April 24, 1934. G. W. BOOTH 1,956,215

CONTAINER CLOSURE

Original Filed Nov. 26, 1932 2 Sheets-Sheet 1

Fig. 1.

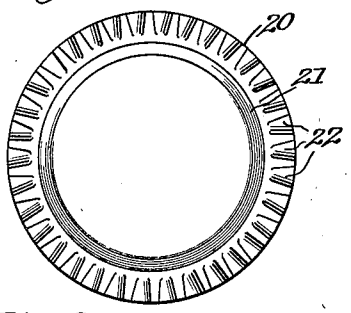


Fig. 2.



Fig. 3.

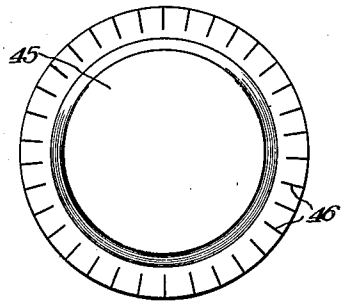


Fig. 4.

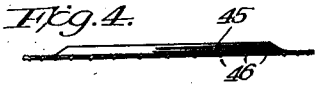


Fig. 5.

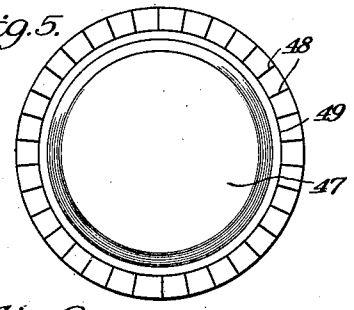


Fig. 6.



Fig. 7.

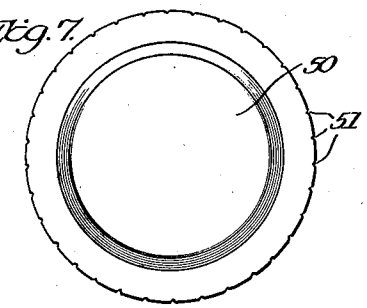


Fig. 8.

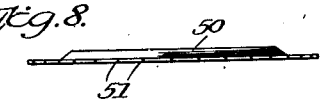


Fig. 9.

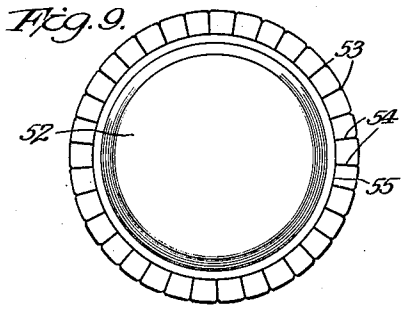


Fig. 10.

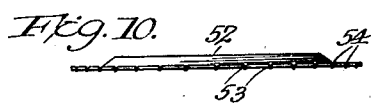


Fig. 11.

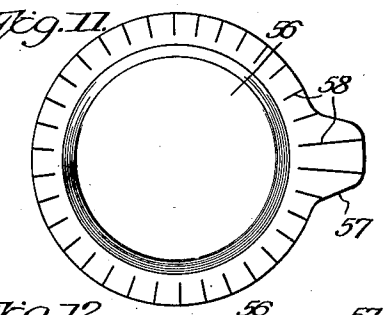


Fig. 12.



Inventor

George W. Booth.

By Cushman Darby & Cushman

Attorneys

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Fig. 13.

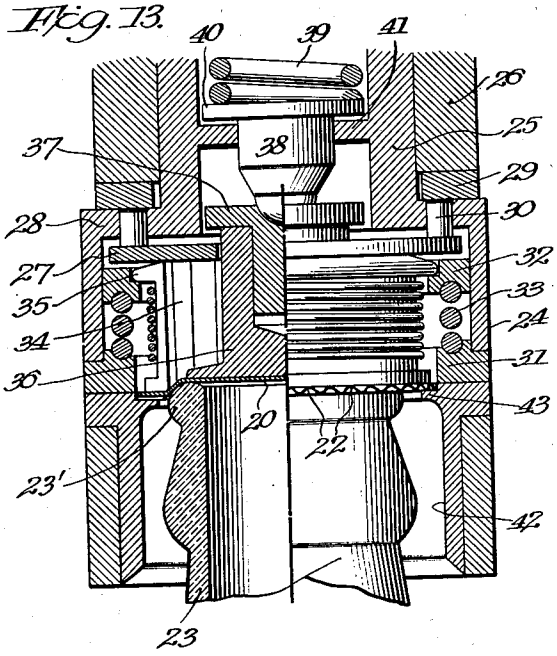


Fig. 15.

