June 3, 1958 P. A. MARCHANT 2,837,128

DROPPER ASSEMBLY

Filed Oct. 1, 1956

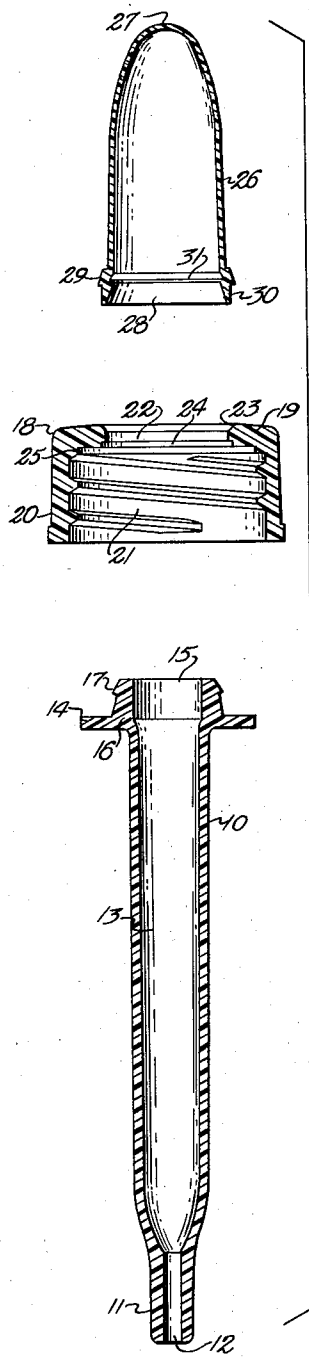



Fig. 1.

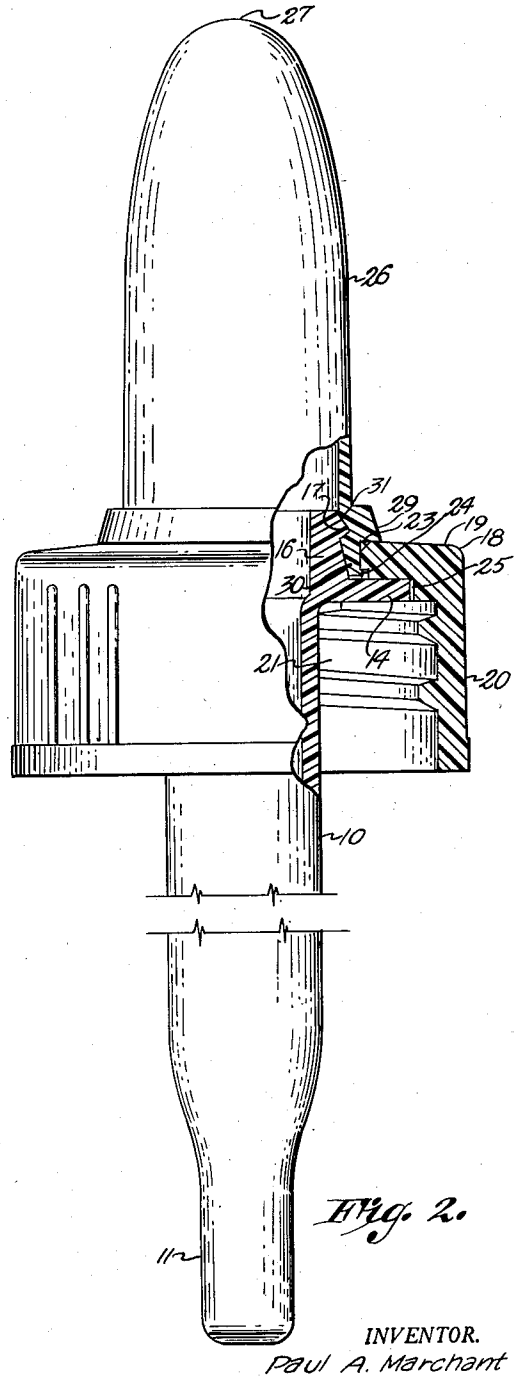



Fig. 2.

