April 9, 1940. H. SPENGLER 2,196,877

CLOSURE

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Fig. 1.

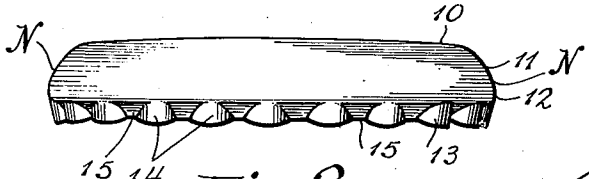


Fig. 2.

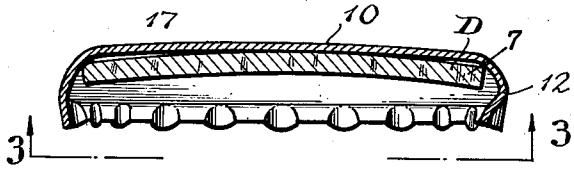


Fig. 5.

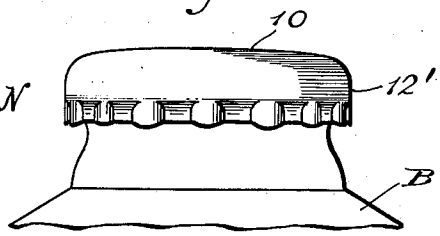


Fig. 4.

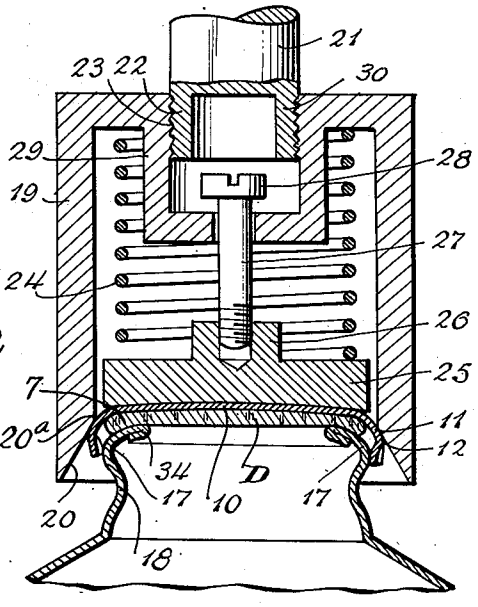
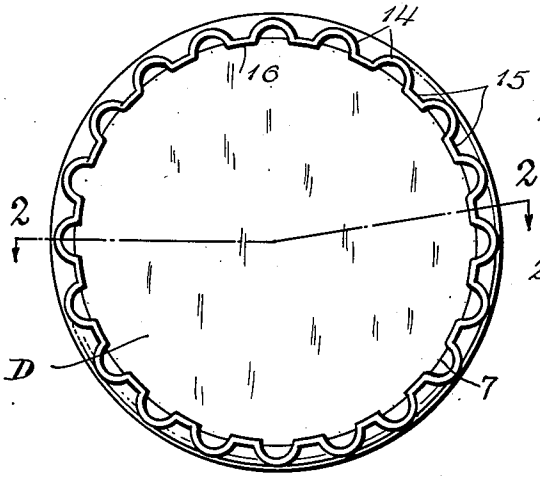


Fig. 3.



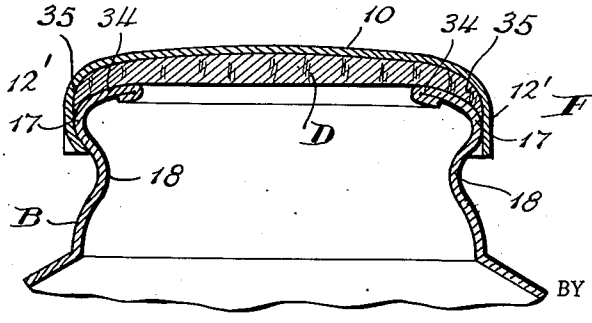


Fig. 6.

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Fig. 7.

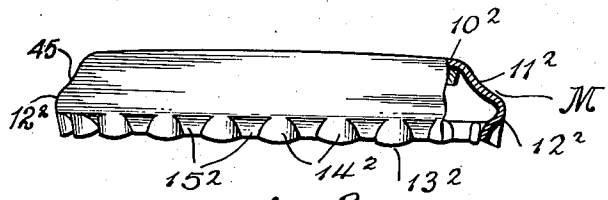


Fig. 8.