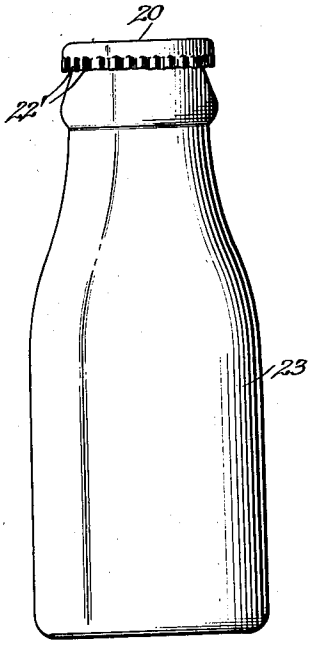
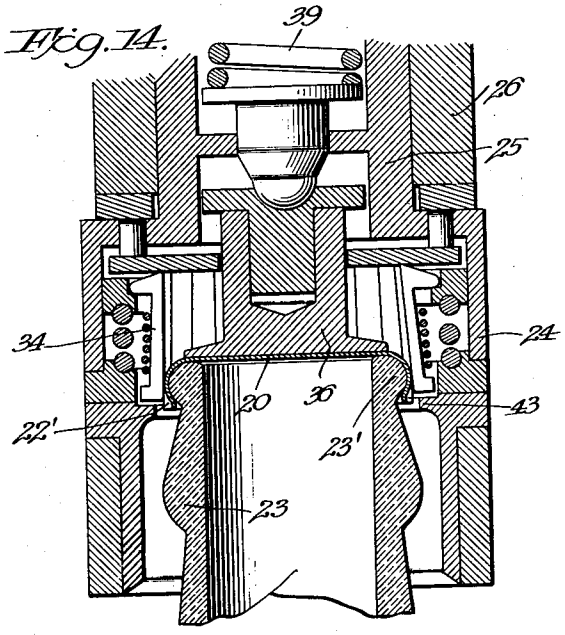


Fig. 14.



Inventor

George W. Booth.

By Cushman Darby & Cushman

Attorneys

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UNITED STATES PATENT OFFICE

1,956,215

CONTAINER CLOSURE

George W. Booth, Baltimore, Md., assignor to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Original application November 26, 1932, Serial No. 644,529. Divided and this application April 29, 1933, Serial No. 688,659

10 Claims. (Cl. 215—39)

The present invention relates to modifications in closures of the type described in my copending United States application Serial No. 553,464, filed July 27, 1931, and in my copending application Serial No. 702,263 filed December 13, 1933 as a continuation of my original application Serial No. 553,463, filed July 27, 1931.

Broadly speaking, whereas the closures of the said applications are generally characterized in use by an irregularly crimped locking band, the present invention contemplates principally a closure characterized by a relatively regularly crimped locking band. To this end, the closure discs of the present invention have their marginal portions deformed in original manufacture or in a supplemental manufacturing step so that the locking crimps take place along prescribed lines. Deformation of the marginal portion of the closures is accomplished in any suitable manner as by bending or weakening at predetermined circumferential intervals and accordingly the words "deformed" or "deformations" will be used hereinafter with broad significance. The cap as applied has an improved appearance by reason of the regularly spaced locking crimps and these, as affording a uniform circumferential locking effect, are mechanically advantageous, especially in the sealing of pressure fluids.

The present application is a division of my copending United States application Serial No. 644,529, filed November 26, 1932.

