

DESCRIPTION

Title of the Invention : RESIN CAP

5 Technical Field

[0001] The present invention relates to a removable resin cap for use with a mouth part of a container such as a PET bottle.

Background Art

10 [0002] As a resin cap noted above, there is widely used a resin cap having a top plate part, a tubular part extending 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 comes into contact with an outer circumferential surface of the container mouth part, and an inner ring that is formed on the inner surface of
15 the top plate part and comes into contact with an inner circumferential surface of the container mouth part, the outer ring and the inner ring having a longer length (a vertical distance from the top plate part) than the outer ring being used for clamping the container mouth part, thus sealing the container (no appropriate document is present that shows this conventional technique).

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Summary of Invention

Technical Problem

[0003] A technique called "hot fill" is known for charging hot content in a container such as a PET bottle. In the hot fill process, the hot content comes
25 into contact with the inner ring. And, the heat in this may cause deformation or fatigue (deterioration) of the inner ring. With this, there occurs reduction in the pressing force of the inner ring to be applied to the container mouth part, whereby sealing performance of the container is reduced. In this respect, there has remained room for improvement.

30 [0004] The present invention has been made in view of the situation described above and its object is to provide a resin cap capable of maintaining sealing performance of a container in a favorable manner even if a hot filling process is performed.

35 Solution to Problem

[0005] According to a characterizing feature of a resin cap relating to the

present invention, the resin cap to be fitted on a container mouth part comprises:

a top plate part;

5 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 that comes into contact with an inner circumferential surface of the container mouth part;

10 wherein, when the resin cap is fitted on the container mouth part, the inner circumferential surface of the container mouth part is sealed at least doubly.

[0006] With this configuration, as the inner circumferential surface of the container mouth part is sealed at least doubly, even when deformation or fatigue occurs in one sealing part due to contact with the content, sealing of the
15 other sealing part not in contact with the content is ensured, so that the sealing performance of the container can be maintained favorably.

[0007] According to a further characterizing feature of the present invention, a plurality of projecting parts are formed on an outer circumferential surface of the inner ring; and the inner circumferential surface of the container mouth
20 part is sealed at least doubly as the plurality of projecting parts come into contact with the inner circumferential surface of the container mouth part, when the cap is fitted on the container mouth part.

[0008] With the above arrangement, the arrangement of at least doubly sealing the inner circumferential surface of the container mouth part can be
25 easily realized with utilization of the projecting parts formed on the inner ring.

[0009] According to a still further characterizing feature of the present invention:

30 the top plate part defines a cavity that projects toward the container mouth part side, the cavity being provided on a more inner side than the container mouth part as seen in a vertical section view, when the cap is fitted on the container mouth part;

the inner ring is formed on the cavity; and

35 the inner circumferential surface of the container mouth part is sealed at least doubly as the cavity and the inner ring come into contact with the inner circumferential surface of the container mouth part, when the cap is fitted on the container mouth part.

[0010] With the above arrangement, the arrangement of at least doubly sealing the inner circumferential surface of the container mouth part can be easily realized by providing seal (forming sealing part) with utilization of the cavity together with the inner ring.

Further, by forming the inner ring in the cavity, the inner ring can be made shorter than conventionally, so that the rigidity of the inner ring can be enhanced, thereby to suppress deformation of the inner ring.

Further, since the contact part between the inner ring and the container mouth part can be made distant from the leading end of the container mouth part, premature break of the seal of the container can be prevented.

Moreover, since the cavity allows the container mouth part to be supported from its inner circumferential surface side, when an outer ring is provided in the resin cap, it is possible to prevent occurrence of internal collapsing of the container mouth part due to a pressing force from the outer ring.

[0011] According to a still further characterizing feature of the present invention, the inner ring is formed such that its thickness increases from vicinity of its base part toward the base part.

[0012] With the above arrangement, as the base part of the inner ring is formed thick, occurrence of deformation or fatigue of the inner ring can be suppressed.

Brief Description of the Drawings

[0013] Fig. 1 is a sectional view showing a state that a resin cap of the present invention is fitted on a container mouth part.

Fig. 2 is an enlarged view of principal part of the inventive resin cap.

Fig. 3 is a sectional view taken along a line III-III of Fig. 1.

