Feb. 10, 1970 J. G. LIVINGSTONE 3,494,496

CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

Filed Jan. 8, 1968 6 Sheets-Sheet 1

FIG. 1

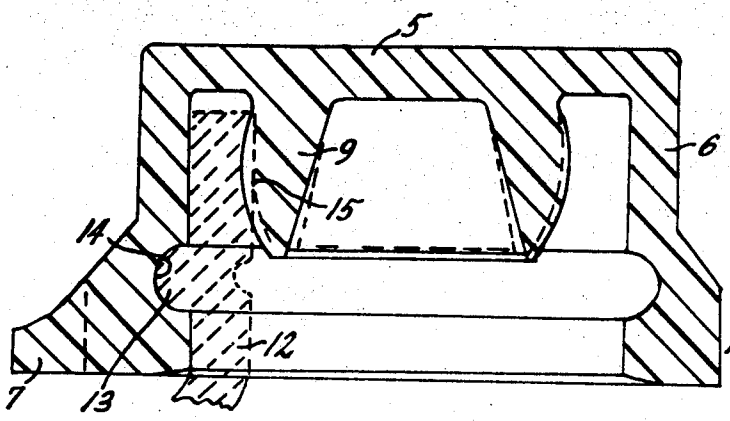
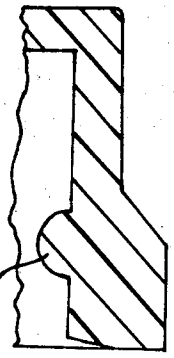


FIG. 2



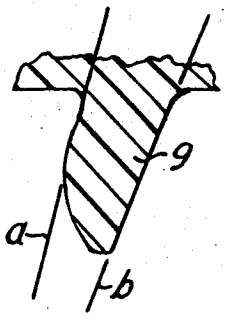


FIG. 3

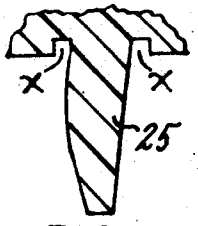


FIG. 4

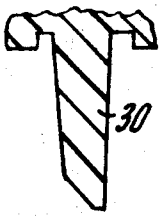


FIG. 5

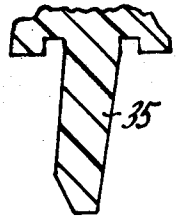


FIG. 6

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CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

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FIG. 9

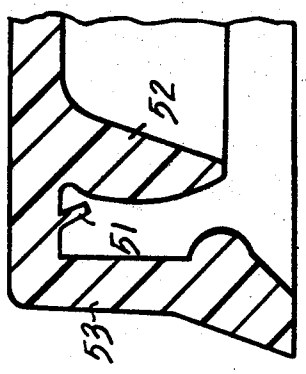


FIG. 11

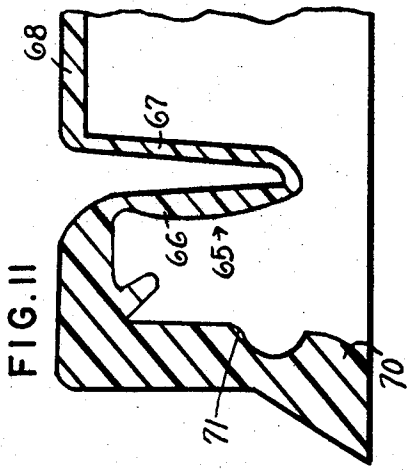


FIG. 8

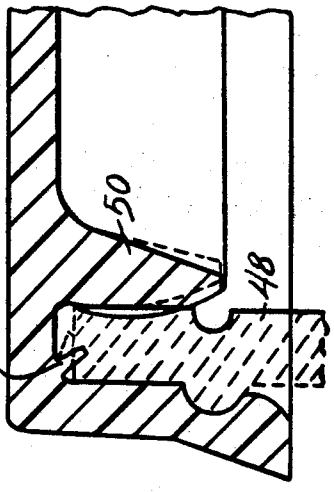
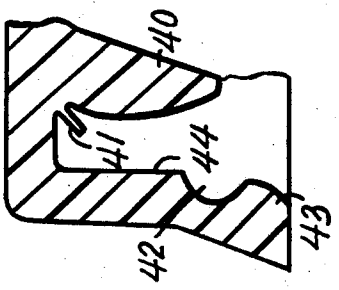


FIG. 7



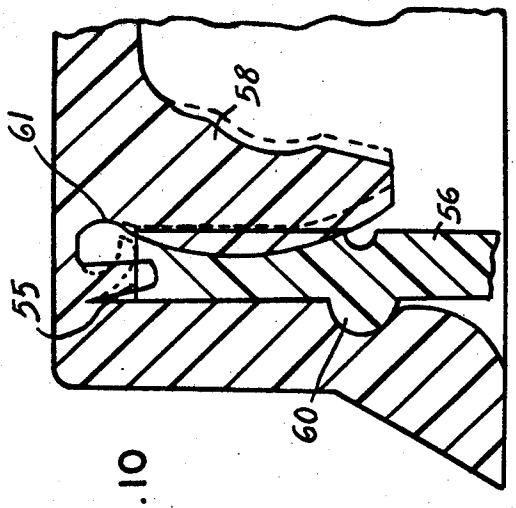


FIG. 10

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CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

