

[54] CONTAINER CAP
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[21] Appl. No.: 199,859

[52] U.S. Cl..... 222/517, 222/498, 222/543,
 220/35, 220/31 S, 222/562

[51] Int. Cl..... B67d 3/00

[58] Field of Search..... 222/543, 544, 556,
 222/562, 517, 498; 220/35, 31 S

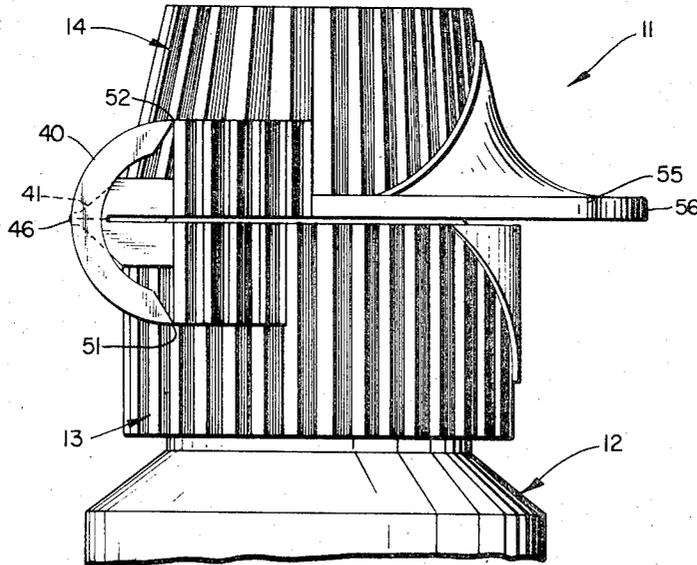
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[57] **ABSTRACT**

An integral captive cap structure has a closure lid connected to the body by an axially short thick hinge element containing the hinge axis about which the lid is pivoted to closed position over the body, a frictional lock being provided between the closed lid and body. Cooperating parts on the closed structure adapt it to fit a chuck or clutch of a conventional container capping machine.

