Dec. 4, 1956 J. N. McCONNELL ET AL 2,772,704

FLUID CONTAINER

Filed Aug. 21, 1952

Fig. 1.

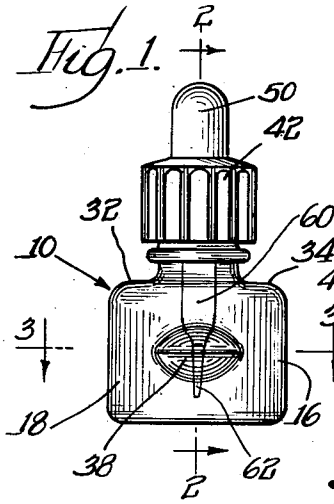


Fig. 2.

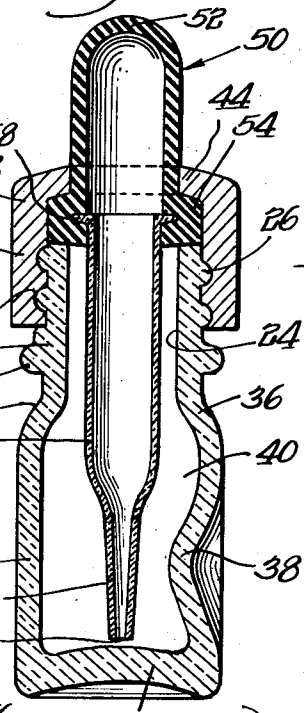


Fig. 3.

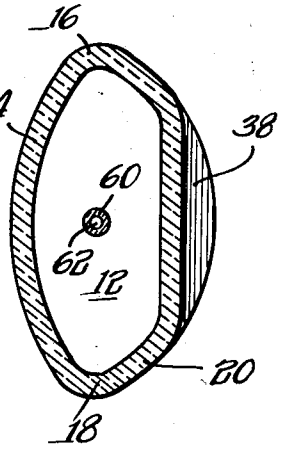


Fig. 4.

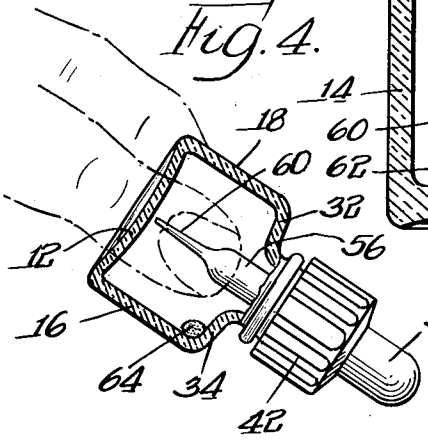


Fig. 5.

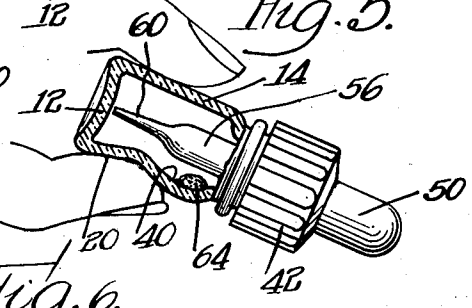
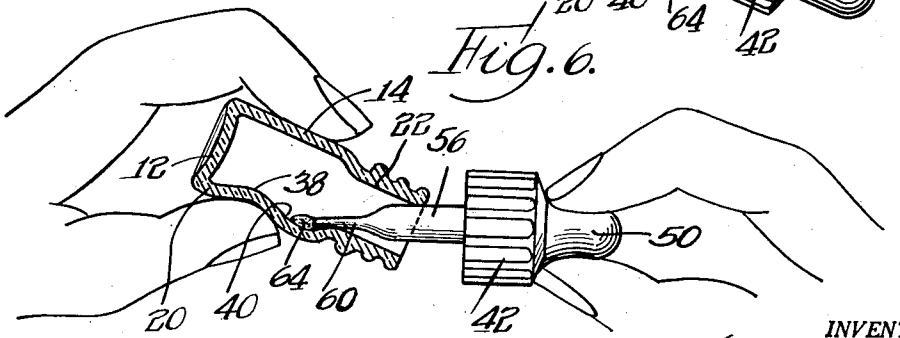


Fig. 6.



