

United States Patent

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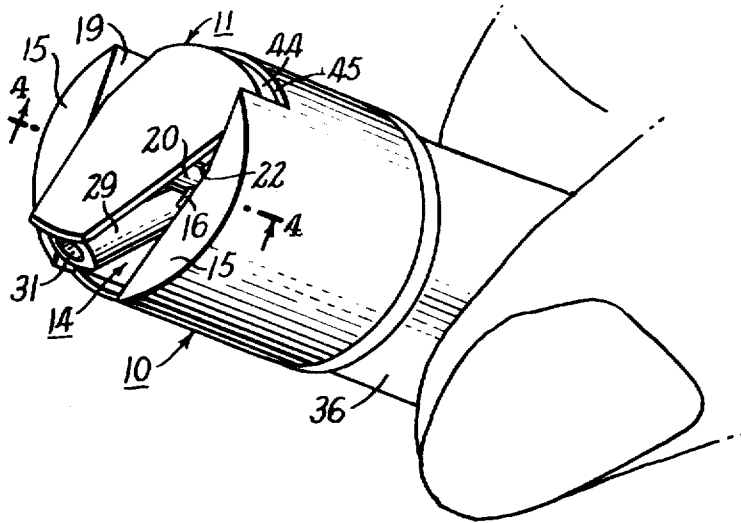
[54] **LIQUID CONTAINER DISPENSING CLOSURES**
6 Claims, 8 Drawing Figs.

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 222/534, 222/536
 [51] Int. Cl. **B67d 3/00**
 [50] Field of Search..... 222/484,
 533, 534, 536, 531Cur, 532Cur

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ABSTRACT: A bottle cap for the controlled dispensing of liquid contents is fabricated from two molded plastic parts, one being a cap member for sealing engagement with the lip of a bottle, and the other being a pivotal cover member mounted in the cap and which pivots with snap action into either closed or open positions by the simple application of finger pressure to the rear portion of the cover member. An orifice in the cap is aligned with a spout opening in the cover when in the open position, and is sealed when the cover is closed. Two embodiments are disclosed, one with and one without a vent port to enable continuous pouring.



