

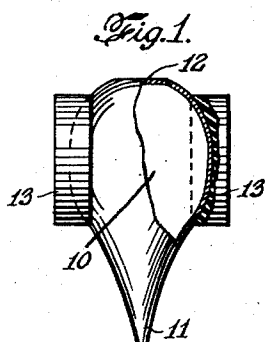
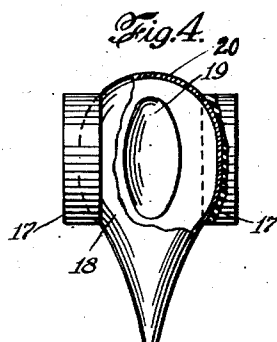
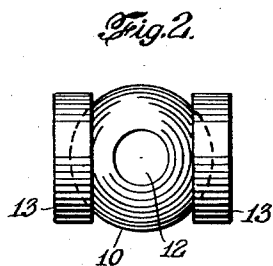
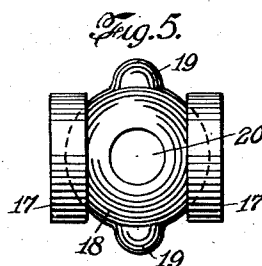
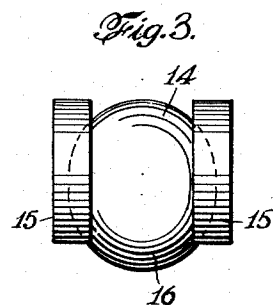
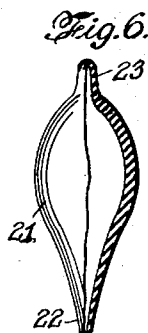
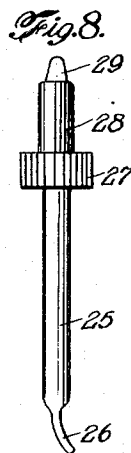
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2,579,718

MEASURED VOLUME LIQUID DROPPER

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MEASURED VOLUME LIQUID DROPPER

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3 Claims. (Cl. 222-207)

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The invention relates to liquid dispensing devices whereby measured volumes of a liquid may be successively discharged in equal amounts from a readily refillable container or reservoir for the liquid, for example, to a device of the general nature of the well-known medicine dropper.

The invention has for an object to provide a simple device to replace, for the purpose hereinbefore noted, graduated pipettes and mechanically operated devices such as are extensively used in laboratories and in the pharmaceutical field, as in serology and therapeutics generally, for example, in titrations, to dispense drops into the nose and for the application of patent or other medications, etc., and useful generally where resilient bulbs with droppers and also pipettes have heretofore been applicable.

A further object of the invention is to afford a relatively large capacity reservoir for retaining the desired liquid and which reservoir by simple manipulation of a compressible portion of the device may be readily filled through aspiration of the desired liquid; also, to afford associated means whereby, upon repeated compressions manually, substantially equal, successive and predetermined small volumes of the liquid may be delivered.

Still another object of the invention is to provide an auxiliary resilient chamber manipulable independently of the said reservoir and of small capacity relatively thereto.

A further object of the invention is to provide a device of this nature which may be readily constructed, be rugged and preferably of one piece to avoid leakage; also, which shall not be objectionable in appearance.

In carrying out the invention, a reservoir for liquid is provided as a bulb of large capacity relatively to the individual discharges to be had therefrom, such bulb being in the nature of a normally distended bellows element of more or less resilient material as rubber. The said bulb is provided with a relatively stiff outlet spout at one end which is suitable also for filling of the bulb with the liquid subsequently to be discharged in small quantities through said outlet spout in the manner hereinafter set forth.

The walls of said bulb may be constituted in whole or in part of relatively heavy or semi-rigid resilient material, or of lighter and more readily compressible resilient material in which case integral and rigid guard portions are associated therewith to prevent unintentional compression of the bulb except at an additional or auxiliary portion or portions thereof of greater resiliency,

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or of more ready compressibility, and designed to effect the individual discharges. Preferably, there is associated with the more rigid and bulb portion proper one or more auxiliary bulb chambers which communicate with the said reservoir chamber and are of predetermined capacity. These auxiliary chambers are constituted of material more readily compressible than the bulb proper in that they are of lesser stiffness but also resilient so as to return to normal distended form upon removal of the compression force after effecting ejection of a small predetermined or measured volume of the liquid from the reservoir chamber. Such volume is designed to correspond to the capacity of an auxiliary chamber, successive ejections being of equal volume from manipulation of a given auxiliary chamber, and the ejections being possible until the supply of liquid in the reservoir is wholly depleted. In some of the embodiments of the invention, provision is made to limit mechanically the degree of compression of an auxiliary chamber.