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FLUID CONTAINER

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5 Claims. (Cl. 141—24)

This invention relates to fluid containers and, more particularly, to fluid containers that are shaped to facilitate removal of all the contents therefrom.

Although the present invention is of general utility, it has special usefulness when used with fluids that are expensive and which must be dispensed in an accurate dropwise manner. An example of such a fluid is so-called typing serum which is used to determine the blood type of various blood samples. In using typing serum an accurately sized drop is mixed with the sample in running a typing test. The serum is relatively expensive and, accordingly, it is desirable to be able to utilize every drop in the container and thus eliminate waste. To this end the container of the present invention is particularly shaped so that the last drop of fluid can be removed therefrom by means of an accurate eye dropper.

Curved eye droppers have been used with standard shaped containers heretofore to remove the last drop of fluid from the container. This method is successful in removing the last drop of fluid from the container but curved eye droppers cannot be manufactured consistently with the requisite tolerance of internal dimension to give accurately sized drops. More particularly, eye droppers in which the dispensing portion is straight can be manufactured with a higher degree of accuracy than eye droppers with curved dispensing portions and, accordingly, more accurately sized drops are obtained by using eye droppers having straight dispensing portions.

Therefore, it is an object of the present invention to provide an improved container for fluids of the type set forth and, more particularly, a fluid container from which the last drop of fluid can be removed by means of eye droppers having straight dispensing portions.

Another object of the invention is to produce a bottle of the type set forth which is provided with a shape that is more securely and easily gripped during manipulation.

Yet another object of the invention is to provide fluid containers of the type set forth which have a good label supporting surface.

Still another object of the invention is to provide a fluid container of the type set forth which has a low center of gravity and a correspondingly high stability against tipping.

These and other objects and advantages of the invention will be better understood from the following description when taken in conjunction with the accompanying drawing. In the drawing wherein like reference numerals have been utilized to indicate like parts throughout:

Fig. 1 is an elevational view of a fluid container embodying the principles of the present invention;

Fig. 2 is an enlarged view in vertical section substantially as seen in the direction of the arrows alone the line 2—2 of Fig. 1;

Fig. 3 is an enlarged vew in horizontal section substantially as seen in the direction of the arrows along the line 3—3 of Fig. 1;

Fig. 4 is a view in partial section showing the initial step in manipulation of the container to place the last drop in the dispensing cavity;

Fig. 5 is a view in partial section showing the last drop of fluid positioned in the dispensing cavity; and

Fig. 6 is a view similar to Fig. 5 showing the eye dropper in position to take up the last drop in the container.

Referring now to the drawing, there is shown a fluid container or bottle **10** made in accordance with and embodying the principles of the present invention. Bottle **10** has a bottom **12** which is slightly concave upwardly as is best seen in Fig. 2. Referring to Fig. 3, it will be seen that bottom **12** is shaped like a flattened ellipse having an elongated axis shown vertically in the drawing and a shorter axis positioned horizontally in the drawing. Formed integral with the bottom **12** is an upstanding wall **14** that is curved slightly to form a pair of ends **16** and **18**. The other side of the bottle is closed by a wall **20** that is also curved, the curvature of wall **20** being considerably greater than the curvature of wall **14**. The walls **14** and **20** extend upwardly and merge into a neck **22**. The inner surface **24** of neck **22** is substantially circular and the outer surface of neck **22** is provided with screw threads **26**. An enlarged bead **28** is formed on the neck below the screw thread **26**.

The outer diameter of neck **22** at the point of bead **28** is substantially equal to the greatest outside distance between walls **14** and **20** and is considerably shorter than the distance between ends **16** and **18**. Neck **22** merges into wall **14** by means of an outwardly curved front shoulder **30** as may be best seen in Fig. 2. Wall **14** is substantially straight in a direction parallel to the axis of bottle **10**. This straight formation of wall **14** and the slight curvature therein provides a good label supporting surface having a relatively large area that can be seen at a glance and to which a label can be easily and securely attached.

