March 5, 1957 E. N. CROCE 2,783,923

CONTINUOUS-FLOW DROPPER DEVICE

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FIG. 2

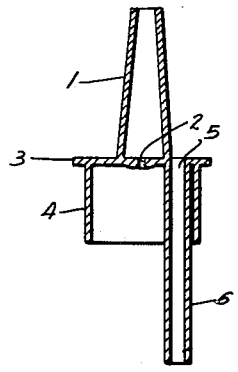


FIG. 1

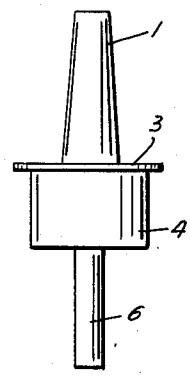
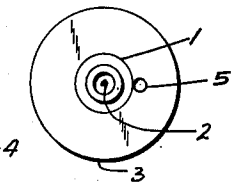


FIG. 3



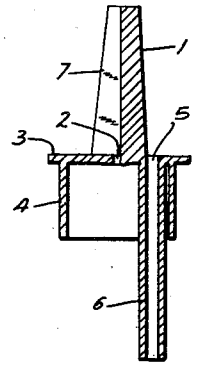


FIG. 2a

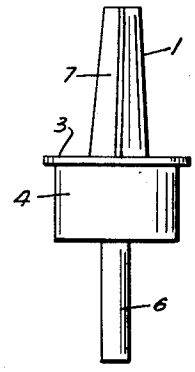


FIG. 1a

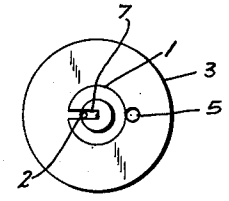


FIG. 3a

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FIG.3b

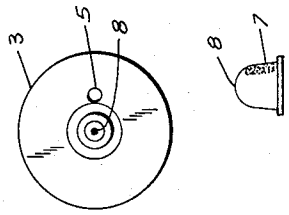


FIG.4

FIG.1b

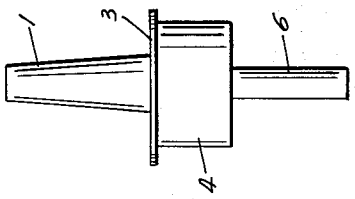
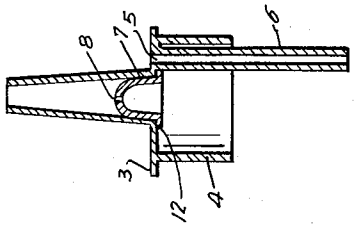


FIG.2b



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CONTINUOUS-FLOW DROPPER DEVICE

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Application April 28, 1953, Serial No. 351,573

Claims priority, application Italy February 13, 1953

3 Claims. (Cl. 222—420)

This invention concerns improvements relating to continuous-flow dropper devices. Various dropper devices are known which are either incorporated in bottles or other vessels or are intended to be fitted thereto, but these exhibit disadvantages in practical use, especially for dispensing more or less valuable medicines. In particular, some liquid may be lost and the number of drops obtained cannot readily be accurately controlled, either quantitatively or volumetrically. The continuous flow dropper device forming the subject of the present invention is intended to obviate these disadvantages.

The said device is made of a plastic material, preferably a polyethylene, such as alkathene, and comprises a hollow cylindrical body to be pressed into the neck of a vessel containing the liquid and a hollow conical spout whose base is in communication with the top of the body through a small central hole located symmetrically with respect to the said spout, and a tube extending downwardly from the top of the body where it is open to atmosphere through a larger hole, a required number of drops being obtainable by tilting the vessel so that the liquid flows through the central hole and out from the spout while air enters the vessel through the second hole in a quantity corresponding to the quantity of liquid allowed to flow out from the spout in drops. With such a device any number of drops can be poured from the spout with accuracy. The pressure of the liquid, contained in the vessel, at the small central hole is determined by the air entering the vessel through the second, larger, hole. The two holes may be formed in the same plane at the top of the body of the device. They may be on opposite sides with respect to the axis of the spout. The whole device may be made in one piece or may comprise, as a separate part, a plug of a plastic material with a small hole at the top and pressed into the spout where it seats against the underside of the top of the body exactly in the centre of the base of the spout.

Three forms of embodiment of the invention are illustrated by way of example in the accompanying drawings, in which:

Figures 1, 2 and 3 are an elevation, a vertical section and a plan view respectively of a first form of the device,

Figures 1*a*, 2*a* and 3*a* are similar views of a second form, and

Figures 1*b*, 2*b*, and 3*b* are similar views of a third form, Figure 4 showing a plug component in elevation.

