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LIQUID DISPENSER HAVING A SUPPLY CONTAINER DELIVERING TO A RECEIVING CHAMBER

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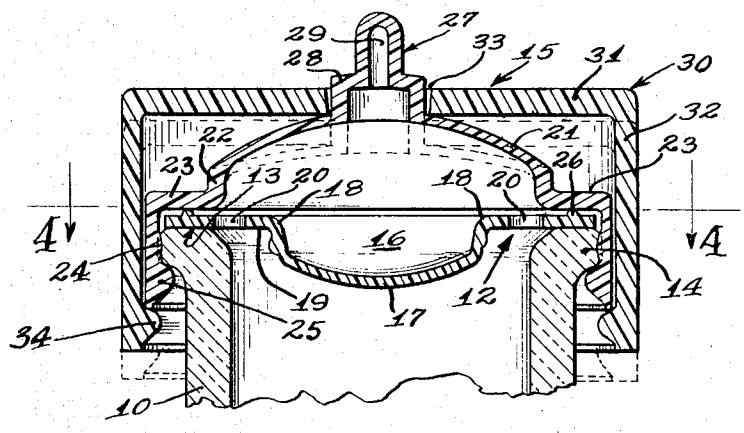



FIG. 3.

FIG. 2.

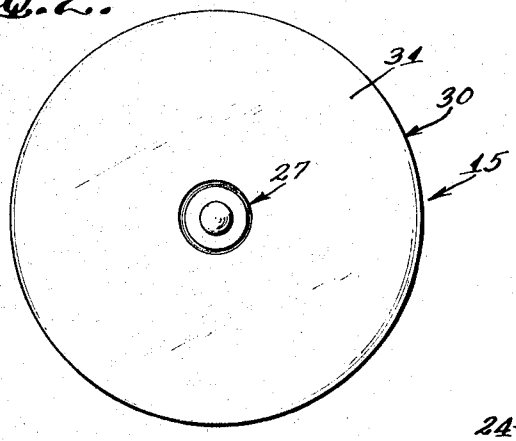
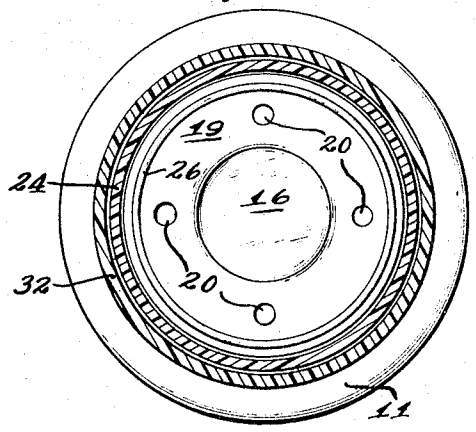



FIG. 4.



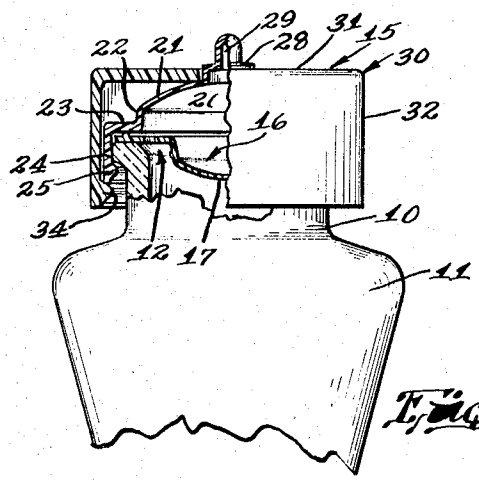




FIG. 1.

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# LIQUID DISPENSER HAVING A SUPPLY CONTAINER DELIVERING TO A RECEIVING CHAMBER

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My invention relates to liquid dispensers and more particularly to that type which also functions as a closure cap affixed to the mouth of a receptacle or container, such, for example, as a glass bottle or similar container.

My invention is particularly adapted for use in the dispensing of liquid sugar substitutes and has for an important object the provision of a dispensing fitment which initially is the primary closure for a container of such liquid, while in the hands of the ultimate consumer it becomes a means for dispensing the liquid either in drop-by-drop fashion or in stream flow, at the election of the consumer.

