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E. M. ENKUR

2,403,511

CONTAINER CLOSURE

Filed Feb. 19, 1943

FIG. 1.

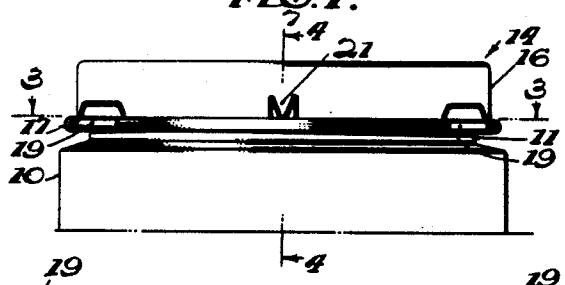


FIG. 2.

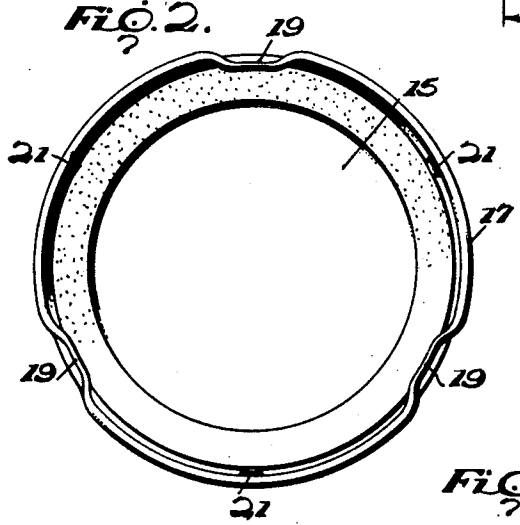


FIG. 3.

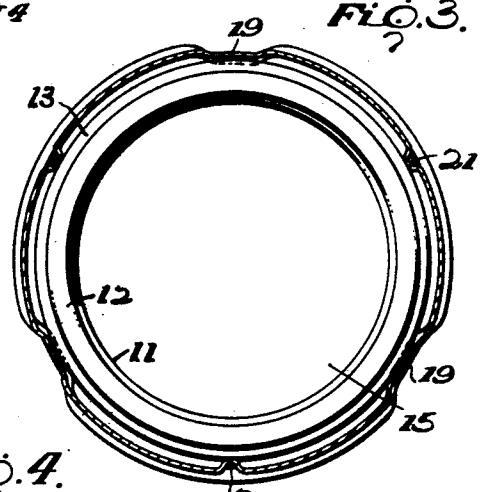


FIG. 4.

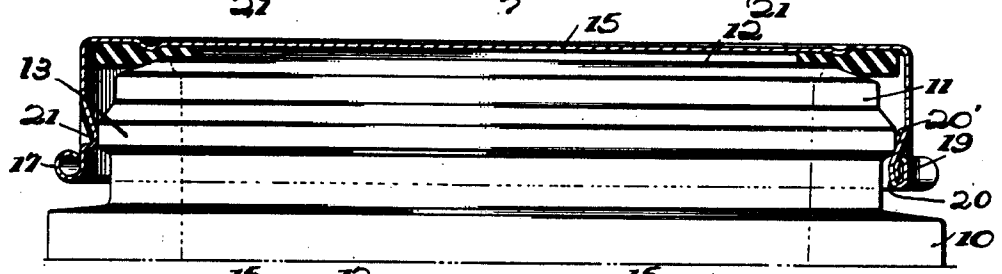


FIG. 5.

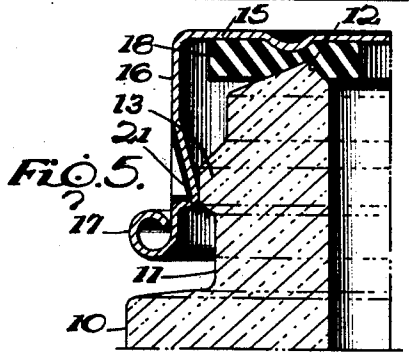
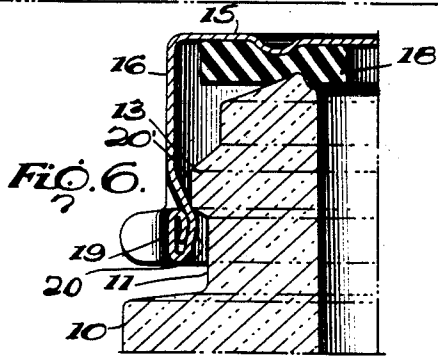


FIG. 6.



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CONTAINER CLOSURE

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Application February 19, 1943, Serial No. 476,447

8 Claims. (Cl. 215—38)

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This invention relates to container caps designed for snap-on and pry-off coaction with the continuous rigid locking rings of containers and is an improvement on the cap of this type disclosed in the patent to Stewart, No. 2,109,805, issued March 1, 1938.