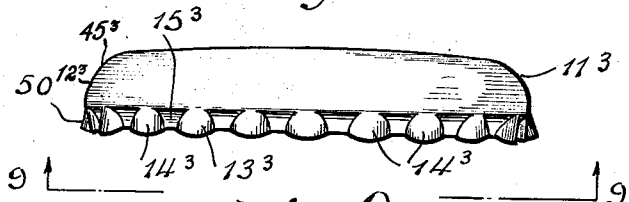


Fig. 9.

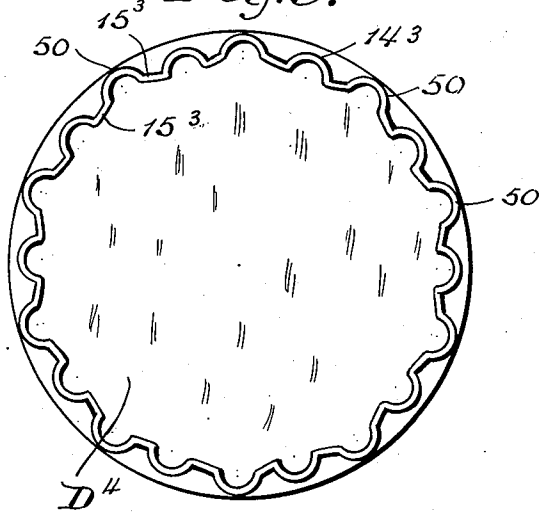
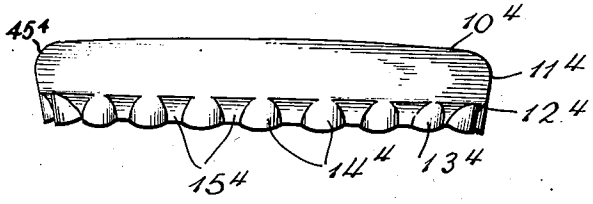


Fig. 10.



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UNITED STATES PATENT OFFICE

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CLOSURE

Henry Spengler, New York, N. Y., assignor to Spengrey Cap Corporation, New York, N. Y., a corporation of Delaware

Application January 27, 1937, Serial No. 122,630

1 Claim. (Cl. 215—39)

The present invention relates to a closure and it particularly relates to a type of closure to be applied to the mouths of glass bottles, cans, jugs or other containers, the mouths of which are provided with peripheral beads or lips.

In my prior application, Serial No. 72,679, filed April 4, 1936, there is disclosed an improved cap construction which is designed to replace the usual type of closure designated as being of the "crown" type in which old type "crown" cap the metal of the skirt and the cap is tucked inwardly about the bottle or container mouth while a lower portion of the skirt extends more or less outwardly presenting a sharp edge.

The skirt of the cap of said prior application was provided with an upper or intermediate fold or bulge, the lower portion of said skirt below said fold or bulge being gathered or crimped.

This fold or bulge was designed to supply extra metal and to be extended or flattened by a cylindrical capping tool which, at the same time, pressed the lower portion of the skirt below the bead of the container, can or bottle, as the case may be.

By so constructing the caps and applying them to containers, it has been found that the caps more readily adjust themselves to varying types of beads, even though such beads are slightly offshape or not truly circular, that breakage or deformation of containers in applying the caps is greatly lessened, that the cap when pressed down upon the bottle seals both the top and the side of the bead, and that a considerable amount of metal is saved.

It is, therefore, among the objects of the present invention to provide an improved cap of the character described in said prior application which cap may be readily applied and automatically will adjust itself to the top of the container.

It has further been found that an improved closure is obtained when the cap is drawn down over the top of the beaded mouth of the container and when the metal of the skirt of the cap together with the sealing disk enclosed in the cap have been drawn outwardly over the top of the bead and downwardly over the side of the bead, and it is among the further objects of the present invention to provide an improved cap of this character which will permit of this application to the mouth of the container.

Other objects will be obvious or will appear during the course of the following specification.

In accomplishing these objects, it has been found most suitable to expand the bulge, fold or bend which supplies the extra metal for expansion to seal the top of the bottle so that it will extend over the entire side of the cap above the indentations.

In one form of the invention, the upper portion of the skirt is formed as a frustro-conical surface which may be slightly convexed or concaved.

