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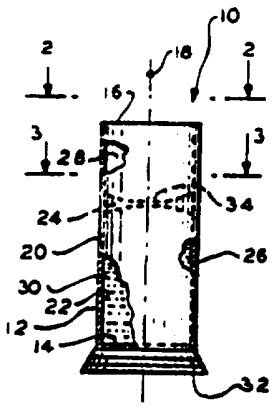
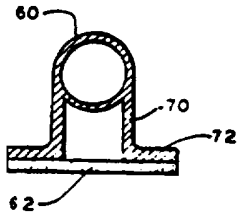
(54) Title: FLUID DISPENSER

(57) Abstract

This invention is a fluid dispenser (10a) for use in dispensing droplets of a medicinal fluid or the like without contamination of the fluid. The dispenser (10a) includes wall portions forming a sealed chamber (26a) containing fluid, wall portions forming a cavity (28a), and a rupturable wall portion (24a) disposed between the sealed chamber (26a) and the cavity (28a) for dispensing portions of the fluid from the chamber (26a).





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FLUID DISPENSER

FIELD OF THE INVENTION

The invention generally relates to a dispenser of a flowable substance and, in particular, the invention relates to a fluid dispenser having a sealed chamber for holding fluid and a cavity for holding the fluid upon opening of the chamber.

BACKGROUND OF THE INVENTION

The most pertinent prior art for fluid dispensers is described in U.S. Patent No. 5,100,028, issued March 31, 1992. and U.S. Patent No. 5,035,348, issued July 30, 1991.

The prior art fluid dispenser, as disclosed in these patents, includes a peripheral wall, a first end wall, and a second end wall which is rupturable and encloses a sealed chamber which contains fluid.

One of the major problems with these prior art fluid dispenser is that the fluid is dispensed simultaneously with the rupture of the rupturable end wall resulting in complete discharge of the fluid.

SUMMARY OF THE INVENTION

An object of the invention is to dispense a fluid from a dispenser without spilling any of the fluid.

Another object of the invention is to provide a fluid dispenser which can contain an ophthalmic medical solution and which can be used to directly dispense solution droplets into the sensitive areas of the body such as an eye.

The foregoing and other objects, features and advantages will be apparent from the following description of the preferred embodiment of the invention.

According to the present invention, a novel fluid dispenser is provided. This dispenser has a peripheral wall with an elongate axis, a first closed end wall portion, a second end wall portion axially spaced from the first end wall portion, a rupturable partition wall disposed axially between the first end wall and the second end wall forming a sealed chamber containing fluid adjacent to the first closed end wall and forming a dispensing cavity adjacent to the second end wall.

By using a dispensing cavity, the prior art problem of simultaneously dispensing fluid upon rupturing the partition wall is avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages will be apparent from the following description of the preferred embodiment of the invention as illustrated in the accompanying drawings.

Figure 1 is a cutaway elevation view of a fluid dispenser according to the present invention;

Figure 2 is a plan view as taken along the line 2-2 of Figure 1;

Figure 3 is a section view as taken along the line 3-3 of Figure 1;

Figure 4 is a cutaway elevation view of a second embodiment of a fluid dispenser according to the present invention;

Figure 5 is a section view as taken along the line 5-5 of Figure 4; and

Figure 6 is a cutaway elevation view of a second embodiment of a fluid dispenser according to the present invention.

Figure 7 is a top view of a third fluid dispenser according to the present invention;

Figure 8 is a side elevation of the dispenser shown in Figure 7.

Figure 9 is a side elevation of the dispenser shown in Figure 7 taken along lines 9-9.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in Figures 1, 2 and 3, a fluid dispenser or first embodiment or dispenser or ampoule 10 is provided. Dispenser 10 has a peripheral wall 12 which has a closed end wall 14 and which has an open end wall portion 16. Peripheral wall 12 has an elongate axis 18, a radially outer surface 20, and a radially inner surface 22. Peripheral wall 12 has an intermediate partition wall 24, which separates a sealed chamber 26 from an open cavity 28. Chamber 26 contains a material, such as a fluid or a medical solution 30.