INVENTOR.
Paul A. Marchant

BY
Thos. E. Scofield
ATTORNEY

United States Patent Office 2,837,128 Patented June 3, 1958



2,837,128

# DROPPER ASSEMBLY

Paul A. Marchant, Kansas City, Mo., assignor to Injection Molding Company, Kansas City, Mo., a corporation of Missouri

Application October 1, 1956, Serial No. 613,266

15 Claims. (Cl. 141—24)

This invention relates to droppers for liquid containers and refers more particularly to a dropper engaged with the cap of the container which is sealed when the cap is screwed on the container or otherwise fixed thereon.

An object of the invention is to provide a container cap dropper assembly comprising a pipette, a resilient bulb and the container cap wherein the bulb and container are both sealed when the cap is fixed on the top of the container.

Another object of the invention is to provide such a liquid container cap dropper assembly having an exceedingly simple construction which permits the molding of all the parts from suitable materials and which is easily and swiftly assembleable.

Another object of the invention is to provide such a liquid container cap dropper assembly having an extremely durable construction which makes possible a long life therefor despite heavy and continued use.

Another object of the invention is to provide such a liquid container cap dropper assembly which will permit the construction of all parts of the assembly of materials which will not deteriorate under chemical action of varied container contents, the use of these materials not sacrificing the functional advantages provided by the unique dropper assembly construction.

Another object of the invention is to provide a liquid container cap dropper assembly which can be employed in combination with a pipette and cap to hold a sealed charge within the assembly relative to the container liquids indefinitely for mixture with the container contents when the container is opened for use, this feature is provided by the unique interengaging sealing structure of the pipette, bulb and container cap comprising the assembly.

Other and further objects of the invention will appear in the course of the following description thereof.

In the drawings, which form a part of the instant specification and are to be read in conjunction therewith, an embodiment of the invention is shown and, in the various views, like numerals are employed to indicate like parts.

Fig. 1 is an exploded cross-sectional view showing the three parts of the dropper assembly disassembled and spaced relative one another prior to assembly, all of the parts being shown sectionally.

Fig. 2 is a side view with parts cut away and in section to illustrate the interengagement of the three parts of the assembly shown separate in Fig. 1 when assembled.

Referring to Fig. 1, and especially to the lower element therein, at **10** is generally designated the wall of the dropper assembly pipette. Pipette **10** has a lower discharge end **11** having discharge orifice **12** extending therethrough into the body of the pipette. The pipette consists of the side wall **10** enclosing a hollow annulus **13**. Cap top engaging flange **14** extends circumferentially outwardly from the outer surface of the wall **10** of the pipette adjacent to but below the open upper engaging end thereof. The upper end has opening **15** therein communicating with the upper end of the annulus **13**. The wall of the pipette extends above the flange **14** and preferably is thickened above the flange as shown at **16** to provide a



heavier, less resilient interengaging section of the pipette above the flange. Such thickening causes an increase in the outer diameter of the pipette above flange **14** to avoid any decrease of the diameter of the pipette bore. Circumferential bead **17**, preferably substantially triangular in cross section, is formed on the thickened portion **16** above the flange. The pipette is preferably made of a somewhat resilient, yet dimensionally stable material, such as polyethylene, as it is necessary that the thickened engaging portion **16** of the pipette be slightly compressed in the interengagement of the parts one with the other yet be resilient enough to attempt to return or spring back to its original outside diameter.