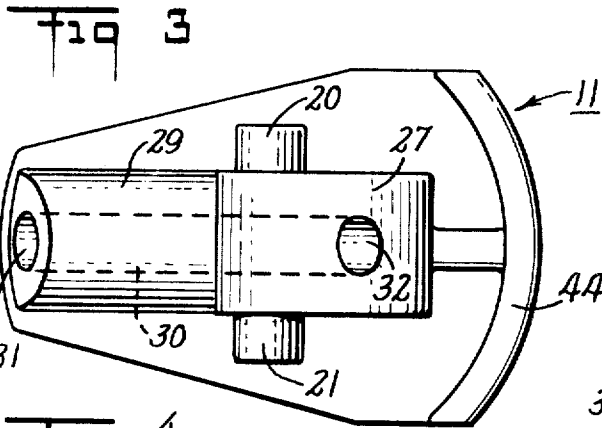
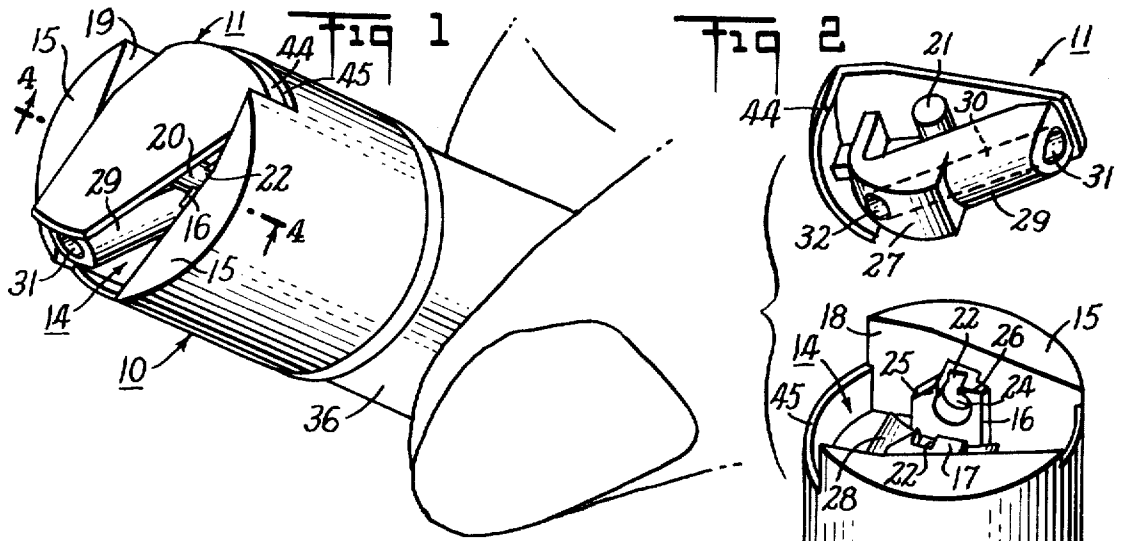
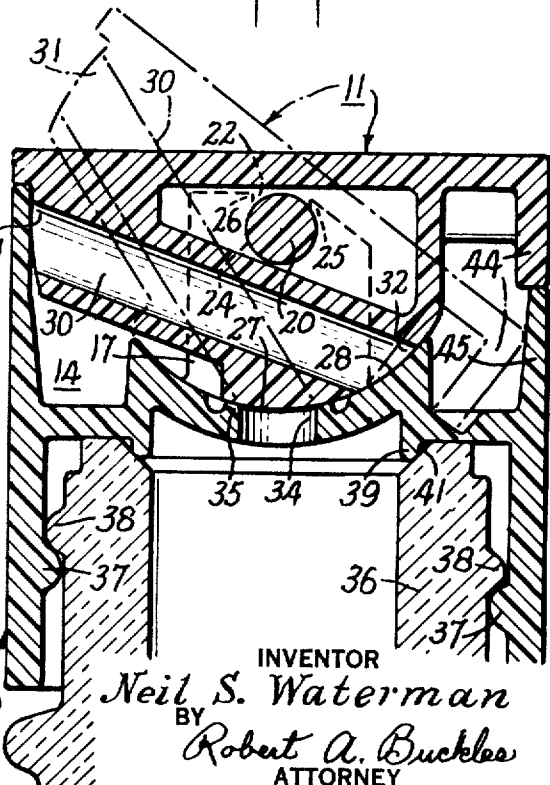
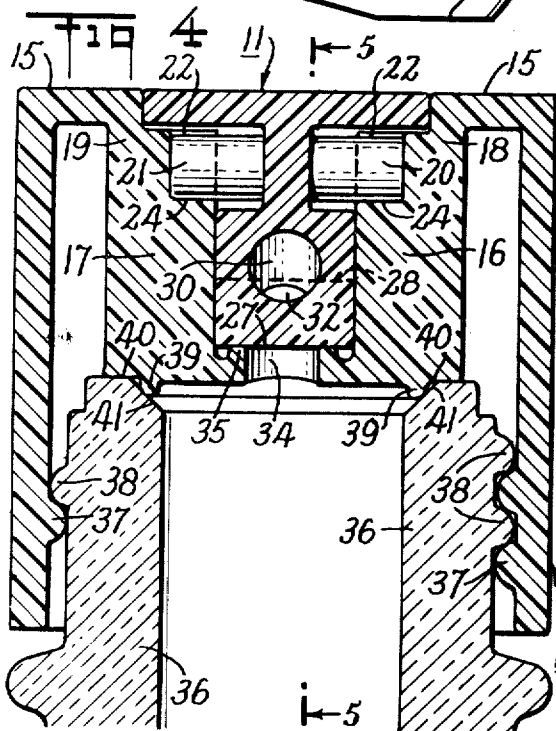
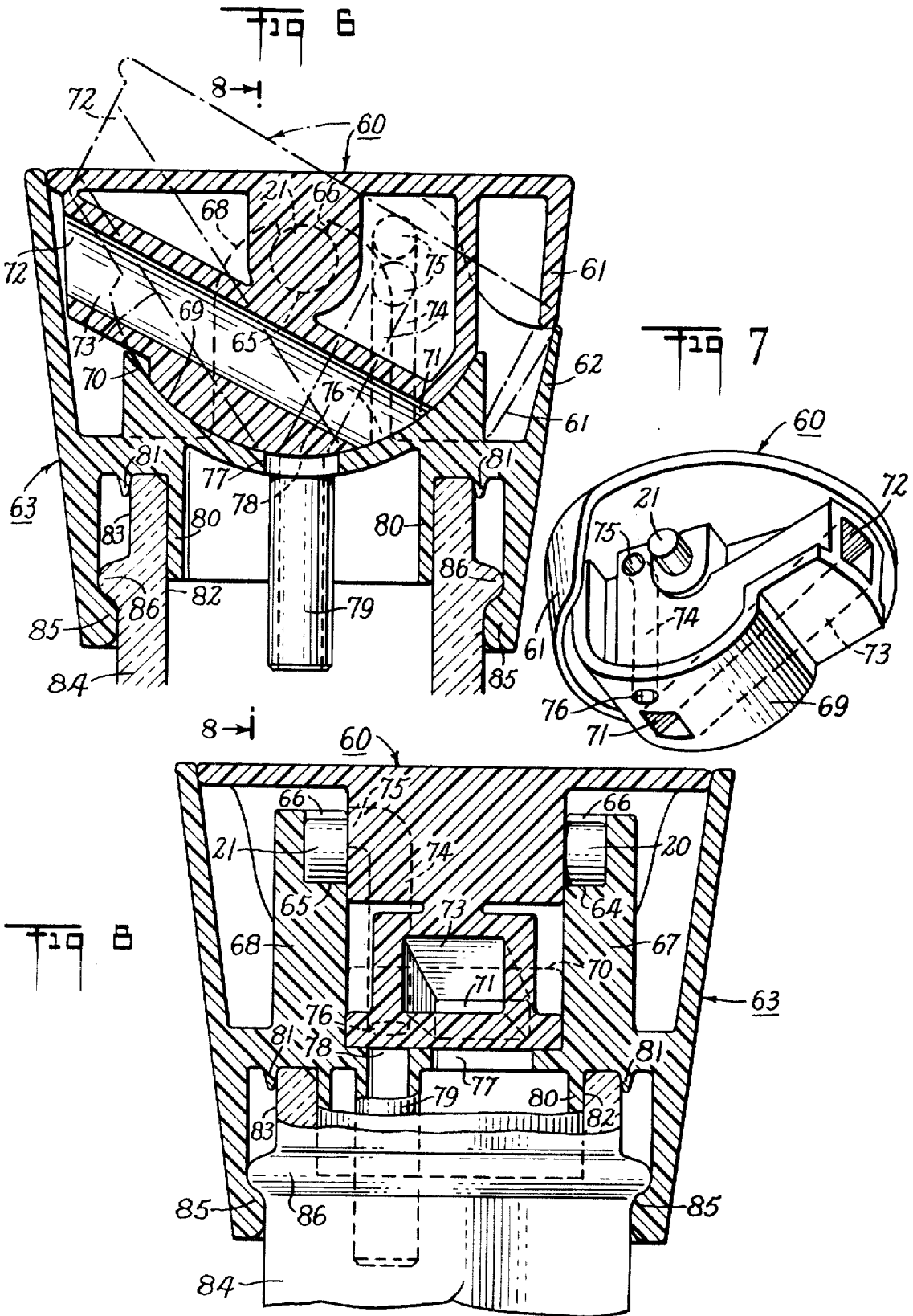


Fig 5



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LIQUID CONTAINER DISPENSING CLOSURES

BACKGROUND AND OBJECTS OF THE INVENTION

The invention relates to improved bottle closures which may be quickly and easily opened with one hand for convenient dispensing of controlled quantities of liquids. Whereas the prior art bottle closures require the use of two hands, one for holding the bottle and the other for manipulative removal of the cap either by unscrewing or otherwise, the principal object of the present invention is to provide a bottle cap adapted for opening or closing by the touch of a finger, even while holding the bottle in one hand. A further object is to provide such a closure which does not require the user's fingers to touch the dispensing area, thereby assuring cleanliness.

Another object of the invention is to provide such a bottle cap with a spout through which limited quantities of liquid may be dispensed under the complete control of the user.

A more specific object in one embodiment of the invention is to provide an improved dispensing cap for condiment bottles, such as bitters for example, which will allow the contents to be dispensed one drop at a time.

In a second embodiment of the invention the object is to provide an improved dispensing bottle cap with spout and air vent means to allow continuous pouring of liquids, such as spirits for example.

Additional objects of the invention are to provide such improved liquid dispensing closures with means to prevent leakage or evaporation during shipment or storage, and which are inexpensive to manufacture and commercially attractive to purchasers.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of one embodiment of the dispensing bottle closure of the invention, here shown open and ready for dispensing;

FIG. 2 is an exploded perspective view of the two molded plastic parts which comprise the bottle closure of FIG. 1;

FIG. 3 is a bottom view of the pivotal closure member shown in FIGS. 1 and 2;

FIG. 4 is a cross-sectional view of the assembled bottle cap, taken along the line 4-4 of FIG. 1;

FIG. 5 is a cross-sectional view taken along the line 5-5 of FIG. 4 and showing the closure member in open position by broken lines and in closed position in solid lines;

FIG. 6 is a cross section view similar to FIG. 5 showing an alternative embodiment provided with vent means for continuous pouring;

FIG. 7 is a perspective view of the pivotal closure member of FIG. 6, more clearly showing the vent and spout means; and

FIG. 8 is a cross-sectional view of the assembled and closed pourer cap taken along the line 8-8 of FIG. 6.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now in greater detail to FIGS. 1 through 5 of the drawings, the droplet dispenser embodiment of the invention will be described. A molded plastic cap portion, indicated generally at 10 in FIG. 1 and FIG. 2, has a recessed cavity 14 formed in its top surface 15 to receive a pivotal closure member indicated generally at 11. A pair of upright trunnion supports 16 and 17 are formed on the vertical walls 18 and 19 within cavity 14 to engage and support pivotal shaft portions

20 and 21 of the closure member 11. Each of the trunnions 16 and 17 has formed in the top portion thereof a keystone notch 22 (FIG. 2) through which the shaft portions 20 and 21 are forced into seating engagement with bearing sockets 24 as shown in FIG. 2. During assembly of the closure member 11 into the recess 14 of cap 10 the molded plastic material, of which the trunnions 16 and 17 and the shafts 20 and 21 are formed, deforms elastically as the pivotal shafts are forced into and through the keystone slots 22-22. When the pivotal shafts 20 and 21 are seated within their respective bearing sockets 24, the elastically deformed plastic material substantially returns to its normal state whereby the shafts 20 and 21 are securely held within sockets 24 by a slight downwardly downward pressure from the shoulder corners 25 and 26 at the narrow bottom end of keystone slots 22-22. This downward pressure forces an arcuately curved portion 27 of closure member 11 into intimate sealing engagement with a correspondingly curved surface 28 within the recess 14 of cap 10.

A spout portion 29 of closure member 11 has a substantially cylindrical hole 30 formed therethrough with an exit port 31 at its front end and an entrance port 32 through the arcuate bearing surface 27. A corresponding opening 34 in the cap member 10 (FIG. 4 and FIG. 5) is aligned with the entrance port 32 of closure member 11 when in the open positions as shown in FIG. 1, and as shown by the broken lines in FIG. 5. When the pivotal closure member 11 is in its closed position, as shown by solid lines in FIG. 4 and FIG. 5, the opening 34 is closed and sealed by the arcuate surface 27. To assure a leak-proof seal between the opening 34 and the surface 27, a raised annular bead 35 is provided around the top portion of opening 34 as shown in FIG. 4 and FIG. 5. The elastic force exerted downwardly by shoulders 25 and 26 of trunnions 16 and 17 upon the pivotal shafts 20 and 21 forces surface 27 into liquid-tight sealing engagement with raised bead 35.

Still referring to FIG. 4 and FIG. 5, the bottle cap 10 is secured to the top of a bottle 36 by means of screw threads 37 which engage corresponding screw threads 38 around the neck of bottle 36. To assure a positive leak-proof seal between cap 10 and bottle 36 an annular bead 39 is formed about the opening 34 on the bottom portion of cap 10. When the cap 10 is screwed down until the shoulder 40 rests upon the upper lip of bottle 36 the annular bead 39 is elastically deformed into intimate contact throughout its periphery with surface 41 of the bottle top, thereby providing an effective stopper to prevent leakage between bottle and cap.

Referring now in particular to FIG. 2 and FIG. 5, an arcuate depending skirt portion 44 of closure member 11 corresponds to and engages an arcuate upstanding wall portion 45 of cap 10 when the device of the invention is in closed position as shown by solid lines in FIG. 5. The abutting engagement between skirt 44 and wall 45 effectively locks the closure member 11 in closed position to prevent any accidental leakage or spillage during handling and shipping. However, because of the elastic properties of the molded plastic material, the skirt 44 may be disengaged from its abutment with wall 45 by the application of finger pressure to the rear top portion of closure member 11. When this is done the closure member 11 pivots about the axis of shaft 20-21, the skirt 44 moves down as shown in FIG. 5 into the recess 14 within the top of cap 10, the spout hole 30 moves into alignment with opening 34 and the exit port 31 moves up into open position as shown in FIG. 1, and as shown by the broken lines in FIG. 5. To close the cover member 11 it is only necessary to apply finger pressure to the top portion thereof at a point forward of the pivotal axis 20-21. The closing and opening actions occur with a snap as the skirt 44 and wall 45 deflect into engagement or disengagement.

The embodiment of the invention described above with reference to FIGS. 1 through FIG. 5 of the drawings is particularly adapted for dispensing droplets of liquid, such as "dashes" of bitters or other condiments.

SECOND EMBODIMENT

An alternative embodiment of the invention will now be described with reference to FIGS. 6, FIG. 7 and FIG. 8 of the drawings. In this embodiment, which is particularly adapted for continuous pouring of liquids, an air vent is provided in the pivotal closure member and an air venting tube is extended from a second orifice of the cap member downwardly into the neck of the bottle. The pivotal supporting means, the pressure sealing means, and the snap locking closure means are essentially the same as described hereinabove with reference to FIGS. 1 through FIG. 5 of the drawings.