According to the said patent to Stewart, the cap has a skirt of substantially greater inner diameter than external diameter of the locking ring and the skirt is provided with a number, six being shown, of equally spaced lugs. When the cap is applied or removed, the skirt portions between the lugs, due to the excess diameter of the skirt, tend to straighten as the lugs ride over the locking ring, and in this manner any substantial deformation of the lugs is prevented so that the cap can be removed and reapplied indefinitely and still afford an efficient reseal. It has been found that with a six lug arrangement the cap is rather difficult to remove in view of the fact that in the pry-off operation the lugs at the sides of the point where the pry-off force is applied tend to be pulled under the locking ring. When a fewer number of lugs, for example three, are provided, this removal difficulty is averted but the long arcs between the widely spaced lugs permit the skirt of the cap to bulge at the locations of the lugs so that the locking effect is impaired. The lugs have a wedging engagement under the locking ring with a consequent outward radial force component which is not sufficiently resisted by the long arcs of the skirt to maintain an adequate locking effect. The main purpose of the present invention is to overcome this difficulty, providing a cap which locks efficiently and yet which is readily removable. How this object may be accomplished is shown by way of example in the accompanying drawing to which reference will now be made.

In the drawing:

Figure 1 is an elevation of the upper portion of a jar equipped with a cap in accordance with the invention.

Figure 2 is a bottom plan view of the cap of Figure 4.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is an enlarged section of the cap on line 4—4 of Figure 1, the upper portion of the jar being shown in elevation.

Figure 5 is an enlarged section in an axial plane of a portion of the cap and container, and

Figure 6 is an enlarged section on a different axial plane of the cap and container.

Referring to the drawing, the jar 10 has a mouth defined by a portion 11 of circular cross

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section, the said portion including a lip 12 and an external continuous locking ring 13.

The sheet metal cap 14 has a circular top portion 15 and a cylindrical skirt portion 16 provided at its bottom with a continuous outwardly curled edge 17. The skirt portion has an internal diameter substantially greater than the diameter of the locking ring, just as disclosed in the said Stewart patent. A circular gasket 18 of compressible material such as rubber is adhered to the bottom surface of the cap top in position to engage the lip 12 when the cap is applied.

Formed in the edge 17 are three equi-distantly spaced locking lugs 19, these lugs having lower portions 20 in the curled edge 17 which incline gradually downwardly and outwardly relative to the inner surface of the skirt above said edge and have upper portions 20' which incline gradually outwardly and upwardly relative to said inner surface and merge into the latter a distance above said edge. These lower and upper portions of the lugs afford a shoehorn effect in the cap applying and removing operations, respectively, easing the innermost portions of the lugs past the locking ring in either direction. If the thus constituted cap is applied to the container the portions between the lugs straighten somewhat, as permitted by the clearance between the skirt and the locking ring, as the lugs move across the locking ring. As the inclines 20' move under the locking ring, the arcuate portions of the skirt between the lugs attempt to return, but in view of the wedging engagement of the inclines with the ring, there is a rather powerful radially outward component which prevents the full return of the skirt and consequently the lugs do not move sufficiently under the ring against the resistance to compression offered by the gasket 18.

To overcome this difficulty I provide the skirt 16 above edge 17 with three indentations 21, one substantially midway between each adjacent pair of lugs. As is most clearly shown in Figures 4 and 5, these indentations merely bear against the periphery of the locking ring and do not engage thereunder and are consequently without locking effect. Their extent of inward projection is substantially equal to the difference between the radius of the locking ring and the inner radius of the cap and consequently when the cap is applied the normal radius of the cap skirt is maintained on the radii which include the indentations. Therefore, instead of a single relatively long arc between each two lugs, there are two shorter arcs up to each indentation and these, of course, have a substantially greater re-

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distance to straightening than the long arc would have. As a result, the lugs are forced further under the locking ring and the gasket is adequately compressed so as to insure an effective seal. The indentations offer no resistance to the removal of the cap except insofar as at the start of the removal operation they resist flexing of the full arcs between the lugs. In the illustrated relationship, the indentations are substantially entirely above the lower surface of the locking ring and thus quickly pass above the ring during the removal operation. In other words, the lower ends of the indentations are directed toward the skirt from just below their points of engagement with the locking rings. The extent of inward projection of the indentations is figured on the basis of the minimum tolerance in the locking ring. When a maximum tolerance is encountered the indentations are merely somewhat flattened out and perform their sustaining function as before.

Thus, in accordance with the invention only a few, and at least three, locking lugs are used, and supporting indentations for cooperation with the locking ring are provided between the lugs. In a cap of the size illustrated the number of lugs is limited to three and a single indentation is provided between each pair of lugs. A larger number of lugs and indentations can be provided, particularly in larger caps, but for the best results in general, the illustrated lug and indentation arrangement is used.

It will be understood that the invention extends to such variations of the described features as come within the following claims.