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FIG. 12

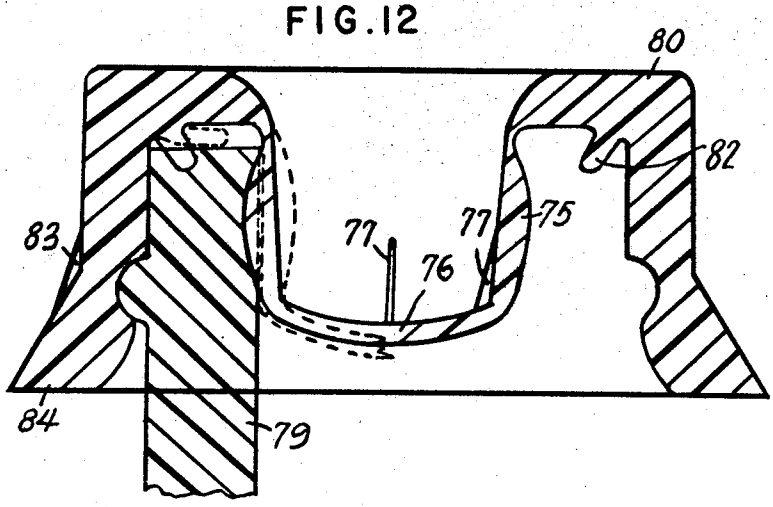


FIG. 13

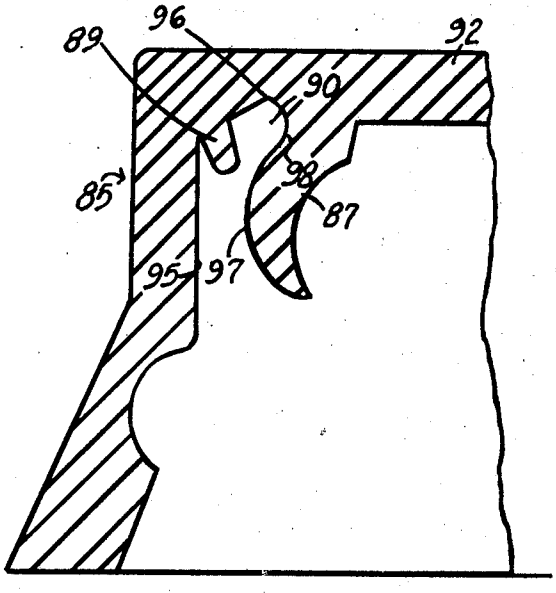
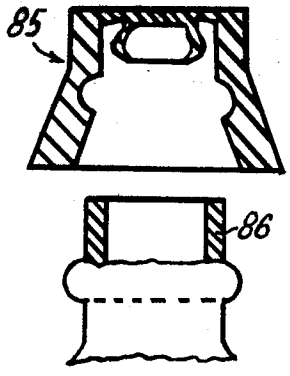


FIG. 14



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CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

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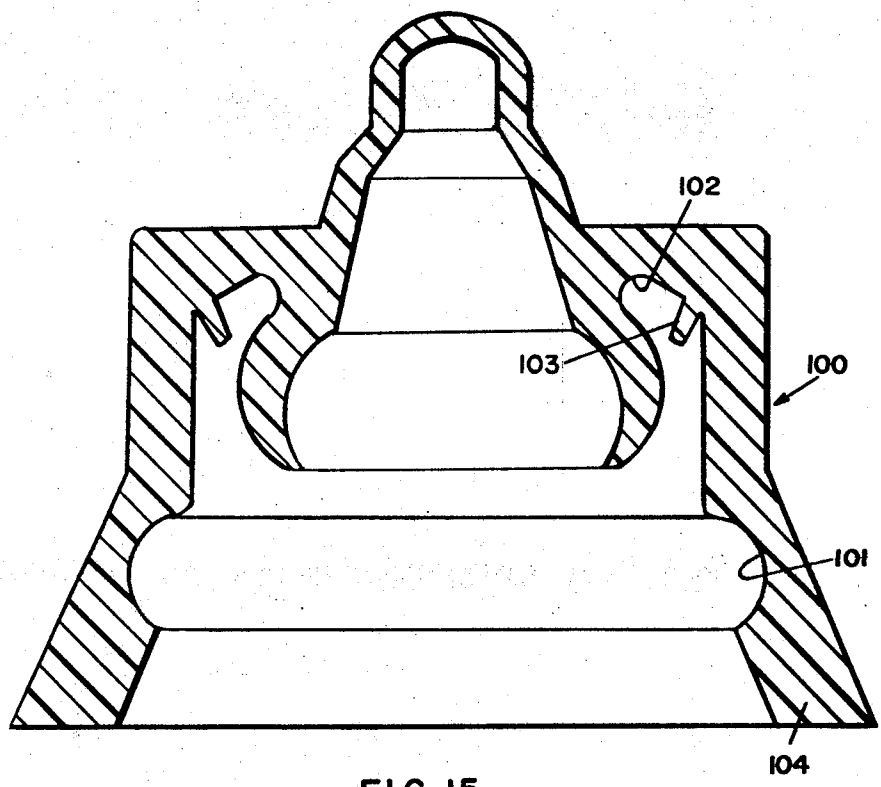


