

Aug. 19, 1958

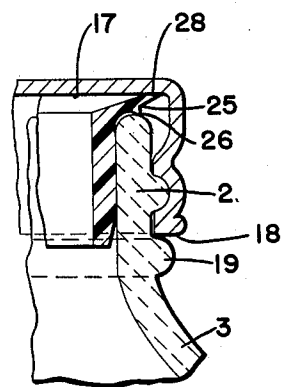
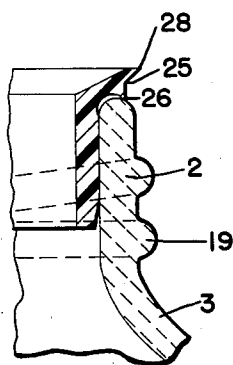
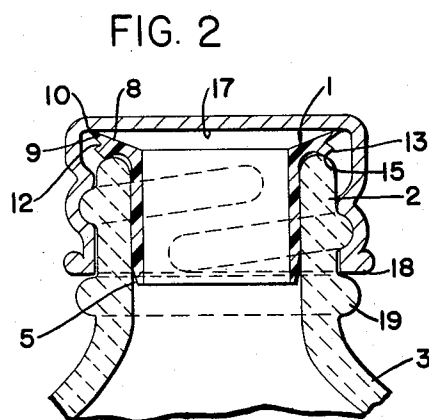
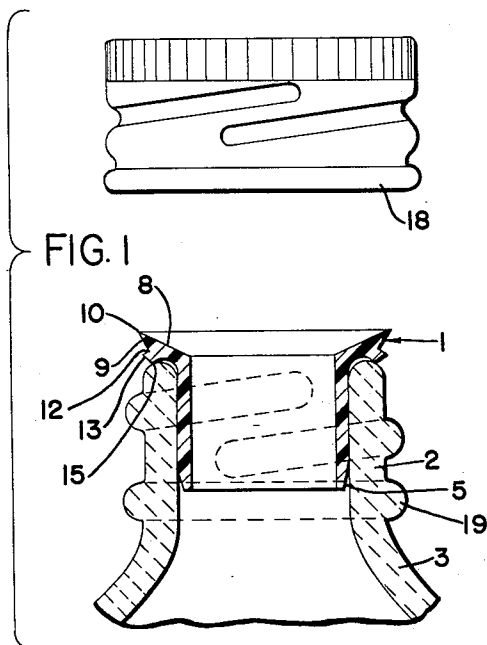
J. G. LIVINGSTONE

