

# PATENT SPECIFICATION

DRAWINGS ATTACHED

1.187.508

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## COMPLETE SPECIFICATION

### Improvements relating to Closure Caps for Containers

We, AMERICAN FLANGE & MANUFACTURING CO. INC., of 30 Rockefeller Plaza, New York, New York 10020, United States of America, a corporation organised under the laws of the State of Delaware, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to hand-removable closure caps for containers with caps which are made of light-weight metal such as aluminium and are removed by tearing and which are provided with a ring shaped tearing ear adapted for reception of a person's finger to facilitate removal.

According to the invention, there is provided a hand-removable light weight metal closure cap comprising a disc-like top portion, a depending skirt therearound terminating in a substantially circular free edge, a pair of weakened tearing lines extending across said cap skirt and into said cap top portion, said lines defining a portion of a tear strip therebetween forming an integral part of said cap skirt and top portion, said tear strip being continuous radially outwardly away from said skirt and having its lower end formed into a ring shaped tearing ear, said ear being formed from the material of the tear strip and comprising a base panel commencing in a neck portion which is a continuation of said portion of the tear strip and merging into an annular base panel portion, a major portion of the outer periphery of said annular base panel portion being curled downwardly and terminating in a radially inwardly extending fold portion, and the inner periphery of said annular base panel portion being curled downwardly and terminating in a radially outwardly extending fold portion.

Although the art of scoring lightweight metal closure caps to facilitate easy hand re-

moval by tearing has been developed to a high degree, there still exist certain conditions under which difficulty may be encountered in removing the cap by means of a force applied through one's fingers to a simple gripping area. In order to overcome any possible inconvenience in such removal it has already been proposed to provide a ring shaped gripping each which would enable one to positively grip the ear, through insertion of a single finger, and exert a pulling force far in excess of that possible with a conventional imperforate gripping ear and with far greater ease than the finger pinching action needed to pull an imperforate ear allows.

Going a step further, it has been found that a number of factors must be considered respecting the specific ring formation. The elimination of any sharp protruding edges is essential to avoid the possibility of injury. The ring must be rigid enough to withstand the abuse of normal handling without distorting. It is also important that there be sufficient body in the ring formation to avoid any discomfort when a substantial finger applied pulling force is exerted. A formation which is not readily susceptible to collecting dirt and other foreign matter is desirable as such caps are commonly employed in the beverage field where cleanliness is essential. These and other factors, including of course, material and manufacturing cost, have been advantageously provided for in the cap of the invention.

An embodiment of the invention will now be described by way of an example and with reference to the accompanying drawing, in which:

Figure 1 is a top plan view of the closure cap in accordance with the invention;

Figure 2 is a vertical elevational view thereof;

Figure 3 is a bottom plan view of the ring shaped tearing ear taken on lines 3—3 of

[Price 5s. 0d.]

Figure 2 and looking in the direction of the arrows;

Figure 4 is a vertical section taken on lines 4—4 of Figure 3 and looking in the direction of the arrows; and

Figure 5 is a vertical section taken on line 5—5 of Figure 3 and looking in the direction of the arrows.

The closure cap of the invention, as shown in Figures 1 and 2, is formed out of light-weight sheet metal and comprises a disc-like top portion 1 having a cylindrical skirt 2 depending therefrom and terminating in a substantially circular free edge 2a. Integrally formed within the top 1 and skirt 2 of the cap is a portion of a tear strip 3 which portion is defined by a pair of tearing lines 4 and 5 weakened for that purpose by scoring. The tearing strip 3, as seen in Figure 2, extends downwardly beyond the free edge 2a to form a short extension 6 of the skirt 2 and is bordered on either side at its departure from the skirt by an inverted V-shaped notch 7 which aids in the accurate commencement of the tearing of the tear strip at the point where the tear strip joins the cap skirt. Extending radially outwardly and downwardly at an angle of approximately 15 degrees is a ring shaped tearing ear generally indicated by the numeral 10. The ring configuration is formed in a base panel extending away from the skirt extension 6 in a flat neck portion 11 which in turn merges into an annular base panel portion 12 having a convexly curved upper surface as seen in Figure 4.

