

**April 11, 1961**

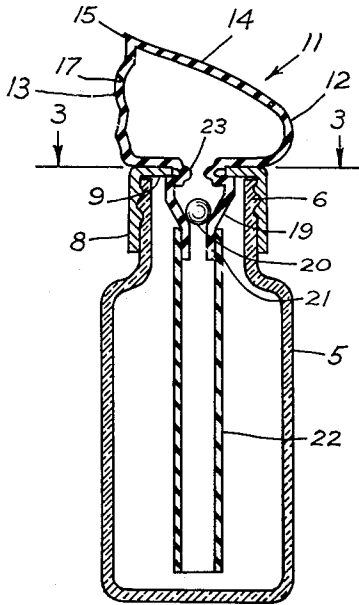
M. FAHR

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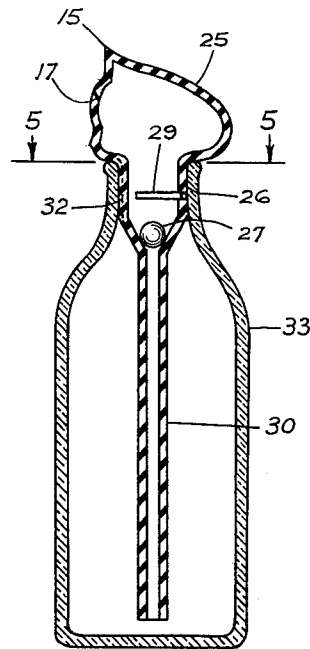
# DISPENSER CAPS FOR FLUID CONTAINERS

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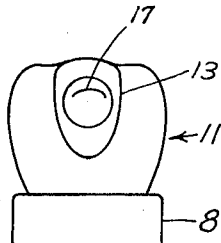
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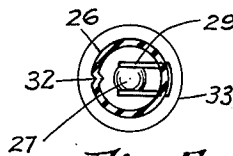
*Fig. 1*



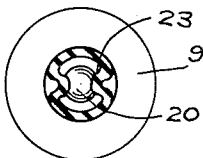
*Fig. 4*



*Fig. 2*



*Fig. 5*



*Fig. 3*

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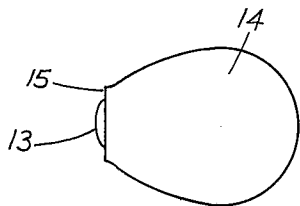
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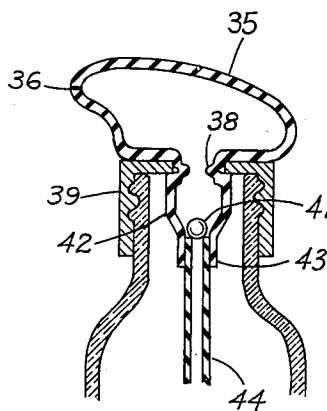
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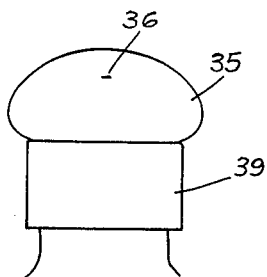
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*Fig. 6*



*Fig. 7*



*Fig. 8*

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## DISPENSER CAPS FOR FLUID CONTAINERS

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3 Claims. (Cl. 222—207)

The present invention relates to dispensers of viscous liquids, such as lotions, cold cream, and other cosmetic preparations, and dispensers of liquids of lighter consistencies for spraying cleaning fluids, etc., on glass and other materials.

In my copending application, Ser. No. 651,285, filed April 8, 1957, now U.S. Patent No. 2,942,762, I describe and claim a dispenser of the general type of the present invention. This prior dispenser utilizes a unit which may be attached to the mouth of a bottle, and by actuation of a flexible top portion will dispense a measured quantity of the contents of the bottle. This prior dispenser was assembled from several parts, such as a delivery tube, a lock ring, a coupling, a check valve housing, a ball check, a stop pin, and a flexible cap. These elements were all assembled before insertion into the mouth of a fluid container.

