state in accordance with matching between the male screw portion and the female-screw-shaped portion, the opening mouth portion is maintained in a sealed state by the seal member.

[0014] In the mounted state, the skirt portion covers the outer peripheral face of the neck portion of the beverage bottle and also the upper region of the skirt portion is formed (shaped) with the throttle portion that is fitted into the engaging peripheral groove portion formed at the mouth portion of the beverage bottle. For consuming the beverage, when the cylindrical portion is rotated around an axis of the beverage bottle in the opposite screwing direction, the cylindrical portion including the female-screw-shaped portion rotates with the top board portion and displaces upward.

[0015] In such a case, because the throttle portion is fitted into the engaging peripheral groove portion, upward displacement of the skirt portion is blocked and accordingly shear force is applied to the bridge portion of the unseal-break portion. By the above-mentioned shear force, the bridge portion is broken, the cylindrical portion is detached from the mouth portion of the beverage bottle, the opening mouth portion is unsealed (uncapped), and the beverage is able to be poured into a glass or the like. The skirt portion remains on the neck portion of the beverage bottle.

[0016] When the beverage bottle is disposed after consuming, the handling portion formed at the skirt portion is set to be caught and pulled up by fingers, thereby detaching the skirt portion from the beverage bottle by breaking thereafter. Specifically, because there is a clearance between a region in which the handling portion is formed and the outer peripheral face of the neck portion of the bottle, a fingertip is able to be easily hooked on a convex side end portion of a convex-shaped portion of the handling portion. In such a case, when a part adjacent to the convex-shaped portion of the handling portion is pressed in the centripetal direction of the bottle, because of the clearance, a press part is deformed so as to recess in the centripetal direction and a width of the cut line is enlarged.

[0017] Therefore, when the fingertip is hooked and the handling portion is lifted up in the outer diametrical direction, the handling portion is taken off and is easily caught by fingers. Following the above, when the handling portion is operated so as to be peeled off, the skirt portion is broken at least along the break line. Because the break line extends upward from the handling portion to the upper end portion of the skirt portion, the skirt portion is able to be broken along a traversed line of the throttle portion and thereby the skirt portion is able to be easily detached from the beverage bottle.

[0018] The detached skirt portion and the beverage bottle are separated from each other and are disposed. Because a continuous completely cut line portion of the handling portion is just formed in a line in a middle portion of the skirt portion so as to constitute the handling portion in the convex shape, design performance is hardly impaired in the mounted state on the beverage bottle.

[0019] Break is not progressed from a lower end of the skirt portion due to mechanical external force when the screw cap for the beverage bottle is mounted or when an end portion of the handling portion is caught by a surrounding portion

or the like by mistake at such time of packing, conveying, and displaying at the store in the mounted state. There is no concern for adverse effect by a progress in break or obstruction in handling. Because there is no notch or hollowed-out part for forming the handling portion, punching debris accompanied with punching is not generated and there is no concern for a foreign substance to be mixed into a product.

[0020] In the screw cap for the beverage bottle of the above aspect of the present invention, the convex shape of the handling portion is formed so as to be directed to the circumferential direction of the skirt portion and the break line can be constituted by an upper break line extending upward from one end portion of the completely cut line portion of the handling portion.

[0021] When the handling portion is caught by fingers and is broken, the skirt portion is broken at least along the upper break line. Because the upper break line extends upward from the one end portion of the completely cut line portion of the handling portion to the upper end portion of the skirt portion, the skirt portion is easily detached from the beverage bottle as mentioned above.

[0022] In the screw cap for the beverage bottle of the above aspect of the present invention, a press deformation promoting line extending in the circumferential direction can be formed on a protruding direction side of the convex shape of the completely cut line portion.

[0023] When a part, in which the press deformation promoting line is formed, of a convex shape portion side part of the completely cut line portion is pressed in the centripetal direction of the beverage bottle, because there is a clearance between the above part and the outer peripheral face of the neck portion in the bottle, a pressed part is deformed so as to easily recess in the centripetal direction. Therefore, a width of the completely cut line portion of the handling portion is easily enlarged and fingers are able to easily catch the handling portion as mentioned above.

[0024] In the screw cap for the beverage bottle of the above aspect of the present invention, the press deformation promoting line can have an upper press deformation promoting line and a lower press deformation promoting line that respectively extend from upper and lower end portions of the completely cut line portion.

[0025] When a part between the upper press deformation promoting line and the lower press deformation promoting line of the skirt portion is pressed in the centripetal direction of the beverage bottle, a pressed part is deformed so as to more easily recess in the centripetal direction. Therefore, fingers are able to more easily catch the handling portion.

[0026] In the screw cap for the beverage bottle of the above aspect of the present invention, the press deformation promoting line is constituted by a continuous completely cut line.

[0027] The pressed part is more easily deformed by the above-mentioned press.

Effects of the Invention

[0028] By the screw cap for the beverage bottle of the present invention, there is no fear of breaking the skirt portion by mistake in handling before uncapping, the skirt portion after uncapping is easily detached, design performance is not impaired in the mounted state on the beverage bottle, and there is no concern for obstructing handling.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

- FIG. 1 is a first embodiment of the screw cap for the beverage bottle of the present invention and a schematic front view illustrating a state before the screw cap for the beverage bottle is mounted on the beverage bottle.
- FIG. 2 is a front view illustrating a state in which the screw cap for the beverage bottle of the embodiment is mounted on the mouth portion and the neck portion of the beverage bottle.
- FIG. 3 is a longitudinal sectional view illustrating the state in which the screw cap for the beverage bottle of the embodiment is mounted on the mouth portion and the neck portion of the beverage bottle.
- FIG. 4 is a front view illustrating a state in which the cylindrical portion of the screw cap for the beverage bottle is broken and eliminated.
- FIG. 5 is a view illustrating a procedure of preparation for eliminating the skirt portion.
- FIG. 5A is a partially broken sectional view taken along a line illustrated by arrows X in FIG. 4 illustrating the state before preparation.
- FIG. 5B is a view similar to FIG. 5A and illustrates a state at a time of preparation.
- FIG. 6 is a view similar to FIG. 1 and illustrates a second embodiment of the screw cap for the beverage bottle of the present invention.
- FIG. 7A is a view similar to FIG. 1 and illustrates a third embodiment of the screw screw cap for the beverage bottle of the present invention.
- FIG. 7B is a view similar to FIG. 1 and illustrates a modified example of the embodiment.

FIG. 8A is a view similar to FIG. 1 and illustrates a fourth embodiment of the screw cap for the beverage bottle of the present invention.

FIG. 8B is a view similar to FIG. 1 and illustrates a modified example of the embodiment.

FIG. 9A is a view similar to FIG. 1 and illustrates a fifth embodiment of the screw cap for the beverage bottle of the present invention.

FIG. 9B is a view similar to FIG. 1 and illustrates a modified example of the embodiment.

FIG. 10A is a view similar to FIG. 1 and illustrates a sixth embodiment of the screw cap for the beverage bottle of the present invention.

FIG. 10B is a view similar to FIG. 1 and illustrates a modified example of the embodiment.

FIG. 11A is a view similar to FIG. 1 and illustrates a seventh embodiment of the screw cap for the beverage bottle of the present invention.

FIG. 12 is a view similar to FIG. 1 and illustrates an eighth embodiment of the screw cap for the beverage bottle of the present invention.

FIGS. 13A and 13B are views that schematically illustrate an example of a method for cutting processing to the screw cap for the beverage bottle of the present invention.

FIG. 14A is a sectional enlarged view taken along an arrowed line A-A of FIG. 13B.

FIG. 14B is a sectional enlarged view taken along an arrowed line B-B of FIG. 13B.

FIG. 14C is a sectional enlarged view taken along an arrowed line C-C of FIG. 13B.

FIG. 15 is a plan view that schematically illustrates another example of the method for cutting processing.

DESCRIPTION OF THE EMBODIMENTS

[0030] An embodiment of the present invention is explained below based on drawings. FIGS. 1 to 5 illustrate a first embodiment of the screw cap for the beverage bottle of the present invention. A screw cap for a beverage bottle 1 in figures is made of metal such as aluminum, and includes a top board portion 3 in a circular shape provided with a seal member 2 (reference to FIG. 3) on a rear face thereof, a cylindrical portion 4 extending downward from an outer peripheral portion of the top board portion 3, and a skirt portion 6 in a cylindrical shape connected to a lower end portion of the cylindrical portion 4 through an unseal-break portion 5 having a bridge portion 5a intermittent in the circumferential direction. The screw cap for the beverage bottle 1 is mounted, for instance, from a mouth portion 11 to a neck portion 12 of a beverage bottle 10 made of glass, with reference to FIGS. 2 to 5.

[0031] The cylindrical portion 4 is formable with a female-screw-shaped portion 4a that matches with a male screw portion 11a (reference to FIGS. 3 and 4) of the mouth portion 11 when the screw cap for the beverage bottle 1 is mounted on the mouth portion 11 of the beverage bottle 10. An upper region 60 of the skirt portion 6 is formable with a throttle portion 60a that is fitted into an engaging peripheral groove portion 11b (reference to FIG. 3) of the mouth portion 11 when the screw cap for the beverage bottle 1 is mounted on the mouth portion 11 of the beverage bottle 10.

[0032] The skirt portion 6 is shaped so as to cover the neck portion 12 with a clearance C at least between a lower region of the throttle portion 60a and an outer peripheral face of the neck portion 12 when mounted as above. A region of the skirt portion 6 in which the clearance C is formed, i.e. a vertical direction intermediate region 61 of the skirt portion 6, has a handling portion 62 for breaking the skirt portion 6. The handling portion 62 is in a convex shape directed to the circumferential direction of the skirt portion 6 and includes a completely cut line portion 620 as a component portion of the convex shape. The skirt portion 6 has an upper break line 63, i.e. a break line, extending upward from the handling portion 62 to an upper end portion 6d of the skirt portion 6.

[0033] In the embodiment, the neck portion 12 of the beverage bottle 10, in a tapered shape, gradually expands in diameter downward from a lower side portion of the engaging peripheral groove portion 11b. On the other hand, the skirt portion 6 is in the cylindrical shape in which the vertical direction intermediate region 61 is in equal diameter toward a lower end portion 6a thereof. The lower end portion 6a of the skirt portion 6 is in close contact with the neck portion 12 of the beverage bottle 10, but the clearance C that gradually becomes larger from the lower end portion 6a into the upper region 60 is formed between the vertical direction intermediate region 61 of the skirt portion 6 and the neck portion 12.

[0034] The handling portion 62 is an area defined by the completely cut line portion 620 in a semicircular shape and is formed in such a manner that the convex shape of a convex curved shape by the completely cut line portion 620 in the semicircular shape is directed to the circumferential direction of the skirt portion 6. The upper break line 63 is formed so as to cover from an upper end portion 620a, i.e. one end portion, of the completely cut line portion 620 to the upper end portion 6d of the skirt portion 6.

[0035] Further, a lower break line 64 extending in the circumferential direction is formed from a lower end portion 620b, i.e. other end portion, of the completely cut line portion 620. The upper break line 63 and the lower break line 64 are each constituted by a continuous semi cut line. The upper break line 63 extends in an upward curved line shape from the upper end portion 620a of the completely cut line portion 620 and a distal end portion 63a of the upper break line 63 reaches the upper end portion 6d of the skirt portion 6. The lower break line 64 straightly extends from the lower end

portion 620b of the completely cut line portion 620 into the circumferential direction and is formed in such a manner that a distal end portion 64a remains within the intermediate region 61 without reaching the lower end portion 6a of the skirt portion 6.

[0036] In addition, the distal end portion 64a of the lower break line 64 is positioned in such a manner that a position in the circumferential direction of the distal end portion 64a reaches a tip side in the circumferential direction further than a position in the circumferential direction of the distal end portion 63a of the upper break line 63.

[0037] The completely cut line is a cut line that is formed so as to penetrate through a front face and a rear face of the skirt portion 6; the semi cut line is a cut line that is formed so as not to penetrate through from the front face into the rear face or from the rear face into the front face, of the skirt portion 6; the same applies hereinafter.

[0038] A lower portion of a region of the cylindrical portion 4 formed with the female-screw shaped portion 4a is formed with a knurl portion 4b for preventing a slip of a grasp finger of an unsealing person at the time of unsealing, to be mentioned below. For reinforcing so as to prevent a twist of the cylindrical portion 4 when the cylindrical portion 4 is rotated around an axis and is detached from the skirt portion 6 by break, a first annular protrusion portion 4c is formed between the knurl portion 4b of the cylindrical portion 4 and the unseal-break portion 5.

[0039] An adjacent portion to the unseal-break portion 5 of the skirt portion 6 is formed with a second annular protrusion portion 6b for reinforcing so as to prevent a twist of the upper region 60 of the skirt portion 6 by intercepting propagation of rotational force through the unseal-break portion 5 into the skirt portion 6 at the time of unsealing. In addition, a third annular protrusion portion 6c is formed for cushioning at the time of forming the throttle portion 60a, the third annular protrusion portion 6c being adjacent to a lower side portion of a forming region of the throttle portion 60a of the upper region 60 of the skirt portion 6.