6 Claims, 6 Drawing Figures



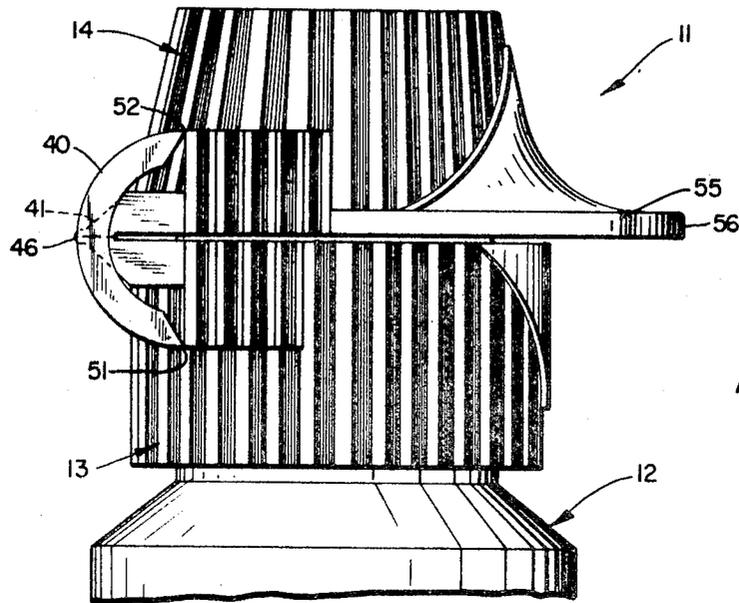


FIG. 1

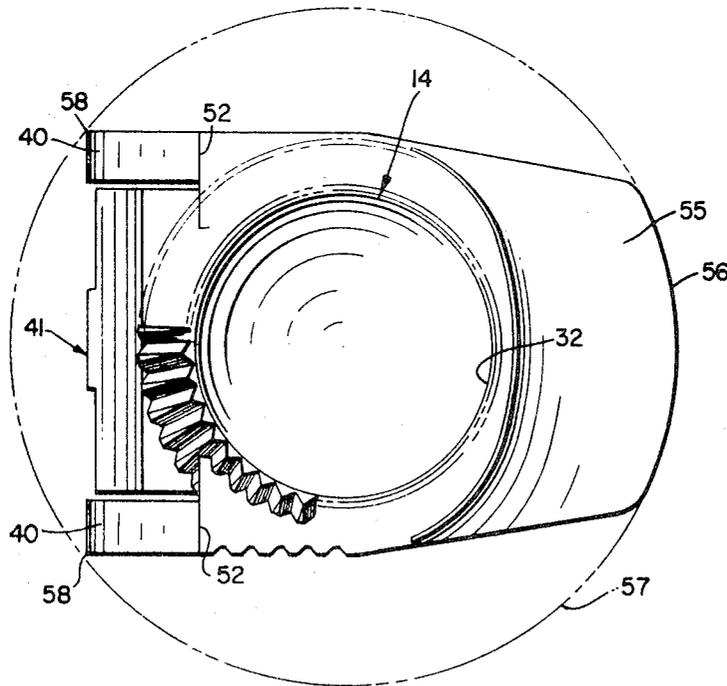


FIG. 2

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CONTAINER CAP

This invention relates to cap structure for containers and particularly to cap structure of the so-called captive cap type wherein one annular part is adapted to be secured upon the dispensing end of the container and another closure part is attached thereto by a flexible hinge that provides for repeated opening and closing operations.

In its preferred embodiment the invention will be described as an integral cap structure for mounting on the discharge nozzle of a flexible walled toothpaste or like container tube.

Captive caps for containers and tubes have been proposed. For example, such are disclosed in U.S. patents to Tupper U.S. Pat. No. 2,690,861; Lohrer U.S. Pat. No. 2,894,654 and Fanning U.S. Pat. No. 3,416,688. It is also known to provide unitary flexible hinges between parts of molded plastic containers as exemplified by U.S. patents to Wolf U.S. Pat. No. 3,289,877 and Koleske U.S. Pat. No. 3,516,115.

The present invention contemplates a unitary captive cap of novel structure that provides an improved flexible hinge connection between parts, more reliable closure action, and adaptation for installation upon the container in conventional automatic capping machinery, and this is the major object of the invention.

A further object of the invention is to provide a novel integral container cap comprising an annular body part adapted to be threaded or otherwise fixed on a container neck or nozzle, and closure part or lid connected to the body part by a relatively short, thick intermediate hinge structure.

Another object of the invention is to provide a novel integral captive cap structure for a container comprising an annular body part adapted to be threaded or otherwise fixed on a container neck or nozzle, and a flexibly hinged closure part that in the closed position has special locking engagement with the body parts.

A further object of the invention is to provide a novel integral captive cap structure for a container consisting of an annular body adapted to be threaded or otherwise fixed to the container neck or nozzle and a flexibly connected hinged closure, with certain hinge elements and a closure tab being so disposed as to adapt the cap structure to fit with the chuck or clutch of a conventional capping machine.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a side elevation showing a cap structure according to a preferred embodiment of the invention mounted at the dispensing end of a conventional threaded dispensing nozzle toothpaste or like tube;

FIG. 2 is a top plan view of the one-piece plastic cap structure of FIG. 1;

FIG. 3 is a plan view of the cap structure when the closure part or lid has been pivoted to open position;

FIG. 4 illustrates the cap structure substantially in section on line 4-4 of FIG. 3;

FIG. 5 is a plan view of the opened cap structure as seen oppositely from FIG. 3; and

FIG. 6 is a fragmentary view in section showing locked engagement of the cap lid and body in closed condition.

PREFERRED EMBODIMENTS

The cap structure 11 is intended primarily for mount-

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ing upon a flexible walled toothpaste or like container tube 12. This tube may be the threaded neck type shown in FIG. 4, or it may have a plain or corrugated neck on which the body of the cap is force fitted.

Cap structure 11 is integral and essentially consists of a body 13 adapted to be installed in fixed relation on the tube neck and closure lid 14 swingable about a flexible hinge.

The hinge consists of an intermediate relatively short thick hinge portion joining the body and lid at an effective pivot axis, and laterally outwardly spaced resilient hinge loops that control movement and location of the lid as will appear.