Neck **22** merges into the ends **16** and **18** through a pair of side shoulders **32** and **34**. As shown in Fig. 1 these shoulders are preferably substantially square whereby to give a side profile of the bottle which exhibits a rectangular body surmounted by a neck. Wall **20** is joined to neck **22** by means of a back shoulder **36** which is rounded and shaped complementarily to front shoulder **30**. The major portion of back wall **20** is parallel to the axis of bottle **10**. Formed substantially in the center of rear wall **20** in a longitudinal direction is a depression or dimple **38** which is positioned centrally of wall **20** in a lateral direction and extends inwardly. Formed between depression or indentation **38** and shoulder **36** is a cavity or drop-receiving depression **40**. As will be explained more fully hereinafter the last few drops are removed from bottle **10** by placing them in this depression where they can be picked up with an eye dropper. It will be noted that the upper inner surface of the indentation **38** forms the lower inner surface of the drop-receiving depression **40**. The drop-receiving depression has the upper inner surface thereof positioned adjacent the neck portion and there is a sump or basin portion between the upper and lower inner surfaces of the drop-receiving depression. It will be further noted that the upper inner surface of the drop-receiving depression is inclined from the basin or sump portion gradually toward the oppositely disposed edge at the open end of the neck portion. The angle of inclination of this surface of the drop-receiving depression is such that a straight bore dropper inclined, as shown in Fig. 6, from the oppositely disposed edge of the neck portion will lie substantially along the upper inner surface of the drop-receiving depression so that the tip **62** of the dropper will project into the sump or basin portion of the drop-receiving depression, thus to facilitate picking up of the last drop of fluid.

A cap **42** is provided having a top **44** and a flange **46** encircling top **44** and extending substantially perpendicularly thereto. Formed on the inner wall of flange **46** are

screw threads 48 that are shaped complementary to the screw threads 26 and neck 22. It will be seen that cap 42 can be securely screwed upon neck 22.

Top 44 has an aperture therein through which extends an elastic bulb 50 of the type commonly used with eye droppers. The upper end 52 of bulb 50 is closed and the lower end is provided with an outwardly and radially extending flange 54. Flange 54 has a normal diameter slightly greater than the internal diameter of cap 42. Flange 54 is effective to hold bulb 50 in operative position as shown in the drawing.

Attached to bulb 50 is a tube 56 which together with bulb 50 forms a completed eye dropper. Tube 56 is generally circular in cross section and cylindrical in form. The upper end of tube 56 is provided with an outwardly extending flange 58 that fits into a complementarily shaped groove formed on the inner wall of flange 54. The groove in flange 54 and the flange 58 cooperate to hold bulb 50 and tube 56 in assembled air-tight relationship to form a complete eye dropper.

Formed on the lower end of tube 56, see Fig. 2, is a drop dispensing portion 60. Portion 60 is straight throughout its length whereby to give an accurate bore for this portion. In addition, section 60 is tapered toward an outlet end 62. By forming section 60 straight throughout its length, the inner bore of this section can be accurately controlled during manufacture as can be the diameter of end 62. This, in turn, produces a dropper that gives drops of uniform predetermined size when used. This is most important in certain applications wherein it is desirable to dispense a predetermined quantity of fluid without utilizing any additional special measuring apparatus.

Referring now to Figs. 4, 5 and 6, the manner in which the last drop of liquid is removed from bottle 10 will be described in detail. The bottle is first grasped by placing the thumb in indentation 38 and gripping wall 14 by one or more of the fingers on the left hand. The bottle is next tipped to the position shown in Fig. 4 wherein the last drop 64 of the fluid is positioned in the corner formed by shoulder 34 and end 16. Rotating the bottle about its longitudinal axis until depression 38 is positioned downwardly moves drop 64 into the drop-receiving depression or cavity 40. The drop is now in position to be picked up by the eye dropper. As shown in Figs. 5 and 6, the container, with the drop 64 positioned in the depression, is tipped so that the drop-receiving depression is positioned lowermost with respect to the remainder of the wall, in which position the dropper is inserted, as shown in Fig. 6. The inclination of the lower inner surface of the indentation 38 is generally symmetrical with respect to the upper inner surface of the drop-receiving depression so as to facilitate flow of fluid thereover and thus it will be seen that the inner surface of the wall 20 is gradually and reversely curved from the bottom of the body portion up to the neck portion.

