

DESCRIPTION

RESIN CAP

5 Technical Field

[0001] The present invention relates to a removable resin cap to be used on a mouth part of a container such as a PET bottle.

Background Art

10 [0002] A resin cap that is widely used as such a resin cap includes a top plate part, a tubular part that extends downward from a circumferential edge of the top plate part, an outer ring that is formed on an inner surface of the top plate part and is capable of coming into contact with an outer circumferential surface of a container mouth part, and an inner ring that is formed on the
15 inner surface of the top plate part and is capable of coming into contact with an inner circumferential surface of the container mouth part, and seals a container by the outer ring and the inner ring holding the container mouth part therebetween, the inner ring having a length (distance from the top plate part in a vertical direction) longer than that of the outer ring (there are no
20 appropriate documents that describe this conventional technique).

Disclosure of Invention

Problem to be Solved by the Invention

[0003] Containers such as PET bottles are sometimes filled with a content at
25 a high temperature for the purpose of sterilization. When the temperature of the content with which the container has been filled decreases, the content contracts, and the pressure inside the container is reduced. In this reduced-pressure atmosphere, sealing performance of the container tends to deteriorate due to a decrease in pressing force applied to the container mouth
30 part from the inner ring caused by deformation of the inner ring.

The pressing force applied to the container mouth part from the inner ring tends to decrease due to weakening (deterioration) caused by heat generated when the container is filled with the content at a high temperature as mentioned above or heat generated during heat sterilization performed
35 after the container is filled with the content.

[0004] The present invention was achieved in light of such circumstances,

and an object thereof is to provide a resin cap capable of suppressing a decrease in pressing force applied to a container mouth part from an inner ring.

5 Means for Solving Problem

[0005] A feature of a resin cap according to the present invention is that the resin cap is to be attached to a container mouth part and includes a top plate part, a tubular part that extends downward from a circumferential edge of the top plate part, and an inner ring that is formed on an inner surface of the top plate part and is capable of coming into contact with an inner circumferential surface of the container mouth part, and the inner ring is formed such that a base part of the inner ring is located on an inner side with respect to the container mouth part in a vertical cross-sectional view when the resin cap is attached to the container mouth part.

15 [0006] With this configuration, the inner ring is formed such that its base part is located on the inner side with respect to the container mouth part in a vertical cross-sectional view, and therefore, the inner ring can press the container mouth part in a lateral direction. The inner ring is less likely to move away from the container mouth part due to the force applied in the lateral direction, thus making it possible to suppress a decrease in pressing force applied to the container mouth part from the inner ring even when pressure is reduced or weakening occurs.

20 [0007] Another feature of the present invention is that a recessed part is formed in the top plate part so as to be located on the inner side with respect to the container mouth part in a vertical cross-sectional view and recessed to project toward the container mouth part side when the resin cap is attached to the container mouth part, and the inner ring is formed in the recessed part.

25 [0008] With this configuration, the distance between the top plate part and the container mouth part is reduced, thus making it possible to reduce the length of the inner ring compared with that of a conventional one, and therefore, the rigidity of the inner ring can be enhanced to suppress deformation of the inner ring.

30 A part (sealing point) where the inner ring and the container mouth part are in contact with each other can be kept away from the front end part of the container mouth part, thus making it possible to prevent the container from being unsealed at an early stage.

[0009] Another feature of the present invention is that a thin part that has a thickness smaller than those of any other parts of the top plate part is formed in the top plate part so as to be located on the inner side with respect to the container mouth part in a vertical cross-sectional view when the resin cap is attached to the container mouth part, and the inner ring is formed in the thin part.

[0010] With this configuration, when pressure inside the container is reduced due to a decrease in temperature of a content with which the container has been filled at a high temperature, the thin part can undergo deformation (displacement) toward the inside of the container. When the thin part undergoes deformation toward the inside of the container, the inner ring formed in the thin part is pulled toward the inside of the container, thus making it possible to bring the inner ring into tight contact with the container mouth part in the lateral direction.

[0011] Another feature of the present invention is that the inner ring is formed such that a thickness increases from a part near the base part toward the base part.

[0012] With this configuration, the thickness of the base part of the inner ring can be increased to suppress deformation or weakening of the inner ring.

[0013] Another feature of the present invention is that the inner ring is formed in a semilunar shape that protrudes outward in a vertical cross-sectional view.

[0014] With this configuration, a semilunar protrusion of the inner ring comes into contact with the container mouth part, thus making it possible to enhance the pressing force applied to the container mouth part from the inner ring.

