Sept. 5, 1967 C. F. MILLER 3,339,772

CONTAINER CAP

Filed Nov. 16, 1964 2 Sheets-Sheet 1

Fig. 1.

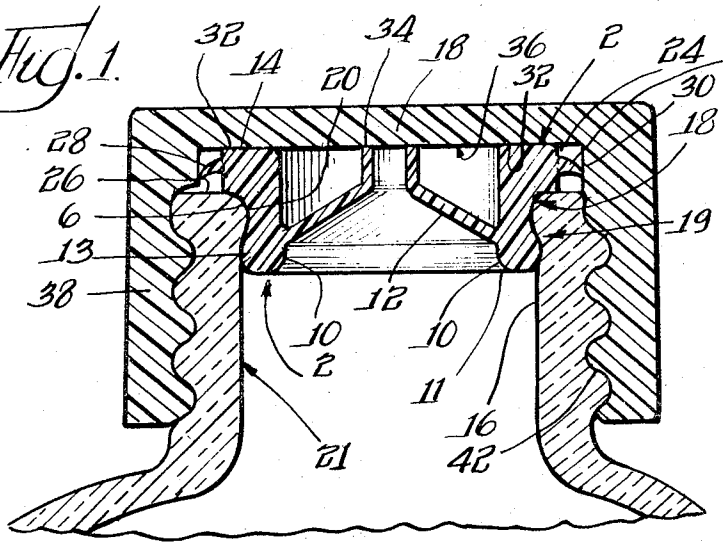


Fig. 2.

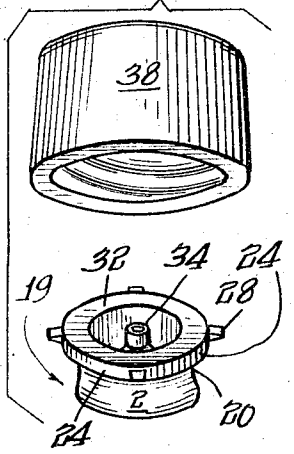


Fig. 3.

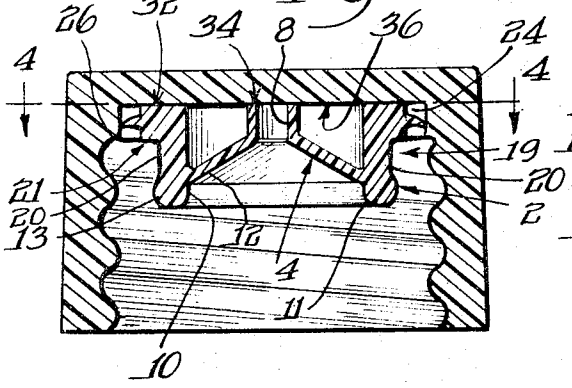


Fig. 5.

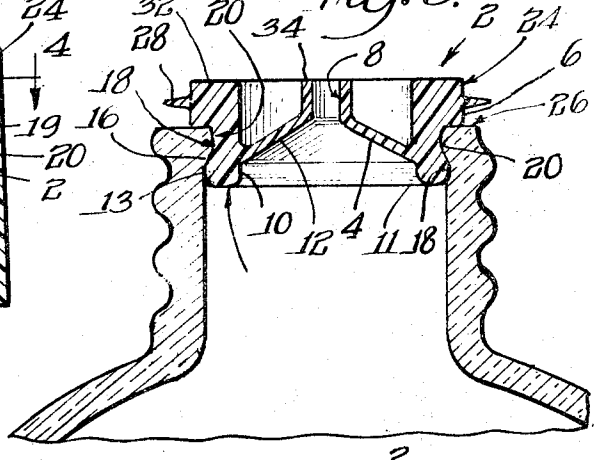


Fig. 4.