When the cap is applied this surface is preferably substantially spaced from the upper portion of the bead and with the lower corrugated or indented portion of the skirt fitting closely adjacent to and around the maximum diameter of the said bead.

In applying this cap to the beaded mouth of a suitable container, a capping die is preferably provided which will grip and press downwardly upon a portion of the conical surface substantially below the top of the cap and preferably at a portion intermediate of the bulge or convexity or concavity.

The die then in extending the bulge and in applying the cap will draw the top and sides of the cap outwardly and downwardly over the bead and at the same time will draw the sealing disk enclosed in the cap downwardly over the top and side of said bead.

As a result a perfect seal will be formed not only on the top of the bead but also along the side of the bead.

The above and other objects will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing the preferred embodiments of the inventive idea.

Referring to the drawings:

Figure 1 is a side elevational view of one form of cap according to the present invention upon a substantially enlarged scale, as compared with the actual size of the cap in use.

Figure 2 is a transverse sectional view upon the line 2—2 of Figure 3.

Figure 3 is a bottom view of the cap upon the line 3—3 of Figure 1.

Figure 4 is a longitudinal sectional view of the cap of Figure 1 on the top of a container and about to be pressed into sealing position by a suitable capping die.

Figure 5 is a side elevational view of the cap after attachment on the bottle upon a somewhat smaller scale as compared to Figures 1 to 3.

Figure 6 is a longitudinal cross sectional view of the cap of Figure 5 after application and upon the same scale as Figures 1 and 2.

Figure 7 is a side view partly in section of an alternative cap construction.

Figures 8 and 9 show another alternative cap construction, Figure 8 being a side view and Figure 9 being a bottom view upon the line 9—9 of Figure 8.

Figure 10 is a side view of still another form of cap construction.

Referring to Figures 1 to 3, the cap has a base 10, an upper skirt portion 11 and a lower skirt portion 13. The entire upper skirt portion 11 may be bulged or it may be provided with an intermediate bend, fold or bulge 12.

The upper skirt portion receives the thin flexible paper, cloth or cork disk or insert D which disk or insert terminates substantially short of the bend 12.

The bulge of the skirt portion 11 and the bulge or fold 12 provide extra metal to enable extension of the cap upon capping.

The lower skirt portion 13 is gathered or provided with a series of indentations or corrugations having outwardly extending rounded portions 14 and indentations 15.

The cap may be made of steel or of alloys of iron, tin, brass, copper, aluminum and/or lead.

It will be noted by reference to Figure 3 that the inner portions 16 of the indentations 15 extend inside of the periphery 7 of the disk D and thus hold said disk in a position that it cannot fall out. This construction eliminates the necessity of gluing or adhesively connecting the disk D to the base 10 of the cap and enables a simpler and better construction.

The disk may be composed of or faced with any suitably treated paper or foil material.

In applying the cap of Figures 1 to 3 to the top of the can B having the bead 17, with a lower recess 18, a cylindrical die 19 with a bevelled lower edge 20 may be employed.

The die 19 receives an actuating member 21 screwed at 22 into the threaded recess 23. The cylindrical member 19 also receives the coil spring 24 which presses down the flat die member 25. The flat member 25 has an upstanding nipple 26, which is tapped and receives the bolt 27 having the head 28. The bolt passes through an opening in the bottom of the cup 29 and may reciprocate in said cup 29 and also in the recess 30 in the end of the rod 21.

In operation, the capping die 19 will come down and the inner edge 20a of the bevel 20 will strike the extended portion or bulge 12 at a point substantially below the base and inside of the maximum diameter of the said bulge.

Then, as the die 19 continues its downward movement, it will collapse the bulge 12, inwardly and extend the metal of said skirt from the position as shown in Figures 1 to 4 to the position as shown in Figures 5 and 6.

At the same time, the metal of the base 10 and the cap will be drawn outwardly and downwardly over the bead 17 with the result that in the final cap, after application, as shown in Figures 5 and 6, the metal of the base 10 will be under substantial tension and the expanded bulge 12' will press inwardly on the outside of the bead 17.

While this drawing of the metal of the cap is taking place, the flexible sealing disk D is also being drawn outwardly with the result that it will be forced into the recess 35 between the sides of the cap and the bead of the can thus the cork or flexible disk will not only seal the top 34 of the bead 17 but will also seal the upper side of said bead as indicated at 35 in Figure 6.

