

CONTAINER AND CLOSURE CAP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a container and closure cap therefor and in particular relates to a container and closure cap of the type in which the cap is screwed onto the container to a predetermined rotational orientation relative thereto.

2. Discussion of the Prior Art

It is frequently desired, typically for aesthetic reasons but also for some child resistant closure latch mechanisms, to design threaded closures and containers with non-round shapes or otherwise irregular protrusions intended to sit in alignment with respect to each other when the package is in the closed and sealed position. One example would be square shaped jars and caps for skin creams or other personal care products. Another includes oval shaped double wall screw caps designed to lock onto oval child resistant containers for medicines and other hazardous consumer products.

Due to minor variations in thread and sealing lip dimensions resulting from mass production tooling and processes, closure orientation may vary by as much as 20 to 100 degrees relative to the container body when screwed on and tightened to a particular sealing force. Conversely, when such closures are screwed on to an orientation stop, the sealing force may vary from zero to an unacceptably high value.

While there are many dimensions that can vary to cause the problem, the net result of any combination of variations may be measured as a variation in the vertical dimension between the inside roof of the closure and the sealing lip on the bottle when the cap is brought to a particular orientation and stopped.

In the past, closures have been designed to overcome this problem by means of a special sealing feature designed to telescope vertically with a cooperating feature on the container neck, such as tight fitting plug sized to seal the bore of the container neck over a range of depths of insertion. However, in many cases this technique will not work for lack of a smooth controlled diameter on the bottle to seal against.

In other instances closures have been designed to use a gasket resilient through an appropriate range of compressibility to take up the variation and provide sealing pressure within a suitable range. However, it is frequently desired to use only a thin film glued or heat sealed across the mouth of the container in place of a resilient gasket so as to provide tamper evidence, improved barrier properties and reduced cost.

The stop to which such closures are tightened to provide alignment with the container may be either or both of two general configurations. In the first instance, a radial stop on the neck of the container is configured to interact with a cooperating stop, either at the thread tail-out or on the skirt of the closure. In other cases, the stop is implemented as the lower extremity of the closure skirt comes into the vertical contact with a specially configured (squared off) shoulder on the container. The latter is frequently used to eliminate any unsightly gap between the skirt of the closure and the shoulder of the container. Again, in both cases, the positioning of the closure against any surface other than the sealing surface creates a variability in the pressure exerted against the sealing surface and results in either over-tightened

closures, which are difficult to remove, or loose closures which are not well sealed to the container.

In U.S. Pat. No. 3,894,647 a container and closure cap are described in which the cap is screwed onto the container to a predetermined rotational orientation defined by a stop. The cap is formed with a tubular skirt connected to a disc-like top through a resilient annular shoulder portion which flexes to compensate for tolerance variations in the threads of the cap and container neck in order to ensure that the cap liner seals the neck of the container. The flexing of the annular shoulder causes an unsightly distortion and may even leave visible stress marks.

SUMMARY OF THE INVENTION

The present invention seeks to improve on the prior art and provides a container and closure cap therefor comprising: a container having an open-ended and externally screw threaded cylindrical neck; and a closure cap having a cylindrical side wall with an internal screw thread adapted to cooperate with the thread on the container neck and a planar end wall adapted to form a seal with the open end of the container neck; wherein at least one of the opposing surfaces of the screw threads on the cap and the container neck is inclined to the plane perpendicular to the axis of the neck of the container at an angle of at least 60° and both screw thread surfaces have sufficient lateral extent, that the screw threads can slip laterally on one another to enable the side wall of the cap or the neck of the container to deform when the cap is tightened onto the container to a particular predetermined rotational orientation relative thereto which is rotationally beyond the point at which the end wall of the cap forms a seal with the open end of the neck.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention are described below with reference to the accompanying drawings in which:

FIG. 1 is an isometric view of a container with a closure cap fitted;

FIG. 2 is a partial cross sectional view taken on the line II—II in FIG. 1 with the cap loosely applied to the container;

FIG. 3 is a view similar to that of FIG. 2 but with the cap tightly applied to the container; and

FIG. 4 is a view corresponding to that of FIG. 3 but showing an alternative container and cap.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A generally rectangular container **1** is shown in FIG. 1 having a generally rectangular closure cap **2**. As seen from FIG. 2 the container has a body **3** and a cylindrical neck **4** connected to the body by a shoulder **5**. The neck has an open end **6** and is provided with an external screw thread **7**. External screw thread **7** includes an upper surface and a lower surface **13**. Lower surface may be inclined relative to a plane perpendicular to the axis of the neck **4**.

The cap **2** has a planar end wall **8** and a cylindrical side wall **9** which is provided with an internal screw thread **10** having an upper surface **14** and a lower surface. When cap **2** is attached to neck **4**, upper surface **14** may be inclined relative to a plane perpendicular to the axis of the neck **4**. The threads **7** and **10** are adapted to enable the cap to be screwed onto the container so that the end wall **8** can form a seal with the open end **6** of the neck **4**. A cap liner **11** is provided to enhance this seal.

The cap is also formed with a skirt **12** which has a rectangular cross section corresponding to that of the container **1** and surrounds the cylindrical side wall.