Fig. 4 is a sectional view showing a state that a variation of the inventive resin cap is fitted on a container mouth part.

Fig. 5 is an enlarged view of principal part showing a variation of the inventive resin cap.

Fig. 6 is an enlarged view of principal part showing a variation of the inventive resin cap.

Description of Embodiments

[0014] Next, with reference to the accompanying drawings, a resin cap relating to the present invention will be explained.

Embodiment 1

5 [0015] A resin cap 10 relating to this embodiment, as shown in Fig. 1, is used with a container mouth part 20 formed of resin.

The resin cap 10 relating to the present embodiment, as shown in Figs. 1-3, 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 that comes 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 top plate part 11 and that comes into contact with an inner circumferential surface of the container mouth part 20.

15 [0016] The resin cap 10 is not particularly limited in the respects of its material, method of manufacture, etc., but can be manufactured by injection molding of the top plate part 11, the tubular part 12, the outer ring 13 and the inner ring 14 all together, with using a resin such as polyethylene, polystyrene, etc.

20 [0017] The top plate part 11 of the resin cap 10 is formed like a round plate in agreement with a shape of the container mouth part 20. A screw thread 12a is provided in the inner circumferential surface of the tubular part 12 to be threaded with a screw thread 20a provided in the outer circumferential surface of the container mouth part 20, whereby the resin cap 10 is fitted on the container mouth part 20.

25 [0018] The outer ring 13 and the inner ring 14 respectively are shaped to project from the inner surface of the top plate part 11. As 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 surface of the inner ring 14 comes into contact with the inner circumferential surface of the container mouth part 20, respectively, the container is sealed.

30 [0019] In the inner ring 14, two projecting parts 14a are formed on its outer circumferential surface, the projecting parts 14a protruding radially outward of the inner ring 14. Thus, the inner ring 14 has a comb-like vertical sectional shape. As the two projecting parts 14a come into contact with the inner

circumferential surface of the container mouth part 20, the inner circumferential surface of the container mouth part 20 is doubly sealed. One of the two projecting parts 14a which is formed on the leading end side of the inner ring 14 has possibility of being deformed or fatigued due to its contact with the content. However, as the other one formed on the base end side of the inner ring 14 is free from contact with the content, good sealing can be maintained.

[0020] Each projecting part 14a is formed to project in a form of a curved face. This arrangement allows reduction of resistance ("capping resistance") encountered when the resin cap 10 is to be fitted to the container mouth part 20.

[0021] The inner ring 14 is formed such that its thickness increases from the vicinity of its base part toward the base part. In the instant embodiment, except for the parts of the projecting parts 14a, the base part has the largest thickness. This serves to increase fatigue resistance of the inner ring 14.

[0022] A container having the container mouth part 20 is not particularly limited, but can be a resin container for e.g. beverage made of a synthetic resin such as polyethylene terephthalate, etc., for instance. Particularly suitable is a resin container used for fruit drink, isotonic drink, tea, etc., in which its content is hot-filled.

Other Embodiments

[0023] In the foregoing embodiment, there was explained a case in which the projecting parts 14a are formed at the front end part and the approximately center part of the outer circumference of the inner ring 14. However, the forming positions of the projecting parts 14a are not limited thereto. For instance, two projecting parts 14a can be formed at approximately center part of the outer circumferential surface of the inner ring 14.

[0024] In the foregoing embodiment, there was explained a case in which two projecting parts 14a of a same shape are formed. Instead, these may have shapes different from each other.

[0025] In the foregoing embodiment, there was explained a case in which the inner circumferential surface of the container mouth part 20 is doubly sealed by causing the two projecting parts 14a formed on the inner ring 14 to come into contact with the inner circumferential surface of the container mouth part 20. However, the technique of doubling sealing the inner circumferential

surface of the container mouth part 20 is not limited thereto. For instance, as shown in Fig. 4 and Fig. 5, on a more inner side than the container mouth part 20 as seen in a vertical section view, there can be provided a cavity 15 that projects toward the container mouth part 20 side, and on this cavity 15, the inner ring 14 is formed. In this, as the cavity 15 and the inner ring 14 come into contact with the inner circumferential surface of the container mouth part 20, the inner circumferential surface of the container mouth part 20 is sealed doubly. In this arrangement, the distance from the top plate part 11 to the container mouth part 20 is made shorter. Thus, the inner ring 14 can be made shorter than conventionally, so that the rigidity of the inner ring 14 can be enhanced, thereby to suppress deformation of the inner ring 14.

