

Jan. 5, 1954

J. ZÜBLIN

2,665,037

CONTAINER

Filed June 17, 1949

2 Sheets-Sheet 1

Fig. 1

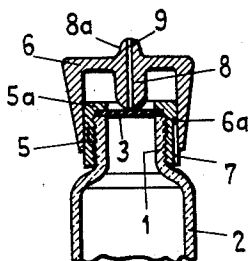


Fig. 2

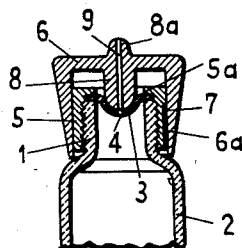


Fig. 3

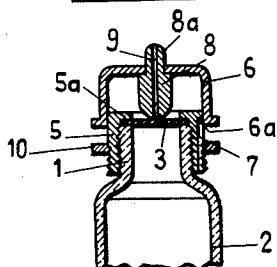


Fig. 4

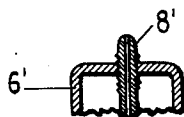


Fig. 5

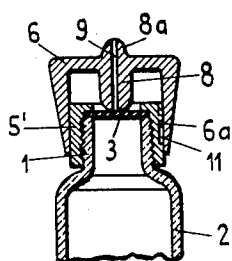
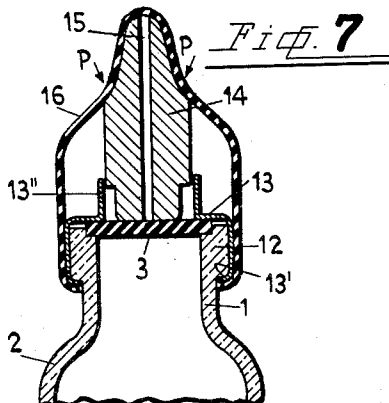
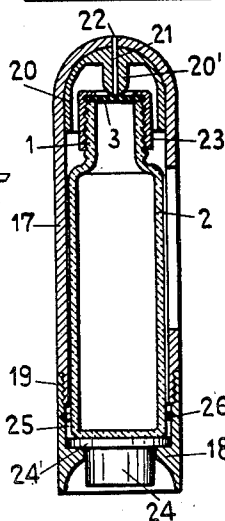


Fig. 6



Fig. 8



INVENTOR:
JULIUS ZÜBLIN
BY *Heinrich Strauss*
PAT.

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Fig. 9

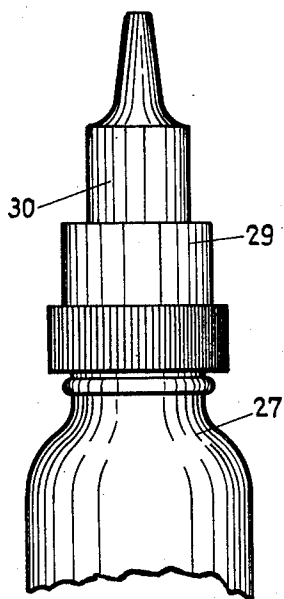


Fig. 10

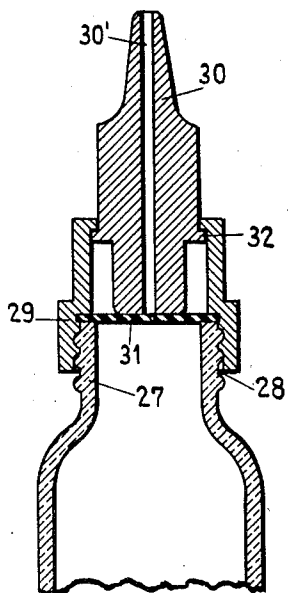
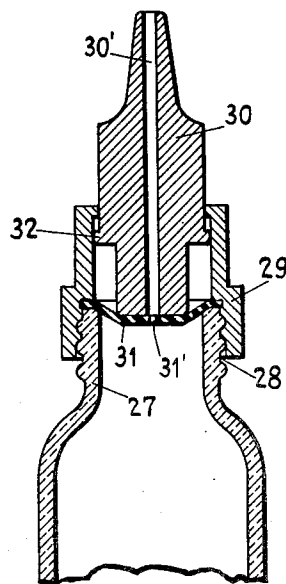


Fig. 11



INVENTOR:
JULIUS ZÜBLIN
BY *Alvin M. Schaefer*

UNITED STATES PATENT OFFICE

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CONTAINER

Julius Züblin, Glarisegg-Steckborn,
Switzerland

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4 Claims. (Cl. 222-490)

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This invention relates generally to a combination closure and dispensing device for receptacles.