Another object of my invention is the provision of a combination closure cap and liquid dispenser, which, upon inversion of the container carrying same, will dispense the liquid contents as a succession of drops but, if desired, can effect regulable stream flow through due to manual axial deflection of a part of the dispenser.

A further object of my invention is the provision of a liquid dispenser comprising a compressible reservoir capable of segregating some of the liquid from the main body in a container carrying such dispenser, the latter having so-called "snip-tip" or nozzle which, after being snipped, is capable of either drop-by-drop or stream flow discharge of liquid directly from the reservoir.

It is also an object of my invention to provide in a liquid dispenser of the above character a novel, effective device for compressing a diaphragm portion, such being a flanged collar encompassing the reservoir and freely movable axially of the latter and container neck to effect compression of the diaphragm.

Other objects will be in part apparent and in part pointed out hereinafter.

In the accompanying drawings forming a part of my application:

FIG. 1 is a sectional elevational view of my invention mounted upon the mouth-defining neck of a bottle.

FIG. 2 is a top plan view of the dispenser.

FIG. 3 is an enlarged vertical transverse sectional view of my liquid dispenser secured to the mouth-forming neck of a liquid container.

FIG. 4 is a cross-sectional view taken along the plane of line 4—4 of FIG. 3, also showing in elevation a portion of the container.

The illustrated embodiment of my invention is shown attached to the neck **10** of a liquid container **11**, such as a bottle, the neck being cylindrical and creating a mouth **12**. Externally of the neck **10**, at its rim end **13**, is an annular radial rib **14**, or bead, which, as will be apparent, aids in securing the liquid dispenser **15** to the bottle.

The dispenser **15** initially functions as the primary closure for the container, as is abundantly clear. It comprises an inner basin **16** created by the centrally dished disk-like wall **1** which may well be formed of relatively rigid polyethylene, or similar plastic material. Encircling the basin at the rim end **18** thereof is a relatively wide annular flange **19** or web, which extends radially outward to a position of rest upon the rim **13** of the container neck **10** to thereby locate this basin in the mouth **12** of the container. The radial width of this flange **19** is sufficiently great and the diameter of the basin **16** small enough to provide an exposed annular area in which a plurality of



apertures **20** or ports, are formed to permit flow of the liquid contents of the container **11** into the space beyond the basin **16**. As will become apparent presently, such flow of liquid through the apertures **20** occurs incident to inversion of the container, while deposition of such liquid in the basin takes place upon reinversion of the container. This basin **16** and a highly resilient polyethylene diaphragm **21** associated therewith, together create a reservoir capable of isolating a small but normally adequate amount of the liquid at a convenient point for ready, immediate dispensing, when desired.

The diaphragm **21** is of generally dome-shape, and at its margin is provided with an integral depending annular wall **22** of a diameter slightly greater than the diameter of an imaginary circle registering with the axes of the apertures **20**. Thus these apertures, or ports, may freely perform their function. At the lower or inner margin of this depending wall **22**, is a radially outwardly projecting flange **23** joined at its outer margin to an attaching skirt **24**. This skirt is of a diameter to encompass the bottle neck **10**, particularly the radial rib **14** thereof and has an annular internal bead **25** so positioned as to firmly engage the lower side of said radial rib **14** and thereby firmly, yet releasably, secure the diaphragm and hence the basin **16**, assembled with the container **11**. Preferably a sealing bead **26** of annular form is interposed between the radial apertured flange **19** of the basin and the radial flange **23** of the diaphragm. I have shown it formed as a part of the inner flange **19** of the basin unit. It, of course, could be on the other flange **23**, if preferred. Snapping of the diaphragm in place tends to embed the sealing bead in the adjacent flange and prevents leakage of the contents, as is apparent.

