United States Patent

Itoh

[15] **3,651,972**

[45] **Mar. 28, 1972**

[54] **CAP**

[72] Inventor: Mimpei Itoh, 8-10 Nishi-Tsuruma-2-chome, Yamato, Japan

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[30] **Foreign Application Priority Data**

Jan. 14, 1970 Japan.....45/4672
Sept. 5, 1970 Japan.....45/88593

[52] **U.S. Cl.**.....**215/41**
[51] **Int. Cl.**.....**B65d 41/22**
[58] **Field of Search**.....215/41 R, 43 R, 9

[56] **References Cited**

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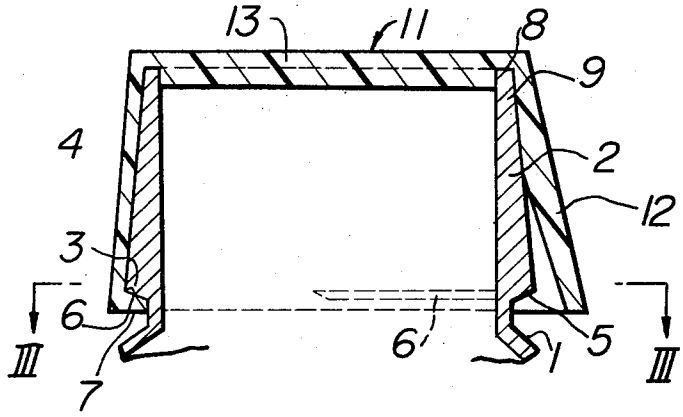
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Assistant Examiner—Thomas C. Culp, Jr.
Attorney—Karl W. Flocks

[57] **ABSTRACT**

A cap of elastic material for use in combination with a neck portion of hard material having an annular projection or ridge formed in the lower portion thereof has the hollow lower portion or skirt whose cross section is elliptical or polygonal such as triangular, square and the like. A bow-shaped or crescent-like recess is formed in the inner surface of the hollow skirt portion for engagement with the annular projection or ridge when the cap is fitted over the neck portion. The cap may be readily released from the neck portion just by applying the pressure to the skirt portion without any rotation of the cap. The neck portion may have a top wall having an opening while the cap has an opening formed through its top wall so that upon rotation of a slight amount of the cap the container is ready to dispense the contents thereof without removing the cap.