Even when the inner ring moves in a direction away from the container mouth part due to pressure reduction or weakening, the contact between the inner ring and the container mouth part can be maintained for a long period of time due to the semilunar protrusion of the inner ring.

Brief Description of Drawings

[0015] FIG. 1 is a cross-sectional view showing a state in which a resin cap of the present invention is attached to a container mouth part.

FIG. 2 is an enlarged view of main parts of the resin cap of the present invention.

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

FIG. 4 is a cross-sectional view showing a modified example of the resin cap of the present invention.

FIG. 5 is an enlarged view showing main parts of a modified example
5 of the resin cap of the present invention.

FIG. 6 shows enlarged views showing main parts of a modified example of the resin cap of the present invention. FIG. 6(A) shows a normal state, and FIG. 6(B) shows a pressure reduction state.

FIG. 7 is an enlarged view showing main parts of a modified example
10 of the resin cap of the present invention.

Best Mode for Carrying out the Invention

[0016] Hereinafter, a resin cap of the present invention will be described with reference to the drawings.

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Embodiment 1

[0017] As shown in FIG. 1, a resin cap 10 according to this embodiment is to be used on a container mouth part 20 made of resin.

As shown in FIGS. 1 to 3, the resin cap 10 according to this
20 embodiment includes a top plate part 11, a tubular part 12 that extends downward from a circumferential edge of the top plate part 11, an outer ring 13 that is formed on an inner surface of the top plate part 11 and is capable of coming into contact with an outer circumferential surface of the container mouth part 20, and an inner ring 14 that is formed on the inner surface of the
25 top plate part 11 and is capable of coming into contact with an inner circumferential surface of the container mouth part 20.

[0018] Although there are no limitations on a material of the resin cap 10, a method for manufacturing the resin cap 10, and the like, the resin cap 10 can be manufactured by integrally forming the top plate part 11, the tubular part
30 12, the outer ring 13, and the inner ring 14 by injection molding using resin such as polyethylene or polystyrene, for example.

[0019] The top plate part 11 of the resin cap 10 is formed in a disk shape so as to correspond to the shape of the container mouth part 20. The resin cap 10 is configured to be attached to the container mouth part 20 by screwing a
35 screw thread 12a formed on the inner circumferential surface of the tubular part 12 on a screw thread 20a formed on the outer circumferential surface of

the container mouth part 20.

[0020] The outer ring 13, and the inner ring 14 have a shape projecting from the inner surface of the top plate part 11. The inner circumferential surface of the outer ring 13 comes into contact with the outer circumferential surface of the container mouth part 20, and the outer circumferential surfaces of the inner ring 14 comes into contact with the inner circumferential surface of the container mouth part 20, and thus the container is sealed.

[0021] The inner ring 14 is formed such that its base part is located on the inner side with respect to the container mouth part 20 in a vertical cross-sectional view and the inner ring 14 presses the container mouth part 20 in a lateral direction when the resin cap 10 is attached to the container mouth part 20. This makes it possible to suppress a decrease in pressing force applied on the container mouth part from the inner ring even when pressure is reduced or weakening occurs.

[0022] Since the inner ring 14 is formed such that its base part is located on the inner side with respect to the container mouth part 20, the inner ring 14 can be brought into contact with the container mouth part 20 in a direction oblique to an axis direction of the container mouth part 20. This makes it possible to enhance the pressing force applied to the container mouth part 20 from the inner ring 14.

[0023] The inner ring 14 is formed such that the thickness increases from a part near the base part toward the base part. In this embodiment, the inner ring 14 is formed such that the base part has the largest thickness. Thereby, the inner ring 14 is less likely to be weakened.

[0024] Although there is no particular limitation on types of the containers having the container mouth part 20, resin containers for a beverage that are made of synthetic resin such as polyethylene phthalate can be used, for example. In particular, resin containers for a fruit drink, an isotonic drink, tea, and the like that are filled with a content at a high temperature are preferable.

Other embodiments

[0025] Although the case where the top plate part 11 is formed in a flat disk shape is described in the above-mentioned embodiment, the shape of the top plate part 11 is not limited thereto. For example, as shown in FIGS. 4 and 5, a recessed part 15 may be formed so as to be located on the inner side with

respect to the container mouth part 20 in a vertical cross-sectional view and recessed to project toward the container mouth part 20 side, and the inner ring 14 may be formed in the recessed part 15. With this configuration, the distance between the top plate part 11 and the container mouth part 20 can be reduced, thus making it possible to reduce the length of the inner ring 14 compared with that of a conventional one, and the rigidity of the inner ring 14 can be enhanced to suppress deformation of the inner ring 14.