The bottles heretofore known provided with drop counters have the disadvantage that their use requires a certain amount of skill so that when dispensing the contents of the container in the form of drops mistakes often occur which may have a harmful effect when medicinal liquids are dispensed.

This deficiency is eliminated by the present invention. This invention relates to a method of drawing-off liquid from the container in metered or predetermined amounts and to a device for carrying out said method. The method according to the invention consists in that an excess pressure in the container is created by operative action, means being provided serving to close the orifice of the container, said excess pressure causing the issue of a predetermined quantity of liquid out of the container. The device for carrying out the method is characterized in that the container is provided with means consisting of resiliently extensible material provided with at least one outlet opening, the outlet opening closing automatically in one position due to the inherent elasticity of the aforesaid means and being under the operative action of pressure means for the purpose of creating an excess pressure within the container by operating the closure means, said excess pressure causing the issue of a predetermined quantity of liquid out of the container.

By way of example several embodiments of suitable devices for carrying out the method are shown in the accompanying drawing in which—

Fig. 1 is a longitudinal section through the device according to the first example of embodiment shown in the closed position and in connection with a partly illustrated bottle-shaped container,

Fig. 2 the same device in the open position,

Fig. 3 a second example of embodiment of the device also in the longitudinal section and in connection with a bottle-shaped container only partly shown,

Fig. 4 a detail of an alternative,

Fig. 5 a longitudinal section through the device according to the third example of embodiment again in connection with a bottle-shaped container only partly shown,

Fig. 6 a detail to Fig. 5 in side elevation,

Fig. 7 a longitudinal section through the device according to the fourth example of embodiment in connection with a bottle-shaped container, only partly shown,

Fig. 8 a longitudinal section through the device according to the fifth example of embodiment,

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Fig. 9 a side elevation of the device in connection with a bottle only partly shown,

Fig. 10 a longitudinal section through the device shown in Fig. 9 in the closed position and

Fig. 11 the same device in the open position.

With the first example of embodiment shown in Figs. 1 and 2 the device consists of a closure means adapted to be secured on the neck 1 of a bottle 2 only (partly shown). The closure means in the form of a disk acts as a diaphragm 3 made from elastic extensible material, such as a rubber disk of circular shape. The diaphragm 3 is provided with an opening or orifice 4 (Fig. 2) in its center, said opening or orifice, being normally closed in the non-tensioned position due to its inherent elasticity. The diaphragm 3 is arranged to extend across the mouth of the neck 1 of the bottle and is secured to the edge 5a by means of a sleeve 5. Said sleeve 5 is provided with an inside screw thread and is screwed on to the outside screw thread provided on the neck 1. Over the sleeve 5 an axially displaceable cap 6 is arranged, said cap being prevented from rotating by the nose 6a which nose 6a is guided in a groove 7 provided on the circumference of the sleeve 5 and extending in the axial direction of the sleeve. The cap 6 is provided with a pressure piece 8 arranged centrally which pressure piece is axially pierced by a duct 9 and has a projection 8a on its end opposite to the neck 1 of the container. The pressure piece 8 is of such a length and has an end face positioned opposite projection 8a that it comes to lie in the position of rest above or on the upper surface of the diaphragm 3 shown in Fig. 1 without tensioning said diaphragm. If, however, the cap 6 together with the aforesaid end face of the pressure piece 8 is axially displaced into the position shown in Fig. 2, the diaphragm 3 is tensioned causing the opening or orifice 4 provided in the diaphragm 3 to register with the duct 9 of the pressure piece 8 which has a sufficiently large end face so as to be incapable of piercing the perforated diaphragm or disk 3.

To operate the device described, the bottle 2 is gripped and inclined to such an extent until the neck 1 is filled with liquid representing the contents of the bottle. Now the cap 6 is axially displaced from the closed position (Fig. 1), so that the end face of the pressure piece 8 will tension the diaphragm 3 more or less according to the amount of displacement. In this manner an excess pressure is created through the displaced diaphragm within the bottle. Simultaneously the opening 4 of the diaphragm 3 is expanded and freed due to the tension and according to the amount of tension, this opening or

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orifice will have a smaller or larger diameter. At the same time an exactly metered quantity of liquid issues through the opening 4 due to the excess pressure. The calibration of the device can be carried out empirically. Depending on the rate of axial displacement the same amount of liquid issues in the form of drops on slow displacement or in the form of a liquid spray on rapid displacement. For the exact controlling of the quantity of liquid the cap nut 5 can be provided with a graduation with which e. g. the corresponding edge of the cap 6 co-operates.

