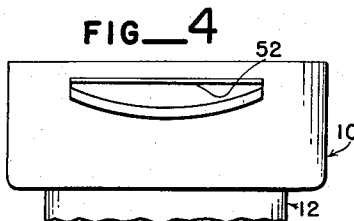
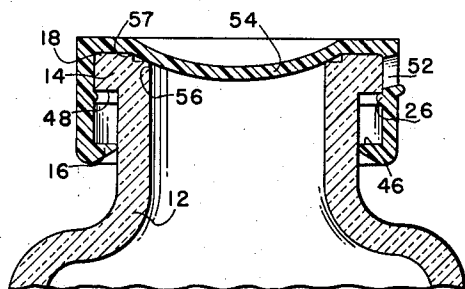
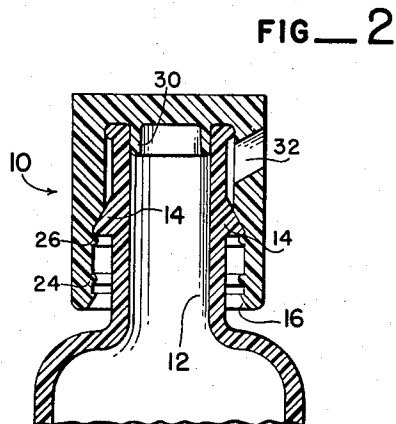
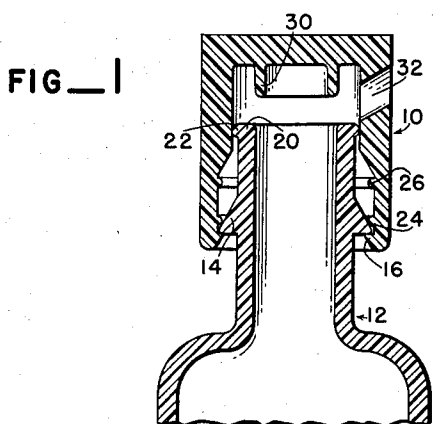


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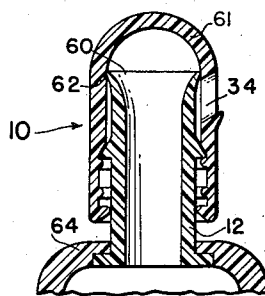
L. P. GARDNER
SNAP CAP FOR BOTTLES

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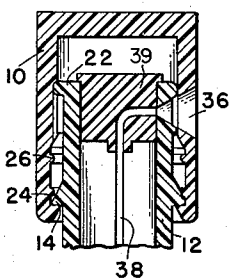
Filed May 6, 1957



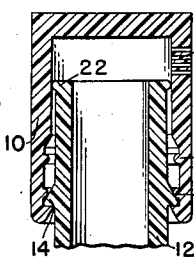
FIG_3



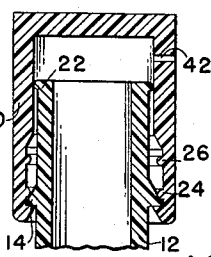
FIG_5



FIG_6



FIG_7



FIG_8

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SNAP CAP FOR BOTTLES

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5 Claims. (Cl. 215—74)

This invention relates to the general art of bottle closures, and more particularly to a bottle cap or closing device made of one of the resilient plastic materials. The design is further characterized by making use of an annular ledge or lip on the bottle neck and one or more annular ledges on the interior of the bottle cap, so that it will be definitely held in either the open or the closed position and there will be a definite snap of the cap in moving from one position to the other. Thus, the user will be fully aware of the fact that the bottle is entirely open or fully closed, there being no intermediate point where an indication would be made.

Manufacturers who fabricate bottles of different types of material are vying with each other to get a bottle structure that is adequate to serve its intended purpose and at the same time provide either niceties of construction, which are reflected in convenience in using, or they are able to produce items at a very low cost. My present bottle cap is of the first type and is adaptable to any of the various types of bottles, whether they be made of glass or metal or the plastics, particularly the flexible plastic or so-called "squeeze" type bottle.