A part where the inner ring 14 and the container mouth part 20 are in contact with each other can be kept away from the front end part of the container mouth part 20, thus making it possible to prevent the container from being unsealed at an early stage.

[0026] Although the inner ring 14 is formed in a shape in which a projecting part 14a that projects outward is formed at the front end part in FIGS. 4 and 5, the shape of the inner seal 14 is not limited thereto and may be a linear shape as shown in FIGS. 1 to 3.

[0027] Also, as shown in FIG. 6, a thin part 16 that has a thickness smaller than those of any other parts of the top plate part 11 may be formed in the top plate part 11 so as to be located on the inner side with respect to the container mouth part 20 in a vertical cross-sectional view. Normally, the thin part 16 is flat as shown in FIG. 6(A), but when pressure inside the container is reduced, the thin part undergoes inward deformation as shown in FIG. 6(B). In this pressure reduction state, the inner ring 14 is pulled inward, thus making it possible to bring the inner ring 14 into tight contact with the container mouth part 20 in the lateral direction.

[0028] Although it is sufficient that the thin part 16 has a thickness to an extent that the thin part 16 can undergo deformation when pressure inside the container is reduced, it is preferable that the thickness of the thin part 16 is $1/5$ to $1/2$ of the thicknesses of parts of the top plate part 11 whose thicknesses are not reduced, from the viewpoint of a balance between ease of deformation and retention of strength.

[0029] When the thin part 16 is formed, it is preferable to form the inner ring 14 in a shape in which the area of a part where the inner ring 14 and the container mouth part 20 are in contact with each other increases with the deformation of the thin part 16. An example of such a shape is a shape in which a projecting part 14a that projects outward in a claw shape is formed at the front end part, such as that of the inner ring 14 shown in FIG. 6.

[0030] Although the case where the thin part 16 is formed by reducing the thickness from the outside of the top plate part 11 is shown as an example in FIG. 6, the thin part 16 may be formed by reducing the thickness from the inside of the top plate part 11 or by reducing the thickness from both sides of the top plate part 11.

[0031] As shown in FIG. 7, the inner ring 14 may be formed in a semilunar shape that protrudes outward in a vertical cross-sectional view. This makes it possible to increase the pressing force applied to the container mouth part 20 from the inner ring 14.

Even when the inner ring 14 undergoes displacement in a direction away from the container mouth part due to pressure reduction or weakening, the contact between the inner ring 14 and the container mouth part 20 can be maintained for a long period of time due to the semilunar protrusion of the inner ring 14.

[0032] It should be noted that the semilunar inner ring 14 shown in FIG. 7 can be applied to a form having the recessed part 15 shown in FIGS. 4 and 5, and a form having the thin part 16 shown in FIG. 6.

Reference Signs List

20	[0033]	10	: Resin cap
		11	: Top plate part
		12	: Tubular part
		12a	: Screw thread
		13	: Outer ring
25		14	: Inner ring
		14a	: Projecting part
		15	: Recessed part
		16	: Thin part
		20	: Container mouth part
30		20a	: Screw thread

CLAIMS

1. A resin cap to be attached to a container mouth part, the resin cap comprising:
 - 5 a top plate part;
 - a tubular part that extends downward from a circumferential edge of the top plate part; and
 - an inner ring that is formed directly on an inner surface of the top plate part and is capable of coming into contact with an inner circumferential
 - 10 surface of the container mouth part,
 - wherein the inner ring is formed such that a base part of the inner ring is located on an inner side with respect to the container mouth part in a vertical cross-sectional view when the resin cap is attached to the container mouth part,
 - 15 a recessed part is formed in the top plate part so as to be located on the inner side with respect to the container mouth part in a vertical cross-sectional view and recessed to project toward the container mouth part side when the resin cap is attached to the container mouth part,
 - the inner ring is formed in the recessed part, and
 - 20 the inner ring is brought into contact with the container mouth part in a direction oblique to an axis direction of the container mouth part.
2. The resin cap according to claim 1, wherein the inner ring is formed such that a thickness increases from a part near the base part toward the base
- 25 part.
3. The resin cap according to claim 1, wherein the inner ring is formed in a semilunar shape that protrudes outward in a vertical cross-sectional view.