The cap structure is formed by molding an organic synthetic plastic material such as polypropylene which is suitably inert with respect to the contents of the tube and has a modulus of elasticity sufficient to permit necessary repeated opening and closing during its useful life.

Referring to FIGS. 3 and 4, body 13 is of hollow open ended annular form having an internal thread 15 adapted for mounting the cap structure on the threaded hollow discharge nozzle 16 of tube 12. When the body 13 is turned until the upper edge 17 of tube neck 16 abuts a downwardly facing annular shoulder 18 in the body, the cap structure is fixedly secured upon tube 12. Body 13 may be longitudinally corrugated at 19 for turning it to a tight position.

The upper end of body 13 has an annular planar surface 21 disposed at right angles to the body axis. An axially short annular lip 22 rises from the plane of surface 21 to terminate in a flat annular edge 23 parallel to surface 21. The outer periphery of lip 22 is preferably conical, and interiorly lip 22 is formed with a reduced diameter discharge orifice 24 disposed upwardly of a downwardly facing annular internal ledge 25 having a rounded edge 26.

Lid 14 has a downwardly open recess 27 surrounded by a downwardly diverging conical wall 28 that intersects a planar bottom surface 29 disposed at right angles to the cap axis. The closed top wall 31 of the lid has a concave finger receiving recess 32 and the sides are longitudinally corrugated at 33 for turning.

A hollow tubular projection 34 depends from wall 31 centrally within recess 27. The external diameter d at the tip 35 of projection 34 which terminates about level with surface 29 is only slightly less than the diameter of body orifice 24 so that when the lid is closed as shown in FIG. 6 the tip of projection 34 will slide smoothly within lip 22.

Referring to FIG. 3 it will be seen that, while the major external circumference 36 of projection 34 lies in a cylinder of diameter d , an eccentric lip 37 is formed at one side having an outer surface 38 formed on the arc of a circle of radius r eccentric to the center of surface 36. Surface 38 smoothly merges at opposite ends into surface 36. Lip 37 projects sufficiently laterally of the tip of projection 34 that when the lid is closed as in FIG. 6 lip 37, as permitted by the flexibility of the plastic composing the cap structure, cams about rounded edge 26 and under ledge 25 to tightly lock the lid to the cap and form a reliably held closure against discharge of the tube contents.

Referring to FIGS. 1 and 3-5, the body and lid are formed at the hinge with coextensive portions that project toward each other and are of reduced cross section as they approach the effective hinge axis where they

terminate in spaced thin parallel edges 42 and 43. These portions of the body and lid are connected only by the intermediate centrally disposed relatively short hinge element 41 that extends only a minor distance longitudinally of the space between said edges but is thicker than the body or lid portions at said edges. As shown, element 41 is substantially thickened at the effective pivot juncture indicated at 46 in FIG. 4 by a portion 47 thereof being raised above the plane of surfaces 21 and 29. It has been found that this relatively short but thick hinge section between the body and lid provides a more reliable and longer lasting hinge than would be provided by continuing the reduced cross section portions of the body and lid toward each other to integrally intersect along a longer thinner region extending the entire length between them. The effective hinge axis is preferably parallel to edges 42 and 43 and it passes through element 41.

Integral hinge loops 40 are identical and of uniform rectangular cross section and (FIG. 1) integrally connected at reduced section opposite ends to the body and lid respectively along thin effective pivot junctures 51 and 52 that are parallel to but displaced from the effective hinge axis through hinge element 41. Hinge loops 40 are equally spaced laterally from hinge element 41 and are parallel to each other and lie in planes that intersect at right angles with the effective pivot axis through hinge element 41. As the lid 14 is pivoted between the closed position of FIG. 1 and the open position of FIG. 3 the ends 51 and 52 of the hinge loops will be spread apart at first so that each hinge loop acts as a tension spring that initially tends to resist opening and bias the lid back toward closed position and then snap over center to act to bias the lid toward open position. The reverse action takes place when the lid is closed. In the fully open and closed positions of the lid, the hinge loops are substantially relaxed and not in tension.