[0040] The unseal-break portion 5 is constituted in such a manner that a plurality of bridge portions 5a connecting the cylindrical portion 4 and the skirt portion 6 and a plurality of slit portions 5b between the bridge portions 5a are arranged intermittently in the circumferential direction. The number and space, i.e. a circumferential direction length of the slit portion 5b, of the bridge portions 5a are appropriately set according to unseal maintaining strength, easiness in unsealing, or the like.

[0041] An upper end portion of the cylindrical portion 4 is integrally formed with the top board portion 3 in the circular shape and the rear face of the top board portion 3 (facing an inner portion of the cylindrical portion 4) is attached to the seal member 2. The seal member 2 is made of a cork sheet, a resin sheet, a rubber sheet, or the like. The seal member 2 is held on the rear face of the top board portion 3 at a peripheral edge portion by a constriction portion 4d in an annular shape formed at the upper end portion of the cylindrical portion 4 as in the figures and/or held so as to be adherently integrated on the rear face of the top board portion 3 by glue or the like.

[0042] The figures illustrate an example in which the upper break line 63 and the lower break line 64 are formed in the semi cut lines that respectively continue from the upper end portion 620a and the lower end portion 620b of the completely cut line portion 620. However, the upper break line 63 and the lower break line 64 can be formed in the semi cut line or in the completely cut line of a perforation shape, i.e. a dotted line shape, from the upper end portion 620a and the lower end portion 620b.

[0043] In the embodiment, a vertical direction distance "a" from the upper end portion 620a of the completely cut line portion 620 of the handling portion 62 to an upper side portion 60aa of a region corresponding to the throttle portion 60a is equal to or less than a vertical direction distance "b" from the lower end portion 620b of the completely cut line portion 620 to the lower end portion 6a of the skirt portion 6. A vertical direction distance "c" from the lower end portion 620b of the completely cut line portion 620 of the handling portion 62 to the upper side portion 60aa of the region corresponding to the throttle portion 60a is smaller than the vertical direction distance "b" from the lower end portion 620b of the completely cut line portion 620 to the lower end portion 6a of the skirt portion 6.

[0044] Further, a vertical direction distance "d" from the lower end portion 620b of the completely cut line portion 620 to the upper end portion 6d of the skirt portion 6 is smaller than the vertical direction distance "b" from the lower end portion 620b of the completely cut line portion 620 to the lower end portion 6a of the skirt portion 6.

[0045] The screw cap for the beverage bottle 1 constituted as above is mounted so as to reach part of the neck portion 12 from the mouth portion 11 of the beverage bottle 10 in a state in which the beverage bottle 10 is filled with a beverage L, reference to FIG. 3. A dedicated tool is used for mounting as above, and a region of the cylindrical portion 4 corresponding to the male screw portion 11a of the beverage bottle 10 is formed into the female-screw-shaped portion 4a by shaping so as to match with the male screw portion 11a by fastening force of the tool in mounting.

[0046] Thereby, the male screw portion 11a and the female-screw-shaped portion 4a are in a screwed state. In the screwed state as above, an upper end opening mouth edge portion 11c of the beverage bottle 10 adheres to the seal member 2 mounted on the rear face of the top board portion 3 and an opening mouth portion of the mouth portion 11 is sealed. A region of the upper region 60 of the skirt portion 6 corresponding to the engaging peripheral groove portion 11b of the beverage bottle 10 is formed into the throttle portion 60a that fits into the engaging peripheral groove portion 11b by shaping so as to swage into the engaging peripheral groove portion 11b by the fastening force of the tool in mounting.

[0047] In such a case, because the third annular protrusion portion 6c is formed adjacent to a lower side portion of the throttle portion 60a, i.e. a lower edge portion 60b of the upper region, the third annular protrusion portion 6c acts like a swaging margin absorbing a strain or the like in the vicinity of the throttle portion 60a in accordance with a diameter reduction in throttle forming; and the throttle portion 60a is formed with a good appearance without generating a crease or the like in the vicinity of the throttle portion 60a.

[0048] The skirt portion 6 covers an outer peripheral face from the mouth portion 11 to the neck portion 12 of the beverage bottle. Thus, in the state in which the screw cap for the beverage bottle 1 is mounted on the beverage bottle 10, the opening mouth portion of the mouth portion 11 is sealed and a liquid level of the beverage L filled is covered with the skirt portion 6 so as not to be visually recognized.

[0049] Before consuming the beverage L in the beverage bottle 10 for a first time, by grasping a body portion, not shown in the figures, of the beverage bottle 10 and the cylindrical portion 4, the body portion and the cylindrical portion 4 are relatively rotated around the axis of the beverage bottle 10 in the direction for relaxing the screwing between the male screw portion 11a and the female-screw-shaped portion 4a, i.e. the opposite screwing direction. By a screwing releasing action in accordance with such a rotation, the cylindrical portion 4 tends to be displaced upward. By rotational force of the cylindrical portion 4 and upward displacement attempting force, shear force is applied to the bridge portions 5a of the unseal-break portion 5.

[0050] Because the throttle portion 60a is fitted into and engaged with the engaging peripheral groove portion 11b, the skirt portion 6 is not displaced upward. Therefore, the shear force concentrates on the bridge portion 5a, the bridge portion 5a is broken, the cylindrical portion 4 is separated from the skirt portion 6 and detached from the beverage bottle 10. FIG. 4 illustrates a state in which the cylindrical portion 4 is detached from the beverage bottle 10, i.e. an uncapped state.

[0051] Thereby, the cylindrical portion 4 of a main constituent of the cap is detached from the beverage bottle 10 and the beverage L in the beverage bottle 10 is able to be poured into a glass or the like with the skirt portion 6 remained on the beverage bottle 10. Until completely consuming the beverage, the opening mouth portion of the beverage bottle 10 is able to be sealed every time by screwing the cylindrical portion 4 with the male screw portion 11a of the beverage bottle 10 through the female-screw-shaped portion 4a.

[0052] After consuming the beverage in the beverage bottle 10, the skirt portion 6 is detached from the beverage bottle 10 and the skirt portion 6 and the beverage bottle 10 are separately disposed. In such a case, the skirt portion 6 is able to be detached from the beverage bottle 10 in such a manner that the handling portion 62 formed at the skirt portion 6 is set to be caught and pulled up by fingers, the skirt portion 6 is broken along the upper break line 63 in a spiral shape, the skirt portion 6 is broken along the lower break line 64 in the circumferential direction, and is opened laterally.

[0053] FIG. 5 illustrates a procedure of preparation for breaking easily. As illustrated in FIGS. 5A and 5B, there is the clearance C between the neck portion 12 of the beverage bottle 10 and the skirt portion 6. Therefore, as illustrated in FIG. 5B, when a part 621, hereinafter referred to as a press part, adjacent to a left side in the circumferential direction of a convex shape portion of the completely cut line portion 620 is pressed by a finger "hf" in the centripetal direction of the beverage bottle 10, because of the clearance C, the press part 621 is deformed so as to recess in the centripetal direction and a width of the completely cut line portion 620 is enlarged.

[0054] Therefore, if the finger "hf" is hooked into the width and the handling portion 62 is lifted up in the outer diametrical direction, the handling portion 62 is pulled up and easily caught by the finger "hf". Because the screw cap for the beverage bottle 1 is made of a thin sheet metal such as aluminum, by pressing with the finger "hf", the recess deformation is performed easily so as to invert a curved face of the press part 621. Furthermore, click feeling by inversion peculiar to metal material in recessing is transmitted to the finger "hf" and thereby the unsealing person has a special good feeling of touch.

[0055] In the embodiment, because the upper break line 63 extending from the upper end portion 620a of the completely cut line portion 620 of the handling portion 62 extends into the upper region 60 of the skirt portion 6 and reaches the upper end portion 6d of the skirt portion 6, following break of the throttle portion 60a, break is able to be progressed easily until the upper end portion 6d of the skirt portion 6. Because engaging of the throttle portion 60a relative to the engaging peripheral groove portion 11b is released and lateral opening of the skirt portion 6 is performed effectively and at the same time break along the lower break line 64 progresses, the skirt portion 6 is smoothly detached from the beverage bottle 10.

[0056] Because the distal end portion 64a of the lower break line 64 is formed so as to remain within the intermediate region 61 without reaching the lower end portion 6a of the skirt portion 6, break from the lower end portion 6a of the skirt portion 6 is not progressed by mechanical external force when the screw cap for the beverage bottle 1 is mounted or by mistake when the beverage bottle is packed, conveyed, and displayed in the mounted state.

[0057] Therefore, there is no concern for adverse effect by a progress in break or obstruction in handling. By a formation of the handling portion 62 and the upper and lower break lines 63, 64 continuing to the handling portion 62, a processing margin becomes smaller and impairment of design performance is able to be suppressed. Because there is no notch or hollowed-out part for forming the handling portion 62, punching debris accompanied with punching is not generated

and there is no concern for a foreign substance to be mixed into a product.

[0058] Further, in the embodiment, the distal end portion 64a of the lower break line 64 is positioned in such a manner that the position in the circumferential direction thereof reaches the tip side in the circumferential direction further than the position in the circumferential direction of the distal end portion 63a of the upper break line 63. Therefore, even after break by the upper break line 63 reaches the upper end portion 6d of the skirt portion 6, break further extends in the circumferential direction from the distal end portion 64a of the lower break line 64 by continuing breaking, and the lateral opening and break of the skirt portion 6 is performed promptly.

[0059] Magnitude relation of the vertical direction distance "a" from the upper end portion 620a of the completely cut line portion 620 of the handling portion 62 to the upper side portion 60aa of the region corresponding to the throttle portion 60a, the vertical direction distance "b" from the lower end portion 620b of the completely cut line portion 620 to the lower end portion 6a of the skirt portion 6, the vertical direction distance "c" from the lower end portion 620b of the completely cut line portion 620 to the upper side portion 60aa of the region corresponding to the throttle portion 60a, and the vertical direction distance "d" from the lower end portion 620b of the completely cut line portion 620 to the upper end portion 6d of the skirt portion 6 is set as above.

[0060] Therefore, a breaking amount by the upper break line 63 is able to be reduced and break reaching the upper end portion 6d of the skirt portion 6 is performed promptly. Such setting of the magnitude relation of "a", "b", "c", and "d" is not shown in the figures, but is adopted similarly in the embodiment as follows.

[0061] FIG. 6 illustrates a second embodiment of the screw cap for the beverage bottle of the present invention and a state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, an upper press deformation promoting line 65 and a lower press deformation promoting line 66 that extend in the convex shape direction of the completely cut line portion 620 and in the circumferential direction, i.e. the opposite direction to the upper break line 63 and the lower break line 64, are formed respectively from the upper and lower end portions 620a, 620b of the completely cut line portion 620.

[0062] The upper press deformation promoting line 65 and the lower press deformation promoting line 66 are formed in order to make press deformation of the press part 621 easily occur in pressing as illustrated in FIG. 5, and are constituted by the continuous semi cut line in the embodiment. Forming lengths of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are appropriately formed in a length range enough for being pressed by the fingertip.

[0063] The screw cap for the beverage bottle 1 of the embodiment is mounted, similar to the above example, from the mouth portion 11 to the neck portion 12 of the beverage bottle 10, reference to FIGS. 2 to 4. In breaking and eliminating the skirt portion 6, the press part 621 is pressed in the centripetal direction by fingers and the press part 621 is deformed into a recess shape. In such a case, because the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous semi cut line are formed on upper and lower sides of the press part 621, forming parts of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are folded more easily in a ridge, specifically folded in the form of a mountain.

[0064] Thereby, the deformation of the press part 621 easily occurs, the width of the completely cut line portion 620 becomes larger, and operability of the break by fingers is facilitated. Other structures are the same as the first embodiment, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted here.

[0065] FIG. 7A illustrates a third embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, the completely cut line portion 620 is formed in an arc shape of which radius of curvature is greater than that of the completely cut line portion 620 of the above-mentioned embodiment, i.e. an arc angle is smaller than 180°.

[0066] The upper break line 63 and the lower break line 64 that extend similarly to the first embodiment from the upper and lower end portions 620a, 620b of the completely cut line portion 620 are each formed by the continuous semi cut line. In the example, the handling portion 62 is a part that is defined by the completely cut line portion 620 in the arc shape, and by parts 630, 640 (parts on a side of the completely cut line portion 620) of the upper break line 63 and the lower break line 64.

[0067] Similarly to the above-mentioned example, the screw cap for the beverage bottle 1 of the embodiment is mounted from the mouth portion 11 to the neck portion 12 of the beverage bottle 10, reference to FIGS. 2 to 4. In breaking and eliminating the skirt portion 6, the press part 621 is pressed in the centripetal direction by fingers and is deformed into a recess shape. By the deformation of the press part 621, the skirt portion 6 is able to be easily broken and eliminated similar to the above.