Referring now to the central member of Fig. 1, the cap of the dropper assembly, the cap is generally designated at **18** and comprises a top wall **19** having depending side walls **20**. The side walls **20** are preferably interiorly threaded as at **21**. Cap top wall **19** has hole, opening or orifice **22** therein having tapered upper edge **23** to facilitate the insertion of the bulb lower edge and the lower edge thereof formed inwardly so at **24** to provide a ledge of greater inner diameter than the inner diameter of the opening **22** in the cap top. The inner surface of the cap top is also recessed as at **25** to form a well to receive the pipette flange **14** when the pipette thickened upper end **16** extends through the opening **22** and thus the ledge **24** lies within the recess **25**. The internal diameter of the well **25** is preferably substantially equal to the outer diameter of the flange **14** and is preferably also of a depth substantially equal to the thickness of the flange **14** whereby when the flange **14** is positioned within the well, the thickened portion **16** of the pipette extends centrally through the opening **22**. The diameter of the hole **22** in the cap is greater than the outer diameter of any part of the upper pipette portion **16** including bead **17**.

Referring now to the upper member of Fig. 1, the bulb, the bulb wall is designated generally at **26** and has closed upper end **27** and opening **28** in its lower engaging end. Cap top abutting flange **29** is formed adjacent to but above the lower end of the bulb **26** and extends outwardly circumferentially from the side wall thereof. The lower edge of the flange is preferably of greater outer diameter than that of the upper edge to minimize the necessary total size of the bulb flange. The outer diameter of the lower edge of the bulb flange is greater than the diameter of the opening **22** in the cap top **18** whereby the undersurface of flange **29** abuts the top surface of cap **18**. The engaging portion of the bulb below the flange **29** is designated at **30** and is preferably slightly thickened to afford greater rigidity than the bulb wall above the flange which is to be squeezed to expel liquid from the dropper assembly. The outer diameter of bulb portion **30** is slightly greater than the diameter of the cap top opening **22** whereby it will be put under compression when forced into the cap opening **22** and thus a sealing fit between the bulb and cap will be achieved. A circumferential groove **31** to receive bead **17** on the pipette is formed on the inner surface of the bulb adjacent the lower end thereof and preferably opposite flange **29**. The inside surface of the bottom edge of the bulb **30** is preferably slightly tapered to receive the upper engaging end **16** of the pipette. The bulb may be formed of like material as the pipette to deform under applied force yet tend to return to its original shape.

The length of the lower end **30** of the bulb below the bottom surface of the flange **29** is preferably slightly greater than the thickness of the cap top from its upper surface to the inner surface of the well **25**. The distance from the lower edge of the groove **31** in the inside surface of the bulb **26** to the lower edge of the bulb is also preferably slightly greater than the distance from the underside of the bead **17** on the pipette **10**

to the upper surface of the pipette flange **14**. Thus, when the bulb and pipette are forced together so that the bead **17** engages the groove **31**, the bottommost edge of the bulb **26** is forced laterally into the groove **24** on the under edge of the cap perforation **22**. This aids in the sealing fit of the parts in addition to the engagement of the flange **14** with the bottom surface of the well **25** and the lower surface of the bulb flange **29** with the top surface of the cap **18**. The distance between the upper surface of the pipette flange **14** and the lower surface of the bulb flange **29**, when the parts are interengaged, is preferably essentially equal to the distance from the surface of the well **25** in the cap top to the top surface of the cap top itself. As previously noted, since the bulb **26** itself in its lowermost portion **30** is of a greater outer diameter than the inner diameter of the opening **22**, when the bulb portion **30** is forced within the opening **22** the lower end of the bulb is placed under compression. The inner diameter of the bulb portion **30** is also formed to be of a lesser inner diameter, even when not engaged by the cap top, than the outer diameter of the thickened pipette portion **16**, both in the bead portion **17** and the portion thereof below the bead above the flange **14**. The upper end **16** of the pipette is not only put into compression when the pipette and the bulb are interengaged by the bulb itself, but also additionally by the compression exerted on the bulb lower end **30** by the cap. Thus, a complete sealing fit is afforded by the abutment of the bulb flange **29** with the top surface of the top of the cap, the abutment of the pipette flange **14** with the surface of the well **25**, the lateral forcing of the lower end of the bulb **30** into the groove **24** and the compression of the cap on the outer surface of the bulb and the inner surface of the bulb upon the outer surface of the pipette.

