

Container and closure having an outer foil cover.

This invention relates to containers having a foil overwrap over their closure, in particular to such containers for fluids, such as pourable liquids.

Containers for fluids, e.g. beverages such as fruit drinks and cordials, are commonly bottles, or bottle-shaped, having a neck closed with a screw threaded closure. The closure may be given a foil cover extending over the closure and partly over the neck as a way to provide evidence of tampering, and to enhance the image of the product. An example of a container and closure of this type is the container used for the marketed RIBENA™ fruit juice concentrate.

When opening the container, the foil is sometimes difficult to break, but production methods make it difficult to perforate the foil cover for easier removal. US 4538740 discloses a shrink fit sleeve over a container closure, and having a longitudinal, i.e aligned in the axial direction of the bottle upon which it is fitted, row of weaknesses.

It is an object of this invention to provide a container and closure in which the above-mentioned difficulties are alleviated.

In one aspect, the present invention provides a container having a neck and a mouth through which the container contents are dispensed, having a closure for the mouth that has threading for mating with corresponding threading on the neck, and which is rotated relative to the container for opening, the container having an outer foil cover extending beyond the edge of the closure to lie against the wall of the container; the closure having a skirt portion which descends around the neck toward the base of the container, characterised in that the closure has one or more external projections that puncture or weaken the foil cover on rotation of the closure.

Suitably the contents may be a fluid, such as a pourable liquid, e.g the above-mentioned beverages.

Typically the closure is a screw threaded cap closure having a top portion that seals against the rim of the mouth, and a skirt portion with threads that engage complementary threads on the container wall or neck surrounding the discharge mouth. The threads may be a conventional screw thread, but alternatively other forms of twist and remove closures may be used, for example where the cap skirt and container wall have cooperating cam surfaces rather than screw threads. The term "threads" as used herein includes both screw threads and cooperating cam surfaces.

To break through, or weaken by scoring, a foil cover applied to such a cap, a plurality of external projections may be provided on the skirt portion of the cap. Preferably these one or more projections are arranged at the bottom rim of the

closure, to encourage the foil to sever around the bottom rim, so as to result in a neatly cut edge. Typically a plurality of projections may be arranged in one or more rings around the outer surface of a circular closure, typically in a single planar ring, typically around the bottom rim of the skirt. These projections are advantageously integrally formed during moulding of a plastics cap.

The projections preferably have a section, about planes parallel to the axis of rotation, which is outwardly tapering, i.e. converging toward a point remote from the closure, e.g. wedge shaped, to give a cutting or chisel action against an embracing foil cover as the closure is rotated.

The shape and number of the projections may be varied to suit the weight and thickness of the foil cover, and the torque expected to be applied, in opening any particular closure/bottle combination. Preferably the shape and size of the projections is such that they present no danger of injury to the hand of a user when opening the container. Such a design constraint is easily applied by those skilled in the art.

For example it may be convenient to form the leading edge (when unscrewing) of the projections as an inclined, or curved surface for increased wedge or cam action, and to improve cutting efficiency, although projections of a substantially rectangular shape in plan in a plane perpendicular to the axis of rotation have been found suitable. The projections may be provided in the form of an outwardly projecting serrated e.g. castellated or sawtooth in plan, edge, albeit adapted to the curvature of the rim, around the bottom rim of the closure.

The above described closure, provided for a container of this invention, forms a further aspect of this invention.

Accordingly, the present invention also provides a container closure that has threading for mating with corresponding threading on the neck of a container, and which is rotated relative to the container for opening, the closure having a skirt portion which descends around the neck toward the base of the container, characterised in that the closure has one or more external projections that puncture or weaken an outer foil cover extending beyond the edge of the closure to lie against the wall of the container on rotation of the closure.

A preferred embodiment of this container closure comprises a cap closure having a top portion that seals against the rim of a container mouth, and a skirt portion which descends around the neck toward the base of the container carrying threads or cam surfaces that engage complementary threads or surfaces on the container neck surrounding the discharge mouth, characterised in that the skirt portion has one or more radially outwardly extending projections, preferably a plurality of

projections lying on a common circumferential circle.