8 Claims, 12 Drawing Figures



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SHEET 1 OF 2

FIG. 1

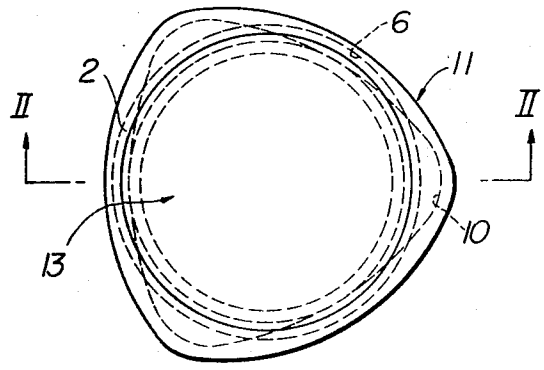


FIG. 2

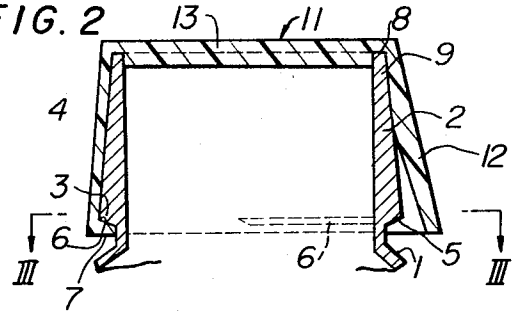


FIG. 3

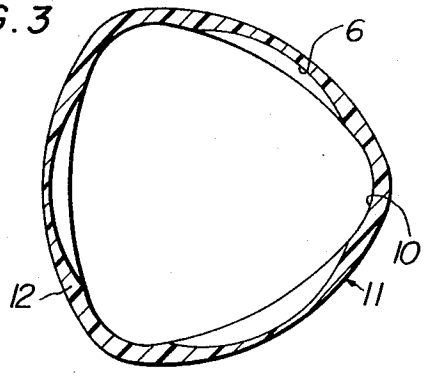


FIG. 4

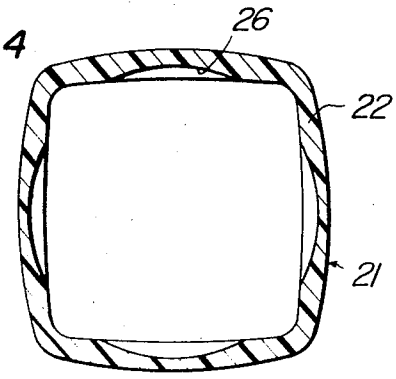


FIG. 5

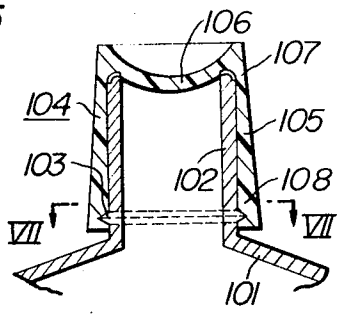


FIG. 6

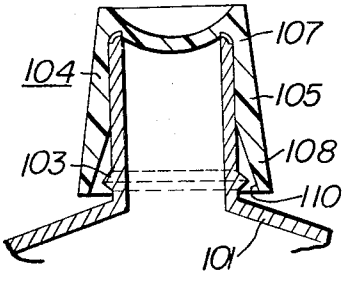
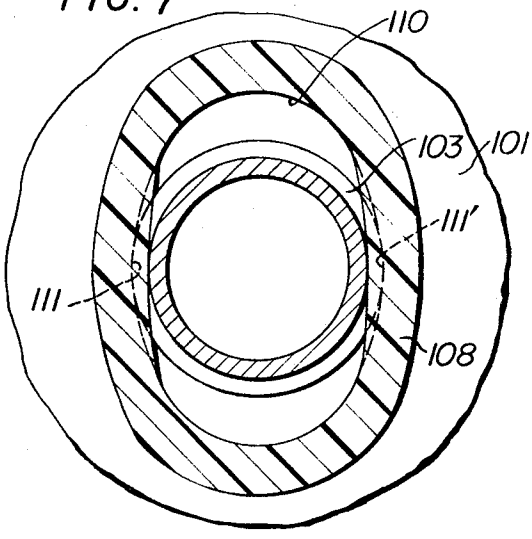