In this embodiment 10, wall 12 is made of a transparent, flexible plastic material. Closed end wall 14 has a crimped, closed, end wall portion or fin seal 32. End 14 is sealed after fluid 30 is added to the chamber 26. Partition wall 24 is disposed transverse to axis 18 and is axially disposed between end wall portions 14, 16.

Partition wall 24 has a relatively weak center portion 34 which has a relatively thin or reduced thickness for ease of breaking through wall 24 by fluid pressure, in order to allow fluid 30 to pass from chamber 26 to cavity 28.

In operation, a user applies a selective amount of finger pressure or opposite radial inward forces on peripheral wall 12 adjacent to partition wall 24 and chamber 26. Central portion 32 will then break or crack open due to the radially inward forces and fluid pressure. Fluid 30 then passes through partition wall 24 from chamber 26 to cavity 28. An applicator (not shown) can be used to remove fluid 30 from cavity 28.

As shown in Figures 4 and 5, a second embodiment 10a of the invention is provided. Parts of embodiment 10a which correspond to parts of embodiment 10 have the same numerals, but with a subscript "a" added thereto. Dispenser 10a has a peripheral wall 12a, a closed end wall 14a and a second end wall portion 16a. Peripheral wall 12a has an axis 18a, a

radially outer surface 20a, and a radially inner surface 22a. Peripheral wall 12a has an intermediate partition wall 24a, which separates a sealed chamber 26a from a cavity 28a. Chamber 26a contains a fluid 30a. End wall 14a has a fin seal 32a. Partition wall 24a has a relatively weak center portion 34a. Open end wall 16a supports and receives an applicator or swab 40. Swab 40 contacts fluid 30a when fluid 30a is disposed in cavity 28a, after center portion 34a is broken open. Swab 40 has an underside application contact surface 42. Swab 40 is made of cotton or the like. The dispenser is preferably approximately 3/8 inch in diameter and approximately 2 inches long.

In operation, fluid 30a passes into cavity 28a upon breaking center portion 34a. Dispenser 10a is held upside down and is squeezed until the swab surface 42 is wet. Then, dispenser 10a is held in a vertical position with swab 40 pointed upwardly. Swab 40 is then removed from cavity 28a for applying the portion of fluid 30a disposed on swab surface 42. Alternately, swab 40 can be made of a material of relatively large porosity for passing droplets through the swab by gravity and for dispensing droplets from its exterior surface.

As shown in Figure 6, a third embodiment 10b is provided. Parts of embodiment 10b which correspond to parts of embodiment 10 have the same numerals, but with a subscript "b" added

thereto. Dispenser 10b has a peripheral wall 12b, a closed end wall 14b and a second end wall portion 16b. Peripheral wall 12b has an axis 18b, a radially outer surface 20b, and a radially inner surface 22b. Peripheral wall 12b has a partition wall 24b, which separates a sealed chamber 26b from a cavity 28b. Chamber 26b contains a fluid 30b. End wall 14b has a fin seal 32b. Partition wall 24b has a relatively weak center portion 34b. The end wall portion 16b supports a dropper tip or cap 50. Cap 50 has an elongate spout 52 with a passageway 54 for dispensing droplets of fluid 30b. Cap 50 has a cup-like portion 56 which overlaps part of outer surface 20b at end wall portion 16b.

In operation, fluid 30b passes into cavity 28b upon breaking center portion 34b. Dispenser 10b is held with cap directed downwardly, so that cap 50 dispenses droplets of fluid 30b.

Referring to Figures 7, 8 and 9 a third type of dispenser is shown which has a housing 60 which contains a fluid receiving chamber 70, a foam applicator pad base 62 and a plastic container 64 for holding fluid. The container 64 has a removable cap 68 at one end which allows ease of filing. The cap can be removed, the liquid placed in the container and the cap 68 reinserted. The cap must fit tight enough to remain leak proof when the container is squeezed. The container has one

or more plastic discs 66 representing a point of lower resistance of the container which will rupture when pressure is applied to the container. By squeezing the container, it causes the disc to break away because of the thickness of the plastic of the container wall at the place where the disc is located. As an illustration, the thickness of the wall of the container can be 0.005 inches, whereas the thickness under the disc can be 0.002 inches. The disc can be any size but it is preferred that the disc be of a size to just cover the area of decreased thickness in the wall of the container. A size of about 0.3 inches to about 0.5 inches in diameter is preferred, with a range of 0.2 inches to 1.0 inch being useful.