2,848,145

POURING ADAPTER

Filed March 17, 1955

2 Sheets-Sheet 1



INVENTOR.
JAY G. LIVINGSTONE

BY

Jordan C. Vasek

ATTORNEY

Aug. 19, 1958

J. G. LIVINGSTONE

2,848,145

POURING ADAPTER

Filed March 17, 1955

2 Sheets-Sheet 2

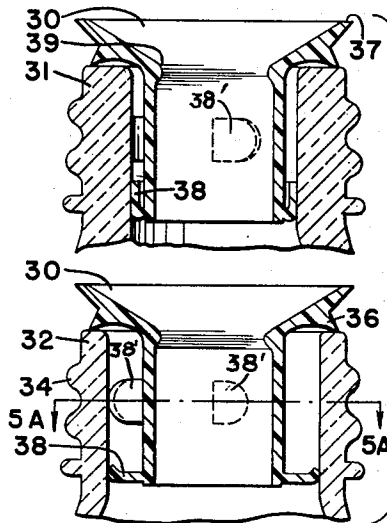


FIG. 5

FIG. 5A

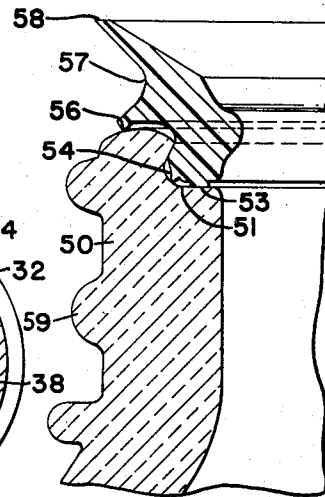


FIG. 8

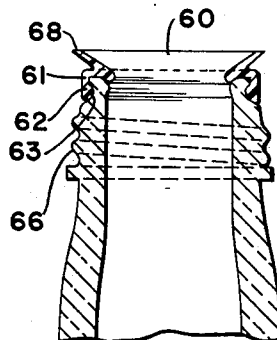


FIG. 9

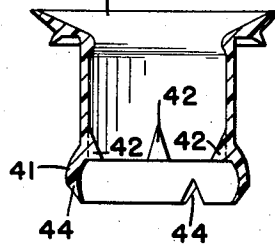


FIG. 6

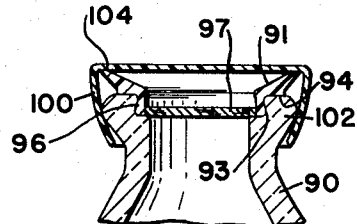


FIG. 13

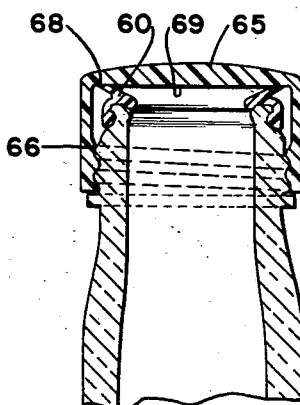


FIG. 10

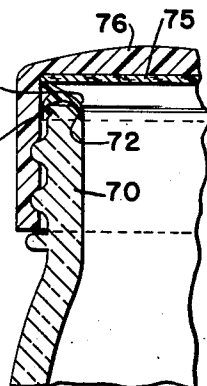


FIG. 11

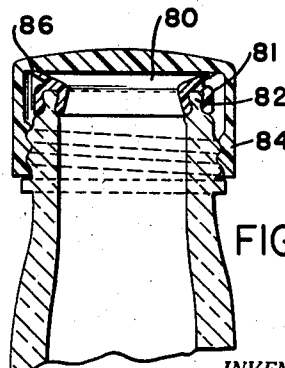


FIG. 12

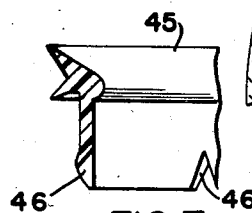


FIG. 7

INVENTOR.
JAY G. LIVINGSTONE

BY

Forbes C. Mack

ATTORNEY

2,848,145

POURING ADAPTER

Jay G. Livingstone, Akron, Ohio

Application March 17, 1955, Serial No. 494,985

6 Claims. (Cl. 222—542)

This invention relates to an adapter designed to be fastened to a bottle or the like, and preferably to the neck of the bottle. The adapter is non-dripping and prevents liquid from running down its outer surface and thence over the outside of the bottle to which it is attached. The invention includes all combinations of the adapter with a bottle or the like, including combinations with a cap which forms a tight seal with the top of the adapter when it is screwed onto threads on the neck of the bottle or is otherwise attached to the bottle. The invention will be described more particularly in connection with the use of the adapter on a bottle.

The adapter is made of resilient plastic such as polyethylene or the like. The top of the adapter includes a flange which extends upwardly and outwardly from the annular body portion of the adapter which contacts the end of the neck of the bottle and makes a tight seal with it, particularly when a cap is fastened onto the bottle and presses the adapter against the end of the bottle.

A cap of metal or plastic (either rigid or resilient) or the like is advantageously provided to fit over the adapter, and if threads are provided on the bottle neck the cap will be designed to screw down on these. The cap may be held on the bottle by other means. The inner surface of the cap is provided with a surface which presses flat against the outer edge of the flange and deflects it outwardly when the cap is fastened tight on the bottle, whereby a tight seal is formed between the flange and the cap.

In order to produce a tight seal the area of contact between the flange and the inner surface of the cap is narrow, and the cap may produce mere line contact with the flange. The cap applies pressure to the flange around its entire top, in a circle located radially outwardly from the outer edge of the area of support of the annular body portion of the adapter on the end of the bottle. While the outer edge of the flange is flattened as pressure is applied by the cap, and a liquid-tight seal is thereby made between the edge of the flange and the cap, the under surface of the body portion of the adapter presses against the top of the bottle and makes a tight seal with it. The under surface of the annular body portion of the adapter may advantageously make substantially line contact with the end of the bottle which insures a tight seal. Thus, when the cap is screwed down on the bottle there is no danger of liquid escaping from the cap, even though the threads of the cap do not make a tight seal with the threads of the bottle.

The invention will be further described in connection with the accompanying drawings, in which—

Fig. 1 is an exploded view showing a bottle with the adapter in its neck, and a cap above the same, the bottle and adapter being shown in cross section;

Fig. 2 is a cross section of the same with the cap applied to the bottle;

Figs. 3 and 4 are similar views of a modified form of the adapter with the same bottle and cap;

Fig. 5 shows two sections through an adapter in differ-

ent bottles of the same outside diameter but different inside diameters; Fig. 5A is a section on line 5A—5A of Fig. 5;

Figs. 6 and 7 are sections through adapters of somewhat different design which have a bead at their lower edge to assist in holding them in a bottle;

Fig. 8 is a section of an adapter in a bottle with a countersunk recess at the top;

Fig. 9 shows an adapter and bottle with means for holding the adapter to the outside of the neck of the bottle;

Fig. 10 shows the same with a cap on the bottle;

Fig. 11 shows a modification of the adapter of Fig. 10 adapted for a different bottle and using a gasket in the cap;

Fig. 12 shows a further modification on a bottle of different design; and

Fig. 13 shows an adapter in a bottle such as a milk bottle with a cap on the adapter.

The adapter 1 is inserted in the neck 2 of the bottle 3. The adapter includes the cylindrical bottom portion 5 which may be tapered somewhat to facilitate insertion in the neck of the bottle. The cylindrical portion 5 is designed to make a tight fit within the neck of the bottle, and some compression of the cylindrical portion is desirable when inserted in the bottle.

The flange at the top of the adapter is provided with the upwardly and outwardly sloping upper surface 8 over which liquid may be poured as the bottle is tilted in any direction. The undersurface 9 of the flange meets the upper surface 8 at the line 10. This forms a thin edge at 10 which prevents the bottle from dripping. The line 10 is farther from the axis of the adapter than any other part of the adapter. Thus, when liquid is poured over this line edge 10, there is no interference with any other part of the adapter.

In the embodiment of the invention shown in Figs. 1 and 2 there is a groove 12 immediately under the edge 9, and a lip 13 below this. Although there normally is no drip from such a thin pouring edge as the edge 10, and no liquid retained on the edge runs down the outer surface of the adapter when the bottle is righted after pouring, any drop which may be present will collect in the groove 12 and will not run down onto the bottle.

The bottom surface of the flange is provided with the circular boss 15 which forms line contact with the top end of the bottle. When the cap is screwed onto the bottle and presses against the edge 10 of the adapter, some of the pressure is transmitted to the boss 15 and a liquid-tight seal is formed with the upper end of the bottle. Pressure on the edge 10 which is located radially outwardly from the line 15 tends to squeeze the line 15 inwardly over the edge of the bottle and, therefore, the point of contact 15 is preferably located outwardly from the center of the end of the bottle.

A comparison of the adapter as shown in Figs. 1 and 2 shows how the adapter is compressed when the cap is screwed down onto the bottle. The line 10 makes sealing contact with the flat inner surface 17 of the cap. The lower edge 18 of the cap does not contact the bead 19 around the bottle, because this would prevent the application of the desired pressure between the upper edge of the flange and the inner surface of the cap. The compression of the flange when the cap is screwed on tight, is sufficient to press the cap up and thus cause the threads on the cap to bind against the threads on the bottle, and prevent any tendency of the cap to become unscrewed in transit or storage.

Figures 3 and 4 show a somewhat modified form of the adapter in which there is no groove comparable to the groove 12 shown in Figs. 1 and 2. The under surface 25

3

of the flange shown in these two views tapers downwardly to form the boss 26 which makes no more than line contact with the top of the bottle. The outer edge 28 of the flange is somewhat wider than the edge 10 of the flange of Figs. 1 and 2, but the flange is so designed that when liquid is poured over this flange it touches no more than the upper surface so there is no drip or run-down. The pressure of the cap on the outer edge of the flange produces sealing contact between the edge of the flange and the cap and also between the under surface of the flange and the end of the bottle.

If the bottle contains liquid, and is turned over, the liquid may collect in the cap but there will be no leakage between the cap and the adapter because of the tight seal formed between the cap and the edge of the flange. The under surface of the adapter makes a tight seal with the bottle, so there is no danger of leakage between the adapter and the bottle.

For alcoholic liquors and other materials which may be affected by aluminum or the other metal of a metal cap, the inner surface of the cap may be coated with a suitable lacquer or plastic. Ordinarily, the surface coating will not cover the threads, as in applying the cap the coating on the threads might be damaged. The coating may be a lacquer coating. Alternatively, a disc of plastic may be sealed to the flat under surface 17 of the metal cap. It is not necessary that the cap be perfectly flat across the top. If it is dome shaped, a thin sheet of the plastic may be sealed to the inner surface before the dome is drawn into the cap, and this plastic will then be shaped as the dome is drawn into the cap. If a curable plastic such as rubber is employed, the plastic may be laminated to the cap in an uncured condition and be cured after the cap is shaped.

Although bottle manufacturers make special bottles with necks of controlled inside and outside diameters, generally only the outside diameter is controlled and this is particularly true of bottles which are designed to have caps threaded onto them. Thus, the inside diameter of bottles may vary over a considerable range. Figure 5 illustrates the same adapter 30 in the necks of two different bottles 31 and 32. The outside diameter of both necks is held to the same close minimum tolerance because the root diameter of the threads and their outer diameter must be substantially the same on all bottles of a given nominal size to prevent standard caps from jumping the threads. Therefore, the adapter is designed to contact the end of the bottle in the same location near its outer edge, so that regardless of whether the bottle has a thick or thin wall the ring of the adapter will surely contact the end of the bottle. The inside diameter of neck 31 is much smaller than the inside diameter of neck 32. Both necks are externally threaded at 34. The adapter is designed to make contact with the end of the neck of the bottle by means of the ring 36. This ring is located so as to contact the outer edge of a bottle to insure its making contact with the end of the neck of the bottle regardless of its inside diameter. Thus these adapters are designed to function properly when inserted in any bottle made to the standard specifications. The outer edge of the ring 36 is indented only slightly from the outer edge of the flange 37 at the top of the adapter.

The lower flange 38 makes contact with the inner surface of the bottle neck. This is flexible and in a bottle having a neck of smaller inside diameter, this flange 38 is flexed upwardly as illustrated in the upper of the two views shown in Fig. 5. The plastic is somewhat stiff and the lower of the two views shows that it is only necessary that this flange 38 make more than bare contact with the inner surface of the neck in order to center the adapter within the neck and hold it there. The stiff flexible fins 38' (of which there usually need be no more than three or four) center the upper portion of the adapter in the bottle neck. These fins extend from the outer wall of the adapter at an angle of about 20° away

4

from a true radius, and may be folded substantially flat against the adapter wall (as in the upper view of Fig. 5), or may extend substantially straight with only their tips bent against the bottle neck as in the lower view of Fig. 5 and in Fig. 5A. These two views show the extreme situations. Usually the inner diameter of the neck of a standard bottle will be between the extremes shown.

Designing the upper surface of the flange at a certain angle, the bead 39 occurs at the union of the flange and the cylindrical wall of the adapter, as a necessary result of providing the necessary wall thickness at this juncture. By enlarging the bead, the size of the opening in the adapter can be restricted to provide the small opening desired for sauces, toilet water, etc. This bead performs a very useful function in adapter designed for certain purposes. For instance, where only a few drops of a liquid are desired, as for example a few drops of Worcestershire sauce (or any other hot meat sauce or the like), this bead breaks the smooth flow of the liquid when the vessel is moved from a pouring to a non-pouring position and permits the delivery of regulated small quantities.

The adapter 40 of Fig. 6 is provided with a hollowed-out bead 41 near its lower edge. This bead makes contact with the inner surface of the neck of the bottle. The triangular lugs 42 give rigidity to the cylindrical portion of the adapter and tend to stiffen the adapter and hold the bead 41 against the inside of the neck. The inner surface of this bead is hollowed out somewhat to render the bead flexible. Three notches, such as the notches 44 which extend upwardly from the lower edge of the adapter to the portion of largest diameter, permit reduction in the circumference of the bead as it is forced into the neck of a bottle. The area of these notches is preferably greater at the inner wall of the adapter than at the outer wall, as illustrated. Any number of notches may be used. The plastic is sufficiently stiff so that the bead tends to assume the position illustrated in Fig. 6 and makes a tight fit with the inner surface of the bottle regardless of its exact diameter.

The adapter 45 of Fig. 7 is somewhat similarly constructed. However, the bead is not hollowed out and may be somewhat stiffer. The notches 46, of which there may be a small number such as three or four, permit the bead to be squeezed and its circumference reduced as the adapter is forced into the neck of a bottle.

Figure 8 illustrates an adapter on a bottle 50. This bottle 50 is provided with the recess 51 which is like the recess in the top of a milk bottle. The adapter makes contact with the recess at two places and also contacts the top of the bottle near its outer edge. The contact 53 is relatively wide and supports the adapter in the recess. The line contact 54 forms a tight seal. The lip 56 also makes line contact with the end of the neck of the bottle, particularly when a cap is fastened on the bottle and makes sealing contact with the edge 58 of the flange. The radius 57 minimizes flexing of the lip of the pouring spout when the cap is screwed down on to the neck, thereby providing greater pressure and a better seal between the edge 58 of the flange and the cap, and also between the lip 56 and the end of the neck. Threads 59 are provided for fastening a cap to the bottle.