Referring now to FIG. 7 which is a perspective view from the underside of the pivotal pourer closure, a circular plane top portion 60 has a depending skirt portion 61 which is formed in an esthetically pleasing symmetrical curve for rear edge locking engagement with a correspondingly curved portion of an upstanding edge wall 62 of the bottle cap member indicated generally at 63 in FIG. 6 and FIG. 8, when the pivotal closure member of FIG. 7 is assembled with the cap member 63 as shown by solid lines in FIG. 6 and FIG. 8. It is to be understood that the integrally molded pivotal shaft members 20 and 21 correspond in all respects to the similarly referenced shaft members of FIGS. 2 through FIG. 5 and are inserted in bearing sockets 64 and 65 (FIG. 8) through keystone slots (66 in FIG. 6) in parallel vertical trunnions 67 and 68 (FIG. 8), in exactly the same manner as described above with reference to the first embodiment of the invention. The convex arcuately curved bearing surface 69 of the pivotal closure member (FIG. 7) is maintained in liquid-tight sealing engagement with the correspondingly curved concave surface 70 of the cap member 63 (FIG. 6) by the same means heretofore described with reference to FIGS. 1 through FIG. 5. An entrance port 71 connected with an exit port 72 by a cored passage 73 in the molded plastic closure member of FIG. 7 correspond functionally to the passage 30 and ports 31 and 32 described with reference to FIG. 3 above. A tubular vent passage 74 having an air entrance port 75 and an air exit port 76 is formed within the molded plastic closure member of FIG. 7 to permit air freely to enter the bottle enclosure during pouring, and to displace the volume of liquid poured therefrom. When the pourer member of FIG. 7 is in closed position as shown by solid lines in FIG. 6 and FIG. 8 both ports 71 and 76 are disengaged from their mating openings, 77 and 78 respectively, in the cap member 63, and are closed by the concave surface 70 whereby neither spillage nor evaporation can occur through passages 73 or 74. A vent tube 79 is connected with and surrounds vent opening 78 in body member 63 to prevent liquid during pouring from entering the air vent passage 74.

An annular inner skirt portion 80 of body cap 63 fits snugly within and against the annular inner wall 82 of a bottle neck 84 as shown in FIG. 6 and FIG. 8, while an annular outer lip 81 snugly engages the outer wall 83 of the bottle neck 84. In this illustrated embodiment the cap body 63 is secured to the bottle neck 84 by an inwardly protruding annular ring portion 85 of the cap body which is rolled into locking engagement with an outwardly extending annular ring 86 formed on the neck of the bottle 84. It is to be understood, however, that an internally threaded cap body may be employed with the the pouring dispenser, as disclosed in the embodiment of FIG. 4 and FIG. 5, or conversely the droplet dispensing cap of FIGS. 1 through 5 may be secured to the bottle top by the rolled annular means shown in FIG. 6 and FIG. 8, if desired. The screw cap design of the first embodiment offers the advantage that if more than just a few dashes of condiment are called for, as for example when a recipe calls for a spoonful or more, the entire closure cap may be unscrewed and the required quantity may be poured directly from the bottle into an appropriate measuring container. On the other hand, the rolled edge means of securing the cap to the bottle in FIG. 6 and FIG. 8 provides the advantage that the dispensing cap cannot be

removed from the bottle top without destroying the cap sealing means, thereby rendering it exceedingly difficult, if not impossible, to refill an empty bottle.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above article without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. A liquid dispensing bottle cap comprising in combination:
 - A. a cap member having a recess formed in the top thereof:
 1. a concave arcuate surface formed in the bottom of said recess,
 2. a depending annular skirt portion formed integrally with said cap member,
 3. first means on said skirt portion for securing said cap member to the top of a bottle,
 4. further means within said skirt portion cooperative with said first means for effecting sealing engagement of said cap member with the annular lip of a bottle to which said cap member is secured by said first means, and
 5. at least one opening through said concave surface connecting said recess with the opening of a bottle to which said cap member is secured,
 6. opposed pivotal bearing means within said recess and formed integrally with said cap member,
 - B. a pivotal closure member receivable in said recess and having:
 1. a pair of alined pivotal engageable with said pivotal bearing means,
 2. a convex arcuately curved portion of said closure member corresponding to said concave arcuate surface of said recess and slidably engageable therewith as said closure member is pivoted about the axis of said pivotal bearing means,
 3. a skirt portion depending from one edge of said closure member and movable into said recess as said closure member is pivoted to an open position,
 - a. said skirt portion limiting the pivotal movement of said cover member by abutting engagement with a top surface within said recess,
 - b. said skirt portion engaging a peripheral edge portion of said cap member when said cover member is pivoted to its closed position,
 4. a tubular spout opening through said closure member and having:
 - a. an entrance port in the convex surface of said closure member in alinement with the opening through concave surface of said cap member when said closure member is in its open position, and
 - b. an exit port at the opposite end of said tubular spout extending above the top rim of said cap member when said closure member is in its open position.
2. The combination of claim 1 including an annular raised lip in said recessed concave surface around the opening therethrough to maintain a liquid-tight seal with said pivotal closure member in both its open and closed positions.
3. The combination of claim 1 wherein said first securing means on the skirt portion of said cap member comprise helical screw threads engageable with corresponding screw threads on the neck of a bottle to which said cap is affixed.
4. The combination of claim 1 wherein said first securing means comprises an annular ring on the inner surface of said skirt for rollable locking engagement with a corresponding annular ring on the outer surface of a bottle neck.