Referring particularly to Figures 3 and 4 it can be seen that throughout a major part of the outer periphery of the ring the base panel portion 12 is curled downwardly and radially inwardly at 13. Extending from the outer curled edge 13 is an inner radially inwardly extending fold portion 14 terminating in a radially inwardly facing free edge 15. The fold portion 14 terminates in side edges 17 where the base panel portion 12 blends into neck portion 11. The side edges 17 join the inwardly facing edge 15 at the arcuately shaped corners 17a. In Figure 3 it can be seen that not only do the sides 11a of the neck portion 11 blend into the annular portion 12, as indicated at 16, along a gradually curved line but in addition the side edges 17 of the inner fold portion 14 form a wide angle with the side edge 11a. The specific formation above described reduces to a minimum the possibility of cutting one's finger on either the side edges 17 or the juncture of the side edge 11a with the outer curled edge 13 during removal of the cap from a container.

Throughout the major portion of the inner periphery of the ring 10 the annular base panel portion 12 is curled downwardly and radially outwardly at 18 forming the inner peripheral edge of the ring. Extending radially outwardly from the inner curled edge

18 is an outer fold portion 19 terminating in a radially outwardly facing free edge 20. The inner curled edge 18 is of larger radius than the outer curled edge 13 so that the outer fold portion 19 overlies a portion of the inner fold portion 14 and is slightly spaced therefrom. Here again the likelihood of injury is minimized by having the free edge 15, and the corners 17a covered by the outer fold portion 19 so that the pulling force is not exerted against a metal edge. Furthermore the larger radius of the curved edge 18 provides a surface against which a substantial pulling force may be exerted with relative ease and comfort.

Referring particularly to Figures 3 and 5 it can be seen that in the area of the neck portion 11 the part of the outer fold portion, indicated by numeral 19a, extending between the side edges 17 is curled against the neck portion 11 with free edge 20a pressed against the neck portion 11 resulting in a more tightly curled edge 18a in this area. This construction eliminates any protruding metal edge upon which injury might be sustained.

From the foregoing it is apparent that the ring pull cap of the invention has distinct advantages over prior art constructions in that the ring is completely void of any protruding metal edges which could if present result in a cut finger upon removal of the cap. The improved form of the ring provides sufficient rigidity and strength to prevent damage or undue distortion thereof either during mechanical handling of the cap prior to application or during removal. In addition the ring form has sufficient bulk to enable a substantial pull to be exerted thereon without discomfort. At the same time the ring form has its inner void space, indicated by numeral 21 in Figure 4, sufficiently closed off so as to prevent the accumulation of dirt therein.

#### WHAT WE CLAIM IS:—

1. A hand-removable light-weight metal closure cap comprising a disc-like top portion, a depending skirt therearound terminating in a substantially circular free edge, a pair of weakened tearing lines extending across said cap skirt and into said cap top portion, said lines defining a portion of a tear strip therebetween forming an integral part of said cap skirt and top portion, said tear strip being continuous radially outwardly away from said skirt and having its lower end formed into a ring shaped tearing ear, said ear being formed from the material of the tear strip and comprising a base panel commencing in a neck portion which is a continuation of said portion of the tear strip and merging into an annular base panel portion, a major portion of the outer periphery of said annular base panel portion being curled downwardly and terminating in a radially inwardly extending fold portion, and the inner



Figure 2 and looking in the direction of the arrows;

Figure 4 is a vertical section taken on lines 4—4 of Figure 3 and looking in the direction of the arrows; and

Figure 5 is a vertical section taken on line 5—5 of Figure 3 and looking in the direction of the arrows.