Although generally the adapter will fit inside of the neck of a bottle, this is not necessary. The neck of the bottle may be shaped so that an adapter provided with a skirt fits outside of the neck. It may be held in place by a bead or the like of proper design. Such an adapter may be snapped in place on the bottle.

Thus, the adapter 60 of Figs. 9 and 10 is provided with a snap-on flange 61. The bottom edge of the flange is thickened somewhat internally to form the bead 62 which fits into the groove 63 in the outer surface of the neck of the bottle. The inner surface of the bead and the outer surface of the groove are complementary. When the adapter is snapped in place, it is supported against the top edge of the bottle neck so that when pressure is

5

applied to the top of the adapter, a good seal is formed between the adapter and the top edge of the bottle. Thus, when the cap 65 is threaded onto the external threads 66 on the neck of the bottle, a tight seal is formed not only between the adapter and the top edge of the bottle, but also between the top edge 68 of the adapter and the under surface 69 of the top of the cap.

Figure 11 shows a bottle 70 of somewhat similar design. The adapter 71 does not fit tight against the top end of the neck of the bottle, but makes contact at 72 at the inner edge of the end of the neck and snaps over the edge of the neck, and the bead 73 fits into a suitable groove around the top edge of the neck. The liner 75 in the cap 76 prevents the contents of the bottle from contacting the cap which may be made of taste-imparting metal, plastic or the like. Thus, the bottle may be filled with a foodstuff or a beverage or the like which it is not desirable to bring into contact with the cap. The liner 75 prevents this. It may be a separate disc or a lacquer coat. The adapter makes a tight seal with the end of the neck of the bottle and also with the liner, preventing the contents of the bottle from coming in contact with the cap.

Figure 12 shows a snap-on adapter 80 of a still different design. The under surface of this adapter is provided with the groove 81, and the rim 82 of the top of the bottle fits into this groove when the adapter is snapped in place. The cap 84 makes contact with the outer rim 86 of the flange of the adapter, and screwing the cap onto the bottle insures the formation of a tight seal between the adapter and the top end of the neck of the bottle.

The bottle 90 of Fig. 13 is a milk bottle. The adapter 91 is of the usual design except that it is adapted to fit into the recess 93 and also against the top rim of the bottle at 94. The depending lip 96 of the adapter is sufficiently narrow to permit the insertion of the cap 97 into the adapter to rest on the inner edge of the recess. This cap may be of the usual cardboard or chipboard construction, but unless the milk is delivered with the adapter shown, the cap is preferably made of a more permanent construction. If the bottle is equipped with the adapter when the milk is delivered, the whole will be covered by a suitable cap such as the cap 100 which may be of stiff paper, metal foil or the like. When fastened down around the bead 102 at the cap 100 of the bottle this cap depresses the pouring flange or lip 104 sufficiently to make a tight seal with the cap which is sufficiently tight to exclude dust, etc. from the chamber which is bounded by the disc 97, the cap 100, and the adapter 91.

These various bottles and adapters may be constructed of any suitable materials. Polyethylene is relatively cheap at the present time and is particularly suited for materials of this general type. It is hydrophobic (non-wetting) with respect to most liquids and is therefore particularly suited for the manufacture of these adapters. It is inert to most chemicals and liquids and will be used widely in the manufacture of the adapters of this invention. Although caps or other closures have been omitted from some of the views, and even the bottles or other containers have been omitted from other views, it is to be understood that each of the adapters shown is designed to be held to a bottle or other container which is preferably provided with a suitable closure which forms sealing contact with the pouring flange or lip of the adapter.

The circumference of the annular body portion of the adapter below the flange is usually only slightly smaller than the outside circumference of the flange. However, these circumferences may be of any relative size, as required by any particular situation.

The adapter is of resilient material and forms a tight seal with the inner surface of a metal or other hard-surfaced cap, no gasket being required, although a gasket

6

such as illustrated in Fig. 11 of an appropriate material may be used in any of the different constructions illustrated to protect the contents of the container from becoming contaminated by contact with the cap. Eliminating the gasket saves the cost of the gasketing material and the labor of applying it. Also, the overall thickness of the radial flange may be regulated so that caps of regular length may be used, no special constructions being required.