[0068] Other structures are the same as the first embodiment, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted here.

[0069] FIG. 7B illustrates a modified example of the third embodiment. In the example, the parts 630, 640 (parts on the side of the completely cut line portion 620) of the upper break line 63 and the lower break line 64 are formed by a continuous completely cut line that continues to the completely cut line portion 620. Also in the example, the handling portion 62 is the part that is defined by the completely cut line portion 620 in the arc shape, and by the parts 630, 640

of the upper break line 63 and the lower break line 64.

[0070] The screw cap for the beverage bottle 1 of the example is also mounted, similar to the above-mentioned example, from the mouth portion 11 to the neck portion 12 of the beverage bottle 10, reference to FIGS. 2 to 4. In breaking and eliminating the skirt portion 6, the press part 621 is pressed in the centripetal direction by fingers and the press part 621 is deformed into the recess shape. By the deformation of the press part 621, the skirt portion 6 is able to be easily broken and eliminated similar to the above.

[0071] Compared with the embodiment in FIG. 7A, because the parts 630, 640 of the upper break line 63 and the lower break line 64 that form the handling portion 62 are constituted by the continuous completely cut line, the handling portion 62 is able to be turned up easily and operations of breaking and eliminating the skirt portion 6 are facilitated.

[0072] Other structures are the same as the embodiment illustrated in FIG. 7A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0073] FIG. 8A illustrates a fourth embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, in addition to the example illustrated in FIG. 7B, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that extend in the protruding direction side of the convex shape of the completely cut line portion 620 and in the circumferential direction, i.e. the opposite direction to the upper break line 63 and the lower break line 64, are formed respectively from the upper and lower end portions 620a, 620b of the completely cut line portion 620.

[0074] The upper press deformation promoting line 65 and the lower press deformation promoting line 66 are formed in order to make press deformation of the press part 621 easily occur in pressing as illustrated in FIG. 5, and are constituted by a dotted semi cut line, i.e. a semi cut line in a form of a dot, in the embodiment. The forming lengths of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are appropriate, similar to the embodiment illustrated in FIG. 6, in the length range enough for being pressed by the fingertip.

[0075] The screw cap for the beverage bottle 1 of the embodiment is also mounted, similar to the above-mentioned example, from the mouth portion 11 to the neck portion 12 of the beverage bottle 10, reference to FIGS. 2 to 4. In breaking and eliminating the skirt portion 6, the press part 621 is pressed in the centripetal direction by fingers, and the press part 621 is deformed into the recess shape. In such a case, because the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the dotted semi cut line are formed on the upper and lower sides of the press part 621, the forming parts of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are folded in the ridge more easily.

[0076] Thereby, the deformation of the press part 621 easily occurs, the width of the completely cut line portion 620 becomes larger, and operability of the break by fingers is facilitated. Other structures are the same as the embodiment illustrated in FIG. 7A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0077] FIG. 8B illustrates a modified example of the fourth embodiment. In the example, distal end portions of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 that are each constituted by the dotted semi cut line are connected by a vertical direction press deformation promoting line 67 that is constituted by the dotted semi cut line along the longitudinal direction, i.e. the vertical direction, of the skirt portion 6.

[0078] In this case, when the press part 621 is pressed in breaking the skirt portion 6, a ridge at a forming part of the vertical direction press deformation promoting line 67 is further formed in addition to ridges of the forming parts of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66. Thereby, the deformation of the press part 621 into the recess shape easily occurs. Other structures are the same as the embodiment illustrated in FIG. 8A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0079] FIG. 9A illustrates a fifth embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, in addition to the example illustrated in FIG. 7B, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that extend in the protruding direction side of the convex shape of the completely cut line portion 620 and in the circumferential direction are formed respectively from the upper and lower end portions 620a, 620b of the completely cut line portion 620 by the continuous completely cut line. In the example, forming lengths of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are appropriate, similar to the embodiment illustrated in FIG. 6, in the length range enough for being pressed by the fingertip.

[0080] The screw cap for the beverage bottle 1 of the embodiment is mounted, similar to the above-mentioned example, from the mouth portion 11 to the neck portion 12 of the beverage bottle 10, reference to FIGS. 2 to 4. In breaking and eliminating the skirt portion 6, the press part 621 is pressed in the centripetal direction by fingers and the press part 621 is deformed into the recess shape. In such a case, because the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous completely cut line are formed on the upper and lower sides of the press part 621, the press part 621 practically becomes a tongue-like piece that is directed to a side of the handling portion 62.

[0081] Thereby, the deformation into the recess shape by the press occurs more easily. Therefore, the handling portion 62 is able to be turned up easily and the operations of breaking and eliminating the skirt portion 6 are facilitated. Other structures are the same as the embodiment illustrated in FIG. 8A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0082] FIG. 9B illustrates a modified example of the fifth embodiment. In the example, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are respectively constituted by dotted semi cut lines 65a, 66a on a side of the handling portion 12 and by continuous completely cut lines 65b, 66b that respectively continue to the dotted semi cut lines 65a, 66a.

[0083] In the example, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 respectively include the continuous completely cut lines 65b, 66b, but are constituted by the dotted semi cut lines 65a, 66a on a side of the handling portion 62. Therefore, the press part 621 is not unexpectedly deformed, i.e. turned up or recessed, before intentionally breaking the skirt portion 6. At the time of breaking the skirt portion 6, the deformation by the press is performed smoothly.

[0084] Other structures are the same as the embodiment illustrated in FIG. 9A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0085] FIG. 10A illustrates a sixth embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. The embodiment is different from the embodiment illustrated in FIG. 8A in that the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are constituted by a dotted completely cut line, i.e. a completely cut line in a form of a dot. In the embodiment, in breaking the skirt portion 6, the forming parts of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are folded in the ridge more easily. Thereby, the deformation of the press part 621 by the press is performed smoothly. Furthermore, the press part 621 is not unexpectedly deformed, i.e. turned up or recessed, before breaking the skirt portion 6.

[0086] Other structures are the same as the embodiment illustrated in FIG. 8A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0087] FIG. 10B illustrates a modified example of the sixth embodiment. In the example, because the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are constituted respectively by dotted completely cut lines 65c, 66c and continuous semi cut lines 65d, 66d that overlap the dotted completely cut lines 65c, 66c. In the embodiment, in breaking the skirt portion 6, the forming parts of the upper press deformation promoting line 65 and of the lower press deformation promoting line 66 are folded in the ridge more easily.

[0088] Thereby, the deformation of the press part 621 by the press is performed smoothly. Furthermore, similarly to above-mentioned example, the press part 621 is not unexpectedly deformed, i.e. turned up or recessed, before breaking the skirt portion 6.

Other structures are the same as the embodiment illustrated in FIG. 10A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0089] FIG. 11 illustrates a seventh embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous completely cut line are formed respectively with small intervals 65e, 66e from the upper and lower end portions 620a, 620b of the completely cut line portion 620 so as to extend in the protruding direction side of the convex shape of the completely cut line portion 620 and in the circumferential direction.

[0090] In the embodiment, in breaking the skirt portion 6, pressing is performed in the same way as the above example; the part 621, i.e. the press part, between the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous completely cut line of the press part 621 is deformed into the recess shape in the centripetal direction.

[0091] Parts provided with the small intervals 65e, 66e are pulled by the press part 621 and is deformed into a recess approximately and the deformation of the press part 621 by the press is performed smoothly. Furthermore, because the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are discontinuous with the completely cut line portion 620, the deformation of the press part 621 by the press is performed smoothly.

[0092] Other structures are the same as the embodiment illustrated in FIG. 10A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0093] FIG. 12 illustrates an eighth embodiment of the screw cap for the beverage bottle of the present invention and the state before the screw cap is mounted on the mouth portion of the beverage bottle. In the embodiment, a press deformation promoting line 68 constituted by a single continuous completely cut line is formed so as to extend in the protruding direction side of the convex shape and in the circumferential direction from a central portion of the completely cut line portion 620.

[0094] In the embodiment, in breaking the skirt portion 6, the press part 621 is deformed in the centripetal direction and into the recess shape so as to open upward and downward from the press deformation promoting line 68. Therefore,

the deformation of the press part 621 by the press is performed smoothly. In this case, the press deformation promoting line 68 can be discontinuously formed at a small interval with the completely cut line portion 620 from the central portion of the completely cut line portion 620 in a similar manner to the embodiment in FIG. 1.

[0095] The press deformation promoting line 68 can be constituted by the semi cut line. In such a case, the press part 621 is folded in a valley at a forming region of the press deformation promoting line 68 and is deformed into the recess shape. Further, the press deformation promoting line 68 can be formed so as to slightly deviate either upward or downward from the central portion of the completely cut line portion 620.

Other structures are the same as embodiment illustrated in FIG. 10A, common portions are allotted with the same reference numerals, and explanation for the common portions is omitted.

[0096] In the examples illustrated in FIGS. 1 to 12, although the lower break line 64 that continues to the completely cut line portion 620 of the handling portion 62 is formed so as to straightly extend in the circumferential direction of the skirt portion 6, the lower break line 64 can be formed so as to be bent from midway and be directed obliquely downward. In such a case, in breaking by the upper break line 63 and the lower break line 64, because break from the lower break line 64 progresses obliquely downward and reaches the lower end portion 6a of the skirt portion 6, the skirt portion 6 is more easily detached from the mouth portion 11, reference to FIGS. 3 and 4, of the beverage bottle 10.

[0097] Although a convex shape of the handling portion 62 is formed so as to be directed in the circumferential direction of the skirt portion 6, the convex shape can be formed downward obliquely or along the shaft direction of the skirt portion 6. Further, in the examples, the lower break line 64 that extends from the lower end portion 620b, i.e. other end portion, of the completely cut line portion 620 is provided. However, in case of prioritizing design performance, the examples can be provided without the lower break line 64 and the shape of the lower break line 64 is not limited to those in the figures.

[0098] Further, when the lower break line 64 is provided, the lower break line 64 is preferably formed so as to be directed in the circumferential direction or downward, which includes an example in which the lower break line 64 is formed so as to be directed upward. But, when the lower break line 64 is formed so as to be directed upward, if both upper break line 63 and lower break line 64 are provided so as to reach the upper end portion 6d of the skirt portion 6, in breaking by catching the handling portion 62, the handling portion 62 is sometimes separated from the skirt portion 6 along with a part between both break lines 63, 64.

[0099] Therefore, most of the skirt portion 6 remains on the beverage bottle 10 with a break face exposed; because the remaining skirt portion 6 is not able to be detached by using the handling portion 62, there is no choice but to pull the throttle portion 60a upward after opening laterally with fingers, which leads to inconvenience in detaching and is not preferable.

[0100] Each of the above embodiments illustrates the example in which the distal end portion 63a of the upper break line 63 reaches the upper end portion 6d of the skirt portion 6. The embodiments are not limited to such an aspect, but can be such that the distal end portion 63a of the upper break line 63 reaches the lower edge portion 60b of the upper region 60 of the skirt portion 6, vertically traverses the throttle portion 60a, or further reaches midway of the upper region 60.

[0101] Further, the shape of the completely cut line portion 620 as the component portion of the handling portion 62 is not limited to those in the figures; as long as the shape constitutes the convex shape of the handling portion 62, the shape can be, for instance, a partial shape of an ellipse shape or of a square shape, a head shape of a mushroom shape, a linear shape, or further can be a combined shape of a straight line and a circular shape. The clearance C that is formed between the skirt portion 6 and the neck portion 12 of the beverage bottle 10 can be formed all over the skirt portion 6.

[0102] In addition, although the cylindrical portion 4 has the constriction portion 4d immediately below the top board portion 3 in the figures, when the seal member 2 is fixed to the rear face of the top board portion 3 by glue or the like, other shapes are adoptable in place of the constriction portion 4d. The first annular protrusion portion 4c, the second annular protrusion portion 6b, and the third annular protrusion portion 6c are not required necessarily, and are appropriately chosen and adopted in accordance with predetermined specifications in view of the functionality, the design performance, or the like.

[0103] The whole shape of the screw cap for the beverage bottle 1 and the shape of each component are not limited to those in the figures, and can be other shapes if functionally equivalent to those in the figures. The beverage bottle to which the screw cap for the beverage bottle 1 of the present invention is applied is not limited to a wine or whisky bottle, and is able to be of course applied to bottles for Sake (rice wine), Shochu (distilled spirits), a seasoning such as soy sauce, and further various soft drinks.

[0104] An example of a method for cutting processing of the handling portion, the break line, and the press deformation promoting line in the screw cap for the beverage bottle of the present invention is explained below with reference to FIGS. 13 to 15. FIGS. 13 to 15 illustrate the method for cutting processing of the handling portion, the break line, and the press deformation promoting line in the example illustrated in FIG. 11.

[0105] FIGS. 13 and 14 are views that illustrate a first example of the method for cutting processing. A processing device 100 used for the example includes a die 101, i.e. a die roll, in a cylindrical shape, a punch 102, i.e. a punch roll, in a cylindrical shape, and a processing blade 103 that is provided on an outer peripheral face of either the die roll 101

or the punch roll 102 so as to form the handling portion 62, the upper break line 63 and the lower break line 64, the upper press deformation promoting line 65 and the lower press deformation promoting line 66.