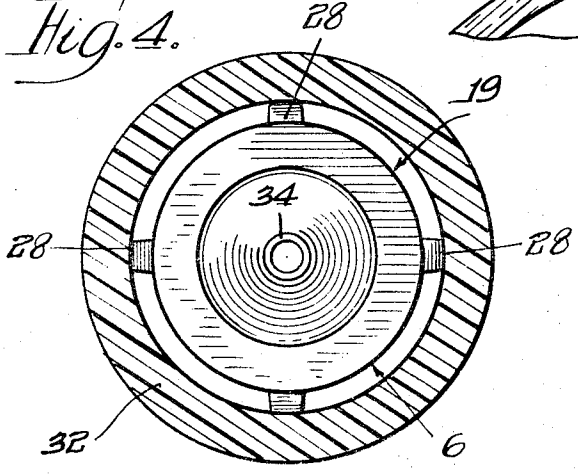
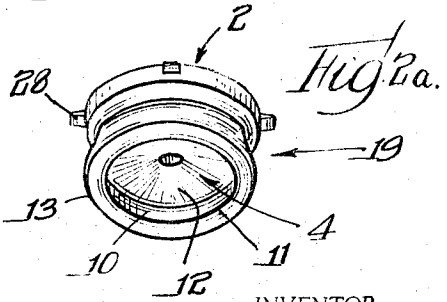


Fig. 2a.



INVENTOR.
Christian F. Miller
BY Olson, Treyler
Wolters & Bushnell
Attys.

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Fig. 6.

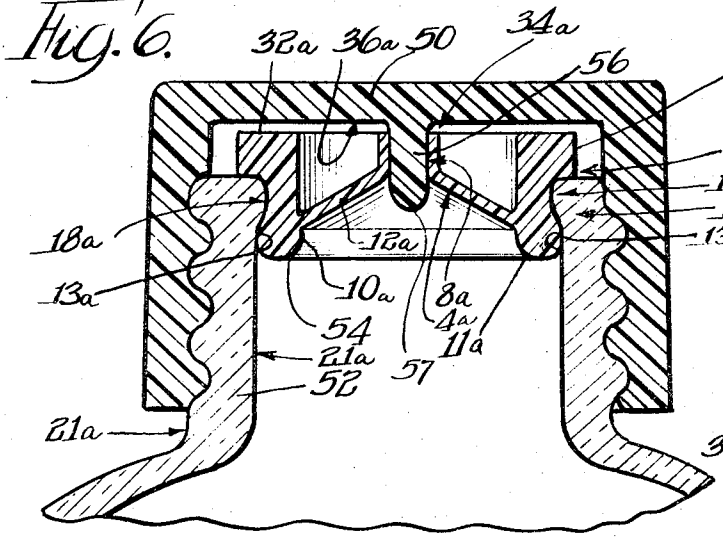


Fig. 7.

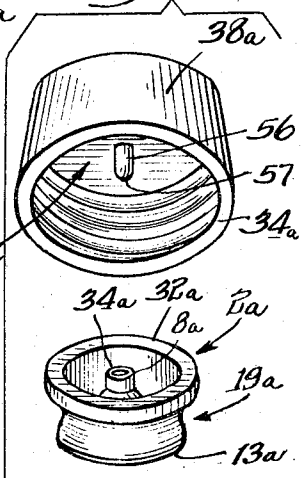


Fig. 8.

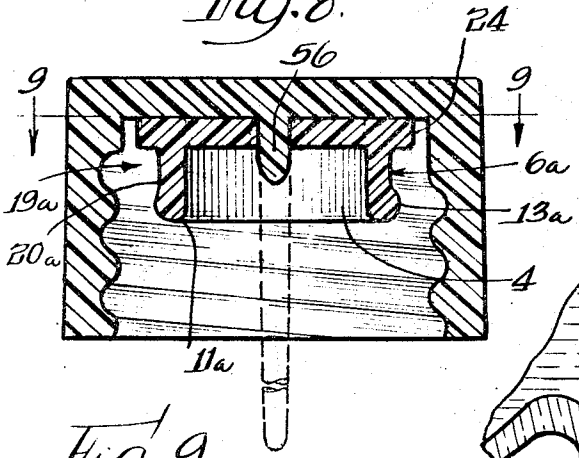


Fig. 10.