5. The combination of claim 1 including a second opening through said concave recessed surface and connecting with a downwardly extending vent tube, and a second tubular opening through the convex surface of said pivotal closure member aligned with said second concave opening when said closure member is in open position, whereby air is admitted to the bottle enclosure to displace liquid poured therefrom and to enable steady continuous pouring.

6. A dispensing bottle cap having a pivotal closure top manually operable to pivot between a closed position providing a leak-proof seal and an open position providing an exposed spout for continuous pouring, comprising in combination:

- A. a molded plastic body member having a depending annular skirt portion adapted to receive and surround the mouth of a bottle:
 - 1. means within said skirt portion for sealing said body member to the mouth of a bottle,
 - 2. a recessed cavity in said body member above said skirt portion,
 - 3. a concave arcuate surface in the bottom of said recess substantially covering the mouth of a bottle to which said body is sealed, and
 - 4. first and second openings through said concave surface connecting said cavity with the mouth of a bottle to which said body is sealed,
 - a. an open tube extending from said first opening downwardly for a distance at least equal to the length of said skirt portion,
 - 5. a pair of parallel trunnions extending vertically within said recessed cavity on either side of said arcuate surface,
 - a. aligned bearing sockets in said trunnions located on

- the axis of said arcuate surface, and
- B. a pivotal cap closure member receivable in said body recess and pivotable into open or closed positions:
 - 1. a convex arcuately curved portion of said closure member corresponding to said concave arcuate surface of said recess,
 - 2. a pair of pivotal gudgeons on said closure member seatable in said bearing sockets whereby said closure member is pivotable about the axis of said arcuate surfaces, and
 - 3. a tubular spout opening through said cap closure member having one end in alignment with the second opening through said concave surface when in the open position and the other end elevated above the rim of said body member,
 - a. said one end of said spout being sealed against said concave arcuate surface and the other end being depressed below the rim of said body member when said cap closure member is pivoted to the closed position,
 - 4. a skirt portion depending from one end of said cap closure member opposite to the other end of said spout opening,
 - a. said skirt portion engaging a peripheral edge portion of said body member to substantially lock said cap in its closed position, and
 - b. said skirt portion manually deformable to disengage from said edge portion and to pivot downwardly into bottom engagement with said recess cavity of said body member, whereby said skirt limits the pivotal movement of said cap into its open position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,542,256

November 24, 1970

Neil S. Waterman

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 17, "as" should read -- a --; line 59, "cross section" should read -- cross sectional --. Column 2, line 13, cancel "downwardly"; line 25, "alined" should read -- aligned --; line 64, "alinement" should read -- alignment --. Column 4, line 34, after "member," insert -- and --; line 38, "alined" should read aligned --; line 38, after "pivotal" insert -- shaft portions --; line 57, "alinement" should read -- alignment --; line 57, after "rough" insert -- said --. Column 5, line 5, "alined" should read aligned --; line 23, cancel "and"; line 33, "alined" should read aligned --. Column 6, line 10, cancel "and"; line 12, "alinement" should read -- alignment --; line 26, cancel "and".

Signed and sealed this 13th day of April 1971.

L)
st:

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Commissioner of Patents