[0106] In the figures, the die roll 101 is provided with the processing blade 103. The processing blade 103 is constituted by a first processing blade 103a for the handling portion 62, a second processing blade 103b for the upper break line 63, a third processing blade 103c for the lower break line 64, a fourth processing blade 103d for the upper press deformation promoting line 65, and a fifth processing blade 103e for the lower press deformation promoting line 66. As illustrated in FIG. 14A, blade heights "h1" of the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e are each set to be greater than a thickness "t" of the skirt portion 6 of the screw cap for the beverage bottle.

[0107] As illustrated in FIG. 14B, blade heights "h2" of the second processing blade 103b and the third processing blade 103c are each set to be smaller than the thickness "t" of the skirt portion 6. A part of the punch roll 102 relative to the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e is provided with receiving groove portions 102a, 102b, 102c having shapes that respectively match with the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e. Depths D of the receiving groove portions 102a, 102b, 102c are each set to be greater than the blade heights "h1" of the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e.

[0108] The die roll 101 is driven to rotate around the axis in the direction along an arrow "e" by a drive source not illustrated in the figures. The punch roll 102 is set to be attachable to and detachable from the die roll 101 as illustrated in an arrow "f". In the figures, although the punch roll 102 is constituted so as to be driven by axial rotation of the die roll 101 and so as to rotate around the axis in the direction along an arrow "e1", the punch roll 102 itself can be set to synchronize with the die roll 101 by the drive source not illustrated in the figures and be driven to rotate in the direction along the arrow "e1".

[0109] In executing the processing by the processing device 100 constituted as above, the die roll 101 is arranged at an inner peripheral portion of the skirt portion 6, which is unprocessed, of the screw cap for the beverage bottle 1, and the punch roll 102 is arranged at an outer peripheral portion of the skirt portion 6. And the die roll 101 is rotated around the axis with the punch roll 102 pressed on the die roll 101 along the arrow "f" direction through the skirt portion 6. By the rotation, the screw cap for the beverage bottle 1 rotates in the same direction as the arrow "e" in a compressed state between the die roll 101 and the punch roll 102, and the punch roll 102 is driven and rotates in the direction along the arrow "e1".

[0110] When the fourth processing blade 103d and the fifth processing blade 103e reach a part between the die roll 101 and the punch roll 102, the fourth processing blade 103d and the fifth processing blade 103e cut into the skirt portion 6 from the inside. The punch roll 102 is formed with the receiving groove portions 102b, 102c that match with the fourth processing blade 103d and the fifth processing blade 103e; and the blade heights "h1" of the fourth processing blade 103d and the fifth processing blade 103e are set to be greater than the thickness "t" of the skirt portion 6. Thereby, the fourth processing blade 103d and the fifth processing blade 103e penetrate the skirt portion 6 in the thickness direction, and blade edges of the fourth processing blade 103d and the fifth processing blade 103e are received into the receiving groove portions 102b, 102c.

[0111] Therefore, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are completely cut and processed in the continuous line. Further, when axial rotation of the die roll 101 is continued, the first processing blade 103a is cut into the skirt portion 6 from the inside. Because the punch roll 102 is formed with the receiving groove portion 102a that matches with the first processing blade 103a, and the blade height "h1" of the first processing blade 103a is set to be greater than the thickness "t" of the skirt portion 6, the first processing blade 103a penetrates the skirt portion 6 in the thickness direction and a blade edge of the first processing blade 103a is received into the receiving groove portion 102a.

[0112] Thereby, completely cutting processing is executed in the handling portion 62. In the above process, the blade edges of the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e do not abut on a surface of the punch roll 102 because the blade edges are respectively received by the receiving groove portions 102a, 102b, 102c; thereby preventing the blade from a chip.

[0113] By continuous axial rotation of the die roll 101, when the second processing blade 103b and the third processing blade 103c reach the part between the die roll 101 and the punch roll 102, the second processing blade 103b and the third processing blade 103c cut into the skirt portion 6 from the inside. Because the blade heights "h2" of the second processing blade 103b and the third processing blade 103c are set to be smaller than the thickness "t" of the skirt portion 6, the second processing blade 103b and the third processing blade 103c do not penetrate the skirt portion 6 in the thickness direction.

[0114] Thereby, from the inside of the skirt portion 6, the cutting processing is executed in the upper break line 63 and the lower break line 64 which are in the semi cut state. After the punch roll 102 is moved away from the die roll 101, the screw cap for the beverage bottle 1 including the handling portion 62 that is constituted by the completely cut line as illustrated in Fig.11, the upper break line 63 and the lower break line 64 that are constituted by the semi cut line, and

the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous completely cut line is able to be taken out.

[0115] FIG. 15 is a view that illustrates a second example of the method for cutting processing. A processing device 200 used for the example includes a first metal mold 201, a second metal mold 202, and a processing blade 203. The first metal mold 201 has a convex mold portion 201a in an arc shape, the second metal mold 202 has a recess mold portion 202a in an arc shape, and the processing blades 203 are provided on a surface of the convex mold portion 201a of the first metal mold 201 so as to respectively form the handling portion 62, the upper break line 63 and the lower break line 64, and the upper press deformation promoting line 65 and the lower press deformation promoting line 66.

[0116] The processing blade 203 in the figures is constituted by a first processing blade 203a for the handling portion 62, a second processing blade 203b for the upper break line 63, a third processing blade 203c for the lower break line 64, reference to FIG. 13B, a fourth processing blade 203d for the upper press deformation promoting line 65, and a fifth processing blade 203e for the lower press deformation promoting line 66, reference to FIG. 13B. Blade heights of the first processing blade 203a, of the fourth processing blade 203d, and of the fifth processing blade 203e; and blade heights of the second processing blade 203b and of the third processing blade 203c are set in a similar manner to the example illustrated in FIG. 14. A radius of curvature of the convex mold portion 201a of the first metal mold 201 is set substantially similar to that of an inner peripheral face of the skirt portion 6; and a radius of curvature of the recess mold portion 202a of the second metal mold 202 is set substantially similar to that of an outer peripheral face of the skirt portion 6.

[0117] The first metal mold 201 and the second metal mold 202 are arranged in such a manner that the convex mold portion 201a and the recess mold portion 202a are positioned so as to face each other. Further, the second metal mold 202 is set to be attachable to and detachable from the first metal mold 201 as illustrated in an arrow "g".

[0118] In executing the processing by the processing device 200 constituted as above, the screw cap for the beverage bottle 1 is arranged in such a manner that the first metal mold 201 is positioned at the inner peripheral portion of the unprocessed skirt portion 6 and that the second metal mold 202 is positioned at the outer peripheral portion of the skirt portion 6. In a state in which the second metal mold 202 is positioned adjacent to the first metal mold 201 along the arrow "g" with the skirt portion 6 interposed therebetween, the recess mold portion 202a of the second metal mold 202 is combined so as to engage with the convex mold portion 201a of the first metal mold 201.

[0119] The above combining is made in such a manner that the first processing blade 203a, the fourth processing blade 203d, and the fifth processing blade 203e of the processing blade 203 penetrate, in the thickness direction, the skirt portion 6 from the inside and that the second processing blade 203b and the third processing blade 203c cut the skirt portion 6 from the inside without penetrating therethrough. Thereby, from the inside of the skirt portion 6, the cutting processing is executed in the handling portion 62, the upper press deformation promoting line 65 and the lower press deformation promoting line 66 which are in the completely cut state; at the same time the cutting processing is executed in the upper break line 63 and the lower break line 64 which are in the semi cut state.

[0120] After the second metal mold 202 is moved away from the first metal mold 201, the screw cap for the beverage bottle 1 including the handling portion 62 that is constituted by the completely cut line, the upper break line 63 and the lower break line 64 that are constituted by the semi cut line, and the upper press deformation promoting line 65 and the lower press deformation promoting line 66 that are constituted by the continuous completely cut line, is able to be taken out.

[0121] In the first and the second methods for cutting processing, the example in which the upper break line 63 and the lower break line 64 are processed from the inside of the skirt portion 6 so as to be in the semi cut state is shown. However, the completely cutting processing can be executed in such a manner that the upper break line 63 and the lower break line 64 become the perforation shape so as to penetrate the skirt portion 6 in the thickness direction.

[0122] In the first method for cutting processing, the processing blade 103 is provided for the die roll 101, but can be provided for the punch roll 102. In such a case, the cutting processing is executed from the outer peripheral portion of the skirt portion 6. Further, in the first method for cutting processing, the processing blade 103 is provided for the die roll 101, but can be provided both for the die roll 101 and for the punch roll 102. A case is exemplified in which the first processing blade 103a, the fourth processing blade 103d, and the fifth processing blade 103e are provided for the punch roll 102 and in which the second processing blade 103b and the third processing blade 103c are provided for the die roll 101.

[0123] Each processing blade 103 is appropriately chosen to be provided for the die roll 101 or the punch roll 102 depending on cutting specifications such as the completely cut and the semi cut on the front or the rear. Also in the second method for cutting processing, the processing blade 203 is appropriately chosen to be provided for the first metal mold 201 or the second metal mold 202 similarly depending on the cutting specifications such as the completely cut and the semi cut on the front or the rear.

[0124] Further, in the above methods for cutting processing, the processing of the handling portion 62, the processing of the upper break line 63 and the lower break line 64, and the processing of the upper press deformation promoting line 65 and the lower press deformation promoting line 66 are executed in the single process but can be executed in plural processes.

[0125] In the first and the second methods for cutting processing, the method is exemplified in which the cutting

processing is executed in the handling portion, the break line, and the press deformation promoting lines in the embodiment illustrated by FIG. 11; when the cutting processing is executed in the screw cap for the beverage bottle in the other embodiments that are illustrated, the cutting processing is executed by using a processing device with the processing blade that respectively corresponds to the embodiments. Furthermore, a method for cutting processing by laser processing is also adoptable as the method for cutting processing.

List of Reference Signs

[0126]

1	screw cap for beverage bottle
2	seal member
3	top board portion
4	cylindrical portion
4a	female-screw-shaped portion
5	unseal-break portion
5a	bridge portion
5b	slit portion
6	skirt portion
6a	lower end portion
6d	upper end portion
60	upper region
60a	throttle portion
61	intermediate region
62	handling portion
620	complete cut line portion
620a	upper end portion (one end portion)
620b	lower end portion (other end portion)
63	upper break line (break line)
63a	distal end portion
65	upper press deformation promoting line
66	lower press deformation promoting line
65a	dotted semi cut line
66a	dotted semi cut line
65b	continuous completely cut line
66b	continuous completely cut line
65c	dotted completely cut line
66c	dotted completely cut line
65d	continuous semi cut line
66d	continuous semi cut line
67	vertical direction press deformation promoting line
10	beverage bottle
11	mouth portion
11a	male screw portion
11b	engaging peripheral groove portion
12	neck portion
C	clearance

Claims

1. A screw cap for a beverage bottle (1) mounted on a mouth portion (11) of a beverage bottle (10) and made of metal, comprising:

- a top board portion (3) in a circular shape provided with a seal member (2) on a rear face;
- a cylindrical portion (4) extending downward from an outer peripheral portion of the top board portion (3); and
- a skirt portion (6) in a cylindrical shape connected to a lower end portion of the cylindrical portion (4) through an unseal-break portion (5) having a bridge portion (5a) being intermittent in circumferential direction,

characterized in that

the cylindrical portion (4) is formable with a female-screw-shaped portion (4a) that matches with a male screw portion (11 a) of the mouth portion (11) when the screw cap for the beverage bottle (1) is mounted on the mouth portion (11),
 an upper region (60) of the skirt portion (6) is formable with a throttle portion (60a) that is fitted into an engaging peripheral groove portion (11b) of a neck portion (12) continuing to the mouth portion (11) when the screw cap for the beverage bottle (1) is mounted on the mouth portion (11),

the skirt portion (6) is shaped so as to cover the neck portion (12) with a clearance (C) at least between a lower region of the throttle portion (60a) and an outer peripheral face of the neck portion (12) when the screw cap for the beverage bottle (1) is mounted on the mouth portion (11),

a region of the skirt portion (6) in which the clearance (C) is formed has a handling portion (62) in a convex shape for breaking the skirt portion (6), and the handling portion (62) includes a completely cut line portion (620) as a component portion of the convex shape and the skirt portion (6) has a break line extending upward from the handling portion (62) to an upper end portion (6d) of the skirt portion (6).

2. The screw cap for the beverage bottle (1) as set forth in claim 1, wherein the convex shape of the handling portion (62) is formed so as to be directed to circumferential direction of the skirt portion (6) and the break line is constituted by an upper break line (63) extending upward from one end portion of the completely cut line portion (620) of the handling portion (62).

3. The screw cap for the beverage bottle (1) as set forth in claim 1 or 2, wherein a press deformation promoting line extending in circumferential direction is formed on a protruding direction side of the convex shape of the completely cut line portion (620).

4. The screw cap for the beverage bottle (1) as set forth in any one of claims 1 to 3, wherein the press deformation promoting line has an upper press deformation promoting line (65) and a lower press deformation promoting line (66) that respectively extend from upper and lower end portions (620a, 620b) of the completely cut line portion (620).

5. The screw cap for the beverage bottle (1) as set forth in claim 3 or 4, wherein the press deformation promoting line (65, 66) is constituted by a continuous completely cut line.

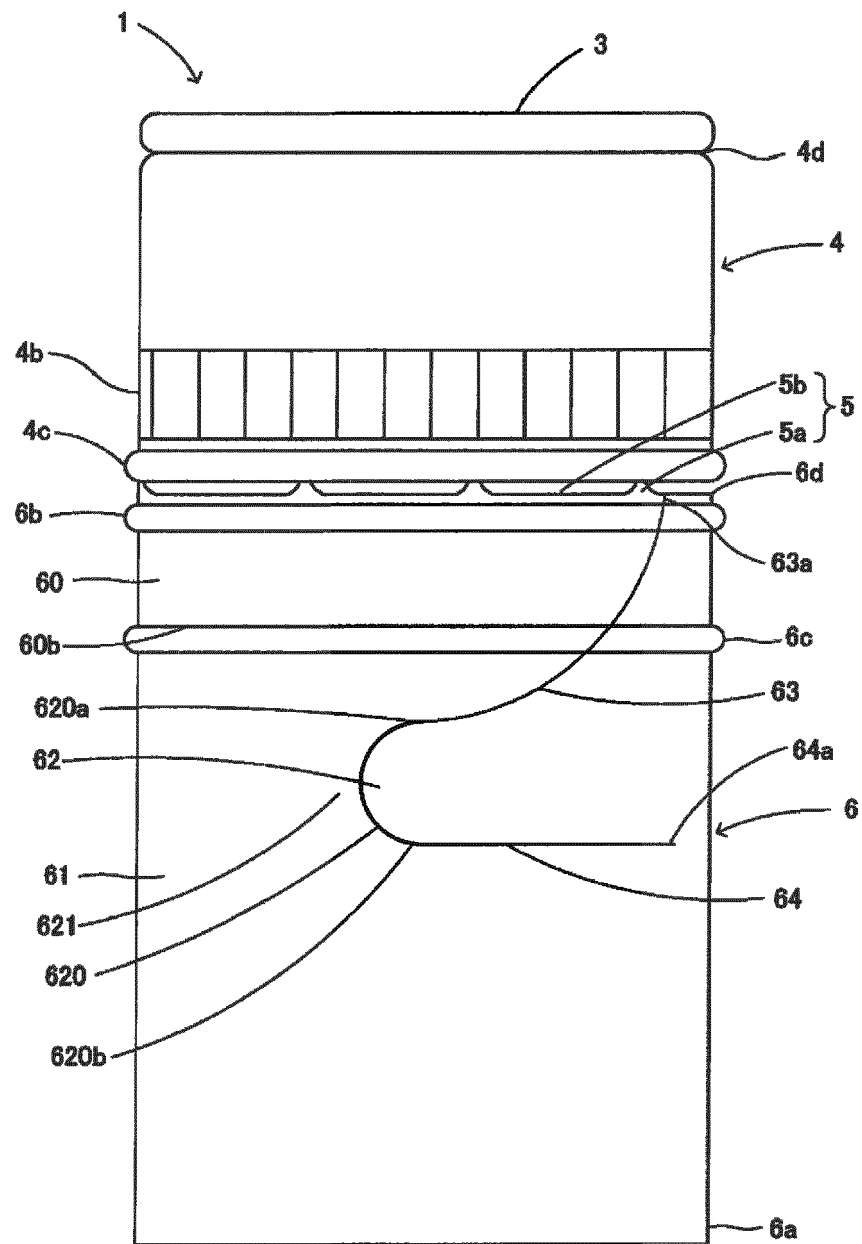


Fig.1

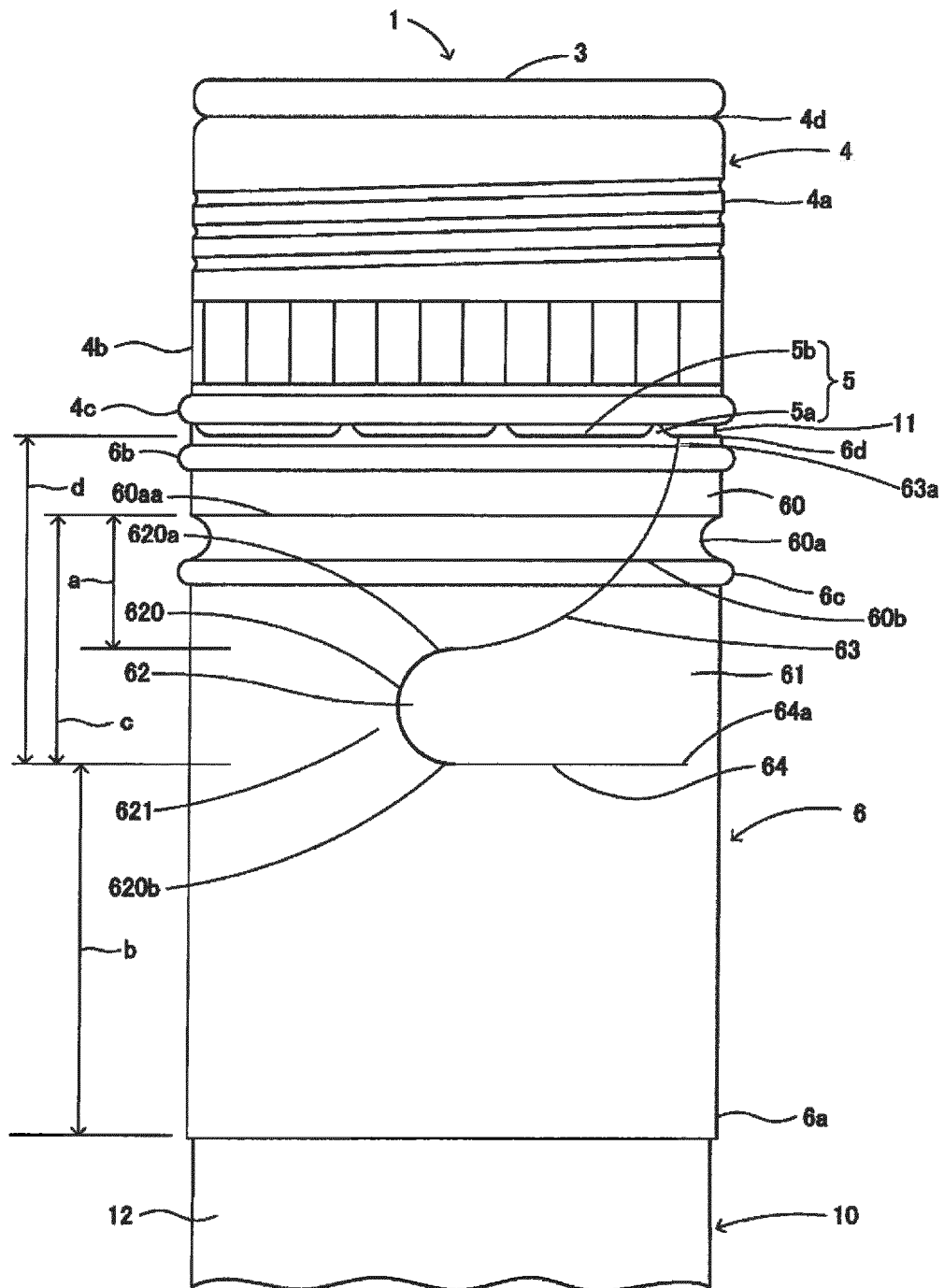


Fig. 2

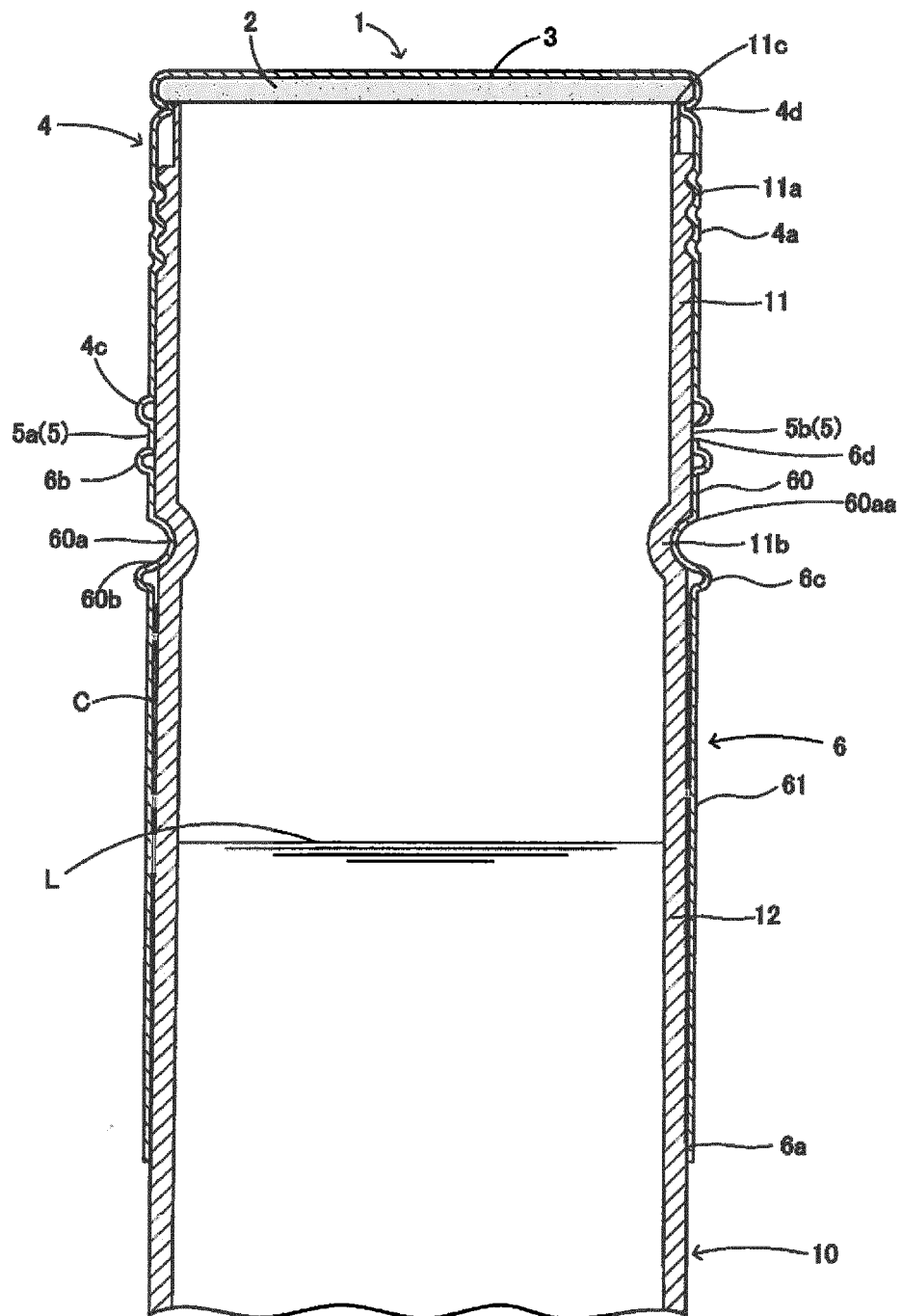


Fig.3

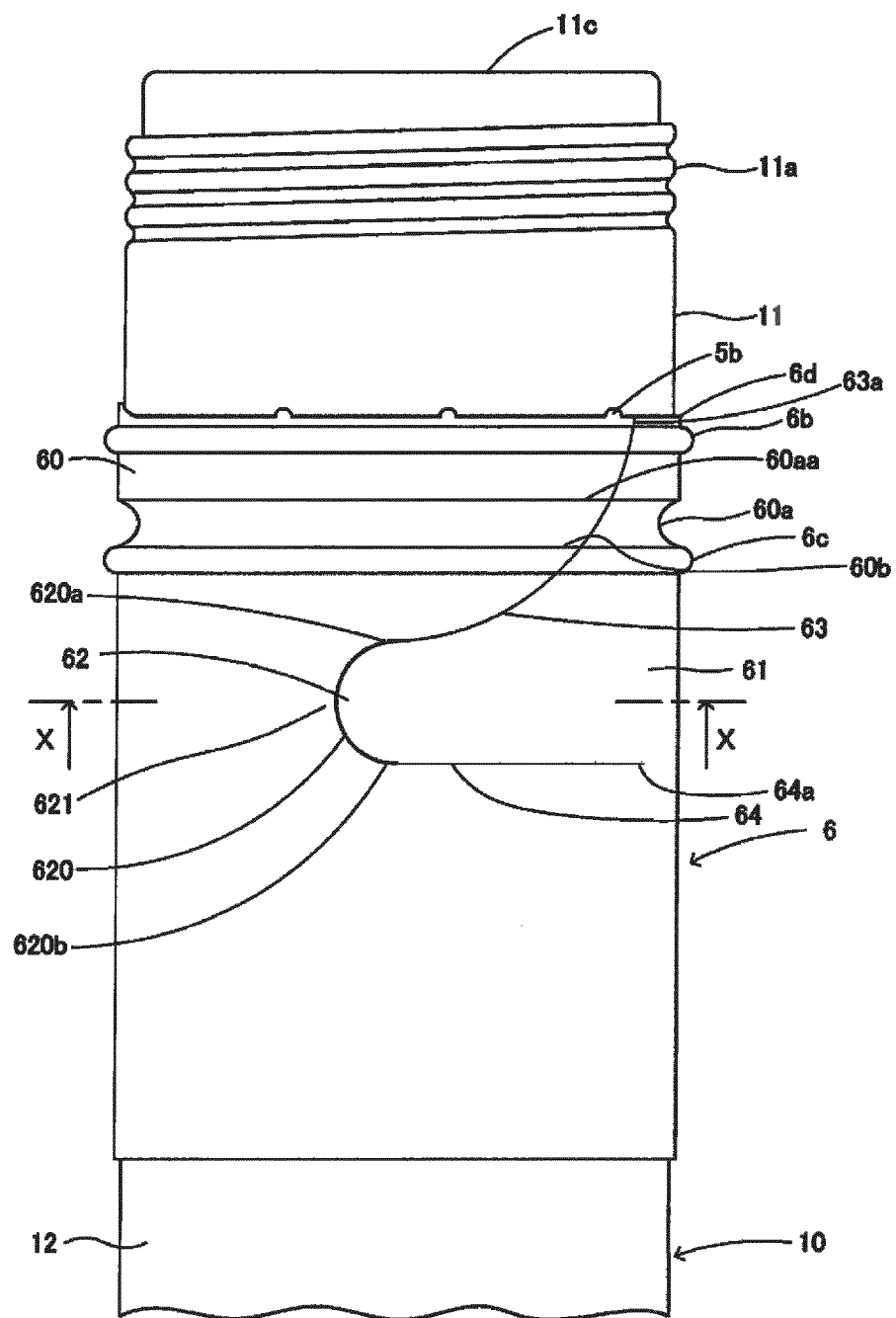


Fig.4

Fig. 5A

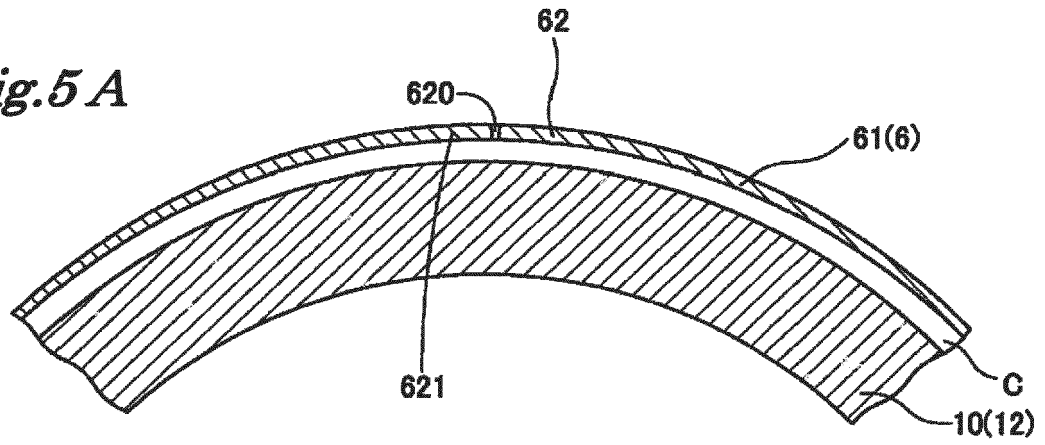
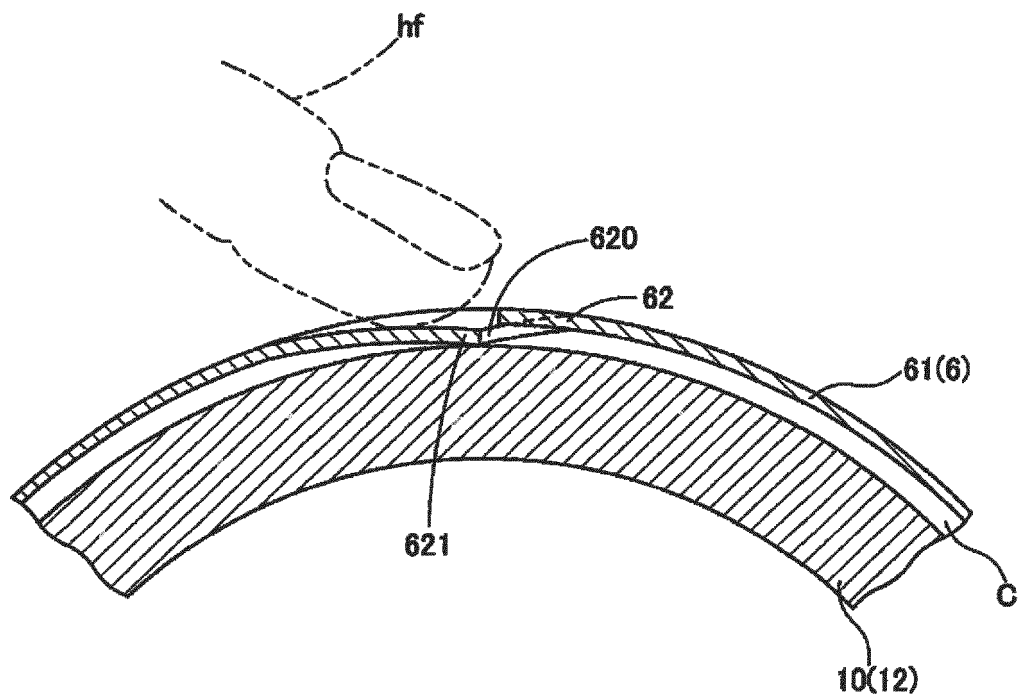


Fig. 5B



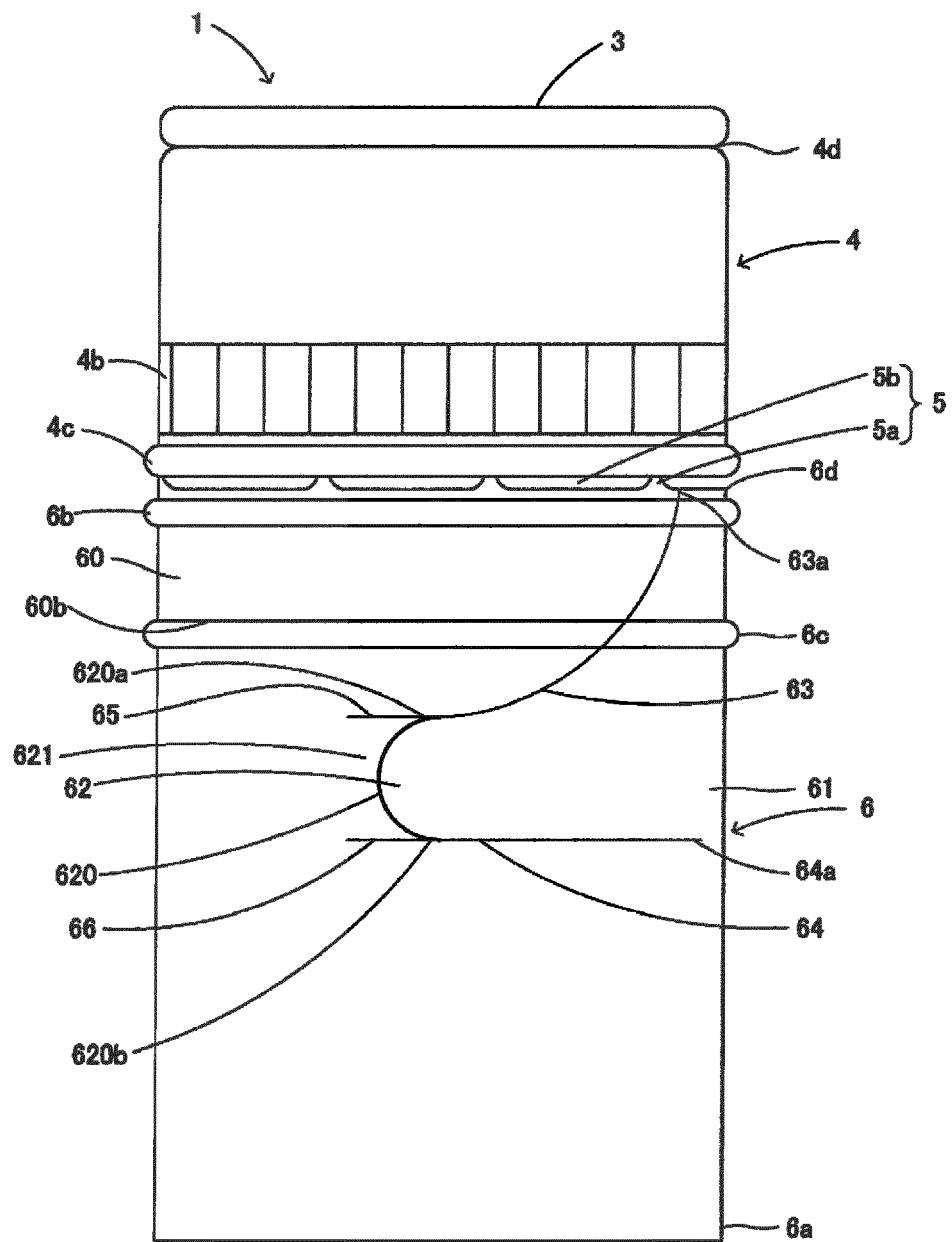


Fig.6

Fig. 7B

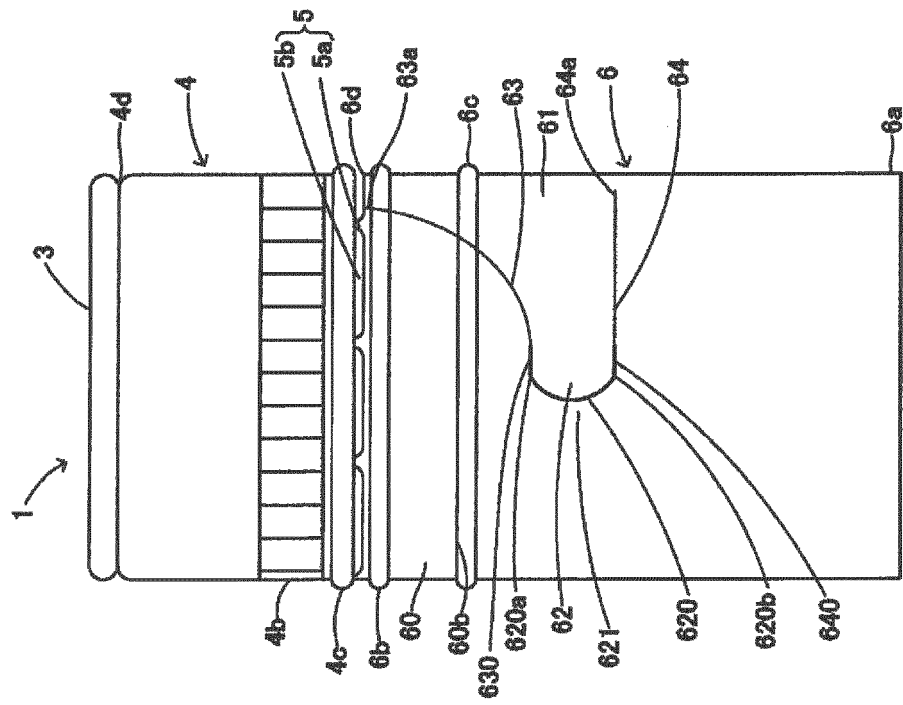


Fig. 7A

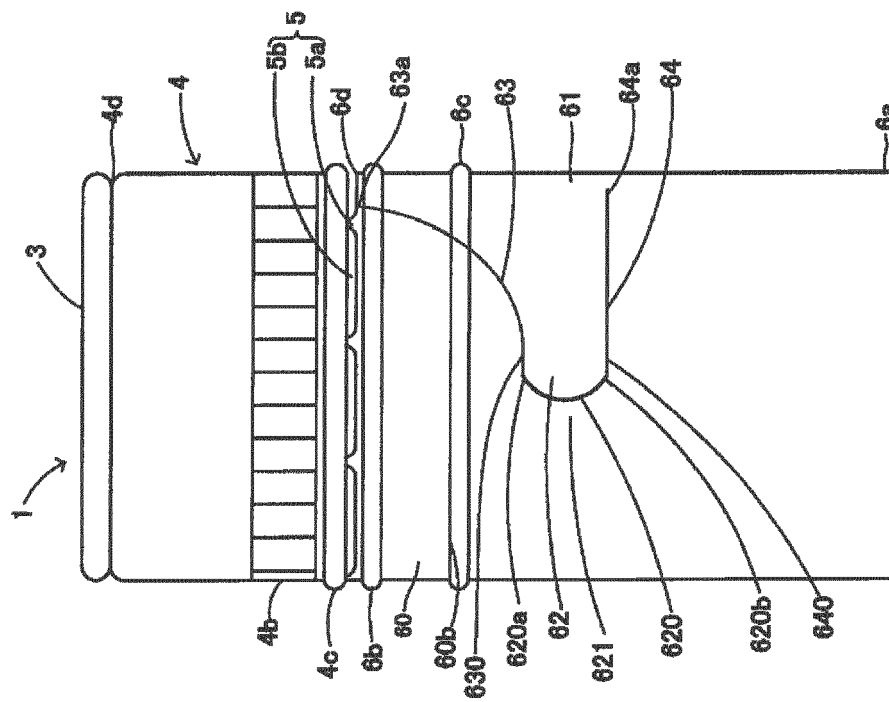


Fig. 8B

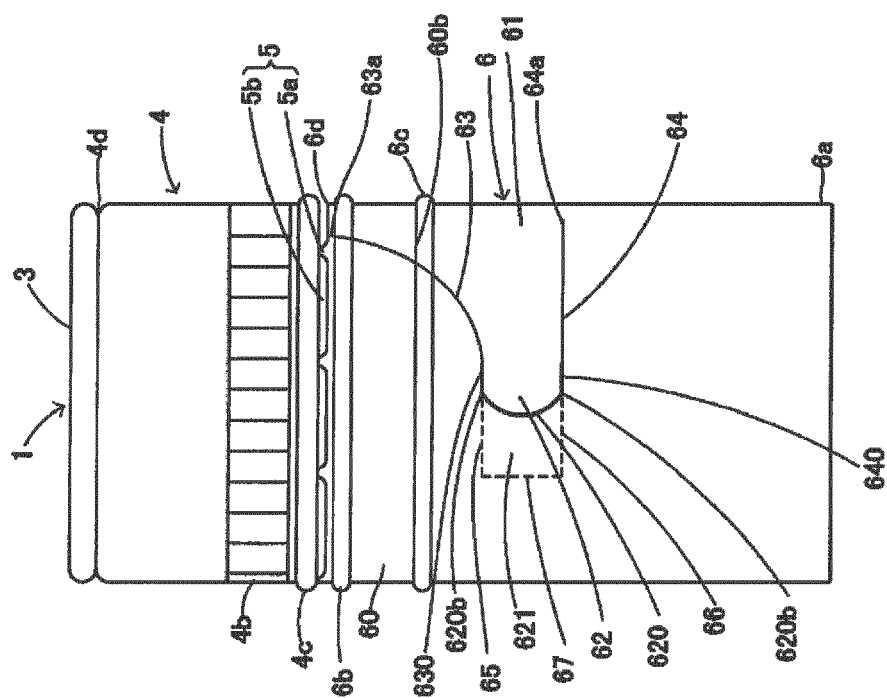


Fig. 8A