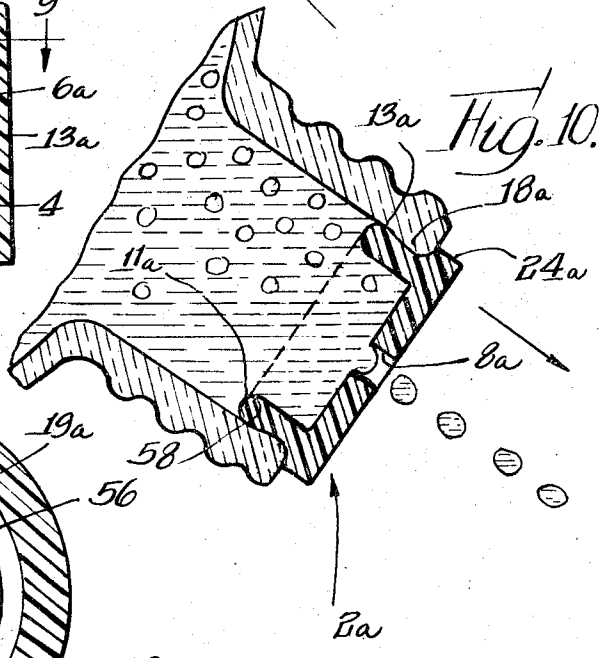
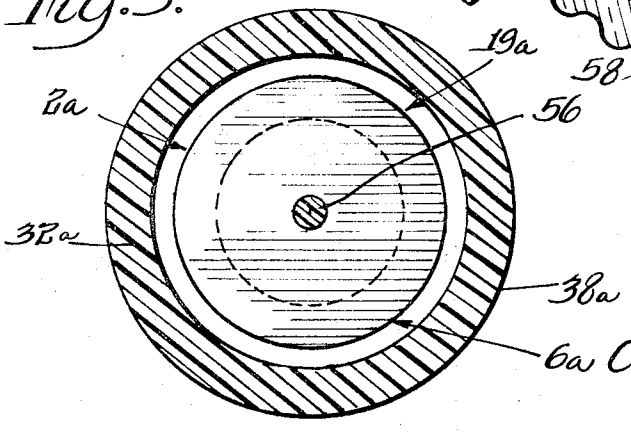


Fig. 9.



INVENTOR.
Christian F. Miller
BY Olson, Trexler
Wolters & Bushnell attys.

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CONTAINER CAP

Christian F. Miller, Palos Park, Ill., assignor to Formold Plastics, Inc., Blue Island, Ill., a corporation of Illinois

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3 Claims. (Cl. 215—40)

This invention relates to a cap device for a bottle or other container, and more particularly relates to a novel cap structure having an insert or perforate spout closure designed for initial attachment to a cap member, becoming thereafter an attachment for the bottle.

In the bottling industry as in many fields today, greater stress is being placed on achieving economy by reductions in material and material handling costs. At the same time, sealing means must be provided within the bottle cap so as to seal the liquid and protect against spillage in all stages of the bottle-capping operation, and against spillage and evaporation of the liquid during shipment, storage and home use.

The pouring nozzle insert as herein contemplated, pursuant to customer requirements and to achieve standardization economies, is suitable for use with a container cap and container alternately as a shaker nozzle, a squeeze nozzle, or a smooth flow pour nozzle dependent on the fluids contained.

The bottle cap or closure means as herein provided is a relatively simple yet aesthetic device, simplicity being required from the viewpoint of inexpensively manufacturing such a device and shipping it to the bottler.

To permit economy of the bottling operation, the device hereof is suitable for shipment in assembled form to the bottler, ready for application to the bottles destined to be sealed.

In the capping area of the bottling operation, an increase in the rate of capping of the bottles results in cost savings to the bottle capper. Since it is essential that the bottle be effectively sealed against leakage during transit, any increase in speed in the capping operation must be consistent with maintenance of an effective or near perfect sealing of the bottles against leakage during transit. The device hereof accomplishes these objectives.

The present invention contemplates a novel pouring nozzle of extremely simple design with consequent cost savings accruing in its manufacture. The pouring nozzle herein contemplated is preferably formed of moldable plastic or the like. It is formed in such shape that it may be positioned immediately after the molding or forming operation within a container cap of the same or any suitable material. The nozzle is positioned in the cap in a snug resiliently held manner so as to permit shipment of container caps and nozzles in mounted, fitted together condition. The cap and nozzle are firmly held together by means provided integral with the cap and nozzle, so that the cap and nozzle remain together during shipment even under adverse conditions such as rough handling or overturning of the containers in which the caps and nozzles are shipped.

On receipt of the assembled caps and nozzles of the present invention by the bottle capper, no problem is involved in segregating caps and nozzles and fitting a nozzle into a cap since they are already assembled ready for the capping operation. Upon attachment to the container, the insert becomes a part thereof.

Thus, an important object of this invention is to provide a novel nozzle insert or spout closure of comparatively simple and economical design suitable for use in preassembled cap and nozzle insert relationship, the same basic insert being suitable for use in sealing a container and functioning alternately as a shaker nozzle, a squeeze nozzle or a smooth flow nozzle.

Another object is to make a nozzle insert of such structure that it may be readily formed of moldable plastic material and which insert is suitable for immediate assembly by the manufacturer within a container cap.

A further and important object of this invention is to provide novel container cap holding means integral with the insert so as to prevent disassembly of the nozzle insert from the container cap during shipment, the insert thereafter becoming a part of the container.

Another object is to provide a nozzle which is suitable for use in mass production methods of bottle capping.

A further object is to provide a pouring nozzle insert which is suitable for quick hand capping operations.

It is another object of the invention to provide nozzle sealing and holding means which will serve to effectively seal the liquids within the container from the atmosphere despite repeated removal and replacement of the container cap.

Another important object of the invention is to provide a novel cap sealing device integral with or molded to the cap whereby to effectively seal off the container pouring nozzle insert means against the possibility of spillage and leakage in the event that the container is overturned while the container cap is relatively loosely secured thereto.

These and other objects of this invention will appear from the description, the accompanying drawings and appended claims.

For a more complete understanding of this invention, reference should now be had to the drawings wherein:

FIG. 1 is a fragmentary elevational view showing a preferred embodiment of my improved pouring nozzle insert in its relationship to a bottle having a threaded neck and a bottle cap threaded to fit the threaded bottle neck;

FIG. 2 is a perspective view of the nozzle insert and bottle cap of FIG. 1 showing their relationship more clearly;

FIG. 2*a* is a somewhat enlarged perspective view of the under side of the nozzle insert shown in FIG. 2;

FIG. 3 is an elevational view on a smaller scale of my improved nozzle insert in assembled relationship to a container cap as they would be shipped to a bottler, with details of the insert more distinctly shown;

FIG. 4 is a plan view showing my invention in its assembled relationship to the container cap, taken along the section lines 4—4 of FIG. 3;

FIG. 5 shows my pouring nozzle insert in its seated relationship to a bottle with the cap removed showing the manner in which the insert is secured in the neck of a bottle;

FIG. 6 is a fragmentary elevation view of a modification of my invention showing a novel provision for a bottle cap suitable for effectively sealing liquids within the bottle from evaporation or spillage through the nozzle insert of this invention, the cap provision also serving as an integral insert holding means to prevent disassembly of the nozzle insert from the cap during shipment;

FIG. 7 is a perspective view of the nozzle insert and the novel container cap shown in FIG. 6;

FIG. 8 is an elevation view showing another embodiment of the spout closure in assembled relationship to the container cap of FIGS. 6 and 7 and more clearly illustrating the manner in which the cap and spout closure are held together during shipment;

FIG. 9 is a sectional plan view taken along the lines 9—9 of FIG. 8 showing the concentric relationship of the cap to the bottle spout closure; and

FIG. 10 shows the novel spout closure, utilized as a shaker nozzle, in assembled relationship to a bottle with the bottle in shaking relationship to the horizontal showing drops of fluid shaken from the bottle through the insert.

Referring now more particularly to FIGS. 1–5, the improved nozzle insert 2 is shown having an inner infundibuliform or inverted funnel shaped portion 4 clearly shown in FIG. 2*a* and a generally circular circumferential outer rim element 6. The inner portion of the spout closure is seen to have two generally cylindrical hollow coaxial portions 8 and 10 through which the liquids are poured and a conical central portion 12. The uppermost portion 8 is seen to have a relatively small inner diameter in comparison to the inner diameter of the lower portion 10 which is also generally cylindrical but with a diameter several times the diameter of the upper portion 8.

The inner edge 11 of the lower cylindrical portion 10 is preferably rounded for streamline laminar flow of liquids within the bottle when the bottle is tipped over for pouring with the fluids flowing around the lower rounded edge 11, thence along the conically shaped central portion 12 to the stem-like lips of the nozzle 8.

Integral with the inner funnel shaped portion and connected thereto at the lower cylindrical portion 10 is a stepped down outer rim element or S-shaped outer surface 19 which is seen to be generally circular in cross section and symmetrically concentric with the infundibuliform element.

The lower surface of the outer rim element is outwardly shaped successively downwardly concavely and convexly having a convexly shaped bulbous portion 13. This lower surface 19 is so shaped and proportioned to act in cooperative sealing interfitting relationship with the neck of a bottle 21 which has a complementary convexly S-shaped bulbous inner lip portion 18 clearly shown in FIG. 5.

The bulbous portion 13 of the outer rim element fits snugly into the neck of the bottle. As the bottle cap is screwed on the bottle, the cap urges the convexly rounded portion 13 of the spout closure downwardly into the bottle past the obstruction formed by the bulbous bottle lip 18 which urges the bulbous portion 13 radially inwardly; and the conical shaped portion 12 of the closure flexes upwardly, as shown in dotted lines in FIG. 1 to permit such radially inward movement of the bulbous portion.

When the bulbous portion 13 has passed downwardly of the bottle lip 18 into the bottle, the conical portion 12 has sufficient flexure to force the bulbous portion 13 outwardly to its original diameter, in which position the portion 13 hugs the inside of the bottle neck with the bulbous portion 13 of the bottle fitting snugly into a concavely shaped complementary portion or cavity 20 of the outer rim element. The cavity 20 has a configuration corresponding closely to the inner lip portion 18 of the bottle to permit the bottle neck to fit sealingly within the cavity.

Extending upwardly from the cavity portion 20 of the outer rim is a generally cylindrical surface 24 of relatively greater diameter than the inner diameter of the bottle with a part of the cavity portion 20 having a planar horizontal surface 21 supported or resting upon the upper surface or outer lips 26 of the bottle.

As the cap is screwed down tightly on the bottle, the surface 24 stops the closure from further downward movement into the bottle and the surface 24 is then compressed between the bottle cap and the upper surface 26 of the bottle, sealing this upper surface, and further urging or forcing the cavity 20 and the bulbous portion 13 outwardly into close sealing proximity to the bottle neck. The horizontal surface 21 while acting to stop the closure from being forced further than desired into the bottle thus also acts cooperatively with the cap, to force the S-shaped outer surface 19 into sealing relationship with the S-shaped lip portion 18 of the bottle.

The outer cylindrical surface of the pouring nozzle insert is seen to have outwardly extending protuberances 28 of which two pairs of two each are illustrated in FIG. 4. These protuberances 28 may be of beak-like shape and extend outwardly on either side of the spout closure in pairs of two. Applicant preferably utilizes two pairs of the protuberances equidistantly spaced around the periphery of the spout closure although one pair or a plurality of equally spaced protuberances could serve the purpose here intended, that is, of flexibly and resiliently hugging the inner sides of a bottle cap and preventing separation of the cap and closure assembly prior to completion of the bottle capping operation.

The distance between tips of a pair of opposing protuberances is of slightly greater distance than the inner diameter of a container cap designed to be used in cooperation with a spout closure. As will be seen from FIG. 1 and FIG. 5, the spout closure fits snugly within the container cap with the protuberances, formed integrally with the spout closure, being sufficiently resilient that they are wedged downwardly within the cap where they firmly hold the spout closure in assembled relationship within the container cap after placement therein even though subjected to much subsequent abuse in shipping, as shown in FIG. 3. However, as the cap is assembled onto the bottle, the insert is permanently transferred thereto, as shown in FIG. 5.

The container spout closure and bottle cap are formed advantageously of moldable resinous plastic. The cap is preferably formed of a relatively rigid plastic, such as polystyrene, while the spout closure, requiring sealing qualities, is preferably formed of a relatively softer, more resilient plastic such as polyethylene or the like.

The bottle as illustrated in FIG. 1 is of the threaded variety with corresponding threads formed in the inner cylindrical surface of the bottle cap.

FIG. 2 illustrates most clearly the manner in which the spout closure is designed to fit within the bottle cap; and it is to be noted that the bottle cap is generally concentric with the container spout closure. The concentricity of the bottle cap, the spout closure and the bottle itself is illustrated most plainly in FIG. 4.

Modified embodiments of the invention are shown in FIGS. 6–7 and in FIGS. 8–10, wherein like numerals have been used to designate parts which are similar to those found in the embodiment of FIGS. 1–5. The suffix letter *a* is employed to distinguish those elements associated with the embodiments of FIGS. 6–10.

FIG. 6 illustrates a bottle cap, bottle and spout closure device in assembled relationship where it is seen that the bottle cap has an inner centrally positioned downwardly extending protuberance or stalactiform 56 integral with the cap and designed for interfitting sealing coaction with the central stem-like or tube-like portion 8 of the spout closure. As will be appreciated, the provision of such a stalactiform provides initial holding means for the spout closure and also provides an additional safeguard against spillage of liquids within the bottle when the bottle cap may not yet be sufficiently tightly threaded to cause the coacting sealing surfaces 32 and 34 of the spout closure and the flat bottom portion 36 of the cap to engage one another, as is illustrated in FIG. 6. As will be understood, however, in most instances these surfaces will be brought into contact by closure of the cap. The spout closure will be transferred to the bottle upon application of the cap to the bottle, as in the embodiment of FIGS. 1–5.

The depending portion 56 thus functions in a similar manner to the outwardly extending protuberances 28. The stalactiform 56 extends through the stem-like portion 8 of the nozzle insert and flexibly and resiliently presses against the hollow inner surface of the upper portion 8, thus, when in assembled position in a container, urging the lower surface 19 of the outer rim element into vapor sealing contact with the neck of a bottle 21.

The stalactiform may be considerably longer extending in a tapered manner downwardly to a point adjacent the bottom of a container, as suggested by the dotted lines in FIG. 8, thus serving as a dabber for perfume or the like. FIGS. 8–10, also show a modified and preferred shape of spout insert.

In FIGS. 8–10 the flat upper portion of the insert is joined to the outer rim element **6** at substantially a right angle; and holds the outer rim bulbous portion **13** snugly and resiliently outwardly so that it fits sealingly and grippingly against the inner lip portion **18** of a bottle when inserted into a bottle or other container.

This method in which the depending portion effectively seals off the container spout even though the cap is not sealed tightly is particularly advantageous, as will be readily appreciated. It is frequently the case that a person will hesitate to tightly screw on a container cap for fear of later inability to remove the cap. Thus, the depending portion **56** permits one who may be the ultimate consumer of the liquids within the container to relatively loosely screw on the cap without danger of the liquids spilling or the bottles overturning; and without evaporation. This is especially desirable as a consumer incentive where the liquid contained within the bottle are fluids such as bleach which may cause discoloration or deterioration of the surfaces upon which spilled; or where the liquid is an expensive perfume which tends to evaporate quickly.

In summary, applicant has provided, by his invention, a novel spout closure and container cap.

Recognizing the need for a simple spout closure which could be shipped preassembled within the bottle cap, applicant has provided interfitting means upon the cap and spout closure to facilitate initial assembly. Thus during shipment, the spout closure is firmly held within the bottle cap ready for assembly on the bottle.

Even though subjected to much handling abuse during shipment, the bottle caps and spout closures remain assembled thus saving the bottler unnecessary time in trying to assemble spout closures and bottle caps. The danger of breakage of the relatively weak spout closure devices provided, by the strong fingers of unskilled laborers assembling them into the caps or bottles, is thus avoided.

The bottle caps and spout closures in assembled relationship are then ready for the bottling operation. By the reason of extreme simplicity of applicant's design, the bottler finds himself in a highly desirable position: he is able to have his workmen manually cap the bottles; or the bottler may follow automatic assembly line techniques. In either capping method the bottler is able to better utilize the preassembled units and thus achieve the speed so desirable for economy of operation.

After the bottle is filled with the liquids, the bottle cap-spout closure assembly is secured to the bottle. In the case of the threaded type bottle illustrated, this is done by simply screwing down the bottle cap. The inner neck of the bottle is provided with a bulbous portion having a smaller inner diameter immediately adjacent the outer surface of the neck than the inner diameter of the rest of the neck.