Suitable and preferred features of the container closure of this aspect of the invention are as described above.

The container may be a conventional glass or plastics material screw necked bottle, and the threads on the closure may engage the threads on the neck of such a bottle directly. Alternatively a threaded adapter, suitably made of plastics material, may be fitted around the neck of the container, and may extend axially to form the rim of the mouth. The threads on the closure may engage with the threads on the adapter. The use of such an adapter facilitates to inclusion of further features, e.g. filters, anti-drip features, additional tamper-evidencing etc., and can also facilitate the use of a thread with a gentle pitch so that the cap rotates a substantial amount during removal so that the projections have ample opportunity to exercise their weakening or puncturing effect on the foil. Such adapters *per se* are known, for example on the above mentioned RIBENA™ bottle, but use of the closure described herein with such an adapter is novel.

The foil cover may be a conventional foil cover as used on known bottles such as the RIBENA™ bottle, and may cover the entire external surface of the closure and extend downwards to also cover adjacent parts of the neck and walls of the container.

Embodiments of the invention will now be described, by way of non-limiting example only, with reference to the accompanying drawings. In the drawings:

Fig. 1 is schematic cross section through a screw threaded closure and foil cover, fitted directly onto the screw threaded neck of a bottle;

Fig. 2 is a part cutaway view of a closure of the invention fitted onto an adapter on the neck of a bottle;

Fig. 3 is a fragmentary cross section through the skirt of the cap of Fig 2, to an enlarged scale.

Fig. 4 is a partial sectional view of the lower rim of the closure of Fig. 3, about the line B-B of Fig 3.

Referring to the Fig 1, a bottle 1 of glass or plastics, for example for a fruit drink, has a conventional mouth 2 in the bottle neck 3. A plastics screw cap closure 4 (general) has a skirt portion 5 with an internal thread 6 engaging a corresponding thread 7 on the external wall of the bottle neck 3 just below the mouth 2. The cooperating threads 6, 7 allow the top portion 8 of the cap closure 4 to sealingly engage against the rim of the mouth 2, to seal the container 1.

A circular piece of metal foil 9 is placed on the cap closure 4 after filling and closing the bottle 1 with the closure. A brushing action sweeps the foil 9 around the

neck 3 of the bottle 1 so that the foil 9 covers the cap closure 4 and is firmly pressed against the neck 3 of the bottle 1.

The cap closure 4 has a single ring of outwardly extending projections 10, which form an outwardly projecting serrated edge, around the periphery of the lower rim of the skirt portion 5. When the cap closure 4 is gripped through the foil cover 9 and rotated about the longitudinal axis A-A of the container 1 for opening, the projections 10 score the foil cover 9 which is pressed against the cap 9, either to puncture or at least to weaken it at the line 11. This allows the user to break the foil cover 9 as the cap 4 is removed without undue effort, and also provides the advantage that the severed foil cover 9 has a neat severed edge.

Referring to Figs 2, 3 and 4, a bottle 12 of glass or plastics, for example for a fruit drink, has a neck 13. Fastened around the neck 13 in a liquid tight seal is a plastics material adapter 14 that together with the neck 13 forms the rim of the bottle mouth (not shown). The bottle 12 and adapter 14 are of conventional construction. A plastics screw cap closure 15 (general) has a skirt portion 16 with an internal thread 17 engaging a corresponding thread (not shown) on an external wall of the adapter 14. The internal profile of the closure 15 closely corresponds to the adjacent external profile of the adapter 14. The cooperating threads allow the top portion 18 of the cap closure 15 to sealingly engage against the rim of the mouth, to seal the container 12.

A circular piece of metal foil 19 (shown part cutaway in Fig. 2) is placed on the cap closure 15 after filling and closing the bottle 12 with the closure. A brushing action sweeps the foil 19 around the neck 13 and adjacent parts of the wall of the bottle 12 so that the foil 19 covers the cap closure 15 and is firmly pressed against the neck 13 and adjacent parts of the wall of the bottle 12.

The cap closure 15 has a single ring of outwardly extending projections 20, which form an outwardly projecting serrated edge, around the periphery of the lower rim of the skirt portion 16. When the cap closure 15 is gripped through the foil cover 19 and rotated about the longitudinal axis A-A of the bottle 12 for opening, the projections 20 score the foil cover 19 which is pressed against the cap 19, either to puncture or at least to weaken it at the line 21. This allows the user to break the foil cover 19 as the cap closure 15 is removed without undue effort, and also provides the advantage that the severed foil cover 19 has a neat severed edge at the line 21.

As shown in Fig. 3 the projections 20 have a section, about planes parallel to the axis of rotation A-A, which is outwardly tapering, e.g. wedge shaped, at an angle α about 30° to the horizontal and a thickness t at the tip of about 0.1 mm. As shown in Fig. 4 the projections are substantially rectangular in shape in plan, and extend a

radial distance r about 0.5mm from the outer surface of the skirt portion, giving the bottom rim of the closure 4 a serrated edge of castellated shape though adapted to the curvature of the closure. It is convenient for the circumferential length c of each projection around the periphery of the skirt to be about 1mm with a gap width w of about 0.75mm between each projection 20. The projections 10 of the closure 4 of Fig. 1 have a similar shape, arrangement and dimensions to those of Figs. 3 and 4. The projections 20 extend radially about 0.5 mm beyond the surface of the adapter 14 immediately adjacent and below the lower rim of the closure 15. Similar dimensions would be expected to be appropriate for projections 20 of other shapes.

**Claims:**

1. A container having a neck and a mouth through which the liquid contents are dispensed, having a closure for the mouth that has threading for mating with corresponding threading on the neck, and which is rotated relative to the container for opening, the container having an outer foil cover extending beyond the edge of the closure to lie against the wall of the container; the closure having a skirt portion which descends around the neck toward the base of the container, characterised in that the closure has one or more external projections that puncture or weaken the foil cover on rotation of the closure.
2. A container according to claim 1 characterised in that the closure is a screw threaded cap closure having a top portion that seals against the rim of the mouth, and a skirt portion with threads that engage complementary threads on the container wall or neck surrounding the discharge mouth.
3. A container according to claim 1 or 2 characterised by a plurality of external projections provided on the skirt portion of the cap closure.
4. A container according to claim 3 characterised by one or more projections arranged at the bottom rim of the closure.
5. A container according to claim 4 characterised by a plurality of projections arranged in one or more rings around the outer surface of a circular closure.
6. A container according to claim 5 characterised by a single planar ring of projections around the bottom rim of the skirt.
7. A container according to any one of claims 1 to 6 characterised in that the projections have a section, about planes parallel to the axis of rotation, which is outwardly tapering.
8. A container according to any one of claims 1 to 7 characterised by projections provided in the form of an outwardly projecting serrated edge around the bottom rim of the closure.
9. A closure for a container according to any one of the preceding claims.

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10. A container closure according to claim 9 characterised by threading for mating with corresponding threading on the neck of a container, and which is rotated relative to the container for opening, the closure having a skirt portion which descends around the neck toward the base of the container, characterised in that the closure has one or more external projections that puncture or weaken an outer foil cover extending beyond the edge of the closure to lie against the wall of the container on rotation of the closure.

11. A container closure according to claim 10 characterised by having a top portion that seals against the rim of a container mouth, and a skirt portion which descends around the neck toward the base of the container carrying threads or cam surfaces that engage complementary threads or surfaces on the container neck surrounding the discharge mouth, characterised in that the skirt portion has one or more radially outwardly extending projections, preferably a plurality of projections lying on a common circumferential circle.

12. A container according to any one of claims 1 to 8 characterised in that a threaded adapter is fitted around the neck of the container, and the threads on the closure engage with the threads on the adapter.

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