The cap itself preferably is of a greater rigidity than the upper portion of the pipette and the lower portion of the bulb whereby the bulb and pipette will be compressed and any distortion of form will take place in these two members rather than the cap.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter hereinabove set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A cap dropper assembly comprising a pipette having a lower discharge end and an upper engaging end, a flange extending circumferentially outwardly from the outer surface of the pipette adjacent but below the upper end thereof, engaging means adjacent the upper end of the pipette on the outside surface thereof above the flange, a cap comprising a top having a depending circumferential container engaging rim, a hole in the top of the cap, said hole engageable by the upper end of the pipette above the flange, the internal diameter of the hole greater than the outer diameter of the pipette above the flange, the flange on the pipette having a greater diameter than the internal diameter of the hole in the top, a squeeze bulb having a closed upper end and an open lower end, the bulb lower end of an internal diameter sufficient relative the pipette to permit engagement of the top of the pipette above the flange by the bulb, a radial flange on the outer surface of the bulb adjacent the lower end thereof but thereabove, the outer diameter of the flange being greater than the inner diameter of the cap hole, and engaging means on the inner surface of the bulb coperable with the pipette engaging means to couple one with the other whereby the bulb flange and the pipete flange will be positioned on opposite surfaces of the cap.

2. A dropper assembly as in claim 1 wherein the thickness of the cap top is less than the extension of the pipette above the pipette flange.

3. A dropper as in claim 1 including a recess in the inside surface of the top of the cap circumferential to the hole therein whereby to receive the pipette flange.

4. A dropper as in claim 3 wherein the recess is substantially the same diameter as the pipette flange.

5. A dropper as in claim 3 wherein the recess is substantially the depth of the thickness of the pipette flange.

6. A dropper as in claim 1 including a recess in the inside surface of the top of the cap circumferential to the hole therein, the thickness of the recessed portion of the top being less than the extension of the pipette above the pipette flange.

7. A dropper assembly as in claim 1 including a recess in the inside surface of the cap top circumferential to the hole therein on the inside surface thereof, the extension of the lower edge of the bulb below the bulb flange being greater than the thickness of the cap top in the recessed area and also greater than the distance between the bulb flange and pipette flanges when the bulb and pipette are engaged whereby the bulb edge will be forced laterally into the recess when the bulb and pipette are engaged relative the cap.

8. A dropper assembly as in claim 1 including a recess in the inside surface of the top cap circumferential to the hole therein whereby to receive the flange, a recess in the recessed area circumferential to the hole in the top cap, the lower edge of the bulb below the bulb flange being of greater length than the thickness of the cap in the area including the two recesses and longer than the distance between the bulb flange and the pipette flange when the bulb and pipette are engaged whereby the lower edge of the bulb is forced laterally into the recess when the bulb and pipette are engaged.

9. A dropper as in claim 1 wherein the engaging means comprises a raised bead extending circumferentially around the pipette adjacent the upper end thereof and above the flange and a circumferential groove on the interior surface of the bulb adjacent the lower end thereof.

10. A dropper as in claim 9 wherein the groove in the bulb is opposite the flange therein.

11. A dropper as in claim 9 wherein the thickness of the cap top is less than the height of the pipette above the flange thereof.

12. A dropper as in claim 9 wherein the height of the pipette above the flange thereof is greater than the thickness of the cap top and the bead adjacent the top of the pipette is a distance above the pipette flange greater than the thickness of the cap top.

13. A dropper as in claim 1 wherein the thickness of the cap top is less than the extension of the pipette above the flange thereof and less than the extension of the bulb below the bulb flange.

14. A dropper as in claim 13 including a recess in the inside surface of the cap top adjacent the hole therein.

15. A dropper as in claim 13 including a flange in the inside surface of the top cap adjacent the hole therein to receive a portion of the bulb lower edge therein and a recess circumferential to this first named recess to receive the pipette flange.

**References Cited** in the file of this patent

UNITED STATES PATENTS

1,988,852 Miller ---------- Jan. 22, 1935