FIG. 7



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FIG. 8

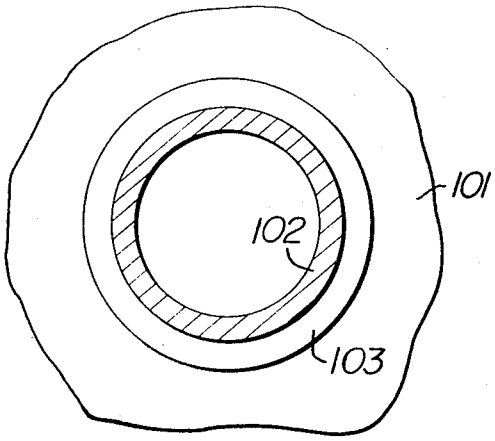


FIG. 9

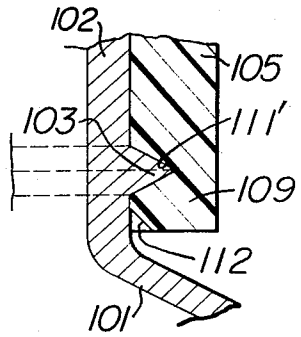


FIG. 10

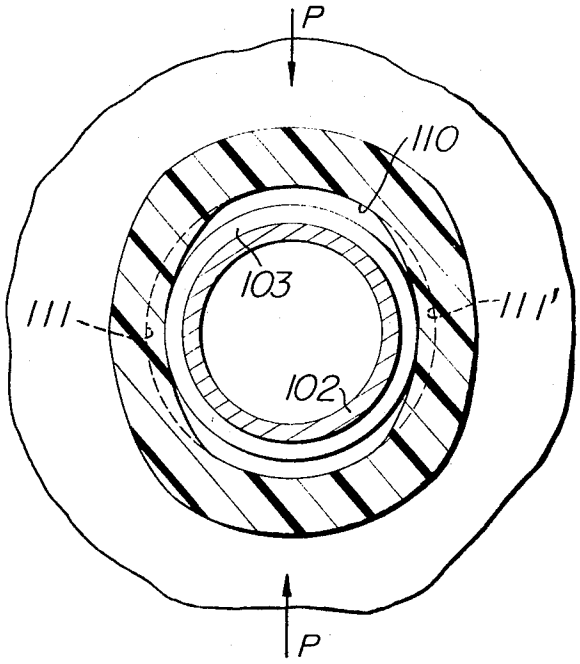


FIG. 11

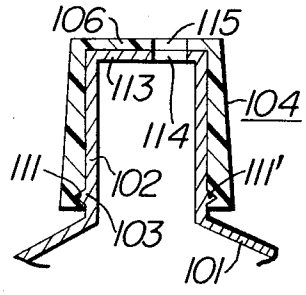
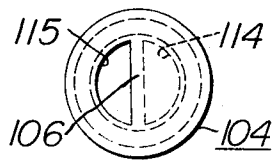


FIG. 12



CAP

BACKGROUND OF THE INVENTION

The present invention relates to a cap for containers and more specifically a cap for tubes containing dental cream and containers for synthetic detergent.

To fit over or release from the neck of a container the cap of the type described, it must be rotated. This is inconvenient for quickly opening and closing the container.

SUMMARY OF THE INVENTION

It is therefore the primary object of the present invention to provide an improved cap which may be fitted over and released from the neck of a container without rotation of the cap relative thereto.

It is another object of the present invention to provide an improved cap which may be easily fitted over the neck of a container only by slightly pressing in the axial direction of the neck the cap placed thereupon and may be readily released from the neck only by slightly pressing the predetermined portion of the cap laterally of the axis of the neck.

It is another object of the present invention to provide an improved cap of the type which may be fitted over and released from the neck of a container without rotation and which may dispense the content in the container only by rotating the cap without taking it out of the neck.

In brief, the present invention provides a cap made of an elastic material for use in combination with a container having a neck portion provided with an annular projection or ridge formed in the lower portion of the neck. The lower portion or skirt of the cap has an elliptical or polygonal cross section and at least one bow-shaped or crescent-like recess is formed in the inner surface of the lower or skirt portion for engagement with the annular ridge of the neck.

In accordance with one aspect of the present invention the neck of a container has a top wall having an opening while the cap is provided with an opening which is formed through the top wall thereof and corresponds to the opening of the neck so that upon rotation of the cap the container may be readily opened or closed.

The present invention will become more apparent from the following description of some preferred embodiments thereof taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top view of a first embodiment of a cap in accordance with the present invention fitted over the neck portion of a container;

FIG. 2 is a cross-sectional view taken along the line II—II of FIG. 1;

FIG. 3 is a cross-sectional view taken along the line III—III of FIG. 2;

FIG. 4 is a cross-sectional view similar to FIG. 3 illustrating a second embodiment of the present invention;

FIG. 5 is a longitudinal sectional view of a third embodiment of the present invention having an elliptical lower or skirt portion, the sectional view being taken along the minor axis of the elliptical lower or skirt portion;

FIG. 6 is a longitudinal sectional view thereof taken along the major axis of the elliptical lower or skirt portion;

FIG. 7 is a cross-sectional view taken along the line VII—VII of FIG. 5;

FIG. 8 is a view similar to FIG. 7 illustrating the neck with the cap removed;

FIG. 9 is a fragmentary sectional view of the cap shown in FIG. 6;

FIG. 10 is a view similar to FIG. 9 illustrating the deformation of the cap when removed from the neck;

FIG. 11 is a sectional view of a fourth embodiment of the present invention; and

FIG. 12 is a top view thereof illustrating the cap rotated through 180° from the position indicated in FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Neck portion **2** extending from the shoulder **1** of a container is made of a hard material such as a metal and is provided with annular projection or ridge **3**. The sloping surface **4** above the projection **3** extends to the top of the neck **2** or mouth and the inverted-cone-shaped portion or surface **5** is formed below the annular projection **3**.