The molding and stamping operations, which are used in the fabrication of bottles generally, make it possible to provide any reasonable configuration of the bottle neck, particularly if the configuration is on the outside of the same and this faculty has been made use of in my present invention, in that to make use of my present cap it is necessary that one or more annular ledges be provided on the outer surface of the bottle neck. My bottle cap is then adapted to immediate use with a bottle made after this teaching and does not require any special fitting operations, it being necessary only to press the cap onto the bottle after the same is filled, and the annular ledge formed either on the bottle or on my bottle cap will serve to prevent the cap from being removed except by special tools. It therefore follows that my bottle cap is intended primarily for use with a dispensing type of bottle, whether it is for liquid or powder, but it is not adaptable to those uses where free access is required, as with large-mouthed bottles used for the storage of different items.

A further object of my invention is to provide a bottle cap that will effectively seal a bottle and then by a movement of the cap, which is attended by a release of the securing means and this in effect provides a snapping of the cap because energy is applied to it. When the resistance is overcome, the bottle cap will move quickly to its open or closed position, depending upon the movement initiated by the user.

A further object of my present invention is to provide dispensing arrangements that will make it possible to adapt my bottle cap to a wide range of products which normally are sold and stored in a bottle and then dispensed from the bottle in limited quantities at the time of use.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the draw-

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ings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a vertical cross-sectional view of a bottle employing one of my snap caps, the same being shown in its open and dispensing position.

Figure 2 is a view similar to Figure 1, showing the same structure but with the bottle cap in the closed position.

Figure 3 illustrates a wide-mouthed bottle, such as, for instance, a milk bottle, the same being shown in its closed position.

Figure 4 is a side elevation of the form shown in Figure 3 and showing the pouring spout arrangement for use with this form of the invention.

Figure 5 is a vertical cross-sectional view of a bottle having a neck insert which may be made of any suitable material and normally molded into the bottle structure during its manufacture. This arrangement is shown with the dispensing cap in its closed position.

Figures 6, 7 and 8 illustrate bottle caps of quite similar construction, all shown in a closed position, and showing in Figure 6 an atomizing arrangement for use with a pressurized bottle, using relatively low pressure. Figure 7 illustrates a somewhat similar cap, but one that is disposed to handle powdered materials or certain liquids, as it provides a large number of small discharge openings so that the discharge will be finely divided. Figure 8 illustrates a form using a single discharge orifice so that a definite stream of material will be obtained when it is used, especially as a shaker bottle in an inverted position.

Referring more particularly to the disclosure in the drawings, the numeral 10 generically designates my bottle cap and 12 a coating bottle neck. In the drawings I have indicated several different variations of my snap cap. However, they all have in common the need for a limited longitudinal movement in order to make it possible to dispense the contents of a bottle. They are all made from distortable plastic material, to the end that they can be pressed onto the neck of the bottle, and after that attachment it is very difficult to remove the same without special tool equipment. In the majority of forms shown, I depend upon a tapered annular ring having its tapered portion extending upwardly except for the variant forms shown in Figures 3 and 4. Here the diameter makes it possible to distort the locking ring 16, which is part of the cap. It has, however, been found desirable to provide a small taper, as shown at 18, in order to facilitate starting the cap even in this variant form. Adapted to engage the annular rim 14 is the locking ring 16, which is common with all the forms shown.

There are several conditions that must be met in applying a cap of this order. First of all, it must provide for the easy manual operation of the same; it must seal the contents of the bottle against leakage when in the closed position; and it must discharge only out of the discharge opening when it is in use. It has been found desirable, therefore, that the upper margin of the bottle neck be provided with an annular rim or bead in order that there is means for guiding the bottle cap on a diameter bigger than the normal neck of the bottle and to thus localize the bearing of the cap on a relatively small area, so that considerable pressure can be applied at this point without building up friction so much that it will be difficult to slide the cap up and down in its normal functional operation. The rounded bead-like rim shown at 22 is a very common one in bottle manufacture, and it has been found that such a ledge will greatly reduce the loss to the manufacturer in his production of the bottles. I have taken advantage of this characteristic of bottle making in the arrangement of my snap cap. In addition to providing the annular rim 16 in my bottle cap, I normally provide

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for two additional stop members. These are indicated at 24 and 26. An example of the use of these, which is true of all forms with the exception of the Figures 3 and 4, is that in the closed position of Figures 2 and 5, the upper annular ring or bead 26 is engaged under the annular ring 14 of the bottle neck. This definitely secures the cap in closed position with some resistance to opening. Ring 26 normally should be of such a height and proportion to ring 14 that moderate physical effort will be applied to spring the cap, which is of course made of resilient material so that ring 26 can slide over ledge 14. This release, while pressure is still being applied by the user, causes the cap normally to snap up to the open position and to have the annular ring 24 ride over and come to rest on the upper side of ledge 14. This holds the bottle in its open position. It also insures that the cap is held in an open position that will prevent leakage, as will be noted, for instance, in Figures 1, 6, 7 and 8, as in these various forms it is important that the top bead 22 be accurately positioned with respect to the interior conformation of the cap.