Instead of a graduation the axial displacement at the cap 6 can be limited by an adjustable stop 10 (Fig. 3). Said stop is formed of a ring and has an inside screw thread so that the ring can be screwed on to a corresponding outside screw thread of the sleeve 5 and can thus be adjusted to various levels.

According to the alternative shown in Fig. 4 the cap 6' is rigidly connected with the sleeve 5 and serves for the reception of a pressure piece 8', said pressure piece being in its turn connected with the cap 6' for the axial displacement. The pressure piece 8' is provided with an outside screw thread so that it is adjustable in a threaded hole of the cap 6', said threaded hole being provided with a suitable inside screw thread.

With the examples of embodiment according to Figs. 5 and 6 the difference compared to the first-described example of embodiment lies mainly in the fact that the sleeve 5' is connected with the cap 6 by means of a bayonet catch. For this purpose the sleeve 5' has a guiding slot 11 (Fig. 6) which consists of two guiding parts running parallel to the axial direction and a connecting part running horizontally thereto. In said slot 11 the nose 6a of the cap 6 (Fig. 5) is guided so that the latter can be secured at two different levels according to the bipartiteness of the slot 11.

The manipulation of the device according to the last-described example of embodiment takes place essentially in the same manner to that according to the first-described examples of embodiment with the difference only that the cap 6 or 6', respectively, is displaced according to its execution in one case against the stop 10, in another case by carrying out a combined sliding and rotary movement (Figs. 5 and 6) or according to Fig. 4 by the pressure piece 8' only being adjusted. In each case an excess pressure is created in the container, i. e. in the bottle 1, and the closure orifice 3 is opened more or less.

A further example of embodiment is shown in Fig. 7. The neck 1 of the container 2 for liquid here only partly shown is provided with an outside beading 12, and the mouth of the neck is closed by a diaphragm 3 secured by means of a sleeve 13. The sleeve 13 can e. g. be pressed of light metal and be so formed that at one end it grips under the lower edge of a bottle edge 12 by means of a flange 13' and at the other end has a collar 13'', said collar being adapted to guide a pressure means 14. The pressure means 14 is arranged co-axially to the bottle 2 and bears with one end against the diaphragm 3 and is axially pierced by a duct 15. With the numeral 16 a cap fitted over the pressure means 14 of the sleeve 13 is designated, said cap consisting e. g. of rubber and closing the duct 15 at the end remote from the diaphragm 3 when not in use.

For use the pressure means 14 is axially dis-

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placed towards the diaphragm 3 by pressure in the direction of the arrow P so that said diaphragm is tensioned and the opening in the centre of said diaphragm, which opening is closed when the diaphragm is not tensioned, is more or less opened. Simultaneously the rubber cap 16 over the pressure means 14 is also tensioned whereby an opening communicating with the mouth of the duct is freed and the contents of the bottle 2 can issue.

A further example of embodiment shown in Fig. 8 is particularly suitable for the reception and dispensing of perfumes, such as eau de Cologne, etc. The difference compared with the examples of embodiment heretofore described lies in the fact that the bottle 2 is arranged in a container composed of a sleeve 17 essentially closed at one end and a bottom part 18 connected with said sleeve 17 by means of the screw thread 19. The closed end of the sleeve 17 has a semi-spherical shape and serves for the reception of a pressure means 20 having a duct 21 arranged co-axially with the bottle 2, and opening 22 in the semi-spherical closed end of the sleeve 17 being arranged to correspond with the duct 21. The pressure means mentioned is a hollow body adapted to fit into the semi-spherical closed end of the sleeve 17 and is provided with a practically cylindrical extension 23' pierced by duct 21, the inner end of said extension bearing against the diaphragm 3 of the bottle 2. The diaphragm 3 is secured to the neck 1 of the bottle in a conventional manner, such as by means of a sleeve 23.