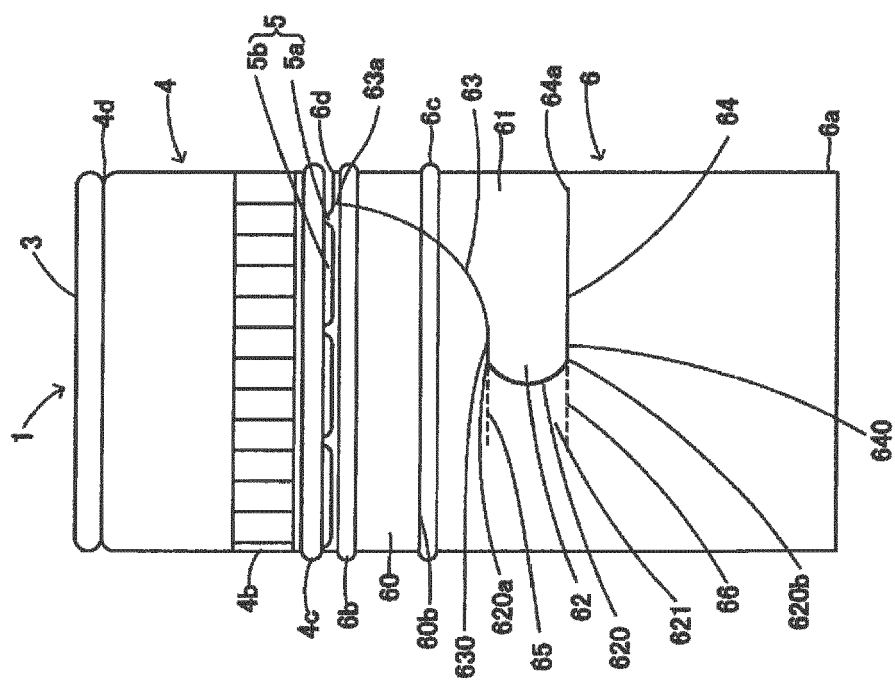


Fig.9B

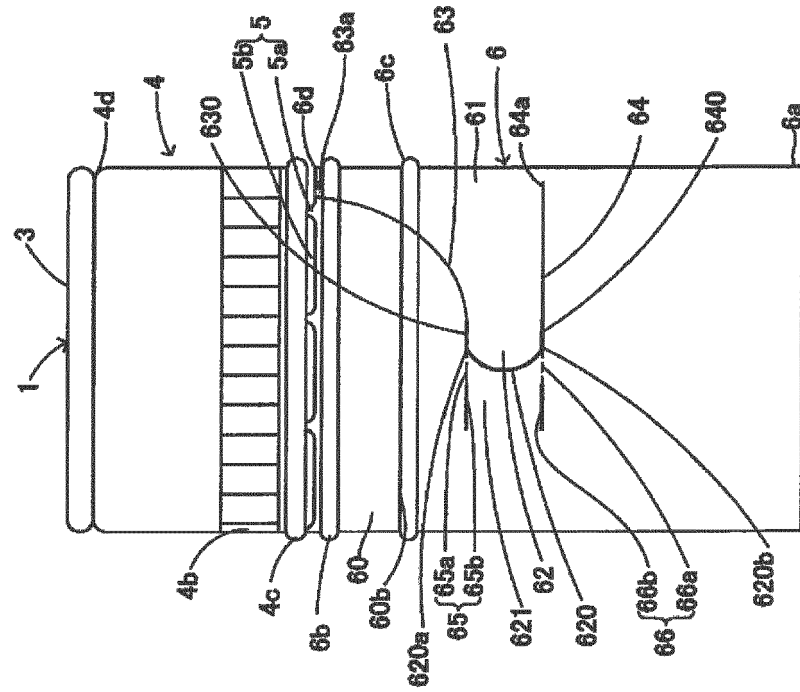


Fig.9A

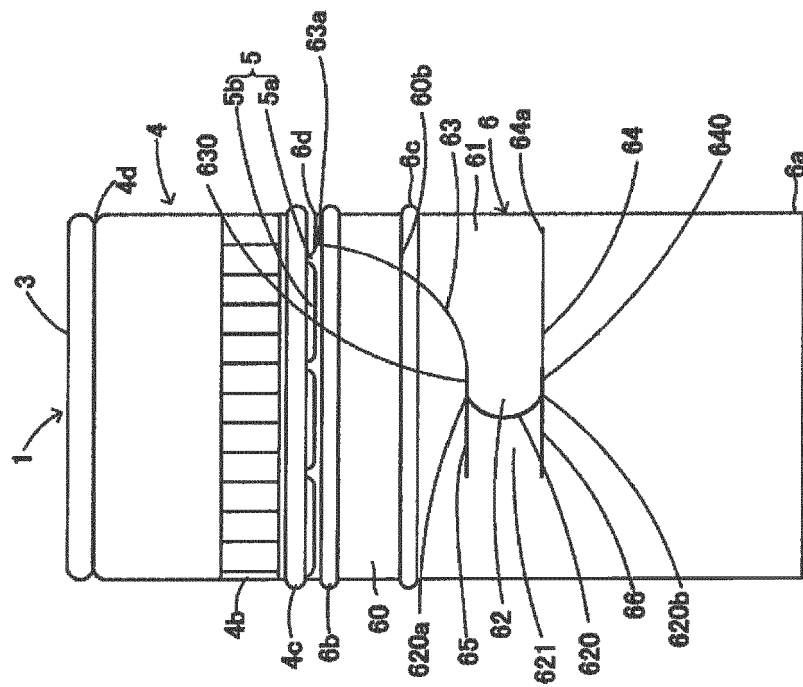


Fig. 10B

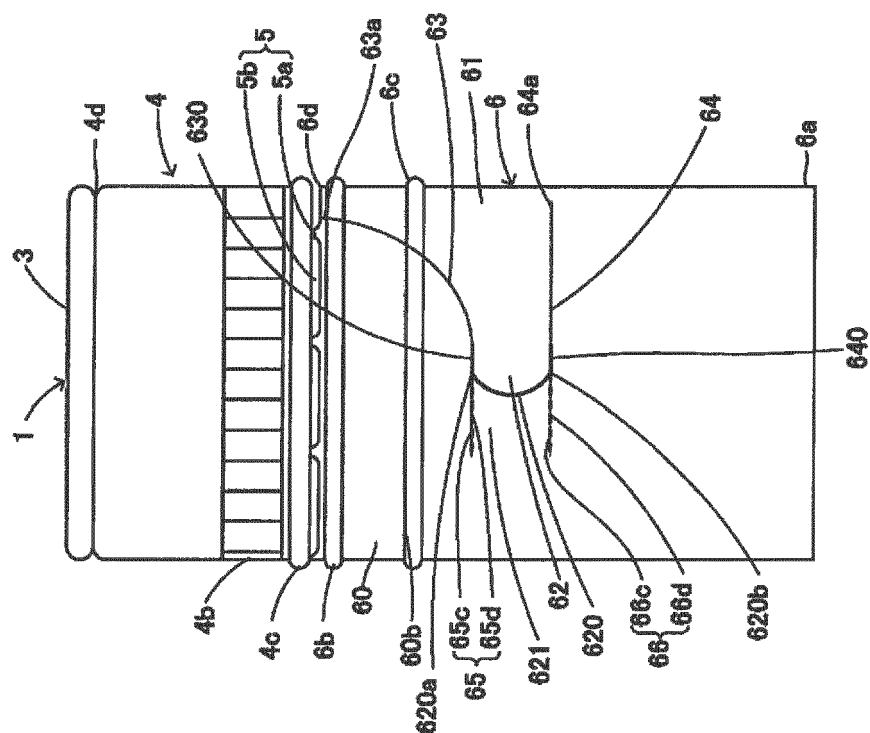
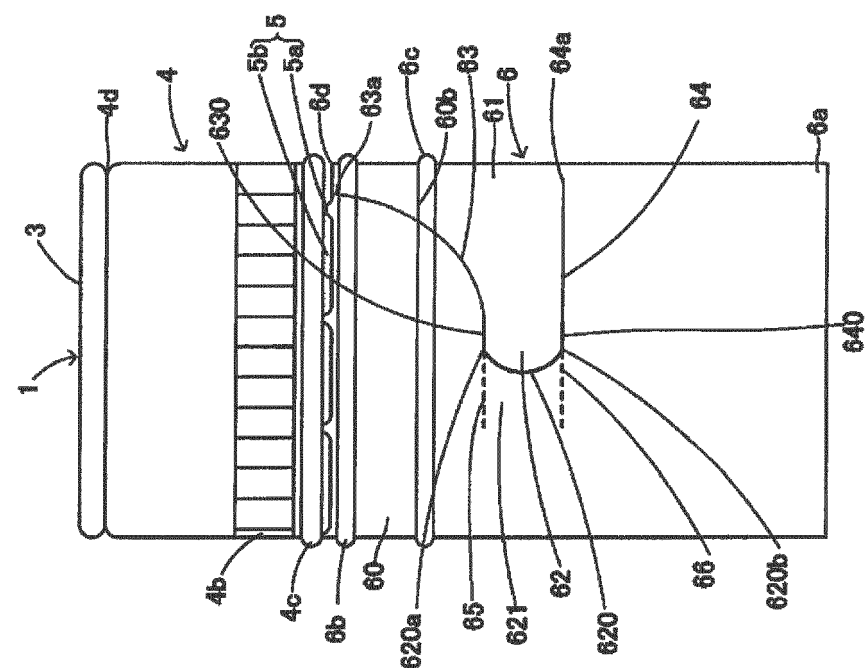


