June 8, 1943. W. DUBILIER 2,321,369

DROPPER

Filed Jan. 29, 1941

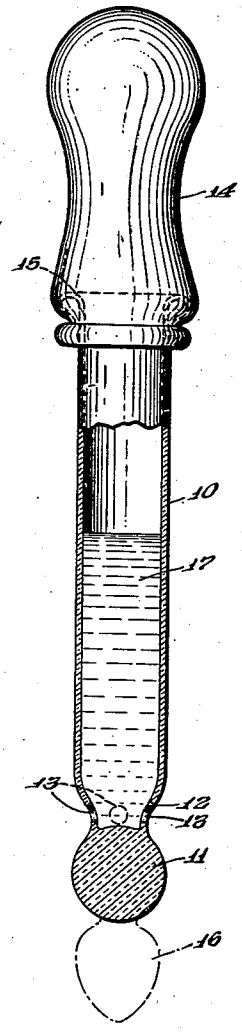


FIG. 1.

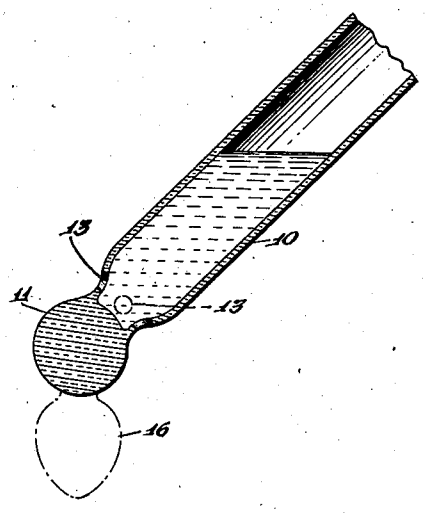


FIG. 2.

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DROPPER

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Application January 29, 1941, Serial No. 376,469

3 Claims. (Cl. 221—148)

This invention relates to an improved dropper for medical and other uses.

The ordinary medicine dropper has the disadvantage when it is desired to measure a certain number of drops of medicated solution that it requires a great deal of practice in order to obtain the right number of drops and not to exceed such number. In particular, droppers of known design are objectionable because of the fact that the speed or number of drops discharged depends on the inclination at which the dropper is held, that is if held vertically a steady stream of drops or fluid will flow at a high rate, while when the dropper is held at an inclined position the speed and number of drops will be decreased accordingly.

With the dropper of this invention only one drop at a time can be obtained and the rate of discharge of the drops is rendered substantially independent of the angle of inclination at which the dropper is held, thus ensuring an exact amount of medicated or other fluid to be administered even in the hands of unskilled persons. Of course, the dropper according to the invention is not limited to medical use but may be employed with equal advantage for other purposes, such as in chemical laboratories where accurate measurement of small quantities of a fluid substance is required.

The invention will be described in detail with reference to the accompanying drawing forming part of this specification wherein

Figure 1 is a vertical cross-sectional view of a dropper embodying the improved features of the invention, and

Figure 2 is a partial view of the dropper according to the preceding figure shown in inclined position to illustrate the advantages and novel results obtained by the invention.

In the drawing, item 10 is a tube of glass or other suitable material the lower end of which terminates in a ball or sphere 11 preferably of the same material and integral with the tube 11. This sphere which advantageously has a diameter equal to or somewhat greater or less than the diameter of the tube 10 may be either solid as shown or hollow and is separated from the tube proper by a constricted portion 12 provided with at least one or preferably a series of discharge openings or ports 13. The openings 13 which are preferably spaced by equal angles and of which four are shown in the example illustrated spaced at 90° from each other will allow a fluid 17 in the tube 10 to discharge and flow along the spherical surface 11 so as to accumulate on the lower part of the latter to form a drop as indicated at 16. The size of the drops before disengaging the sphere 11 will be substantially determined by the physical characteristics, such as the viscosity of the liquid 17 and the surface tension between the liquid and the material of the sphere. The size of the drops and in turn the number of drops discharged per second will be substantially independent of the angle of inclination of the dropper by virtue of the uniform spherical surface on which the fluid has to pass after leaving the ports 13 before accumulating into a drop as will be more clearly understood by reference to Figure 2 showing the dropper in an inclined position. Item 14 is a collapsible rubber bulb clamped over the flanged upper edge 15 of the tube 10 for introducing and discharging the fluid by expansion and compression, respectively, of the bulb 14 in a manner well known.

There is provided, therefore, by the invention a dropper which provides not only a constant number of drops per unit of time independently of the angular position or inclination at which the dropped is held but which also insures each of the drops to be of exactly the same size determined by the diameter of the spherical discharge surface as will be readily understood from the foregoing. This makes it possible to accurately calibrate the dropper such as by a calibration scale applied to the tube 10 both for the number of drops as well as the amount of liquid discharged for a given size of dropper or discharge surface, respectively. In this manner, counting of the number of drops and attendant errors due to the human factor are eliminated.

In place of the collapsible rubber bulb 14 for filling and discharging the dropper any known equivalent arrangement such as a piston moving within the tube 10 may be provided or liquid may be fed to the tube continuously to act as a constant drip feed in scientific and industrial apparatus to make up for solvent evaporated or constituent substances lost in a solution and similar purposes well understood.

It will be evident that the invention is not limited to the specific details of construction shown and disclosed for illustration but that modifications and changes may be resorted to coming within the broader scope of the invention as defined in the appended claims.

I claim:

1. A dropper comprising a rigid tube, a collapsible bulb secured to one end of said tube, the opposite end of said tube being of restricted

diameter and terminating in a spherical head, the restricted portion adjacent to said head being provided with at least one opening adapted upon compression of said bulb to cause a fluid in said tube to pass over the surface of and accumulate in successively discharged drops at the bottom of said head.

2. A dropper comprising a rigid tube, a collapsible bulb secured to one end of said tube, the opposite end of said tube being of restricted diameter and terminating in a solid spherical head of the same material and integral with said tube, the restricted portion of said tube adjacent to said head being provided with at least one opening adapted upon compression of said bulb to cause a fluid in said tube to pass over the surface of and accumulate in successively discharged drops at the bottom of said head.

3. A dropper comprising a rigid tube, a collapsible bulb secured to one end of said tube, the opposite end of said tube being of restricted diameter and terminating in a spherical head, the restricted portion of said tube adjacent to said head being provided with a plurality of openings equally angularly spaced adapted upon compression of said bulb to cause a fluid in said tube to pass over the surface of and accumulate in successively discharged drops at the bottom of said head.

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