The bottle is axially displaceably arranged within the two-part container 17, 18, and a press button 24 in the bottom part 18 of the container is inserted as a displacing means. For this purpose the bottom part 18 is provided with an annular rib 18' on which rib one edge 24' of the press button 24 rests. Between the side wall of the bottom part 18 and the bottle 2 there is a hollow space 25 in which a compression spring 26 is arranged, said compression spring bearing at one end against the edge 24' and at the other end against the opposed limitation of the hollow space 25.

The operation of the last-described device is carried out in such a manner that a pressure is exerted on the press button 24 in the direction of the bottle 2 whereupon the bottle is displaced. By this movement the extension 20' of the pressure means 20 acts operatively on the diaphragm 3, thus causing said diaphragm to be tensioned and its orifice to be opened. At this moment a metered quantity of liquid corresponding to the excess pressure created issues out of the inside of the bottle. In order to be able to check the contents of the bottle 2 capsule part 17 has an oblong opening 26.

The last example of embodiment is shown in Figs. 9-11. On a bottle neck 27 provided with a screw thread 28 a cap nut 29 is secured, said cap nut being adapted to act as a guiding and stop means for a pressure means 30 provided with an annular collar 32. Said pressure means is of an elongated shape and bears with one end against a diaphragm 31 which diaphragm is stretched and extends across the mouth of the neck and is there secured by means of a screw cap 29. The plunger pressure means 30 through which extends a duct 30' is axially displaceable in such a manner that by its displacement the diaphragm 31 is tensioned and a normally closed orifice 31' of the diaphragm aligned with and communicating with the duct 30' is exposed and freed,

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thus affording for the liquid to escape from the inside of the bottle through said orifice and duct. It will be realized that the end face of the plunger means 30 is smaller in diameter or extent than that of the open end of the neck 27, but considerably larger than the diameter of the orifice 31' when diaphragm 31 is deformed and partly displaced within the open end of said bottle or container neck 27 (compare Figs. 10 and 11).

In use the last-described device can be operated in a simple manner by means of one hand only.

The device according to the examples of embodiment described enables a faultless and extremely exact metering of liquids without particular skill or attention being required.

What I claim and wish to secure by Letters Patent is:

1. A container having an opening for dispensing a liquid therefrom comprising means of elastic, extensible material placed across said opening, said means being provided with an orifice remaining normally closed in the position of rest of said means due to its inherent elasticity, a sleeve securing said elastic means to the neck of the container and extending over the neck of the container for securement thereto, a cap, and pressure means on said cap, said pressure means having a duct passing therethrough and arranged coaxially to the orifice of said elastic means and resting against said elastic means from the outside thereof, and means on said cap and said sleeve in the form of a nose and a groove parallel to the axis of the container to prevent rotation.

2. A container with a screw-threaded neck terminating in an open end for discharge of a liquid from within said container through said open end; comprising an extensible elastic disk member having a circumferential edge and a central portion provided with an orifice, said orifice being normally closed when said disk member extends substantially flat across the open end of said neck whereby said open end is obstructed, means threadedly connected to said neck and constructed to clamp said circumferential edge of the disk member on said neck, and plunger means arranged for sliding movement against said central portion of said disk member,

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said plunger means being provided with a duct substantially coaxially disposed with respect to said orifice of said disk member and terminating in an end face, said plunger means being guided during sliding movement in the direction of said disk member thereagainst, whereby the latter is deformed within the open end of said neck and said orifice is opened due to stretching action exerted by said plunger means against said disk member thereby establishing communication from within said container through said opened orifice and said duct, said end face of said plunger means being larger in diameter than that of said orifice to thereby avoid piercing the latter.

3. In a container according to claim 2, including a holder cap for said plunger means, said holder cap being slidably arranged on said means threadedly connected to said neck.

4. A container with a neck terminating in an open end for dispensing a liquid therefrom; comprising an elastic disc member extending across the open end of said neck, whereby said open end is obstructed, said disc member having a circumferential edge and a central portion provided with an orifice, cap means arranged on and for displacement lengthwise of said neck, and a plunger associated with said cap means and having a duct coaxially disposed with respect to said orifice of said disc member, said plunger being provided with an end face larger in diameter than that of said orifice to thereby avoid piercing the latter, said cap means being constructed to clamp said circumferential edge of said disc member on said neck, whereby said plunger abuts against said disc member and said orifice is opened, thereby establishing communication from within said container through said opened orifice and said duct.

JULIUS ZÜBLIN.

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