Referring to FIGS. 1 and 2, it will be noted that lid 14 is formed on the side opposite its hinged connection to the body with a laterally projecting finger tab 55. In assembling the usual conventional threaded cap with a threaded neck tube, it is conventional practice to secure the cap upon the unfilled tube in known capping machinery wherein a chuck or clutch device grips the cap while the cap and tube are brought together and relatively rotated in threaded engagement.

It is an important feature of the present invention that the captive cap structure herein is so constructed and arranged as to fit with the chuck or clutch devices of conventional capping machines so that special machines are not required to handle it. This is accomplished according to the invention (FIG. 2) by providing an extended finger tab that has at the outer edge an arc 56 of a circle 57 that also intersects the outer corners 58 of the hinge loops 40 as shown in FIG. 2. Circle 57 represents the entrance mouth of the chuck or clutch of the capping machine.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. Integral cap structure of synthetic plastic material for a container of the type having a hollow product discharge neck comprising an annular body adapted to be mounted in fixed position on said neck, a closure lid and flexible hinge means between said body and lid, said hinge means comprising a relatively short thick intermediate hinge element extending between thinner adjacently substantially parallel edges of coextensive body and lid portions, said element extending longitudinally only a minor distance along the space between said edges and the effective hinge axis between said body and lid extending through said element substantially parallel to said edges, and parallel flexible hinge loops disposed outwardly of the ends of said space having opposite ends pivotally connected to the body and lid on aligned axes parallel to said effective hinge axis.

2. Integral cap structure of synthetic plastic material for a container of the type having a hollow product discharge neck comprising an annular body adapted to be mounted in fixed position on said neck, a closure lid and flexible hinge means between said body and lid, said hinge means comprising an intermediate hinge element directly bridging adjacent portions of said body and lid with the effective hinge axis extending longitudinally through said element, parallel flexible hinge loops disposed outwardly of the ends of said element having opposite ends pivotally connected to the body and lid on aligned axes parallel to said effective hinge axis, a finger tab projecting outwardly from said lid opposite said hinge element and having an arcuate outer edge, said outer edge coinciding substantially with an arc on the periphery of a circle having its center on the axis of said annular body and with its periphery intersecting the outer corners of said hinge loops in the closed condition of the cap structure.

3. Integral cap structure of synthetic plastic material for a container of the type having a hollow product discharge neck comprising an annular body adapted to be mounted in fixed position on said neck, a closure lid and flexible hinge means between said body and lid, said hinge means comprising an intermediate hinge element directly bridging adjacent portions of said body and lid with the effective hinge axis extending longitudinally through said element, parallel flexible hinge loops disposed outwardly of the ends of said element having opposite ends pivotally connected to the body and lid on aligned axes parallel to said effective hinge axis, said hinge means providing for pivotal movement of said lid between an open position extending away from said body and a closed position wherein it extends over said body, and cooperating frictionally engaged locking means on said body and lid for retaining said closed position.

4. The cap structure defined in claim 3, wherein said body has a discharge orifice in its upper end and said lid has a depending internal tubular projection adapted to slidably extend into said orifice in the closed position of the lid, and said locking means comprises coacting lip and shoulder means engageable at said orifice.

5. The cap structure defined in claim 3, wherein said body has a circular discharge orifice at its upper end and a downwardly facing shoulder below said orifice, and said lid has a depending internal projection the free end of which is smoothly slidable into said orifice when the lid is closed, and said locking means comprises a lip

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projecting laterally of said projection end adapted to be forcibly moved through said orifice and to snap under said shoulder

6. The cap structure defined in claim 5, wherein said lid projection is cylindrical and said lip is a part circular

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projection eccentric to said lid porjection, the outer edge of said lip merging circumferentially smoothly into the surface of said lip projection.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,741,447 Dated June 25, 1973

Inventor(s) Gilbert DeWayne Miles and Russell Park McGhie

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 41, change "aid" to -- said --.

Column 6, line 1, change "porjection" to -- projection --.

Column 6, line 3, change "lip" to -- lid --.

Signed and sealed this 27th day of November 1973.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents