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LINERLESS SCREW CLOSURE FOR CONTAINERS

Filed Jan. 13, 1964

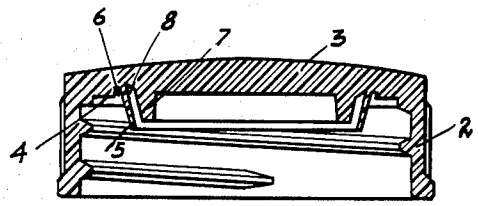


Fig. 1.

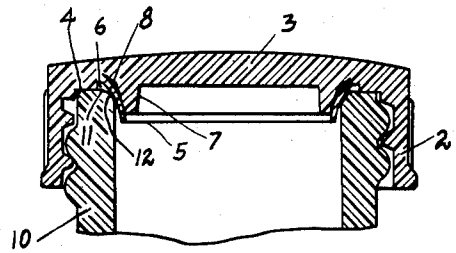


Fig. 2.

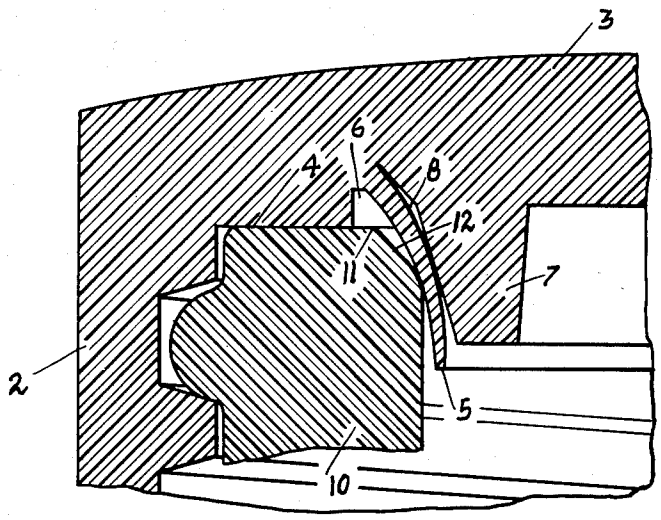


Fig. 3.

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LINERLESS SCREW CLOSURE FOR CONTAINERS

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2 Claims. (Cl. 215—40)

This invention is for a linerless screw closure cap or closure for use on bottles or similar containers for liquids, including liquids having aromatic or vaporizable ingredients. It constitutes an improvement in the closure cap shown in my copending application Serial No. 7,571, filed February 9, 1960.

Bottle closures which are internally threaded to screw onto the neck of a bottle are widely used in the packaging of various liquids, including cosmetics, vegetable oils, and vinegar, drugs and household preparations of various kinds. They are commonly formed of plastic and require an insert or liner in the inside of the top of the cap to form a tight seal against the ends of the bottles to which they are applied.

In my copending application above referred to, there is disclosed a linerless closure having a threaded skirt of usual construction, and an inner end wall having a relatively stiff annular flange or abutment projecting therefrom concentric with the center of the cap. Spaced from the abutment and the skirt and concentric therewith is an integral relatively thin flexible annular sealing flap that slopes from the inner end face of the cap inwardly toward the center of the cap. As the cap is screwed onto the bottle, this flap is engaged against the inner end wall of the bottle neck and flexed toward the abutment to form a tight seal with the inner edge of the neck of the bottle. While this is satisfactory for use on certain sizes and styles of bottles, especially those having a small central opening through which the liquid in the bottle is discharged by shaking the bottle, there are certain bottles, particularly the larger sizes, where the flap tends to buckle or wrinkle so that it does not form with uniformly predictable results a satisfactory seal, or cocks the cap on the bottle at an angle.

This has presented a baffling problem and the present invention is directed toward an improvement to overcome this objection and secure uniformly successful sealing of all bottles made to the proper dimensions within acceptable tolerances.

In this type of closure with a sealing flap as above described, there is a flat area around the base of the flap against which the end of the bottle neck seats. I have discovered that if there is a small annular groove between the base of the flap and this seating area, the flap will fold inwardly smoothly and firmly to form a liquid and vapor-tight seal.

This invention may be more fully understood by reference to the accompanying drawings, in which:

FIG. 1 is a transverse section through a closure cap embodying the invention;

FIG. 2 is a similar view showing the cap applied to a bottle; and

FIG. 3 is a fragmentary view on a larger scale showing a portion of the cap in vertical section applied to a neck portion of a bottle.

In the drawings, 2 designates the internally-threaded skirt portion of a closure cap formed from a plastic material such as polyethylene or like substance that may be molded, but thin sections of which are pliable or resilient. The end wall of the closure cap is designated 3. The external contour of the closure may take many different shapes and forms. This invention is concerned with the interior construction of the cap. On the inside of the end wall of the cap where the skirt and end wall merge, there is a flattened countersunk annular seat 4 adapted to contact the end wall of a bottle onto which the closure is screwed. Concentrically within this annular seat is an annular flap 5 that slopes from its base to its depending free edge so that it decreases uniformly in diameter from the base to its free edge. It also tapers slightly in thickness from its base to its free edge.

Important to this invention is the provision of a narrow, shallow annular groove 6 between the seat area 4 and the base of the flap 5. A depth and width of groove about equal to or even less than the thickness of the flap is adequate, and the thickness of the flap should be such that it may flex under pressure and resume its original shape upon release of pressure. For example, in the typical cap here shown the thickness of the flap at the base is about .0235"; the groove is about .030" in depth, with a width of .010", but these dimensions will of course vary as molding techniques and cap sizes vary.

Spaced inwardly from the flap 5 and concentric therewith is an annular rib 7 which is separated from the base of the flap by an annular groove 8. The rib or flange 7 is so located that under proper conditions the flap may be forced into contact with the abutment rib 7 to press more firmly against the inner edge of the bottle neck as the closure cap is screwed onto the bottle.

This is clearly seen in FIGS. 2 and 3 where the neck of a bottle is designated 10. It is exteriorly threaded and has a flat or nearly flat end face 11 that bears against the seat 4. The inner edge of the bottle neck is rounded or chamfered at 12, and this surface presses against the flap 5, tending to force it inwardly and toward the inner end wall of the cap. The inherent resilience of the flap may provide adequate sealing pressure, but by providing the abutment rib 7, the sealing action may become more effective, since it tends to confine the flap between the interior of the bottle neck and the abutment flange.

By having the grooves 6 and 8 deeper than the seating surface 4, and particularly by having the groove 6 between the seating surface and the flap, the flap will fold inwardly under pressure from the bottle neck without buckling or wrinkling, and without causing the cap to cock toward one side or another, so that a substantial objection to the use of the cap on all properly contoured containers is overcome.

I claim:

1. A screw closure cap for containers having an internally-threaded skirt portion and an integral end wall having an inner face surrounded by the skirt portion, said inner face having a flat annular seating surface around the interior thereof where the skirt and end wall join and against which the end of a container onto which the closure is screwed will seat, said inner face also having an annular integral bendable flap thereon concentrically positioned within said seating surface projecting into the interior of the cap and sloped from its base toward the center of the cap, the flap being separated from the seat

by an annular groove formed in the end wall of the cap betwen the flap and said seating surface.

2. A screw closure cap as defined in claim 1 wherein there is an annular abutment ridge on the inner face of the cap concentrically positioned within the flap and against which the flap may fold when it is pressed by a container onto which the closure is screwed, there being an annular groove between the base of the flap and the base of the ridge of substantially the same depth as the groove between the flap and the surrounding seating surface.

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