In the accompanying drawings, I have shown illustrative embodiments of the invention and the description of the invention will be made with reference to these drawings wherein,

Figure 1 is a plan view of one form of closure contemplated under the present invention, Figure 2 being an elevation of the same closure;

Figure 3 is a plan view of a modified form of closure, Figure 4 being an elevation of the same;

Figure 5 is a plan view of a further modified form of closure, Figure 6 being an elevation thereof;

Figure 7 is a plan view of a further modified form of closure, Figure 8 being an elevation thereof;

Figure 9 is a plan view of a further modified form of closure, Figure 10 being an elevation thereof;

Figure 11 is a plan view of a still further form of closure, Figure 12 showing the same in elevation;

Figure 13 is an axial section through a capping head, a container neck and a closure disc in initial capping position, the disc shown being that of Figures 1 and 2;

Figure 14 is an axial section similar to that of Figure 13, but showing the parts at the end of the capping operation; and

Figure 15 shows the disc of Figure 1 as applied to a container.

Referring first to Figures 1 and 2, reference numeral 20 designates a circular substantially flat closure disc of ductile material, ordinarily metal. As here shown, the disc is single ply and its central portion is slightly upwardly offset to leave an annular marginal portion. In other words, while the disc may be said to be substantially flat, it is preferably formed as shown in Figures 1 and 2, with a central portion and a marginal portion separated by a slight shoulder 21. When the cap is fed over the mouth of the container to rest on the bead thereof, the inner surfaces of the shoulder engage the top external portion of the bead to center the closure thereon.

It should be stated here that the exact make-up of the disc, except for the features to be hereinafter emphasized, is immaterial, so far as the present invention is concerned, and it may be single ply as shown, or may be provided with one or more plies of gasket or protective material, which may be of overall or less than overall extent. Further, the disc may be entirely flat, if desired.

The marginal portion of disc 20 is provided with flutes or corrugations 22 in an operation prior to the capping operation. The flutes or corrugations may be formed in the original punching operation or in a subsequent operation and they may not necessarily be of even as pronounced a nature as those shown.

In Figure 13, disc 20 is shown centered on the bead of a bottle 23 for application by means of apparatus of the nature shown in the copending application of Huntley and Rau, Serial No. 622,154, filed July 12, 1932. This apparatus comprises a capping head 24 carried by a neck 25, which in turn is mounted in a support 26, upward displacement of the neck relative to the support 26 being provided for. In Figure 13, this relative upward displacement is assumed to have taken place.

An annulus 27 is positioned in the head beneath the top wall 28 thereof and is secured to an external annulus 29 by means of studs 30 slidable in apertures in wall 28. Interposed between a fixed flange or seat 31 and a superposed slidable ring 32 is a compression spring 33.

A throat 34 has a top annular rib 35 supported

on a ledge formed on ring 32, spring 33 normally holding the top edge of the throat against annulus 27 and thereby holding the latter against the lower surface of wall 28.

A presser tool 36 is arranged coaxially with throat 34 and is supported, normally, on annulus 27 by means of a cap 37, the latter being engaged by the globular extremity of a stud 38 which is urged downwardly by a compression spring 39, downward movement of the stud being limited by the abutment of its head 40 with a rib 41 formed in the neck.

The head 24 also includes a sleeve-like element 42 which, at its top, has an inwardly projecting annular ledge 43 below the outer portion of the bottom surface of throat 34.

Elements 34 and 43 are generally the same as shown in the copending application of Huntley and Rau above mentioned and consequently, need not be described at length here.

In Figure 13, a disc 20 is assumed to have been fed onto ledge 43 to be supported thereby and the bottle 23 is supported in coaxial relation to head 24 beneath the disc. The mouth of the bottle 23 has the usual bead 23' which has a top exterior surface outwardly convexed, that is, of increasing diameter from its top to its line or plane of maximum circumference, the bead presenting a shoulder below this line.

