

## 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.
- 20 [0003] Generally, a contact ring that is capable of coming into contact with a front end part of the container mouth part is also formed on the inner surface of the top plate part together with the outer ring and the inner ring (see Patent Document 1, for example). A contact ring is originally provided in order to determine the terminal position of the resin cap when attached to the
- 25 container, but is also used to seal the container as in the case of the outer ring and the inner ring in recent years.

#### Prior Art Documents

##### Patent Documents

- 30 [0004] Patent Document 1: JP H8-40444A

#### Disclosure of Invention

##### Problem to be Solved by the Invention

- [0005] In general, a container such as a PET bottle is filled with a content
- 35 and then heated and sterilized in a state in which a resin cap is attached to the mouth part. At this time, the container mouth part is softened by

heating and undergoes displacement (deformation), and thus the contact state between the outer ring or inner ring and the container mouth part may be deteriorated, resulting in the reduction in the sealing performance of the container.

5           The container is sometimes heated and sterilized in a laid-down state. In this case, a heated content comes into contact with the inner ring, and thus the inner ring is softened. Therefore, the contact state between the inner ring and the container mouth part may be further deteriorated. When the container is heated and sterilized using hot water or the like, an outer seal  
10 comes into contact with high-temperature atmosphere, and thus the outer seal may be softened, resulting in the reduction in the sealing performance of the container.

[0006] The present invention was achieved in light of such circumstances, and an object thereof is to provide a resin cap capable of suppressing a  
15 reduction in sealing performance of a container caused by heat sterilization.

#### Means for Solving Problem

[0007] 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  
20 part, a tubular part that extends downward from a circumferential edge of the top plate part, 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 a contact ring that is formed on the inner surface of the top plate part and is capable of coming into contact with a  
25 front end part of the container mouth part, the contact ring being configured to be capable of undergoing displacement due to contact with the front end part of the container mouth part.

[0008] With this configuration, the contact ring is configured to be capable of undergoing displacement due to contact with the front end part of the  
30 container mouth part, and therefore, even when the container mouth part is softened and undergoes displacement due to heat sterilization, the contact ring can follow this displacement, thus making it possible to suppress a reduction in sealing performance of the container caused by the heat sterilization.

35           Even when the container is heated and sterilized in a laid-down state, the contact ring does not come into contact with heated liquid unlike the outer

ring and the inner ring, and therefore, there is the advantage that the contact ring is less likely to be affected by softening caused by heat sterilization.

[0009] Another feature of the present invention is that the contact ring is formed in a shape having a narrow part.

5 [0010] With this configuration, the contact ring is capable of easily undergoing displacement.

[0011] Yet another feature of the present invention is that the contact ring is formed in a shape curved in a radial direction of the top plate part in a state in which the contact ring is not in contact with the front end part of the container  
10 mouth part.

[0012] With this configuration, the contact ring is also capable of easily undergoing displacement.

#### Brief Description of Drawings

15 [0013] 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 shows enlarged views of main parts of the resin cap of the present invention. FIG. 2(A) shows a state in which the resin cap is being attached to the container mouth part, and FIG. 2(B) shows a state in which  
20 the resin cap is attached to the container mouth part.

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

FIG. 4 shows enlarged views of main parts of a modified example of the resin cap of the present invention. FIG. 4 (A) shows a state in which the resin cap is being attached to the container mouth part, and FIG. 4(B) shows a  
25 state in which the resin cap is attached to the container mouth part.

#### Best Mode for Carrying out the Invention

[0014] Hereinafter, a resin cap of the present invention will be described with reference to the drawings.

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#### Embodiment 1

[0015] 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  
35 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 a container mouth part 20, an inner ring 14 that is formed on an inner surface of the top plate part 11 and is capable of coming into contact with an inner circumferential surface of the container mouth part 20, and a contact ring 15 that is formed on the inner surface of the top plate part 11 and is capable of coming into contact with a front end part of the container mouth part 20, and the contact ring 15 is configured to be capable of undergoing displacement due to contact with the front end part of the container mouth part 20.

[0016] 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 12, the outer ring 13, the inner ring 14, and the contact ring 15 by injection molding using resin such as polyethylene or polystyrene, for example.

[0017] 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 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.

[0018] The outer ring 13, the inner ring 14, and the contact ring 15 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, the outer circumferential surface of the inner ring 14 comes into contact with the inner circumferential surface of the container mouth part 20, the front end part of the contact ring 15 comes into contact with the front end part of the container mouth part 20, and thus the container is sealed.

[0019] In this embodiment, a shape that allows a part of the outer circumferential surface of the outer ring 13 to come into contact with the inner circumferential surface of the container mouth part 20 is shown as an example of the shape of the outer ring 13, but there is no limitation on the shape of the outer ring 13 as long as the outer ring 13 is capable of coming into contact with the container mouth part 20, and various common shapes can be adopted in addition to the shapes shown in FIGS. 1 to 3. The same applies to the inner ring 14.

[0020] The contact ring 15 is configured to be capable of undergoing displacement due to contact with the front end part of the container mouth part 20. In this embodiment, the contact ring 15 is formed in a shape having a narrow part 15a. With this configuration, as shown in FIG. 2, the contact ring 15 functions like a spring and is thus capable of undergoing displacement following the contact with the front end part of the container mouth part 20, and therefore, even when the container mouth part 20 is softened and undergoes displacement, the contact ring 15 can follow the displacement of the container mouth part 20, thus making it possible to maintain the contact between the container mouth part 20 and the contact ring 15.