A cap generally designated by **11** and made of an elastic material such as plastics has a side wall **12** and a top wall **13** whose inner surface substantially mates with the top of the neck portion **2**. The side wall **13** extends downwardly like a skirt and has a substantially triangle cross section including the lower edge **7**. Each side of the triangular lower edge **7** has a recess **6** into which is fitted the annular projection **3** of the neck portion **2** and the inner surface indicated by **10** at and adjacent to the vertex of the triangular lower edge **7** is spaced apart from the projection **3**.

The inner surface of the top wall **13** of the cap **11** is provided with an annular groove into which is fitted the upper edge **9** of the neck portion **2**.

To fit the cap **11** on the neck portion **2**, the cap **11** is placed upon the top of the neck portion **2** and then slightly pressed in the axial direction so that the lower edge **7** may override easily the projection **3** and then be fitted into the annular recess **6**. Thus the cap **11** elastically close the neck portion **2**.

When the depth of the cap **11** relative to the height of the neck portion **2** is suitably selected, the cap **11** is attracted toward the shoulder **1** because of the provision of the inner sloping surface of the lower edge **7** and the sloping surface below the annular projection **3** so that the upper edge **9** of the neck portion may be snuggly fitted into the groove **8** of the inner surface of the top wall **13** of the cap **11**. Thus the improved sealing may be provided.

To remove the cap **11** from the neck portion **2**, the portion adjacent to the vertex of the lower edge of the cap **11** is held with fingers and slightly pressed by them so that the portion **10** of the cap **11** is deformed. In consequence, the recess **6** may be released from the projection **3** so that the cap **11** may be easily lifted and removed from the neck portion **2**.

Because of the construction of the cap **11** described above, it will not be removed from the neck portion **2** even when it is rotated in either direction relative to the neck portion since the projection **3** is formed around the whole circumference of the neck portion **2**.

(Second Embodiment)

The second embodiment illustrated in FIG. **4** has a lower portion substantially square in cross section. The cap **21** has four side walls **22** each provided with a recess **26**.

From the foregoing description, it is seen that the cap has a lower or skirt portion in any desired cross section.

(Third Embodiment)

Referring to FIGS. **5–10**, a neck portion **102** extended from the shoulder portion **101** of a container is made of a hard material such as metals and has an annular projection or ridge **103** triangle in cross section and formed along the lower peripheral portion of the neck **102**.

A cap generally designated by **104** has a cylindrical side wall **105** and a top wall **106** made of an elastic material such as plastics. The inner surface of the side wall **105** at the top thereof is so shaped as to mate with the upper portion of the neck portion **102** and the lower portion **108** of the side wall **105** has its lower surface extended downwardly like a skirt as best shown in FIG. **6** in such a manner that its lower peripheral edge **109** may be elliptical in cross section. A pair of bow-shaped recesses **111** and **111'** are formed in the inner portion **110** of the lower elliptical peripheral edge **108** on the sides of the minor axis thereof. In other words, the pair of recesses **111** and **111'** are symmetrical about the major axis of the lower peripheral edge **109** as best shown in FIG. **7** and are adapted to mate with the annular projection **103**. As viewed from FIG. **7**, the recesses **111** and **111'** have the greatest depth along the

minor axis and the depth is gradually made shallower on both sides of the minor axis. It is seen that no recess is formed in the direction of the major axis. As shown in FIGS. 5, 7 and 9, the lower portion 108 of the cap 104 has its recesses 111 and 111' fitted over the annular projection 103 in the direction of the minor axis, but is spaced apart therefrom in the direction of the major axis as best shown in FIGS. 6 and 7.