Upon relative movement of the support 26 and container 23 to approach them coaxially, and assuming that the support is being moved downwardly, the cap 20 comes to rest on top of the bead, as shown in Figure 13, and is centered thereon by reason of its central offset portion. The presser tool 36 resting on the cap holds the latter firmly on the bead and prevents further downward movement of the head with the support so that the support now moves downwardly relative to neck 25, eventually striking annulus 29 and lowering annulus 27 and therewith throat 34 to the position shown. This movement of the throat toward the ledge should be slightly less than that contemplated in the above mentioned application of Huntley and Rau, since the fluted margin of the cap must not be crushed between the lower edge of the throat and the ledge. This shortened movement can be readily brought about by making studs 30 of the proper length.

From the above description, it will be understood that at the time the cap 20 is fed onto ledge 43, and above the container mouth, spring 33 is holding the throat in its uppermost position relative to head 24 wherein annulus 27 bears against the lower face of wall 28. Thus, sufficient clearance is present below the throat to permit the feeding of the cap. It is only upon initiation of the operation that the throat 34 takes the position, as has been mentioned, it does not compress the edge of the disc between itself and the ledge but merely assumes a position relative to the ledge such that upon continuation of the downward movement of the support, the marginal portion of the disc is ironed and drawn over the bead and readily slides from between the throat and ledge under the control thereof.

As the downward movement of the support 26 continues, the head finally comes to the position shown in Figure 14. As here shown, the lower inner edge of the throat has passed somewhat below the plane of maximum circumference of the bead so that the cap has been smoothly conformed, through the ironing and drawing action of the throat, to the upper external surface of the bead and has taken a natural locking crimp beneath the bead.

The capped container is shown in Figure 15, and as will be noted, the locking crimps are regular circumferentially of the cap, this regularity being prescribed by the flutes 22 which have become the more sharply defined crimps 22'. Preferably, the flutes extend radially inwardly of the closure margin only to such an extent as to be confined outwardly of the circle which comes to lie in the plane of maximum diameter of the bead upon application of the closure. However, if the flutes extend inwardly beyond this circle, such inner portions are ironed and drawn smooth during the capping operation.

The throat shown in Figures 13 and 14 is of a somewhat greater diameter relative to the maximum diameter of the bead than as shown in the above mentioned Huntley and Rau application. Whereas, in the said application the lower inner edge of the throat is shown as engaging the closure so as to iron it from substantially the top of the bead down to the plane of maximum circumference of the bead, as shown in Figures 13 and 14. The ironing operation commences immediately above the plane of maximum circumference of the bead. This relation of the parts is fully described in my copending application Serial No. 641,288 and as described in that application, the throat may, if desired, be solid, that is to say, non-expansible.

In Figures 3 to 12, the discs all have the general form of the disc of Figures 1 and 2 but have specifically different types of marginal definitions.

In Figure 3, the disc 45 is provided with regularly spaced score lines 46 on its outer marginal portion, these score lines being radially directed. As shown in Figures 3 and 4, the score lines are impressed on the top of the disc, but they could be impressed on the bottom of the disc or on both the top and bottom. The weakening of the disc margin by the score lines prescribes the crimping lines as the disc margin locks under the container bead. In Figures 5 and 6, disc 47 is again provided with radial score lines as at 48 and additionally, with a circular score line 49 spaced inwardly from the edge of the disc and defining the marginal portion thereof, the radial score lines terminating inwardly at the circular score line. Line 49 is so placed as to come into or slightly below the plane of maximum circumference of the bead upon application of the closure and limits the upward extent of the crimps which are determined by lines 48.

In Figures 7 and 8, disc 50 is provided throughout its circumference with regularly spaced small notches or nicks 51, these weakening the marginal portion of the disc in such a manner as to prescribe the crimping lines upon application of the disc.

Disc 52 of Figures 9 and 10 is provided not only with nicks 53 corresponding to the nicks of Figures 7 and 8, but also with radial scores 54 and a circular score 55 as the disc of Figures 5 and 6. The nicks 53 are at the ends of the radial score lines 54 and cooperate therewith in determining the crimp lines, the extent of the crimps being limited by the circular score 55.

In Figures 11 and 12, disc 56 is provided with a radially projecting tongue 57 and the disc margin including the tongue may be provided with circumferentially spaced radial scores 58 which determine the crimp lines. Upon application of disc 56 tongue 57 being freely projecting below

the edge of the cap skirt, may be grasped for the purpose of removing the cap.