The spout closure device is provided with a bulbous convex portion and a cavity portion, the bulbous portion being of slightly greater outer diameter than the inner diameter of the corresponding bulbous portion of the bottle neck. On applying screwing pressure on the cap, the bulbous portion of the spout closure is pressed inwardly by the bulbous portion of the bottle and on application of further pressure the convexly and concavely shaped outer portion of the spout closure seats itself within the bottle, the bulbous portion of the spout closure resiliently engaging the inner portion of the bottle neck.

The upper portions of the spout closure are generally coplanar and when the bottle cap is screwed down upon the bottle, the coplanar surfaces of the spout closure sealingly engage the planar bottom surface of the bottle cap.

The bulbous portion of the bottle is fitted snugly within a cavity provided in the spout closure and effectively prevents any liquids within the bottle from seeping out around the lips of the bottle. The coplanar abutting relationship of the bottom surface of the cap well and the upwardly facing surfaces of the spout closure further seals off the bottle against seepage. Thus the bottles are ready for shipment to the ultimate consumer with a double safeguard against leakage or seepage of the fluids even though the bottle may be overturned during transportation.

On the consumer's receipt of the capped bottle, it is ready for use by merely unscrewing the bottle cap. The cap is found to be readily removable without any real obstruction by the spout protuberances provided for the purpose of holding the spout closure and the bottle cap in assembled relationship. The spout will remain on the bottle.

Resealing of the container is found to be relatively simple. Exceptionally good sealing ability of the bottle results by reason of the manner in which the spout closure is fitted to the corresponding coplanar inner bottom surface of the bottle cap.

In a modified form of applicant's invention, a depending protrusion or stalactiform is provided centrally located on the bottom of the bottle cap. The stalactiform is generally cylindrical and of such length and size to fit tightly and resiliently within the stem-like upper portion of the spout closure device thus providing a high degree of insurance against leakage of the fluids within the container on overturning of the container in spite of the fact that the bottle cap is not tightened; and performing a further function of frictionally holding the bottle cap and spout closure in assembled relationship during shipment.

From the description above given and the advantages of applicant's novel invention, it is seen that applicant has accomplished the objects heretofore set forth in an exceptionally simple manner yielding a relatively low cost bottle spout closure device which may be shipped to the bottler in preassembled relationship to the bottle cap. This results in savings in materials handling costs for the bottler.

Applicant has also provided a novel device which is seen to provide an exceptional degree of sealing ability of his spout closure and bottle cap against leakage of the contents of the bottle around the sides of the spout closure or around the inner portions of the bottle cap.

Since many modifications of the invention described above and illustrated in the various figures may obviously be made, I do not wish to be limited thereto and it is thus contemplated by the appended claims to cover any modifications as fall within the true spirit and scope of this invention.

The invention is hereby claimed as follows:

1. A cap device comprising: a spout closure of comparatively resilient material, including a tubular skirt and a generally annular member, said skirt having an outer surface sized to sealingly and affixably engage a container neck and said annular member spanning said skirt and having a central throat defining a dispenser orifice; and a cap element of comparatively rigid material, including a cup-shaped body and a central stem portion extending from the floor of said body coaxial with the walls thereof; said stem portion slidably stretchably entering said throat whereby to permit pre-assembling said spout closure and said cap element before affixing same to a container, said stem portion having a greater axial extent than said throat whereby said stem portion acts to clean residual dispensed material from the walls of said throat each time said cap element is replaced on a container neck in which said closure has been mounted.

2. A cap device as claimed in claim **1** wherein, said stem portion has a closed extremity whereby the walls of said stretchably engaged throat act to wipe said stem portion substantially clean each time said cap element is removed from a container to which said cap element and said closure have been assembled.

3. A cap device according to claim **1** wherein the diameter of said outer surface is a multiple of the diameter of

said dispenser orifice so as to arrange said orifice for dropwise dispensing action.

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JOSEPH R. LECLAIR, *Primary Examiner.*

GEORGE O. RALSTON, *Examiner.*

R. PESHOCK, *Assistant Examiner.*