The present invention is a dispenser unit having a flexible cap but which can be molded in one piece. The unit uses a ball check valve, but the ball may be inserted in position because of the flexibility and the particular configuration and construction of the units. The delivery tube may also be a portion of the cap or may be pressed on or into an extension of the cap. A threaded coupling unit is used for a threaded neck bottle, although the dispenser may also be connected to the bottle by a press fit.

Another feature of one modification of the invention is the configuration of the exit slit in the flexible cap. The present cap is oblong in shape with a slanting upper flexible surface and a small front protuberance in which is a curved slit at approximately a 45-degree angle to the face of the surface or wall in which the slit is located. The position of this slit in the front protuberance of the cap at this angle permits the slit to open outwardly and close inwardly, thus functioning in the manner of a one-way check valve. The front rim of the top and sides of the face of the cap meet in fairly sharp corners or edge which enables the lotion to be wiped clear from the slit and rim with no carry-over of the dispensed lotion onto the upper surface.

A modification of the cap utilizes a staple which provides a stop for the ball check. In the preferred modification, however, the stop for the ball check is provided by narrowing down a portion of the cap at the mouth of the bottle which is held in a definite position by a threaded coupling collar. Another modification has one or more small squirt or spray holes, and the ball is then inserted from the bottom and held in position by the end of the delivery tube.

The principal object of the invention, therefore, is to facilitate the dispensing of liquids from bottles.

Another object of the invention is to provide an improved dispenser for viscous and thinner liquids in containers such as bottles.

A further object of the invention is to provide a substantially one-piece dispenser adapted to be connected to liquid containers and bottles.

A better understanding of this invention may be had

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from the following detailed description when read in connection with the accompanying drawings in which:

Fig. 1 is a cross-sectional view of a dispenser unit embodying the invention;

Fig. 2 is a detail front view of the dispensing cap showing the exit slit for the contents of a container;

Fig. 3 is a cross-sectional view of the dispensing cap taken along the line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view of another modification embodying the invention;

Fig. 5 is a cross-sectional view taken along the line 5—5 of Fig. 4;

Fig. 6 is a top view of the dispensing cap;

Fig. 7 is a cross-sectional view of a third modification of the invention; and

Fig. 8 is a front view of the modification shown in Fig. 7.

Referring, now, to the drawings in which the same reference numerals refer to the same elements, a container 5, such as a bottle, is shown having an externally threaded neck portion 6, this neck portion holding the regular bottle cap before the dispenser is connected thereto. Surrounding the neck 6 is a threaded coupling unit 8 having an annular right angle flange section 9, this element being of rigid material. Mounted within the annular rim 9 is a substantially oval-shaped plastic cap shown generally at 11, having a rear curved protuberance wall 12, a front protuberance wall 13, and a sloping upper wall portion 14 with a fairly sharp tip 15. This cap may be of polyethylene or vinyl plastic. In the front protuberance 13 is a convex slit 17 which has an angle of approximately 45 degrees to the surface of the cap in which the slit is located. Thus, pressure on the upper surface 14 will cause the slit 17 to open outwardly and close inwardly, which will provide a tight cut-off to permit the protuberance to be wiped clean.

The cap 14 has a tapered lower cup portion 19 in which is positioned a ball 20 to provide a check valve. On the lower extension 21 of the cup 19 is a delivery tube 22, which is preferably flexible, it being understood that this tube may also be a portion of the entire cap if desired. (See Fig. 4.)