FIG. 15

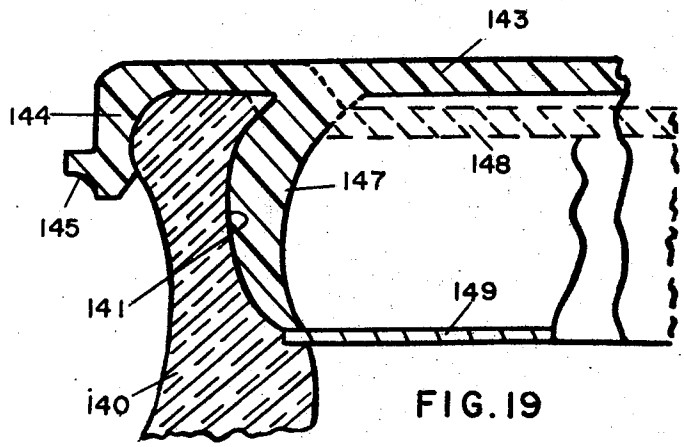


FIG. 19

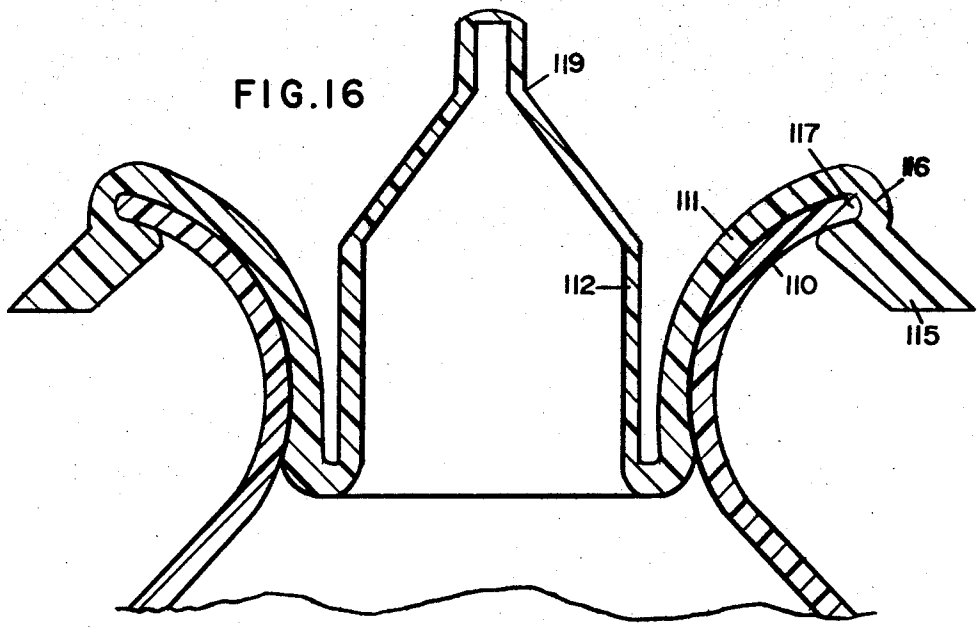
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CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

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FIG.16



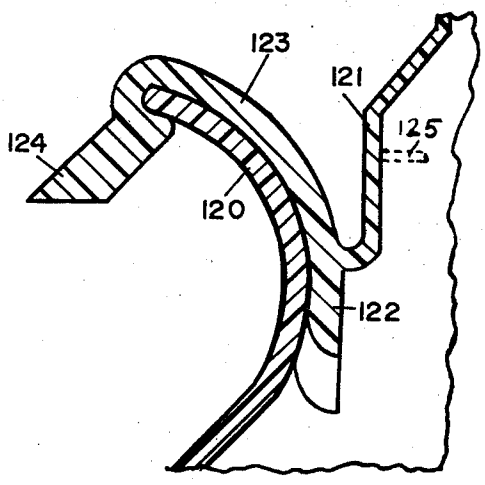


FIG.17

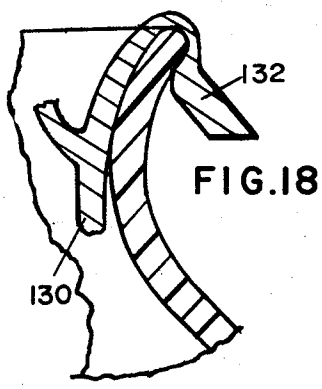


FIG.18

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CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

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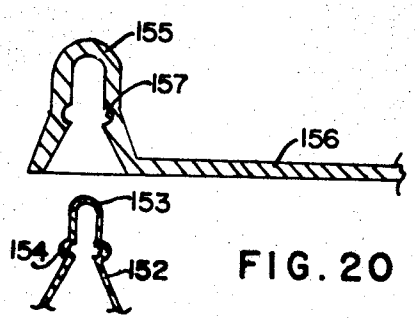


FIG. 20

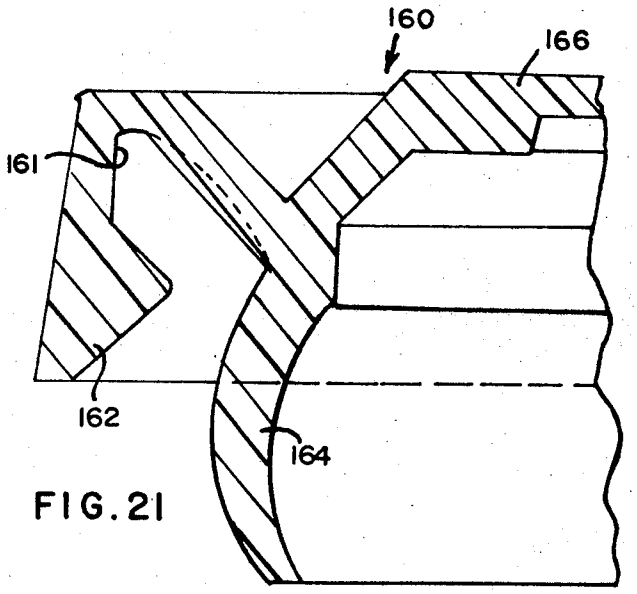
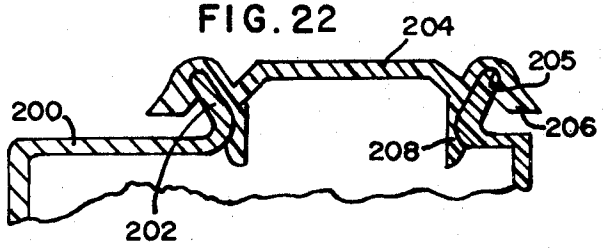


FIG. 21

FIG. 22



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United States Patent Office 3,494,496 Patented Feb. 10, 1970

3,494,496

CLOSURE CAP AND CONTAINER-AND-CAP ASSEMBLY

Jay G. Livingstone, 715 W. Market St., Akron, Ohio 44303

Continuation-in-part of application Ser. No. 665,481, Sept. 5, 1967. This application Jan. 8, 1968, Ser. No. 701,524

Int. Cl. B65d *41/28, 41/22*

U.S. Cl. 215—40 11 Claims

ABSTRACT OF THE DISCLOSURE

A bottle or the like is closed with a snap-on closure cap of resilient plastic. Different designs of caps are included. In each of these different designs, the cap fits over the top of the container, which is preferably a bottle, and an annular tongue which depends from the cap makes a snug fit with the inner surface of the neck or other top portion of the container.