Discharge of the liquid from the reservoir is by way of a "snip-tip" **27**, or nozzle, which, if preferred, may be positioned axially of the diaphrgam **21**. This nozzle is of stepped diameter, being of relatively large diameter in the base section **28** which is connected directly to the diaphragm and having a tip portion of smaller diameter. This tip portion initially is closed and is intended to be severed near the outer end preparatory to dispensing the liquid. With the bore **29** of this nozzle of about one-sixteenth inch diameter, I have determined that mere inversion of the container will produce a drop-by-drop discharge of the liquid. If, however, a more rapid flow is desired, as when filling a teaspoon with the liquid sweetener, axial inward flexing of the diaphragm under finger pressure and with the container inverted will produce the desired results.

To facilitate flexing of the diaphragm as just suggested, I have provided a finger-piece **30**, such being an inverted cup-like element comprising an axially apertured top wall **31**, or panel, and a depending marginal annular skirt **32**. The top wall **31** has a central or axial opening **33** to accommodate the base section **28** of the nozzle **27**, with some clearance between the nozzle and wall of the opening **33** to permit ready assembling of the elements. The top wall **31**, in the area about the opening **33** is in contact with the diaphragm **21** in proximity to the nozzle. In order to hold the finger-piece **30** assembled with the remaining elements, an internal annular bead **34** is formed on the skirt **32** near, or at its free lower end. This bead functions as a stop, preventing accidental separation of the elements and also holds the top wall **31** in contact with the diaphragm at all times.

When one wishes to dispense the liquid contents, it is only necessary to invert the container. In this position and without manipulation of the finger-piece **30**, the liquid flows into the reservoir through the apertures **20** and thence to the nozzle **27**, from which it will discharge drop-by-drop. Should stream flow be desired, the finger-piece

30 is pressed axially to inwardly flex the diaphragm, thereby creating pressure within the reservoir and effecting discharge of the liquid. Through the simple step of only partially inverting the container, the basin **16** may be filled with the liquid and thus maintain a small, but normally adequate, supply ready for immediate dispensing through the nozzle **27**.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

**1.** In a liquid dispenser, a reservoir comprising a marginally flanged basin, a dome-like diaphragm opposed to the basin and having a discharge nozzle communicating with the reservoir interior, the flange of the basin having apertures through which liquid may flow into and out of the reservoir, the flanged basin being formed of a relatively rigid plastic and the diaphragm being highly resilient and capable of axial flexing to thereby create liquid discharge pressure within the reservoir, the nozzle extending axially outward from the diaphragm and an axially movable finger-piece, encompassing the diaphragm and manually operable to flex said diaphragm.

**2.** In combination, a liquid container having a mouth-defining neck, there being an annular radial rib encircling the mouth end of the neck, a liquid dispenser comprising a basin positioned in the mouth, an annular radial supporting flange for the basin resting upon the mouth end of the neck, said flange having at least one aperture through which liquid may flow out of and into the container, an axially flexible resilient diaphragm of generally dome-like form spaced axially outward from said basin, means forming a part of the diaphragm and engaging the radial rib to hold the diaphragm and basin assembled and secured to the container, and a dispensing nozzle through which liquid may discharge, the nozzle being positioned axially of the diaphragm, and axially movable diaphragm flexing means comprising a cup-like element encompassing the diaphragm, basin, and part of the neck and formed with an opening through which said nozzle projects.



**3.** In a combination as defined in claim **2**, a discharge nozzle formed as an integral part of the diaphragm and a manually operable diaphragm flexing means comprising a cylindrical cup-like element including a top wall having a central aperture to accommodate the nozzle, a depending attaching skirt at the periphery of the top wall encompassing the skirt of the diaphragm, and an annular internal rib on the skirt carried by the last named wall to engage the free edge of the diaphragm skirt and hold the basin and diaphragm and flexing means assembled.

**4.** In a liquid dispenser, a reservoir comprising a marginally flanged basin, a dome-like diaphragm opposed to the basin and having a discharge nozzle communicating with the reservoir interior, the flange of the basin having apertures through which liquid may flow into and out of the reservoir, the flanged basin being formed of a relatively rigid plastic and the diaphragm being highly resilient and capable of axial flexing to thereby create liquid discharge pressure within the reservoir, the nozzle extending axially outward from the diaphragm and there being diaphragm flexing means comprising a cylindrical cup-like member encompassing the diaphragm and basin and having an axial opening through which the nozzle projects.


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