In the form of embodiment illustrated in Figures 1, 2 and 3 of the drawing, the device made in one piece from a polyethylene plastic material moulded to form a hollow conical spout **1** which is initially closed at the upper end. The end is removed before the device commences to be used. In the centre of the plane top **3** of the hollow cylindrical body **4** of the device and symmetrically in the base of the spout **1**, a small hole **2** is provided which the liquid enters to pass into the spout **1**, from which, under pressure produced by tilting the vessel to a greater or lesser degree, the said liquid can be caused to issue in

drops with a greater or lesser rapidity. In the same plane top **3**, there is also formed a second or capillary hole **5** which is larger than the hole **2** and communicates with a downwardly extending tube **6**. Due to the tilting of the vessel, a quantity of air in the form of small bubbles enters the said vessel from the hole **5** and through the tube **6**, thus accurately determining the escape through the small hole **2** and the spout **1** of as many drops of liquid of corresponding volume.

The second form of embodiment illustrated in Figures 1*a*, 2*a* and 3*a* only differs from that just described as regards the conical spout **1**. This is provided on one side with a longitudinal groove **7** terminating at the base so as to communicate with the small hole **2**, the spout being otherwise solid.

The form of embodiment illustrated in Figures 1*b*, 2*b* and 3*b* differs from the forms previously described in that a separate plug **7** of a polyethylene material is pressed into a seating, at **12**, in the hollow conical spout **1** from the underside of the plane top **3**, the plug **7** having a hole **8** at the top for permitting the liquid to issue. The exchangeable plug **7** has the function of reducing and proportioning the opening at the base **2** of the spout **1** to suit the different densities of liquids to be measured out. The spout may be closed by screwing a cap or protective cover (not shown) over its end. Such a cap may have a plug or boss in the form of a truncated cone which, during the screwing on of the cap, automatically finds a tight seating in the plane circular mouth of the spout so as to close it hermetically. Closure under pressure of the capillary air inlet hole **5** may also be ensured by an annular packing disposed on the inside of a flange or step on the cap.

What is claimed as new and desired to be secured by Letters Patent is:

1. A dropper device to be attached to the neck of a liquid container for causing a liquid therein to flow in drops from the container, comprising, in combination, a hollow substantially cylindrical body having one end wall and being open at the end opposite said end wall, the latter having an inner face directed toward said open end and an opposite outer face, and said end wall being formed with a first opening passing therethrough and a second opening smaller than said first opening; an elongated tubular member having a diameter equal to that of said first opening fixed to said inner face of said end wall, communicating and being aligned with said first opening, and extending along the interior of said hollow body toward said open end thereof; and an elongated solid discharge member having the shape of a truncated cone, being fixed at the larger of its ends to said outer face of said end wall and being formed with a groove extending along its entire length and communicating with said second opening.

2. A dropper device to be attached to the neck of a liquid container for causing a liquid therein to flow in drops from the container, comprising, in combination, a hollow substantially cylindrical body having one end wall and being open at the end opposite said end wall, the latter having an inner face directed toward said open end and an opposite outer face, and said end wall being formed with a first opening passing therethrough and having a wall portion formed with a second opening smaller than said first opening; an elongated tubular member having a diameter equal to that of said first opening fixed to said inner face of said end wall, communicating and being aligned with said first opening, and extending along the interior of said hollow body toward said open end thereof; and an elongated discharge member fixed to said outer face of said end wall and being formed with a passage extending along the entire length of said discharge member and communicating with said second opening, said elongated discharge member being in the form of a hol-

low tube in the shape of a truncated cone and having opposite open ends the larger of which passes through said end wall and communicates with the interior of said hollow body; and said wall portion being in the form of a hollow plug located within and filling the larger open end of said elongated discharge member and having an end extending across the interior of said elongated member and formed with said second opening.

3. A dropper device to be attached to the neck of a liquid container for causing a liquid therein to flow in drops from the container, comprising, in combination, a hollow substantially cylindrical body having one end wall and being open at the end opposite said end wall, the latter having an inner face directed toward said open end and an opposite outer face, and said end wall being formed with first and second openings passing therethrough; an elongated tubular member having a diameter equal to that of said first opening fixed to said inner face of said end wall, communicating and being aligned with said first opening, and extending along the interior of said hollow body toward said open end thereof; an elongated tubular discharge member fixed to said outer face of said end wall and being formed in the shape of a truncated cone,

said elongated tubular discharge member having opposite open ends the larger of which opens through said second opening into the interior of said hollow body; and a wall member extending across the interior of said elongated tubular discharge member, said wall member having a periphery in sealing engagement with the inner surface of said tubular discharge member, and having a central portion located intermediate said ends of said tubular discharge member, said central portion being formed with an opening smaller than said first opening of said end wall.

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