In a preferred design, the cap does not fit against the top edge of the container, but a space is provided above the top edge of the container, and the distance between this edge and the interlock between the cap and container is relatively short. The tongue extends only about half the distance between this interlock and the top of the skirt of the cap.

To insure a seal, in one design, one or more tonguelets depend from the cap and make sealing contact with the container, preferably against its top edge. In such assemblies, the distance between the top edge of the container and the interlock may be longer, and the tongue may extend as far as the interlock or farther.

The top of the cap may be flat, or, it may extend upwardly, as in caps provided with a tapering top designed to be snipped off for delivery of the contents of the container in a thin stream or in drops. The apex of the tapering top may be open, and a closure for it may be attached to the top by a long flexible member, or the member, or the closure may be entirely separate.

This application is a continuation-in-part of my application Ser. No. 665,481 filed Sept. 5, 1967 and now abandoned.

The invention relates to snap-on closure caps of resilient plastic, and the assembly of such caps with containers, preferably bottles. It includes caps and assemblies of different designs.

In snap-on container-and-cap assemblies, a bead or groove in the inner surface of the skirt of the cap interlocks with a groove or bead on the outer surface of the container, and if the container is a bottle, the interlocking means is on the outer surface of its neck.

In the manufacture of glass and plastic bottles and many other containers, the outside diameter of the wall of the neck or other top of the container is carefully controlled, and the inside diameter varies from container to container. The caps of this invention include an annular tongue which depends from the cap and makes sealing contact with the top of the container, either the top edge or more generally by surface contact with the inner surface of the neck or other top portion of the container, and if the container be a bottle it makes sealing contact with the inner surface of the neck; and because of the resilience of the composition of the tongue, sealing contact is attained in spite of variation of the container's inside diameter.

In glass and plastic bottles and at least some other containers, the distance between the top edge of a container and the snap-on interlocking means varies. This variance is due to the fact that the bottles are produced on a

standard and are trimmed with longer or shorter necks. The variance may be greater in plastic bottles than in glass bottles. This variance has retarded the general acceptance of snap-on caps by the industry. To overcome this, the skirts of many of the caps of this invention extend above the top edge of the container on to which they fit leaving a space which is, for example, about 0.050 inch deep, so that the caps fit the containers regardless of the different distances their tops extend above the interlock.

In a preferred design, the distance between the top of the interlocking means and the top of the inside of the skirt of a cap is short, being, for example, between 0.050 and 0.250 inch. This is desirable in snap-on assemblies, because when the snap-on interlock is broken, the cap does not bind on the top of the container but is easily removed. In such an assembly, the tongue on the cap may make sealing contact with the top inner edge of the neck if it is a bottle, or with the inner edge of any other top portion of the container, and if sealing contact is an area contact made with the outer surface of the tongue, the tongue need not extend more than half the distance to the interlock, and yet form a tight seal. The inside edge of the bottom of the skirt is preferably beveled, or otherwise cut away, at least at one position around the container to provide a finger hold for removal of the cap. If the cut-away is continuous around the skirt, the placement of the cap on the container is facilitated and it is more easily removed.

The distance between the top of the snap-on interlock and the top of the skirt may be greater, and the tongue may be longer. The longer the tongue, the greater the tendency of a snap-on cap to bind on the top of a container as it is being removed. For instance, the bottom of the interlock may be of larger diameter than the top of the interlock, by approximately 0.050 inch. The tongue may extend below the interlock. Regardless of the distance between the top inside of the skirt and the interlock, and regardless of the length and shape of the tongue, one or more annular tonguelets extending from the cap, and usually extending downward therefrom, may advantageously be provided to make sealing contact with the top edge of the container to supplement the seal made by the tongue. Such a double seal is particularly recommended for containers packaged under pressure or under a vacuum.

The tongue and one or more tonguelets must be of resilient material and ordinarily the cap will be made entirely of resilient plastic such as polyethylene or the like. The bottle may also be made of polyethylene but this is not necessary, as it may be made of a rigid plastic, glass or metal.

Different cap shapes may be utilized. Usually, the top of the cap is relatively flat. However, it may be indented, as in caps in which the top closure area is located at or near the bottom of the annular tongue. In such cases, this area is advantageously stiff enough to force the tongue outward into sealing contact with the wall of the container and the outward force may cause the inside of the lip of the bottle to become embedded in the soft top portion of the tongue.

The top of the cap may be peaked to provide a top portion of small diameter such that when the very top is snipped off, the contents of the container (if liquid) can be dispensed in drops or in a stream of small cross section. Alternatively, a molded opening may be provided in the top, and the closure for this opening may be separate or it may be attached to a lower portion of the tapering top by suitable plastic means.

A chief advantage of the combination of this invention which provides a space between the top edge of the container and the top of the skirt, is that because it is

not necessary to control the distance betwen the snap-on arrangement and the top of the bottle within any fine tolerances, the cost of the bottle is materially reduced. Leakage through the opening in the bottle is prevented by the extensive seal formed between the tongue and the inner surface of the bottle, supplemented by the one or more tonguelets, if provided.