Since the inner configuration of the upper portion 107 of the cap 104 corresponds to that of the upper portion of the neck portion 102, the mouth of the neck portion 102 is completely sealed and the cap 104 is prevented from being inclined relative to the neck portion 102. Although the cap 104 has been described and illustrated as having the elliptical cross section, it may have any suitable cross section as needs demand. If required, a suitable marking or the like may be provided for indicating the direction of the major axis of the cap.

To remove the cap 104 from the neck portion 102, the lower portion 108 of the cap 104 is held with fingers and slightly pressed in the directions indicated by P in FIG. 10 so that the elliptical cross section of the lower portion 108 of the cap 104 may be deformed as shown in FIG. 10. In consequence, the recesses 111 and 111' are released from the annular projection 103 so that the cap 104 may be easily pulled out of the neck portion 102.

To fit the cap 104 upon the neck portion 102, it is placed upon the neck portion 102 and is slightly pressed along the axial direction of the neck portion 102 so that the lower peripheral edge 109 may easily override the annular projection or ridge 103 and then the annular projection or ridge 103 is fitted into the bow-shaped recesses 111 and 111'. Thus the cap 104 may be elastically fitted over the neck portion 102. The provision of the tapered edge 112 as shown in FIG. 9 will facilitate to fit the cap over the neck portion 102.

When the depth of the cap 104 relative to the height of the neck portion 102 is suitably selected, the cap 104 is attracted toward the shoulder portion 101 of the container because of the engagement of the inner sloping surface of the lower edge 109 with the lower sloping surface of the annular projection 103 so that the upper edge of the neck portion 102 may be closely made in contact with the inner surface of the top wall 106 of the cap 104. Thus the improved sealing of the container may be attained.

Since the annular projection or ridge 103 is formed along the whole circumference of the neck portion 102, the cap 104 will not be released out of the neck portion 102 even when the cap 104 is rotated in either direction.

(Fourth Embodiment)

Referring to FIGS. 11 and 12, the cap 104 has the bow-shaped recesses 111 and 111' for engagement with the annular projection 103 of the neck portion 102 as in the case of the third embodiment described above. However, the neck portion 102 has a top wall 113 and an opening 114 while the cap 104 has also an opening 115 formed through the top wall 106 thereof.

The cap 104 is rotated relative to the neck portion 102 so that as shown in FIG. 11, the opening 115 is made to coincide with the opening 114 of the neck portion 102 to release the content in the container. When the cap 104 is rotated through 180° as shown in FIG. 12, the opening 114 of the neck portion 102 may be sealed by the top wall 106 of the cap 104. The cap 104 may be fitted over and released from the neck portion 102 in a similar manner described above with reference to the third embodiment.

What is claimed is:

1. A cap for use in combination with a neck portion of a container made of a hard material, said neck portion having an annular projection or step formed in the lower portion thereof, wherein said cap is made of a flexible material and provided with at least one bow-shaped or crescent-like recess formed in the lower inner surface of said cap; and said annular projection or step is normally fitted into said recess when said cap is fitted over said neck portion and is adapted to be released from said recess when the force is applied to said cap laterally of the longitudinal axis thereof.

2. A cap as specified in claim 1 wherein the lower portion of said cap has a polygonal cross section and said bow-shaped or crescent-like recess is formed in at least one inner side wall of said lower portion of said cap.

3. A cap as specified in claim 2 wherein said polygonal cross section is triangular.

4. A cap as specified in claim 2 wherein said polygonal cross section is square.

5. A cap as specified in claim 1 wherein the lower portion of said cap has a substantially elliptical cross section and said bow-shaped or crescent-like recess is formed in at least one of the inner surfaces opposed diagonally across the minor axis of said lower elliptical lower portion of said cap.

6. A cap as specified in claim 1 wherein said bow-shaped or crescent-like recess has a cross section mating with said annular projection.

7. A cap as specified in claim 6 wherein both of the distances from the inner surface of the top of said cap to said bow-shaped or crescent-like recess and from the top of said neck portion to said annular projection are so selected that when said cap is fitted over said neck portion said inner surface of said top of said cap presses against said top of said neck portion.

8. A cap as specified in claim 1 wherein said neck portion has a top wall which is partially opened while the top wall of said cap is provided with an opening corresponding to said opening of said neck portion.

* * * * *