The diameter and length of neck 22 are so proportioned in conjunction with the diameter and length of tube 56 that the drop 64 can be easily reached when it is positioned in cavity 40. It is to be noted that cavity 40 is positioned immediately adjacent the inner end of neck 22. Drop 64 is securely positioned and held in cavity 40 while it is being picked up by the eye dropper. Depression 38 aids in holding bottle 10 steady by providing a firm gripping point for the hand of the user.

Glass has been shown as the material of construction for bottle 10. Other suitable materials of construction would be plastics and the like. It is preferred that the material of construction for bottle 10 be transparent or translucent so that the movement of the last drop can be observed through the walls of bottle 10. Cap 42 may be made of a plastic, glass, or similar suitable material of construction. Tube 56 has been illustrated as being formed of glass. This part could also be made of a plastic if desired. Rubber or a resilient plastic is used in constructing the bulb 50.

It will be seen that there has been provided a bottle which fulfills all of the objects and advantages set forth above. More specifically, the bottle construction permits the last drop of fluid therein to be removed by means of a straight bore eye dropper. Use of a straight bore eye dropper is advantageous in those applications wherein the size of drop dispensed must be accurately sized. The bottle is easily and firmly grasped and presents a broad relatively flat label-bearing surface.

Although a preferred embodiment of the invention has been shown for purposes of illustration, it is to be understood that various changes and modifications can be made therein without departing from the spirit and scope of the invention. Accordingly, the invention is to be limited only as set forth in the following claims.

The invention is hereby claimed as follows:

1. A container for fluids to be dispensed in drops and from which container removal of the last drop is facilitated, and comprising a body portion and a neck portion providing an opening into the interior of the body portion, one wall of said body portion having an inwardly directed shallow indentation adjacent the lower end of said one wall with the upper inner surface of the indentation forming the lower inner surface of an internal drop-receiving depression having an intermediate sump portion, said drop-receiving depression having the upper inner surface thereof positioned adjacent said neck portion and inclined from said sump portion gradually toward the oppositely disposed edge at the open end of the neck portion and at an angle such that a straight bore dropper inclined from said oppositely disposed edge of the neck portion will lie substantially along the upper inner surface of said drop-receiving depression with the tip of the dropper projecting into the sump portion to pick up the last drop of fluid when the said drop-receiving depression is positioned lowermost with respect to the remainder of the said one wall of the body portion.

2. A container as claimed in claim 1, wherein the wall of the body portion opposite to the said one wall containing the drop-receiving depression is curved outwardly and merges at its vertical edges in oppositely disposed corner portions.

3. A container as claimed in claim 1, wherein the lower inner surface of the indentation adjacent the bottom of the body portion is inclined substantially symmetrically with respect to the upper inner surface of the drop-receiving depression.

4. A container as claimed in claim 1, wherein the inner surface of the said one wall is gradually and reversely curved from the bottom of the body portion to the neck portion.

5. In combination, a container for fluids to be dispensed in drops and comprising a body portion, a neck portion providing an opening into the interior of the body portion, a cap removably mounted on said neck portion for closing the same, and a straight bore eye dropper mounted on said cap and extending into said container, one wall of said body portion having an inwardly directed shallow indentation adjacent the lower end of said one wall with the upper inner surface of the indentation forming the lower inner surface of an internal drop-receiving depression having an intermediate sump portion, said drop-receiving depression having the upper inner surface thereof positioned adjacent said neck portion and inclined from said sump portion gradually toward the oppositely disposed edge at the open end of the neck portion and at an angle such that the straight bore dropper is inclined from said oppositely disposed edge of the neck portion to lie substantially along the upper inner surface of said drop-receiving depression with the tip of the dropper projecting into the sump portion to pick up the last drop of fluid when the said drop-receiving depression is positioned lowermost with respect to the remainder of the said one wall of the body portion.

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