I claim:

1. A snap-on and pry-off cap including a top and a resilient substantially cylindrical skirt depending from said top and including a continuous curled bottom edge, said skirt being provided with a small number, at least three, of circumferentially spaced inwardly projecting lugs having upper portions which incline gradually outwardly and upwardly relative to the inner surface of the skirt above said edge and merge into said surface a distance above said edge and having lower portions in said edge inclined gradually downwardly and outwardly relative to said inner surface, said lugs being engageable under a container locking ring of substantially less maximum diameter than the maximum inside skirt diameter when the cap is applied, said lower and upper portions affording a shoehorn effect in the cap applying and removing operations respectively, and inwardly projecting indentations in said skirt above said edge between lugs adapted when the cap is applied to bear against the periphery of such a locking ring, without engaging thereunder, so as to substantially maintain the normal skirt radius on the radii which include said indentations.

2. A cap according to claim 1 wherein the number of lugs in the skirt is limited to three in substantially equally spaced relation, and wherein the number of indentations is also limited to three with one indentation disposed substantially midway between each two of the lugs.

3. A snap-on and pry-off cap including a top and a resilient substantially cylindrical skirt depending from said top and including a continuous curled bottom edge, said skirt being provided with a small number, at least three, of circumferentially spaced inwardly projecting lugs having upper portions which incline gradually out-

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wardly and upwardly relative to the inner surface of the skirt above said edge and merge into said surface a distance above said edge and having lower portions in said edge inclined gradually downwardly and outwardly relative to said inner surface, said lugs being engageable under a container locking ring of substantially less maximum diameter than the maximum inside skirt diameter when the cap is applied, said lower and upper portions affording a shoehorn effect in the cap applying and removing operations respectively, and an inwardly projecting indentation in said skirt above said edge between each two of said lugs adapted when the cap is applied to bear against the periphery of such a locking ring, without engaging thereunder, so as to substantially maintain the normal skirt radius on the radii which include said indentations, said indentations being so disposed in the skirt that upon application of the cap the indentations each terminate downwardly just below their point of engagement with the locking ring.

4. A cap according to claim 3 wherein the number of lugs in the skirt is limited to three in substantially equally spaced relation, and wherein the number of indentations is also limited to three with one indentation disposed substantially midway between each two of the lugs.

5. The combination with a container having a portion defining a mouth terminating in a lip, said portion including a rigid continuous external locking ring, a snap-on and pry-off cap including a top and a resilient substantially cylindrical skirt depending from said top and having a continuous curled bottom edge, a gasket in said cap, said skirt being provided with a small number, at least three, of circumferentially spaced inwardly projecting lugs having upper portions which incline gradually outwardly and upwardly relative to the inner surface of the skirt above said edge and merge into said surface a distance above said edge and having lower portions in said edge inclined gradually downwardly and outwardly relative to said inner surface, said lugs being engaged under said ring with a wedging effect so that a continuing axial tension is exerted on said skirt whereby to compress said gasket between said top and the container lip, the internal diameter of said skirt being substantially greater than the maximum diameter of said locking ring, said lower and upper portions affording a shoehorn effect in the cap applying and removing operations respectively, and inwardly projecting indentations in said skirt above said edge between lugs adapted when the cap is applied to bear against the periphery of said locking ring, without engaging thereunder, so as to substantially maintain the normal skirt radius on the radii which include said indentations.

6. The combination according to claim 5, wherein the number of lugs is limited to three in substantially equally spaced relation, and wherein the number of indentations is also limited to three with one indentation disposed substantially midway between each two of the lugs.

7. The combination with a container having a portion defining a mouth terminating in a lip, said portion including a rigid continuous external locking ring, a snap-on and pry-off cap including a top and a resilient substantially cylindrical skirt depending from said top and having a continuous curled bottom edge, a gasket in said cap, said skirt being provided with a small number, at least three, of circumferentially spaced inwardly

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projecting lugs having upper portions which incline gradually outwardly and upwardly relative to the inner surface of the skirt above said edge and merge into said surface a distance above said edge and having lower portions in said edge inclined gradually downwardly and outwardly relative to said inner surface, said lugs being engaged under said ring with a wedging effect so that a continuing axial tension is exerted on said skirt whereby to compress said gasket between said top and the container lip, the internal diameter of said skirt being substantially greater than the maximum diameter of said locking ring, said lower and upper portions affording a shoehorn effect in the cap applying and removing operations, respectively, and an inwardly projecting indentation in said skirt above said edge between

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each two of said lugs adapted when the cap is applied to bear against the periphery of said locking ring, without engaging thereunder, so as to substantially maintain the normal skirt radius on the radii which include said indentations, said indentations being so disposed in the skirt that upon application of the cap the indentations each terminate downwardly just below their point of engagement with the locking ring.

- 10 8. The combination according to claim 7 wherein the number of lugs is limited to three in substantially equally spaced relation, and wherein the number of indentations is also limited to three with one indentation disposed substantially midway between each two of the lugs.
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