Further, since the contact part between the inner ring 14 and the container mouth part 20 can be made distant from the leading end of the container mouth part 20, so that premature break of the seal of the container can be prevented.

Moreover, since the cavity 15 can support the container mouth part 20 in the direction opposing to a pressing force of the outer ring 13, occurrence of internal collapsing of the container mouth part 20 can be suppressed.

[0026] The outer circumferential surface of the cavity 15 can comply with the inner circumferential surface of the container mouth part and made slidable relative to this inner circumferential surface of the container mouth part. The shape of the inner circumferential surface of the cavity 15 is not particularly limited. Various shapes such as a disc shape, a square shape, etc. can be employed.

[0027] In Fig. 4 and Fig. 5, the inner ring 14 includes, at its front end part, a projecting part 14a that projects toward the radially outer side of the inner ring 14 and this projecting part 14 is placed in contact with the outer circumferential surface of the container mouth part 20. Instead, as shown in Fig. 6, the inner ring 14 can be shaped linear, so that its front end part may come into contact with the inner circumferential surface of the container mouth part 20. In this arrangement, the inner ring 14 can come into contact with the container mouth part 20 in a direction oblique relative to the axial direction of the container mouth part 20. Thus, the pressing force of the inner ring 14 to the container mouth part 20 can be made stronger.

[0028] In the foregoing embodiment, there was explained a case in which the inner circumferential surface of the container mouth part 20 is doubly sealed,

namely, two sealing parts are formed on the inner circumferential surface of the container mouth part 20. However, the number of the sealing parts to be formed on the inner circumferential surface of the container mouth part 20 is not limited thereto, but can be three or more. For instance, in case three
5 sealing parts are to be formed, three projecting parts 14a may be formed on the outer circumferential surface of the inner ring 14 and these three projecting parts 14a may come into contact with the inner circumferential surface of the container mouth part. Further, on the cavity 15 shown in Figs. 4 and 5, an inner ring 14 having two projecting parts 14 may be formed, so that the cavity
10 15 and the two projecting parts 14a may come into contact with the inner circumferential surface of the container mouth part 20.

[0029] Incidentally, the above-described technique of sealing at least doubly the inner circumferential surface of the container mouth part 20 was cited only as a preferred mode. Any other technique may be employed. For instance, the
15 front end part of the inner ring 14 may be branched and this leading end may come into contact with the inner circumferential surface of the container mouth part 20.

Reference Signs List

20 [0030] 10: resin cap
11: top plate part
12: tubular part
12a: screw thread
13: outer ring
25 14: inner ring
14a: projecting part
15: cavity
20: container mouth part
20a: screw thread

CLAIMS

1. A resin cap to be fitted on a container mouth part, comprising:
a top plate part;

5 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 that comes into contact with an inner circumferential surface of the container mouth part;

10 wherein, when the resin cap is fitted on the container mouth part, the inner circumferential surface of the container mouth part is sealed at least doubly.

2. The resin cap according to claim 1, wherein:

15 a plurality of projecting parts are formed on an outer circumferential surface of the inner ring; and

the inner circumferential surface of the container mouth part is sealed at least doubly as the plurality of projecting parts come into contact with the inner circumferential surface of the container mouth part, when the cap is
20 fitted on the container mouth part.

3. The resin cap according to claim 1 or 2, wherein:

the top plate part defines a cavity that projects toward the container mouth part side, the cavity being provided on a more inner side than the
25 container mouth part as seen in a vertical section view, when the cap is fitted on the container mouth part;

the inner ring is formed on the cavity; and

the inner circumferential surface of the container mouth part is sealed at least doubly as the cavity and the inner ring come into contact with the
30 inner circumferential surface of the container mouth part, when the cap is fitted on the container mouth part.

4. The resin cap according to any one of claims 1-3, wherein the inner ring is formed such that its thickness increases from vicinity of its base part toward
35 the base part.