The tongue is preferably of such a design that it makes sealing contact with the top edge or the inner surface of the neck of the bottle or the like over an extensive area. Usually the outer surface of the tongue will be bulbous, although that is not essential as will be evident from what follows.

The invention is further described in connection with the accompanying drawings. It will be understood that where only one wall of a container or cap is shown, the complete cap or container is uniformly circular.

FIGURE 1 shows a plastic snap-on cap with a representation of the neck of a glass bottle in the left-hand portion of the figure;

FIGURE 2 is a section of the right-hand portion of the same except that the snap-on arrangement is constructed of a bead on the cap instead of a groove, the groove being in the neck of the bottle;

FIGURES 3 to 6 illustrate sections through several annular tongues of different shapes;

FIGURES 7 to 10 are sections of modifications which show tonguelets of different shape, differently located to effect sealing agianst the top edge of a bottle neck;

FIGURES 11 and 12 are sections of further modifications showing tonguelets and different types of reverse-folded tongues;

FIGURE 13 is a section of a further modification showing a tonguelet with a different type of tongue differently mounted;

FIGURE 14 is a sectional exploded view of a bottle, partly broken away, and the cap of FIGURE 13;

FIGURE 15 is a section through a cap with a peaked top which can readily be cut off or punctured for dispensing drops or a small stream of liquid from a container;

FIGURE 16 is a section through a bottle with a flaring neck and a different type of cap in which the peaked top rises from the bottom of the annular tongue, and the cap fits tight over the edge of the bottle neck;

FIGURE 17 is a section through a modification in which the peaked top extends upwardly from a point above the bottom of the tongue;

FIGURE 18 is a modification of the bottle and cap shown in FIGURE 17;

FIGURE 19 is a section through the top of a preferred design of milk bottle and closure;

FIGURE 20 is a section through the peak of a cover which is a modification of that shown in FIGURES 15 to 18 with a cap therefor;

FIGURE 21 is a section through a modification of the cover shown in FIGURES 16 to 18; and

FIGURE 22 shows a cover on a container with a flaring top flange.

The closure cap of FIGURE 1 includes the top portion **5**, the skirt **6**, a tab **7** for the convenient removal of the cap from a bottle, and the annular tongue **9**. A part of the neck of a bottle **12** is shown in dotted lines. The continuous bead **13** on the neck of the bottle is fitted in the continuous groove **14** in the cap.

The outline of the tongue **9** as it exists when separate from a bottle is shown in full lines, and the dotted-line showing indicates in a general way the shape of the tongue when contacted by the outer bulbous surface being deformed by pressure contact with the inner surface of the neck of the bottle. It will be noted that the seal is not dependent upon the top edge of the bottle fitting against the cap. In fact, a space of substantial dimensions exists between the top edge of the bottle and the cap. This space is provided to accommodate bottles with either a long or short trim. The area **15** of contact between the compressed outer surface of the tongue and the inner wall of the neck extends over substantial one-half of the small area of the inner surface of the neck of the bottle between the top of the neck and the top of the interlocking groove and tongue which constitute the snap-on arrangement. The tongue may extend farther into the bottles which have a large mouth. This particular arrangement is designed particularly for assemblies in which the distance between the interlock and the top of the skirt of the cap is not over 0.25 inch.

The tab **7** is designed primarily to assist in the removal of the closure cap from the bottle, but it may likewise assist in placing the closure cap on the bottle. It may extend around the entire circumference of the cap. Ordinarily, the groove **14** will be enlarged somewhat by the bead **13** to insure a tight seal between the cap and the bottle, although it is only necessary that the snap-on arrangement prevent movement between the cap and the bottle. The cap should not fit so tight over the neck that it draws the tongue away from the bottle where it makes sealing contact with the inner surface of the neck.

Instead of having the bead on the bottle and the groove in the cap, FIGURE 2 illustrates the location of the bead **20** on the inner surface of the cap and in this case there will be a groove in the outer surface of the neck of the bottle to receive this bead.

FIGURE 3 shows the shape of the tongue **9** when it is not under compression. The lines *a* and *b* show that the tongue gradually lessens in width from the top down, and can therefore be easily removed from a mold.

The tongues **25**, **30** and **35** of FIGURES 4, 5 and 6, respectively, are of somewhat different shape than the tongue **9**, and are positioned at different angles with respect to the top of the cap.

The tongue **25** does not slant outwardly as much as the tongue **9** and therefore will be subjected to less compression when inserted in the top of a bottle. The amount of deformation of the outer surface of the tongue will, of course, depend upon the hardness of the tongue, its resistance to deformation, and the variations in the inside diameter of the bottle neck. The annular indentations *x* in the top of the bottle on both sides of the tongue in FIGURES 4, 5 and 6 are not essential. They merely facilitate the flexing of the tongue.

It is not necessary that the outer surface of the tongue be bulbous, as is evident from FIGURES 5 and 6, although this is generally preferred. The tongue **35** would be compressed more than the tongue **30** in a bottle neck of uniform inside diameter and, therefore, would form a tighter seal if the plastic of which the two tongues are formed is the same. Usually the plastic of a tongue located at the angle illustrated in FIGURE 6 will be of softer composition than the tongue located at the angle shown in FIGURE 5.

FIGURE 7 is a section of a part of a cap showing a tongue **40** which is not essentially different from the tongue shown in FIGURE 1. An annular tonguelet **41** is provided at the juncture of the tongue and the top of the cap. This tonguelet flexes against the top edge of a bottle regardless of the exact length of the bottle above the bead which fits into the groove **42**. The flaring lip **43** is offset outwardly to a slight extent from the wall **44** which fits against the outer wall of the bottle neck. By lessening the expansion required to slip the lip over the bead, this offset makes it easier to slip the cap over the neck and bead than if the lip were in line with the wall **44**.