[0021] When the width (length in a radial direction) of the contact ring 15 is reduced, the range in which the contact ring 15 can move increases, and thus the contact ring 15 can more easily follow the displacement of the container mouth part 20. On the other hand, the contact area between the contact ring 15 and the container mouth part 20 is reduced, and thus sealing performance of the contact ring 15 tends to decrease. In contrast, in this embodiment, the contact ring 15 is formed in a shape in which a tapered part whose width decreases from the top plate part 11 side toward the front end part of the container mouth part 20 and a reversed tapered portion whose width increases toward the front end part of the container mouth part 20 are connected via the narrow part 15a as the center, and therefore, the contact area between the contact ring 15 and the container mouth part 20 can be increased while the range in which the contact ring 15 can move is increased, thus making it possible to enhance both the movability and the sealing performance of the contact ring 15.

[0022] There is no particular limitation on the length (distance from the top plate part 11 in a vertical direction) of the contact ring 15 as long as the front end part of the contact ring 15 is capable of coming into contact with the front end part of the container mouth part 20 when the resin cap 10 is attached to the container mouth part 20, but the length is preferably about 0.1 to 0.5 mm.

The width of the front end part of the contact ring 15 is preferably about 0.1 to 1.0 mm.

The width of the narrow part 15a (minimum width of the contact ring 15) is preferably about  $\frac{4}{5}$  to  $\frac{1}{5}$  of the maximum width of the contact ring 15.

It should be noted that these numerical value ranges are used when the resin cap 10 is not attached to the container mouth part 20, that is, the

contact ring 15 is not in contact with the front part of the container mouth part 20. When the contact ring 15 is in contact with the front part of the container mouth part 20, the contact ring 15 undergoes deformation due to pressure applied from the container mouth part 20, and thus the values may  
5 be out of these numerical value ranges.

[0023] 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,  
10 tea, and the like that are filled with a content at a high temperature are preferable.

#### Other embodiments

[0024] Although the case where the contact ring 15 is formed in a shape  
15 having the narrow part 15a is shown as an example in the above-mentioned embodiment, the shape of the contact ring 15 is not limited thereto. For example, as shown in FIG. 4, the contact ring 15 may be formed in a shape curved in the radial direction of the top plate part 11 in a state in which the contact ring 15 is not in contact with the front end part of the container mouth  
20 part 20. In the same manner as in the above-mentioned embodiment, the contact ring 15 having this shape also functions like a spring and is thus capable of undergoing displacement following the contact with the front end part of the container mouth part 20, and therefore, even when the container mouth part 20 is softened and undergoes displacement, the contact ring 15  
25 can follow the displacement of the container mouth part 20, thus making it possible to maintain the contact between the container mouth part 20 and the contact ring 15.

[0025] Although FIG. 4 shows the case where the contact ring 15 is formed in a shape curved outward in the radial direction of the top plate part 11 as an  
30 example, the contact ring 15 may be formed in a shape curved inward in the radial direction of the top plate part 11.

[0026] It should be noted that the shape of the contact ring 15 that has the narrow part 15a and the shape of the contact ring 15 that is curved in the radial direction of the top plate part 11 are shown merely as preferable  
35 examples of the shape of the contact ring 15, and the shape of the contact ring 15 is not limited thereto. The contact ring 15 may be formed in another

shape as long as the contact ring 15 is capable of undergoing displacement due to contact with the front end part of the container mouth part 20. For example, the entirety of the contact ring 15 is formed in a reversed tapered shape whose width increases toward the front end part of the container mouth  
5 part 20.

[0027] Although the case where the contact ring 15 is formed so as to come into contact with the plane part of the front end part of the container mouth part 20 is shown as an example in the above-mentioned embodiment, there is no limitation thereto, and the contact ring 15 may be formed so as to come into  
10 contact with the corner part of the front end part of the container mouth part 20.

[0028] Although the case where the contact ring 15 is formed at a position located closer to the inner ring 14 with respect to the center of the container mouth part 20 is shown as an example in the above-mentioned embodiment, it  
15 is sufficient that the position of the contact ring 15 is adjusted as appropriate depending on the positions and sizes of the outer ring 13 and the inner ring 14. The contact ring 15 may be formed substantially at the center of the container mouth part 20 or at a position located closer to the outer ring 13 with respect to the center of the container mouth part 20.

[0029] Although the case where only a single contact ring 15 is formed is shown as an example in the above-mentioned embodiment, there is no limitation thereto, and a plurality of contact rings 15 may be formed.  
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#### Reference Signs List

|    |        |     |                        |
|----|--------|-----|------------------------|
| 25 | [0030] | 10  | : Resin cap            |
|    |        | 11  | : Top plate part       |
|    |        | 12  | : Tubular part         |
|    |        | 12a | : Screw thread         |
|    |        | 13  | : Outer ring           |
| 30 |        | 14  | : Inner ring           |
|    |        | 15  | : Contact ring         |
|    |        | 15a | : Narrow part          |
|    |        | 20  | : Container mouth part |
|    |        | 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;

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

10 a contact ring that is formed on the inner surface of the top plate part and is capable of coming into contact with a front end part of the container mouth part,

wherein the contact ring is configured to be capable of undergoing displacement due to contact with the front end part of the container mouth part.

2. The resin cap according to claim 1, wherein the contact ring is formed in a shape having a narrow part.

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3. The resin cap according to claim 1, wherein the contact ring is formed in a shape curved in a radial direction of the top plate part in a state in which the contact ring is not in contact with the front end part of the container mouth part.

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