Regardless of the depth of the bead 17, and the location of the recess 18, the operation indicated in Figure 4, with straightening out of the bulge 12 will cause the lower skirt 13 to collapse around the lower portion of the bead with the indentations and elevations 14, 15 being received in the recess 18.

The attached cap, as shown in Figures 5 and 6, is devoid of sharp outstanding edges, has a relatively neat appearance and may be most readily applied by a capping die such as indicated in Figure 4, with rapidity and decreased breakage by automatic machinery.

The cap will uniformly support a much higher internal pressure than the usual "crown" type and a most satisfactory seal will be obtained even with pressures exceeding 100 pounds.

It will be noted that the outside of the cap, as shown in Figures 5 and 6, after attachment will be substantially cylindrical and a prying or bottle opening tool may be inserted therebelow to lift the cap from the top of the bottle.

The caps as formed in Figures 1 to 3 may ordinarily have a maximum external diameter of $1\frac{3}{8}$ inches, and a maximum depth before placement upon the bottle top of $\frac{3}{8}$ inch.

In Figure 7 the shape of the bulge 12^2 has been slightly varied to provide a concavity at M as contrasted to the convexity at N in Figure 1, similarly functioning parts being indicated by the same numerals provided with a superior "2."

The manner of drawing the cap down over the bead is substantially the same in connection with the embodiment of Figure 7 as has already been described in connection with the embodiment of Figures 1 to 6.

When the capping head 19, as shown in Figure 4, descends over the cap, as shown in Figure 7, the edge 20a of the capping head, as shown in Figure 4, will catch the cap at about the point 45, and will draw the base of the cap 10^2 and the upper side of the cap 11^2 outwardly and downwardly over the bead 17 of a can or bottle, as the case may be. The lower portion of the skirt will be pressed downward and inwardly and the crimped or serrated portion 13^2 will be forced under the bead 17 into the recess 18 in the manner indicated in Figure 6.

In Figures 8 and 9 is shown another alternative construction similar to Figures 1 to 3 in which correspondingly functioning parts are indicated by the same numerals provided with a superior "3".

In Figures 8 and 9, the crimped, indented or gathered structure 13^3 at the bottom of the skirt 11^3 is provided with a series of outwardly projecting rounded portions 50 which replace the ordinary rounded portions 14^3, as shown in Figures 1 to 3.

These spaced extended rounded portions when collapsed inside of the recess below the bead will, in certain instances give better and stronger seals capable of withstanding higher pressure.

The bulge 11^3 will contact with the edge 20a of the capping head at about the point 43^3 and the bulged portion 12^3 will be pressed downwardly and inwardly with the corrugated or serrated portion 15^3 being forced into the recess of the can 18.

In Figure 10, the bulge 45^4 is positioned at the upper part of the skirt portion 11^4, other corresponding parts being indicated by the same numerals provided with a superior "4".

The inner edge 20a of the capping head 19 will strike the bulge which, in this embodiment, is at the inner portion of the skirt and in the

area indicated by the numeral 11⁴ at the point 45⁴ and the peripheral portion of the base 10⁴ and the sides of the skirt will be pressed downwardly and inwardly over the bead 17.

In all of the construction shown and described, the drawing downwardly and outwardly of the base 10 will result in the edges 7 of the sealing disk D being pressed into the periphery or V-shaped space 35, as indicated in Figure 6, between the bead 17 and the skirt of the cap.

It is apparent that the specific illustrations shown above have been given by way of illustration and not by way of limitation and that the structures above described are subject to wide variation and modification without departing from the scope or intent of the invention, all of which variations and modifications are to be included within the scope of the present invention.

What is claimed is:

A cup shaped cap for application to bottles and cans provided with top beads and for application to similar containers, said cap having a circular base, a skirt depending downwardly circularly from the periphery of said base, a pliable sealing disk inset against said base inside of said skirt, said skirt having a corrugated edge portion of smaller average diameter than the upper portion of the skirt, but of larger average diameter than said beads, and an outwardly bulged portion providing extra metal above said corrugated edge, said bulged portion being adapted to be expanded longitudinally and contracted radially upon application of pressure in the direction of the axis of the cap to place the material of the cap under radial tension and grip the corrugated portion tightly below the beads whereby a tightly sealed contact with the top and side of said beads is maintained by radial tension in said cap.

HENRY SPENGLER.