Where a very penetrating liquid is being used in the container, it is often desirable to provide additional sealing, as in the downwardly extending annular rim 30 which as will be noted in the closed position in Figure 2, fits snugly within the interior bore of the bottle neck and thus seals it quite thoroughly. In fact, it may be used with pressure liquids wherein the internal pressure will force the skirt 30 against the neck of the bottle with sufficient force to overcome any tendency for the interior pressure to open the bottle cap.

Economical manufacture of closures of this order indicates that they must be made to serve a wide range of purposes or the tooling-up cost will be disproportionate and make the cost of the closure cap possibly so high as to defeat it as a commercial proposition. With this thought in mind, I have illustrated one form of discharge at 32 in Figures 1 and 2; and in Figure 5 a somewhat similar discharge at 34. In Figure 6 an atomizing spray is provided at 36 with a downwardly extending tube 38, positioned by stopper member 39, which tube should be sufficiently long to always have its lower end immersed in the liquid contained within the bottle. In Figure 7 I have provided a plurality of openings, as shown at 40. This becomes in effect a shaker dispensing arrangement which may be used for either liquids or powders. In Figure 8 I have shown a single discharge orifice as 42, which will project a jet of liquid when the bottle is inverted and shaken.

In Figures 3 and 4 I have illustrated a form of cap which is intended for wide-mouthed bottles, such as milk bottles and other containers of about the like opening. These large-mouthed bottles, following the principles of bottle making, usually are provided with a very pronounced annular rim 14 because of the added rigidity required on such a large diameter. This rim is employed to serve as the limits for the upper and lower positions of the cap. As shown in Figure 3, the cap is closed and the upper annular ring 26 engages under rim 14 and thus insures the secure closure of the cap. On the other hand, when the cap is opened the upper wall 46 of rim 16 contacts the under surface 48 of rim 14 and thus limits the upper travel, and at the same time rim 26 engages the upper surface of rim 14 so as to hold the bottle cap secure in the upper or open position. In this instance, in order to insure pouring, up to a satisfactory capacity, the discharge opening 52 has been given considerable width, as will be noted in Figure 4, so that the volume of milk that would be poured out of a milk bottle, for instance, would be up to the standard that is now found to be practical in pouring milk into a glass. In order to provide for the maximum of sealing, the form shown in Figure 3 is provided with a downwardly cupped top portion 54. This portion, as will be noted, comes to a bearing on the

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corners at 56 and 57, which are normally provided in the milk bottle to take the ordinary disk-like closure member which of course would not be required or desirable with this form of cap. With these corners contacting the disk cover portion 54, a very secure closure is provided.

Figure 5 is a variant form to meet certain conditions, and it is characterized by the same properties as the other forms of the invention except that, instead of having a bead at the upper margin 60 of the bottle neck member 12, the neck portion itself is tapered outwardly so that the extreme outward portion, as indicated at 62, will be out to about the position occupied by the extreme periphery of annular rim 22, in the other forms. This construction insures that the guiding effect is the same and, in case of viscous liquids, the rather sharply defined upper margin strips the viscous liquid from the interior of the cap 61 and thus assures that none of it would be able to work down between the cap and the neck portion. In all these various forms there is a distinct space forming an annular chamber and, unless this chamber is preserved so that the cap is guided by limited areas as it is moved up and down, the friction component becomes so great that it does not function freely with the snap action that is so desirable. Figure 5 also illustrates another variant, in that the neck portion 12 is separately formed and then included in the manufacturing process in the upper portion of the bottle proper as 64.