The closure discs of Figures 3 to 12 may, of course, be applied by the identical devices shown in Figures 13 and 14. However, in applying the closure of Figures 11 and 12, ledge 43, Figures 13 and 14, would preferably be suitably recessed to permit tongue 75 to pass from the ledge simultaneously with the rest of the disc margin.

As a matter of convenience, I have shown the closures as comprising a single ply disc of ductile metal and such a closure is entirely practical. However, as mentioned in the applications referred to at the outset, the discs are preferably provided on their lower surfaces with a sealing facing which may be in the nature of suitable sheet material or a suitable coating.

The specific description of mechanisms and closures above has been made for the purpose of exemplifying the general features of the invention. It will be understood that this disclosure is not to be taken as restrictive of the invention, the scope of which is defined in the following claims:—

I claim:—

1. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its marginal portion radially scored at substantially regular intervals circumferentially.

2. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its marginal portion radially scored at substantially regular intervals circumferentially, the disc having a substantially circular score line defining said marginal portion.

3. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its edge notched at substantially regular intervals throughout its circumference.

4. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its marginal portion radially scored at substantially regular intervals circumferentially, the edge of the disc being notched at each score line.

5. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its marginal portion radially scored at substantially regular intervals circumferentially, the disc having a substantially circular score line defining said marginal portion and the edge of the disc being notched at each radial score line.

6. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having a radially projecting tongue, the marginal portion of the disc, including the tongue, being deformed to predetermine radial bending or crimping lines for said portion upon application of the closure to the container.

7. A closure for containers of the type having a mouth surrounded by an external bead, said closure comprising a substantially flat circular disc of ductile material, the disc being of greater diameter than the maximum diameter of the bead and having its marginal portion weakened at substantially regular intervals circumferentially.

8. A closure for a container of the type having an opening defined by a circumferential lip presenting an external shoulder or bead, said closure being in the form of a substantially flat ductile disc of larger diameter than the overall diameter of the container mouth and including a substantially straight-projecting marginal portion engageable on both sides to support the disc and control the bending of said marginal portion during an ironing applying operation, said marginal portion having an outer portion deformed in such manner as not to impede substantially the bending of said marginal portion and so that upon ironing and drawing the disc over said shoulder or bead said outer marginal portion takes a natural locking crimp beneath the shoulder along lines determined by the deformations, the disc having a substantially annular shoulder inwardly of its edge for centering the disc on the container and the bottom plane of said marginal portion lying substantially above said shoulder upon positioning the closure on said lip and at the initiation of the ironing and drawing operation.

9. A closure for a container of the type having an opening defined by a circumferential lip presenting an external shoulder or bead, said closure being in the form of a substantially flat ductile disc of larger diameter than the overall diameter of the container mouth and including a substantially straight-projecting marginal portion engageable on both sides to support the disc and control the bending of said marginal portion during an ironing applying operation, the outer portion of said marginal portion being slightly radially fluted so as not to impede substantially the bending of said marginal portion and so that upon ironing and drawing the disc over said shoulder or bead said outer marginal portion takes a natural locking crimp beneath the bead along lines determined by the flutings, the disc having a substantially annular shoulder inwardly of its edge for centering the disc on the container and the bottom plane of said marginal portion lying substantially above said shoulder upon positioning the closure on said lip and at the initiation of the ironing and drawing operation.

10. As a new article of manufacture, a closure for a container having an opening defined by a circumferential lip presenting an external shoulder or bead, said closure comprising a substantially flat disc having a body of ductile material of larger diameter than the overall diameter of the container mouth and having a substantially flat marginal portion disposed in substantially the plane of the remainder of the body of the disc and engageable on both sides to support the disc and control the bending of said marginal portion during an ironing applying operation, said disc having joined to its marginal portion a radially projecting tongue and inwardly from said marginal portion being deformed to provide means for engaging a container lip and centering the disc thereon.

GEORGE W. BOOTH.