The different figures of the drawings show different types of tonguelets. These are merely illustrative. The tonguelets are all annular, and usually are of the same construction throughout, although it is conceivable that the shape may vary from one part of an annular tonguelet to another part. A tonguelet may be straight-wall or be bulbous or it may taper to a narrow bottom, and both walls of the tonguelet may curve in the same

direction. A tonguelet may contact the top of a bottle or other container at its inner edge or at its outer edge or between the edges. It may extend downwardly at any angle, either inwardly or outwardly, or even vertically, but if it extends vertically downwardly it usually contacts the edge of the container, and if it contacts the flat top of a bottle it will usually be constructed so as to flex inwardly or outwardly.

FIGURE 8 is a section of a similar cap fitted over the neck **48** of a bottle. The essential difference between the two showings is that the tonguelet **49** is differently located. This tonguelet may extend from either corner of the space above the bottle neck or from some intermediate position, and it may extend at any convenient angle, usually about 40 degrees. It may be of any desired length. The tongue **50** is shown in full lines in the position it occupies before the cap is placed on the bottle, and in dotted lines in the position which it occupies when pressed against the inner wall of the bottle. The amount that the curved outer wall flattens against the inner wall of the bottle neck will depend upon the exact dimensions of the tongue and the bottle neck and the softness of the plastic.

In FIGURE 9 the tonguelet **51** is located at an intermediate point between the tongue **52** and the skirt **53**. With the tongue in any of the three positions shown in FIGURES 7, 8 and 9, it flexes against the top edge of the bottle neck. In all of these instances and in the showings of tonguelets which follow, the tonguelet is annular and makes contact around the top edge of the bottle—whether the bottle be trimmed long or short, i.e., whether it extends a longer or shorter distance above the location of the sealing bead.

FIGURE 10 is a modification which shows a shorter and stubbier tonguelet **55** which is flexed against the top edge of the bottle neck **56** as indicated in dotted lines. The inner surface of the tongue **58** is indented somewhat to facilitate flexing. The full-line showing of the tongue shows the position it occupies before flexing, and the dotted-line position shows how it flexes. The length of the contact of the flexed tongue against the inner wall of the bottle will depend upon how much the outer surface of the tongue is curved, and will also depend upon the inner diameter of the bottle neck and the outer diameter of the tongue. It is noted that the tongue **58** extends below the bead **60** and this gives a longer contact between the outer surface of the tongue and the inner wall of the bottle than if the tongue were much shorter. It also provides contact between the top of the bottle and the tongue. It is noted that the outside surface **61** of the top of the tongue is offset inwardly from the line of the inner wall of the bottle. This permits the tongue to flex at a point above the top of the bottle and provides contact between the tongue and the top edge of the bottle regardless of whether the neck is trimmed long or short. The flexing point of the tongue is above the end of the bottle even though the bottle is trimmed long. This is not true of the tongue-and-bottle combination shown in FIGURE 1, for example. The inward curvature at **61** may be deep enough to accommodate the end of a tonguelet of any length.

The cap of FIGURE 11 is in many ways similar to the cap of FIGURE 10 except that the tongue **65** is separated into two portions **66** and **67** which are reverse-folded. Each portion is thinner and thus more easily flexed than the tongues of the foregoing figures. The flexing of the bottom of the tongue is repressed by the portion **67** which is joined at its top by the circular area **68**. This area **68** tends to repress the inward flexing of the tongue portion **67** and thus insures sealing contact with the botle neck. It is to be noted that the bottom **70** of the lip of the cap, below the location for the bead, is cut back outwardly to provide a radiused edge which facilitates placement of the cap on a bottle. Also at **71** where the top of the bead cutaway joins the inner wall of the cap, the material is radiused to facilitate entry of the top of a bottle into the cap.

FIGURE 12 shows a cap of construction somewhat similar to that shown in FIGURE 11, but instead of the tongue **75** being in two portions, it is formed in a single portion which is joined at the bottom by a circular area **76** which is dished so as to facilitate flexing. Where a tight seal is desired between the tongue and the bottle neck, the extent of dishing may be lessened. To minimize the flexing of the disc **76** it may be desirable to provide any number of wedges **77** which brace the tongue **75** against the disc **76**. Three or four or five such wedges will normally be satisfactory. By stiffening the area **76** a tighter seal is made between the outer surface of the tongue **75** and the inner wall of the neck **79** of the bottle. The tongue gives at its central portion intermediate the disc **76** and the joinder of the tongue with the top **80** of the cap. The juncture of the tongue with the cap is thinner than at the midpoint of the tongue to facilitate flexing.

This cap of FIGURE 12 is provided with a tonguelet **82** which may be suitably located and of any desired shape so that it will flex against the top edge of the neck **79** as indicated in dotted lines. Dotted lines also indicate that as the tongue makes sealing contact with the inner wall of the bottle it flexes below the portion **80**. The portion **80** is not distorted but the tongue flattens on its outer surface and this causes bulging on the inner surface as indicated in dotted lines. Also the area **76** is distorted downwardly as the tongue is moved inwardly as shown in dotted lines.

Wedges such as the wedge **83** may be placed around the cap at three or four or any suitable number of places to reduce the flexibility of the lower portion **84** of the cap. Whether or not such wedges are desirable will depend upon the particular design of the cap and, more particularly, upon the nature of the plastic employed. A polyethylene of very low density, for instance, is much more flexible than a polyethylene of greater density, and when a low-density material is employed wedges such as the wedges **77** and **83** may be desired, whereas in a cap of identical design made of a higher-density polyethylene such wedges may not be needed.