The closure cap of the invention, as shown in Figures 1 and 2, is formed out of light-weight sheet metal and comprises a disc-like top portion 1 having a cylindrical skirt 2 depending therefrom and terminating in a substantially circular free edge 2a. Integrally formed within the top 1 and skirt 2 of the cap is a portion of a tear strip 3 which portion is defined by a pair of tearing lines 4 and 5 weakened for that purpose by scoring. The tearing strip 3, as seen in Figure 2, extends downwardly beyond the free edge 2a to form a short extension 6 of the skirt 2 and is bordered on either side at its departure from the skirt by an inverted V-shaped notch 7 which aids in the accurate commencement of the tearing of the tear strip at the point where the tear strip joins the cap skirt. Extending radially outwardly and downwardly at an angle of approximately 15 degrees is a ring shaped tearing ear generally indicated by the numeral 10. The ring configuration is formed in a base panel extending away from the skirt extension 6 in a flat neck portion 11 which in turn merges into an annular base panel portion 12 having a convexly curved upper surface as seen in Figure 4.

Referring particularly to Figures 3 and 4 it can be seen that throughout a major part of the outer periphery of the ring the base panel portion 12 is curled downwardly and radially inwardly at 13. Extending from the outer curled edge 13 is an inner radially inwardly extending fold portion 14 terminating in a radially inwardly facing free edge 15. The fold portion 14 terminates in side edges 17 where the base panel portion 12 blends into neck portion 11. The side edges 17 join the inwardly facing edge 15 at the arcuately shaped corners 17a. In Figure 3 it can be seen that not only do the sides 11a of the neck portion 11 blend into the annular portion 12, as indicated at 16, along a gradually curved line but in addition the side edges 17 of the inner fold portion 14 form a wide angle with the side edge 11a. The specific formation above described reduces to a minimum the possibility of cutting one's finger on either the side edges 17 or the juncture of the side edge 11a with the outer curled edge 13 during removal of the cap from a container.

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Referring particularly to Figures 3 and 5 it can be seen that in the area of the neck portion 11 the part of the outer fold portion, indicated by numeral 19a, extending between the side edges 17 is curled against the neck portion 11 with free edge 20a pressed against the neck portion 11 resulting in a more tightly curled edge 18a in this area. This construction eliminates any protruding metal edge upon which injury might be sustained.

From the foregoing it is apparent that the ring pull cap of the invention has distinct advantages over prior art constructions in that the ring is completely void of any protruding metal edges which could if present result in a cut finger upon removal of the cap. The improved form of the ring provides sufficient rigidity and strength to prevent damage or undue distortion thereof either during mechanical handling of the cap prior to application or during removal. In addition the ring form has sufficient bulk to enable a substantial pull to be exerted thereon without discomfort. At the same time the ring form has its inner void space, indicated by numeral 21 in Figure 4, sufficiently closed off so as to prevent the accumulation of dirt therein.

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1. A hand-removable light-weight metal closure cap comprising a disc-like top portion, a depending skirt therearound terminating in a substantially circular free edge, a pair of weakened tearing lines extending across said cap skirt and into said cap top portion, said lines defining a portion of a tear strip therebetween forming an integral part of said cap skirt and top portion, said tear strip being continuous radially outwardly away from said skirt and having its lower end formed into a ring shaped tearing ear, said ear being formed from the material of the tear strip and comprising a base panel commencing in a neck portion which is a continuation of said portion of the tear strip and merging into an annular base panel portion, a major portion of the outer periphery of said annular base panel portion being curled downwardly and terminating in a radially inwardly extending fold portion, and the inner

periphery of said annular base panel portion being curled downwardly and terminating in a radially outwardly extending fold portion.

2. A closure cap as in claim 1 wherein said ring shaped tearing ear is dimensioned to snugly receive a single human finger.

3. A closure cap as in claim 1 wherein the portion of the inner periphery of said annular base panel portion adjacent said neck portion is curled about a smaller radius than the remainder of the inner periphery of said annular base panel portion.

4. A closure cap as in claim 1 wherein said radially inwardly extending fold portion is vertically spaced from said radially outwardly extending fold portion.

5. A closure cap as in claim 1 wherein said radially inwardly extending fold portion

and said radially outwardly extending fold portion are overlapped in a radial direction. 20

6. A closure cap as in claim 1 wherein the portion of said radially outwardly extending fold portion underlying said neck portion terminates in its radial extent at a position closely adjacent said neck portion. 25

7. A hand-removable closure cap substantially as hereinbefore described with reference to the accompanying drawing.

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