In using my bottle cap, it is very desirable that a very definite snap action be obtained in moving the cap either up to the open position or down to the closed position, and therefore it is quite essential that strict attention be paid to the clearances of rim or beads 24 and 26 with respect to the annular ledge 14 that they may pass over it. The amount of clearance, of course, will be directly proportional to the stretchability of the material from which the cap is made and will have to be considered by the manufacturer when the caps are made.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of snap cap for bottles.

Having thus disclosed the invention, I claim:

1. A snap cap for bottles, comprising: a pliant bottle cap disposed for limited axial movement on a bottle neck; a bottle neck having at its upper end an outwardly extending top portion and an annular ledge, tapered on its upper surface, spaced therefrom, each of which slidably engages a portion of the inner wall surface of the cap; annular stop rings formed on the inner wall of the cap and adapted to alternately engage said annular ledge and provide limit stops for the cap in its dispensing and in its closed position; an inwardly directed continuous locking ledge disposed on the bottom inner surface of the cap; said locking ledge being beveled on its lower surface to permit its being forced over the tapered ledge of the bottle neck but making it very difficult to remove from the bottle neck; and a discharge opening in the said wall of the cap which is uncovered when the cap is in its uppermost position.

2. A snap cap for bottles, comprising: a pliant bottle cap disposed for limited axial movement on a bottle neck; a bottle neck having an outwardly extending top portion and an outwardly extending annular ledge, each of which slidably engages, in a sealing manner, a portion of the inner wall surface of the cap; continuous annular stop rings formed on the inner surface of the cap and adapted to alternately engage said annular ledge and provide limit stops for the cap in its dispensing and in its closed position; an inwardly directed locking ledge disposed on the bottom inner surface of the cap; beveled means adapted to permit said cap to be forced over the ledge of the bottle neck but making it very difficult to remove from the bottle neck; and a discharge opening in the wall of

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said cap which is uncovered when the cap is in its uppermost position and sealed between the outwardly extending top portion and the outwardly extending annular ledge of the bottle neck.

3. A snap cap for bottles, comprising: a pliant bottle cap disposed for limited axial movement on a bottle neck; a bottle neck having an outwardly extending extreme top portion which slidably engages a portion of the inner surface of the cap, in a sealing manner and thus provides an annular chamber between the bottle neck and the inner wall of the cap; annular continuous coacting stop means formed on the inner surface of the cap wall and the outer surface of the bottle neck adapted to be selectively engaged and provide limit stops for the cap in its dispensing and in its closed position; an inwardly directed continuous locking ledge disposed on the bottom inner surface of the cap; said locking ledge being formed with a bevel adapted to permit its being forced over the tapered ledge of the bottle neck but providing abutting surface parallel to the abutting surface of said tapered neck ledge, making it very difficult to remove from the bottle neck; and a discharge opening in the wall of said cap which is uncovered when the cap is in its uppermost position.

4. A snap cap for bottles, comprising: a pliant bottle cap disposed for limited axial movement on a bottle neck; a bottle neck having an outwardly extending top bead portion and an annular ledge both of which slidably engage, in a sealing manner, a portion of the inner surface of the cap; said annular ledge having a flat lower face; an annular stop ring formed on the inner surface of the cap and adapted to engage said annular ledge and provide limit stops for the cap in its dispensing and in its

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closed position; an inwardly directed locking ring disposed on the bottom inner surface of the cap; said locking ring being beveled on its lower surface and flat on its upper surface to permit its being forced over the annular ledge of the bottle neck but whose upper flat surface engages the flat lower face of said locking ring and coacts therewith to make it very difficult to remove the cap from the bottle neck; and a discharge opening in the wall of the cap which is uncovered when the cap is in its uppermost position.

5. A snap cap for bottles, comprising: a pliant bottle cap disposed for limited axial movement on a bottle neck; a bottle neck having an outwardly extending top bead portion and an annular ledge spaced therefrom, each of which slidably engages a portion of the inner wall surface of the cap in a sealing manner; annular stop rings formed on the inner wall of the cap and adapted to alternately engage said annular ledge and provide limit stops and securing means for the cap in its dispensing and in its closed position; an inwardly directed locking ring disposed on the bottom inner surface of the cap; said locking ring and said annular ledge coacting to provide beveled and flat surface means which may be forced, during assembly, into operational position but making it very difficult to remove the cap from the bottle neck; and a discharge opening in the said wall of the cap which is uncovered when the cap is in its uppermost or dispensing position.

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