A different type of cap **85** is shown in FIGURE 13. In this cap the tongue **87** has a crescent-shaped cross section which facilitates flexing and facilitates removal from the mold. The crescent-shaped tongue conforms to the shape of the bottle neck more readily than the tongues shown in FIGURES 7 to 9, and the bottle neck enters the space between the tongue and the skirt of the cap more readily. Because of the increase in flexure it is not necessary that this tongue extend downwardly to the cavity for the bead. In the top of the space between the skirt and the tongue there is a tonguelet **89** which will flex inwardly against the top of the bottle, The location of this tonguelet, of course, may be varied. This space into which the neck of the bottle fits is extended upwardly at **90** to provide room for the tonguelet **89** to be flexed inwardly and to provide space which extends into the thick portion, such as the area **92** which extends from the tongue on one side of the closure to the tongue on the other side, to facilitate flexing of the tongue and provide for a tight fit of the tongue with a bottle neck regardless of whether the neck is trimmed long or short.

In FIGURE 13 the distance between the inner wall **95** of the skirt and the peak **96** of the opening **90** may, for example, measure .069 inch. The thickness of the top of the bottle neck which this cap is designed to fit, may for example, vary from .050 to .065 inch. If the distance between the outer wall **97** of the tongue and the inner wall **95** of the bottle measures .045 inch and the distance between the inmost portion **98** of the cavity **90** and the wall **95** is .087 inch, the tongue **87** can flex inwardly and make a tight seal with a bottle neck of any of the aforesaid thicknesses, and whether the bottle neck is trimmed to a longer or shorter length.

FIGURE 14 shows a simplified showing of this type of cap **85** positioned for placement on the neck **86** of a bottle. One or more tonguelets may be provided, but a satisfactory seal may be provided by the tongue alone.

FIGURES 15 to 18 are sections through flexible closure caps with a peaked top. FIGURES 16 to 18 show such caps on bottles with flaring necks, and FIGURE 15 shows a bottle with a neck of the more usual design such as shown in the previous drawings. The peaked tops are to be punctured or snipped off when the liquid contents of the container are to be used. Alternatively, these peaks may be provided with stoppered openings through which small amounts of the liquid contents are to be dispensed. Depending upon the size of the opening molded in the peak or formed in it by the user, the liquid will be delivered in separate drops or a small stream. If the bottle be of a flexible plastic, the liquid may be forced out by squeezing the bottle.

In FIGURE 15, the closure cap **100** is for a bottle with a neck the outer wall of which is substantially perpendicular, except for the snap-on interlock which fits into the annular indentation **101**. The curved annular tongue fits snugly against the inner wall of the neck. It flexes from the top **102** of the space above the top edge of the bottle, so only a relatively small area of contact between the inner wall of the neck and the outer wall of the tongue is required to make a tight seal. It will be noted that the tongue tapers downwardly so that its cross-sectional area gets increasingly smaller, and it can readily be snaked out of the mold. The snap-on inter-engagement at **101** holds the tonguelet **103** in sealing contact with the top edge of the bottle. Thus, a tight seal is insured between the closure and the bottle even though there is significant variation in the extent to which the bottle neck extends into the space between the tongue and the skirt of the cap, and even though there is significant variation in the thickness of the bottle neck.

The bottom of the cap flares away from the outside of the bottle neck to provide a finger hold under the closure to facilitate its removal. It also facilitates placing the cap on a bottle. The construction insofar as it concerns the tongue, the tonguelet and the space in the cap above the top edge of the bottle neck is quite similar to that shown in FIGURE 13.

The bottle of FIGURE 16 is of a different shape. The neck **110** flares widely. The cap fits tight over its top edge. The tongue is reverse-folded, and comprises a thicker outer portion **111** flexibly connected at its bottom with a thinner substantially vertical inner portion **112**. The portion **112** forms the lower portion of the peaked top. The outward pressure exerted by the portion **111** against the bottle neck **110** will depend upon the stiffness of the plastic and the tightness of the fit of the portion **111** in the bottle neck. The retainer ring **115** snaps over the edge, and its diameter is such as to pull the outer edge **116** of the cap into tight contact with the top or outer edge **117** of the flaring bottle neck. This insures a tight seal regardless of the efficiency of the seal between the portion **111** and the inner surface of the bottle neck. To open the cap, the peaked top may be merely punctured, but it is preferably removed at the juncture **119**, or above this.

The bottle neck **120** of FIGURE 17 is similar to the neck **110** of FIGURE 16. The peak **121** (shown only in part) rises from above the bottom of the tongue **122**. The amount of pressure exerted by the portion **123** of the tongue against the bottle neck will depend upon the stiffness of the plastic in the peak, how thick its lower portion is, and the fit of the tongue into the flaring neck. The shaded portion shows a preferred length in which the fitment extends just below the narrowest opening in the neck. The vertical wall of the peak **121** is spaced farther from the portion **123** than in FIGURE 16, so the structure is less rigid and exerts less pressure against the inner wall of the bottle neck, and consequently the fitment is more easily placed on the bottle and removed from it. As indicated in dotted lines, the fitment need not rise to a peak, but may be flat-topped as at **125**. The upper portion may be of any shape, and as in all of the embodiments disclosed herein, it may be perforated to form a shaker top. If desired, as indicated by the unshaded extension, the tongue **122** may extend into the neck beyond the narrowest opening in the neck. To facilitate insertion and removal of such a long tongue, the inner surface of its bottom portion below the narrowest opening in the neck may be corrugated or scalloped, as by providing a plurality of grooves, e.g. eight, that extend up to about the area of the narrowest opening, to facilitate flexing of this portion of the tongue while maintaining contact of the whole of the outer surface of the tongue with the inner surface of the neck when the closure is in place on the neck. The ring **124** serves the same purpose as the ring **115** of the cap of FIGURE 16.