Fig. 10A



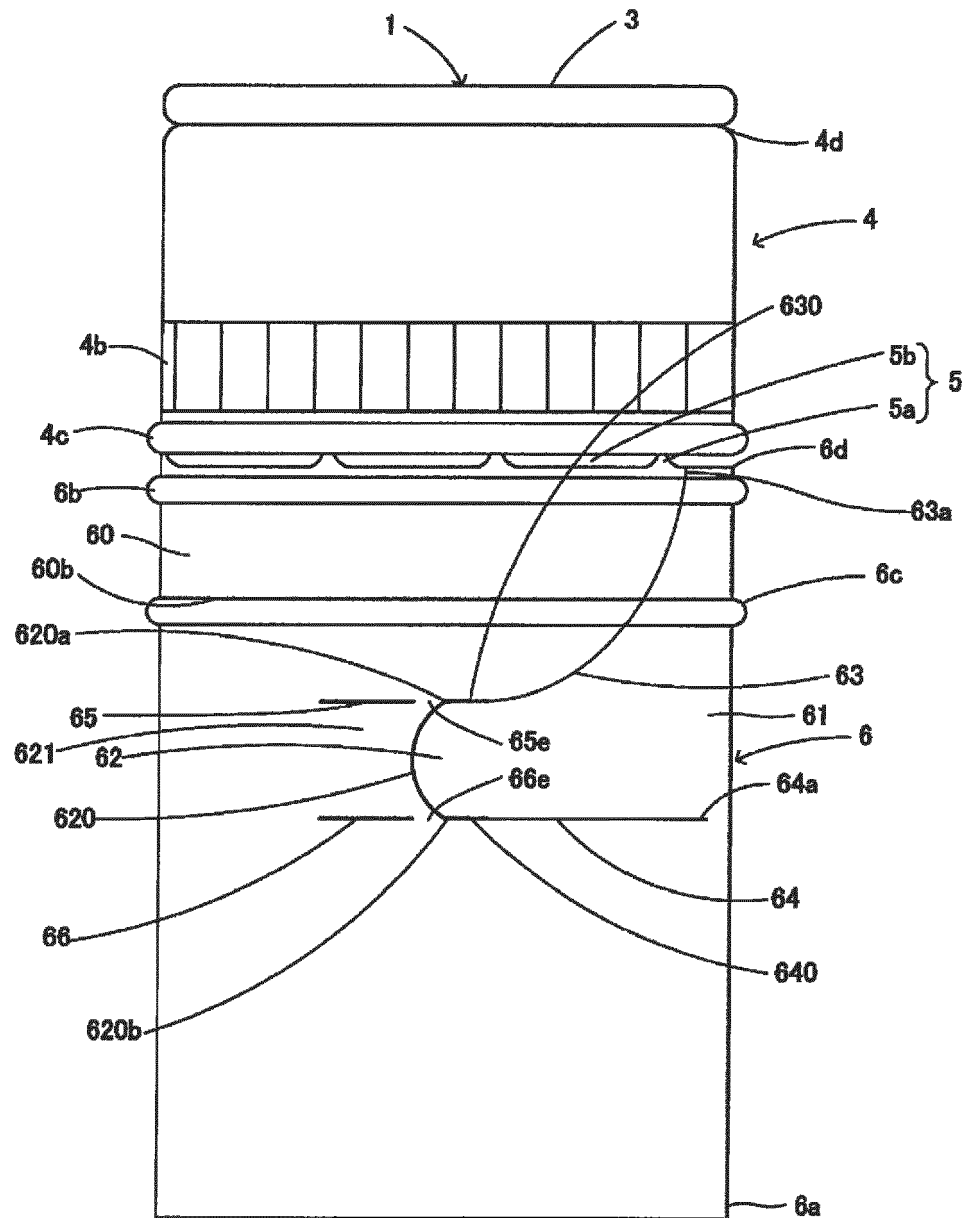


Fig. 11

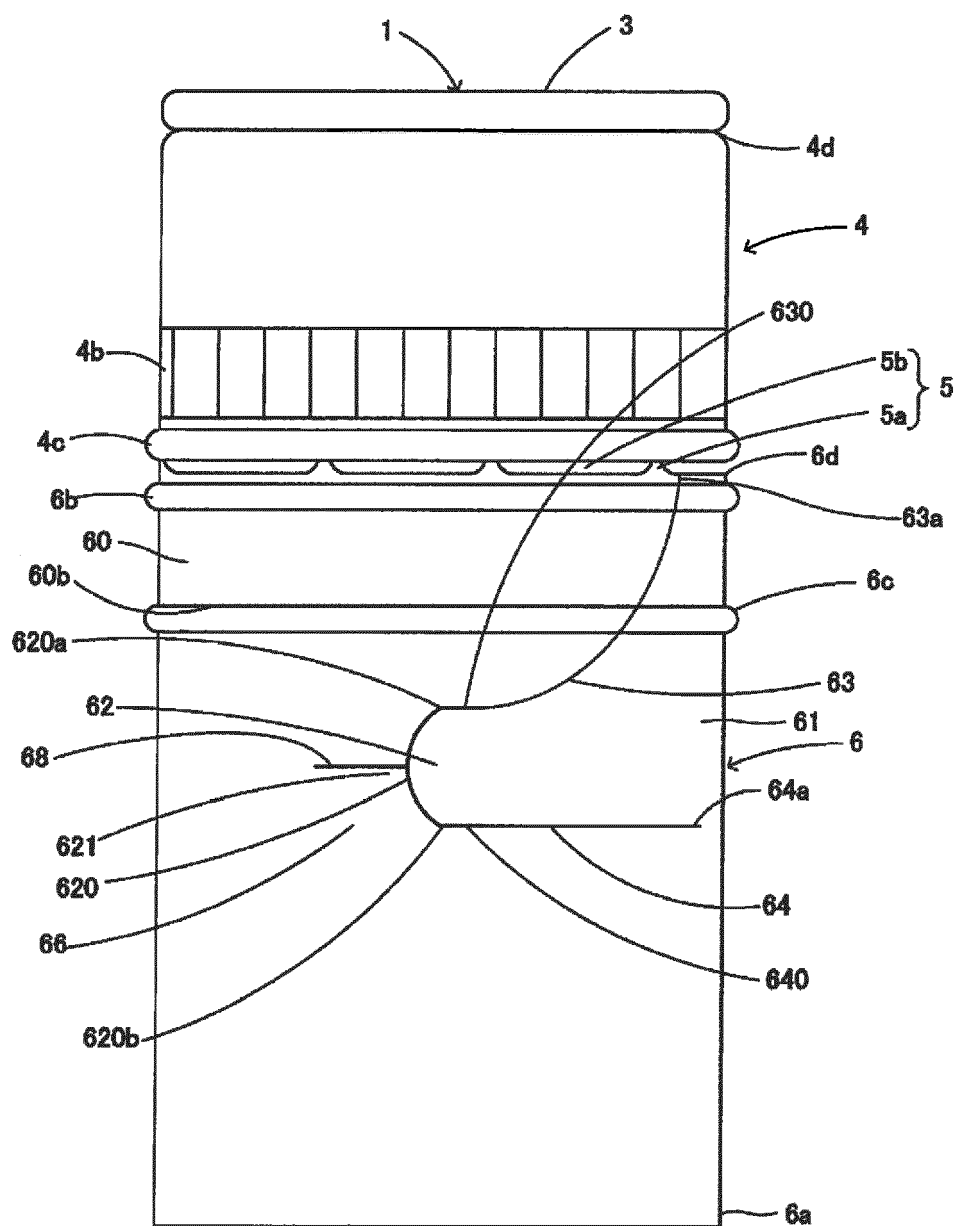


Fig. 12

Fig.13A

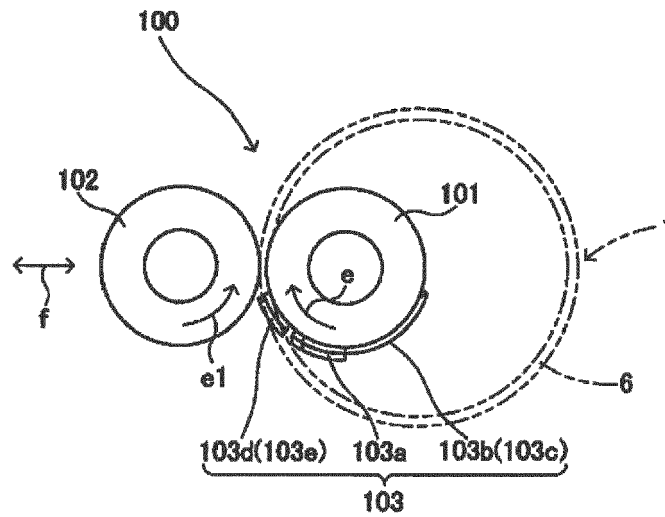


Fig.13B

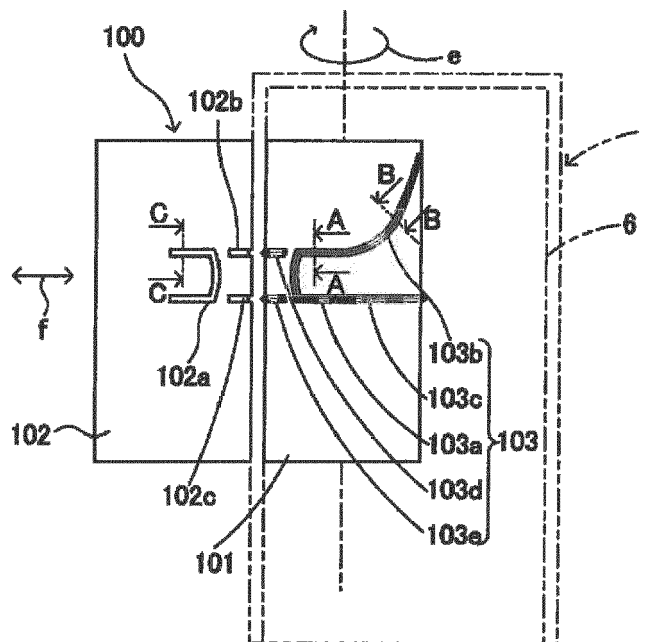


Fig.14A

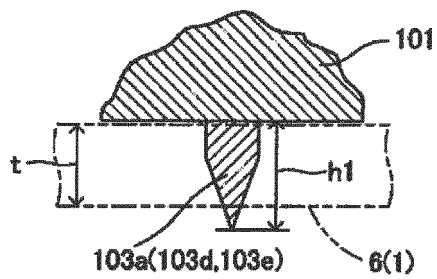


Fig.14B

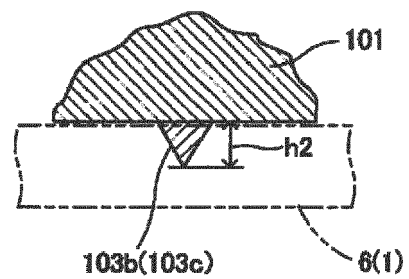
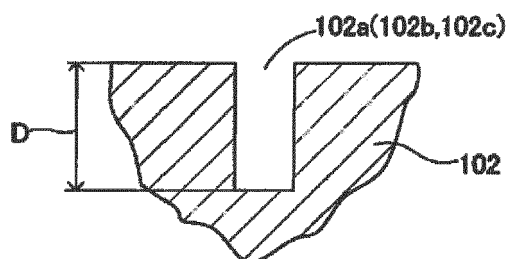


Fig.14C



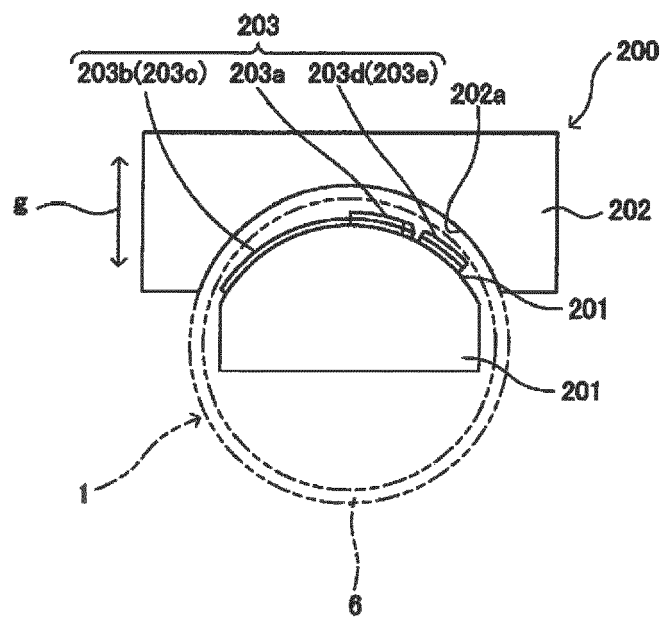


Fig.15



EUROPEAN SEARCH REPORT

Application Number
EP 18 17 5041

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A	JP H04 352648 A (HISASHI KINZOKU KOGYO KK; ISHIZUKA GLASS) 7 December 1992 (1992-12-07) * figure 2 *	1	
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			B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 October 2018	Examiner Fournier, Jacques
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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