To fill the reservoir initially, the spout of the device is inserted into the desired liquid, the bulb or reservoir portion is compressed in the manner of a bellows to expel the air from its interior, and the liquid may then be introduced by releasing the compression on the bulb wall, thus inducing a sucking action as the bellows or bulb expands to fill the reservoir but not, necessarily, an auxiliary bulb chamber or chambers. By then manually applying pressure to such auxiliary bulb to compress the same, liquid will be ejected through the main bulb outlet of a volume corresponding to the capacity of the particular auxiliary bulb, each successive compression delivering a like volume when such auxiliary bulb is fully compressed.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of one embodiment of the novel liquid dispensing device; and Fig. 2 is a plan view thereof.

Fig. 3 is a plan view of a modified form of the device.

Figs. 4 and 5 illustrate a further modification, Fig. 4 being a front elevation and Fig. 5 a plan view thereof.

Fig. 6 is a part front elevation and part vertical section of another modification; and Fig. 7 is a plan thereof.

Fig. 8 is a front elevation showing the outlet element as not integral with the remaining portions of the dispensing device.

Referring to Figs. 1 and 2 of the drawings, the novel dropper device is indicated as comprising the bulb or reservoir portion 10 affording a chamber of relatively large capacity with respect to the volumes to be discharged. The said bulb portion tapers at one end to an outlet or spout 11 for filling the reservoir and through which also its liquid content is to be discharged—in accordance with the invention, in relatively small, predetermined and equal amounts. This is effected by means of manually exerted pressure upon the uppermost or top portion 12 of the bulb which constitutes an additional or auxiliary chamber, the degree to which this top portion may be compressed being limited through contact of the operator's finger or fingers with a pair of stop elements or guards 13 diametrically disposed over opposite sides of the body portion of the said bulb. Thus, it is not possible to eject at one time more liquid than corresponds to the capacity of the auxiliary chamber portion afforded by the said compressible restricted part of the bulb, it being understood that in the filling of the reservoir such auxiliary chamber portion will, generally, not receive the liquid. Filling of the bulb or reservoir 10 is accomplished by compressing the bulb chamber in exerting pressure, for example, upon the guard pieces 13 and inserting the spout 11 into the liquid which is to be subsequently dispensed in measured equal volumes, as aforesaid. Upon release of the pressure, liquid will be drawn into the reservoir, as is well understood.

Instead of providing the auxiliary and compressible chamber at the top, a bulb 14, Fig. 3, may be caused to project beyond the guard pieces 15 at one or more sides as the chamber 16 indicated. In such case, this portion is to be compressed toward the guard pieces for ejecting the successive volumes of liquid, the top and opposite side being substantially flush with edges of said guard pieces.

A further modification in the construction of the device is indicated in Figs. 4 and 5 in that there is provided, preferably between the guards 17 of the bulb 18, additional and auxiliary chambers 19 of a capacity different from that of the auxiliary chamber 20 at the top of the bulb and different also from each other. The auxiliary chambers 19 are to this end made more resilient than the bulb portion proper so as to be more readily compressible, thereby obviating any tendency to compress also the body portion proper and thus cause discharge consecutively of unequal amounts of the liquid.

A still further modification is illustrated in Figs. 6 and 7 which disclose a form of the invention which does not require the guard elements of the previously described embodiments. To this end, the bulb portion 21 is constituted of material which, though sufficiently resilient and compressible to allow of filling with liquid through the spout 22, is relatively so much less compressible than an auxiliary flat, top portion 23 that the latter may be compressed without affecting to any appreciable extent the bulb proper.

The spout portion, also, need not be integral with the remainder of the device and may be separable from its bulb, as indicated in Fig. 8, wherein the spout is indicated in the nature of a glass tube 25 with constricted outlet orifice 26. At its end opposite the outlet, it is suitably retained within a collar or bottle cap 27 having extending longitudinally therefrom a more or less rigid, though compressible, bulb or reservoir portion 28. The latter has at its top an auxiliary rounded bulb 29 of greatly reduced capacity with respect to the capacity of the reservoir 28 and also is much more readily compressible than the reservoir. By pressing downwardly, for example, upon bulb 29, no effect is had upon the reservoir portion 28, but the complete compression of the auxiliary bulb 29 will cause discharge through the orifice 26 of liquid corresponding in volume to that of the said auxiliary bulb when distended.

I claim:

1. A liquid dispenser for delivering successively predetermined and equal volumes of a liquid, comprising a reservoir chamber having a resilient wall adapted to be compressed manually and an outlet spout extending from the chamber adapted to receive and to discharge liquid respectively into and from said chamber, the latter communicating with an additional chamber of considerably less capacity and having a resilient wall more readily compressible than the wall of the said reservoir chamber and adapted for successive compressions manually, and diametrically opposed guard pieces combined with the wall of said reservoir chamber adapted for limiting the extent of compression manually of the wall of the additional chamber through contact of an operator's hand with said guard pieces.

2. A liquid dispenser according to claim 1, wherein a pair of auxiliary compression chambers are provided and extend laterally from the reservoir chamber.

3. A liquid dispenser according to claim 2, wherein the two auxiliary compression chambers are provided of a capacity differing from each other and from that of the additional chamber.

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