As described in my above-mentioned copending application, the liquid within the container 5 is dispensed by simply pumping the flexible upper wall 14 of the cap 11 with the container upright. The wall 14 may be made thinner than the remaining walls of the cap to enhance the pumping action. Each time the cap is released, the liquid contents of the container 5 will move past the ball 20, removing the ball from its seat in the cup 19. The ball 20 will then return to its seat in the cup to prevent the liquid from returning to the container. After several actuations of the surface 14, the upper portion of the dispenser 11 will become filled and the liquid will then be dispensed through the slit 17 in any desired amount determined by the pressure on surface 14. The liquid may also be dispensed by pressure on the cap with the thumb on top and the index finger below the slit, the index finger moving upwardly across the slit. The angle of the slit and the dge 15 permits the cap to be wiped clean with no carry-over on the top surface 14.

It will be noted that the upper opening 23 in the cup 19 is smaller in diameter than the ball 20, which prevents the ball from passing into the upper portion of the dispenser. The ball is inserted in the cup 19 by simply pressing it through the slit 17 and then through the narrow portion 23 of the upper portion of the cup 19 when the coupling 8 is not in position. The coupling 8 is then pressed into position to maintain the narrow opening 23 of a size to prevent the ball from leaving the cup.

Referring, now, to Figs. 4 and 5, a dispenser unit similar

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to unit 11 has an upper portion 25 and a cylindrical lower portion 26 forming a cup portion in which is a ball 27. This modification is for corked bottles and is simply pressed into the neck of the bottle, the upper stop for the ball being provided by a staple 29 pushed in from the upper portion of the cup 26. Also, in this modification, the delivery tube 30 is an integral part of the dispensing cap. Although a staple is shown as a stop, this stop may be omitted with lotions of light consistency, as the check ball will always return to its valve seat. However, the check ball stop is desired when lotions of heavier consistencies are used, since the ball is liable to remain suspended in such lotions.

In the modification of Figs. 4 and 5, a groove is shown by the dotted lines 32, which provides a vent for air in the upper portion of the bottle 33, although the groove is sufficiently small to prevent spillage of the contents of the bottle if upset.

Referring, now, to Figs. 7 and 8, a cap 35 has a small hole 36 at or near the upper edge portion of the cap. There may be several fine holes if desired, depending upon the type of spray required when the flexible cap is actuated by pressure on the top surface of the cap. The throat construction of the cap may be the same as in Fig. 1, whereby the narrow throat 38 is maintained of a size by the rigid screw coupler 39 to prevent the ball 41 from entering the upper cavity of the cap.

The ball 41 is inserted in the cup portion 42 of the cap through the neck portion 43 since the hole 36 is not sufficiently large to pass the ball, as is done in Fig. 1. To hold the ball in the cup 42, a delivery tube 44 is now inserted and attached in any suitable manner within the neck 43, the ball resting on the end of the tube 44. The action of this dispenser cap modification is the same as described above, the liquid now being dispensed in squirts or a spray. This cap is suitable for containers of glass cleaning fluids, insecticides, and perfumes.

From the above description, it will be observed that a very economical and efficient dispenser is provided by molding the dispenser in substantially one piece, the check

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ball being utilized and contained by the configuration and construction of the dispensing cap itself. The dispenser may be used for threaded cap bottles or corked bottles as described above.

I claim:

1. A dispenser unit for attachment to a container for dispensing the contents thereof comprising a cap having a tapered portion for insertion within an opening of said container, said cap having portions external of said container consisting of interconnected front and rear walls and a top wall, said front wall being greater in height than said rear wall, the top wall of said cap extending from the upper edge of said front wall to the rear wall at an angle to the plane of the opening in said container, a protuberance from said front wall, said protuberance having a slit therein, said slit forming a valve for extruding the contents of said container, and a ball in said tapered portion forming a valve in series with said slit valve, said tapered portion, said front and rear walls, said top wall and said protuberance being integral and resilient.

2. A dispenser unit in accordance with claim 1 in which the upper edge of said front wall joints the top wall of said cap in a sharper edge than said rear wall joints said top wall.

3. A dispenser unit in accordance with claim 1 in which a portion of said cap joining said tapered portion and said interconnected walls lies parallel to the plane of the opening in said container and maintains said ball in said tapered cylindrical portion.

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