In FIGURE 18, the neck flares less and the tongue **130** is short. It does not form a seal with the neck below the narrowest opening in the neck. The efficiency of the seal is largely dependent upon the inward pulling action of the ring **132** which acts similarly to the rings **115** and **124** of the prior figures. Each of these rings, before application of the caps to the bottle necks is of slightly less diameter than after application, so that when applied the ring is under tension and pulls the cap tight against the top or outer edge of the bottle neck. The portions of the respective caps adjoining the rings are of somewhat smaller diameter than the edge of the bottle necks to which they are applied so as to be stretched against them after being applied.

The tongue arrangements shown can readily be adapted for use on glass milk bottles. However, ordinarily the top of the milk bottle will fit snugly against the bottom of the cap between its tongue and skirt. FIGURE 19 shows a preferred design of milk bottle and closure cap. The top of the milk bottle **140** is concaved at **141**. The plastic fitment **143** is provided with a skirt **144** which fits over the curved outer edge of the top of the bottle and it may be provided with a tab **145** to facilitate removal from the bottle. The tab may be continuous around the top of the bottle or there may be a single tab. The preferred tongue **147** has not only an outwardly curved outer surface to fit into the concave **141**, but the inner surface is also curved so that the tongue tapers downwardly and can readily be snaked out of the mold. As shown in dotted lines, instead of the top of the fitment going straight across the width of the opening, it may be indented as indicated at **148**. The bottle will ordinarily include a paper cap **149** of the usual type.

FIGURE 20 is a modification of the type of top shown in FIGURES 15 and 16 and also indicated by FIGURES 17 and 18 in which the top **152** of the cover tapers upwardly. The top **153** is to be snipped off above the bead **154** for dispensing the contents of the container. The slip-on cap **155** at attached to the long, narrow plastic leader **156**. This leader is attached to the closure at any suitable distance from the top of the closure and at any convenient location. Thus, the top **155** is always readily available to close the top **152** after it has been opened. The groove **157** cooperates with the bead **154** to hold the cap in place. Alternatively, there may be a groove in the top instead of the bead **154**, and in that event there will be a bead at **157** instead of a groove.

FIGURE 21 is a modification of the structures shown in FIGURES 16 to 18 in which the cover **160** is provided with a groove **161** which fits snugly over the top of a flaring spout and the outside portion **162** is of thicker material than the balance of the cover and is elastic and draws the groove **161** snugly against the top of the rim of the spout. The undersurface **163** of the portion **162** is beveled to facilitate placing the cover over the spout. The flange **164** fits snugly against the inner surface of the spout below the flaring portion. The chief difference between the structure shown here and the structure indicated

by the dotted member **125** of FIGURE 17 is that the cover portion **166** of this spout extends directly from the upper portion of the cover—that is, above the narrowest opening therein. The flare of the spout which the cover of FIGURE 21 is designated to fit is somewhat different from that shown in FIGURES 16 to 18, but it is to be understood that the cover of FIGURES 16 and 18 may be modified for use on a spout shaped as that which the spout of the cover of FIGURE 21 is designed to fit, and the cover of FIGURE 21 may be modified to fit on differently shaped flaring spouts such as those shown in FIGURES 16 to 18, for example. The dotted-line indicates how the top slanting surface of the cover **168** may well be distorted when fitted over the flaring top of a spout.

FIGURE 22 shows the top of a container **200**, and this may be a tin or other metal can or a similar container of glass or plastic. The opening is provided within the flaring annular flange **202**. If the container is a tin can this flange is made by spinning the metal. The plastic cover **204** is provided with an annular groove **205** which fits tight against the rim of the flange **202**, the thickened portion **206** of the cover causing retraction of the cover tight around the rim. The tongue **208** fits tight against the inner surface of the flange **202** and the outer surface of this tongue flares outwardly and extends below the narrowest opening within the flange **202** and holds the cover tight onto the container. The flange **208** makes a liquid-tight and preferably also, when required, a gas-tight seal with the rim **202**.

Although the invention relates more particularly to a closure cap, it may be a perforated or other fitment.

The invention is covered in the claims which follow.

I claim:

1. The combination of (1) a container with an opening in the top thereof and (2) a fitment of resilient plastic with a skirt which encloses at least the top portion of the container, with said container and fitment substantially immovably interlocked by a snap-on arangement which comprises a bead on the one engaged in a groove in the other, the top of the container being spaced from the inside of the top of the fitment within the skirt, and an annular tongue depending from the top of the fitment with its outer surface in sealing contact with the inner surface of the container between the top of the container and the top of the location of said interlocking arrangement, the wall of the container being of substantially uniform thickness from said snap-on arrangement to the top of the container and fitting snugly between said tongue and skirt.

2. The combination of claim **1** in which the outer surface of the tongue makes contact with substantially half of the area of the inner surface of the container between the top of the container and the top of the location of the snap-on arrangement on the container.

3. The combination of claim **1** in which an annular tonguelet depends from the inner surface of the fitment between the skirt and the tongue and makes sealing contact with the top edge of the container.

4. The combination of claim **1** in which the container has a neck, the snap-on arrangement on the container is on the neck, and said sealing contact is between the tongue and the inside of the neck.

5. The combination of claim **4** in which the fitment is a cover, and the distance between the top of the snap-on arrangement and the top of the neck is substantially 0.05 to 0.25 inch.

6. The combination of claim **1** in which the area of the fitment within the tongue is united to the tongue adjacent its bottom.

7. The combination of claim **6** in which a tonguelet extends downwardly from the fitment and makes sealing contact with the top edge of the container.

8. The combination of claim **1** in which the tongue is reverse-folded and the area of the fiitment within the tongue is united to the top of the reverse fold of the tongue.

9. The combination of claim **8** in which a tonguelet extends downwardly from the fitment and makes sealing contact with the top edge of the container.

10. The combination of claim **5** in which the fitment is a closure cap.

11. The combination of claim **1** in which the fitment includes a peaked top which extends upward from substantially the location of the top of the tongue.

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