Modifications may be made in the constructions specifically disclosed without avoiding the claims. Figures 2, 4, 10, 12 and 13 show the upper edge of the lip in sealing contact with the inner surface of the cap. Figure 11 shows the liner 75 between the upper edge of the lip and the cap to prevent the contents of the bottle from contacting the cap. In the claims, the expression "cap closure means" is used to include both constructions.

This application is a continuation-in-part of my application Serial No. 405,693, filed January 25, 1954, and now abandoned and my applications which have matured into Patents 2,601,039 and 2,743,844.

What I claim is:

1. The combination of a vessel with a neck having an outlet therethrough, cap closure means over said outlet and attached to the neck, and an adapter of stiff resilient plastic squeezed between the end of the neck and the closure means; the end of the neck having an annular gasket-seating surface, the adapter being provided with an opening therethrough and an annular body portion extending about the neck and securing the adapter to the neck, the top portion of the inner surface of said opening slanting upwardly and outwardly, a portion of the adapter integral with said body portion extending beyond the end of the neck and said seating surface, said last-named portion having an outwardly opening, annular, substantially V-shaped groove therein with the inner base of the groove positioned over said seating surface, that portion of the adapter on the upper side of the groove tapering outwardly to an annular knife-edge lip and forming a seal with an inside top surface of the closure means, and that portion of the adapter between the lower side of the groove and the seating surface acting as a gasket portion with its under side in sealing contact with said seating surface.

2. The combination of claim 1 in which the closure means includes a liner against a top portion of the inner surface of the cap, and the adapter is in sealing contact with the liner.

3. The combination of claim 1 in which the adapter is secured to the neck by a downwardly extending part of the body portion which is frictionally engaged with the inner surface of the neck, and there is a single pouring opening through the adapter with a bead on the pouring surface which is adapted to break the smooth flow of liquid over said inner surface when the vessel is moved from a pouring to a non-pouring position.

4. The combination of claim 1 in which the body portion of the adapter is provided with a skirt on the inner surface of which is a bead which is engaged in a groove in the outside of the neck near its end, and the closure means is threaded on to threads on the outer surface of the neck.

5. The combination of claim 1 in which the adapter is composed of polyethylene.

6. The combination of a vessel with a neck having an outlet therethrough, cap closure means over said outlet with interengaged means on the inner surface of the cap closure means and the outer surface of the neck, and an adapter of stiff, resilient plastic squeezed between the end of the neck and the cap closure means, the end of the neck having a planar annular gasket-seating surface, the end portion of the neck of the vessel having a circumferential groove in the outer wall thereof, said interengaged means on the neck being below the groove, the adapter being provided with an opening therethrough and

7

an annular body portion extending about the neck with a skirt which extends therefrom around the neck, a bead which projects inwardly from the skirt and is seated in said groove in the outer wall of the neck, the adapter having an upper portion which extends inwardly over the planar seating surface, said upper portion defining an opening, the upper portion of which opening is bounded by an upwardly and outwardly slanting surface, the outer surface of said upper portion of the adapter which is above the end of the neck having an outwardly opening, annular groove therein with the inner base of this groove positioned over said seating surface, that portion of the adapter on the upper side of the groove tapering outwardly to an annular knife-edge lip and forming a seal with an inside top surface of the cap closure means, and that portion of the adapter between the lower side of the groove and the planar seating surface acting as a gasket portion with its under side in sealing contact with said seating surface, the plastic being so resilient that the tapering portion on the upper side of the groove is depressed by said squeezing, said interengaged means on the inner surface of the cap closure means and the outer surface of the neck of the vessel binding one against the

8

other and preventing any tendency of the cap closure means and the vessel to become separated in transit and storage.

5

10

15

20

References Cited in the file of this patent

UNITED STATES PATENTS

373,849	Pomeroy	Nov. 29, 1887
785,116	Perry	Mar. 21, 1905
2,117,807	Jesser	May 17, 1938
2,193,805	Deschwer	Mar. 19, 1940
2,221,527	Schick	Nov. 12, 1940
2,272,549	Deschwer	Feb. 10, 1942
2,296,550	Williams	Sept. 22, 1942
2,362,421	Vow Till	Nov. 7, 1944
2,443,086	Turenne	June 8, 1948
2,601,040	Livingstone	June 17, 1952
2,713,953	Jewell	July 26, 1955
2,736,447	De Brock	Feb. 28, 1956

FOREIGN PATENTS

470,518	Great Britain	Aug. 17, 1937
941,772	France	Aug. 23, 1948