In this device, the housing 60 is elongated and spaced apart from the foam applicator 62. The foam applicator can be made of any natural or synthetic material such as cellulose, polyethylene, polyvinyl chloride and the like. In this manner the liquid will have an opportunity to spray over a larger portion of the surface of the foam applicator than would be the case if the container were in contact with the foam applicator. In operation, the container is squeezed to release the fluid by breaking the disc away from the container. The liquid then wets the applicator foam. The liquid is then applied to the surface to be treated by rubbing the foam layer over the area to be treated.

Advantages of the preferred embodiment are indicated hereafter:

A) Embodiments 10, 10a, 10b can contain and dispense an ophthalmic solution or medication and can be made of flexible plastic material, so that a user is more comfortable using plastic dispenser 10 than using a prior art glass dispenser or dropper.

B) Embodiments 10, 10a, 10b dispense a medicinal fluid 30 directly into the eye or wound or the like.

C) Swab 40 of embodiment 10a, which has a relatively large application surface 42 on the underside thereof, is protected from toxic or undesirable substances in the air.

D) Swab 40 can be used to dispense droplets, or can be used to rub over a selective surface.

While the invention has been described in its preferred embodiments, it is to be understood that the words which have been used are words of description rather than limitation and that changes may be made within the purview of the appended claims without departing from the true scope and spirit of the invention in its broader aspects.

WHAT IS CLAIMED IS:

1. A dispenser comprising:

a closed peripheral wall forming a chamber with an elongate axis having first and second end wall portions;

the first end wall portion being closed;

the second end wall portion axially spaced from the first closed end wall portion;

means for opening and closing the second end portion to allow the introduction of a substance into the chamber;

a rupturable portion on the peripheral wall which will allow the substance to flow out of the chamber at the point of rupture;

said rupturable portion being substantially thinner in thickness than the remainder of the wall; and

a cavity which receives the substance after a rupture of the rupturable partition wall.

2. The dispenser according to Claim 1 comprising:

a peripheral wall with an elongate axis;

a first closed end wall portion at a first end of the peripheral wall;

a second end wall portion axially spaced from the first closed end wall portion;

a rupturable partition wall disposed axially between the first closed end wall and the second end wall portion;

a sealed chamber which contains a fluid and which is disposed axially between the rupturable partition wall and the first closed end wall; and

a cavity which receives the fluid after a rupture of the rupturable partition wall and which is disposed axially between the rupturable partition wall and the second end wall portion.

3. The dispenser of claim 2, wherein the rupturable partition wall has a center portion which has a relatively smaller thickness than the thickness of the remaining portion of the rupturable partition wall for controlling the location of breaking through the rupturable partition wall.

4. The dispenser of claim 2, wherein the second end wall portion receives a swab which has an underside application surface for contacting the fluid in the cavity and for applying the fluid after removal from the cavity.

5. The dispenser of claim 2, wherein the second end wall portion supports a dropper which has a spout with a passageway for dispensing droplets and which has a cup-shaped portion which overlaps the second end wall portion.

6. The dispenser of claim 1, wherein the substance is a liquid and a foam applicator is positioned adjacent to the

rupturable portion to absorb the liquid as it is discharged through the rupturable portion.

7. The dispenser of claim 6 wherein the foam applicator forms the bottom portion of a second container which surrounds the firs container and serves as a handle for applying the fluid from the foam applicator to a surface to be treated.

AMENDED CLAIMS

[received by the International Bureau on 20 September 1996 (20.10.96); original claims 1-7 replaced by new claims 1-7 (3 pages)]

1. A liquid dispenser to allow the slow discharge of a liquid from a container comprising:

a peripheral wall with an elongated axis forming two separate chambers being axially spaced apart;

an end wall in each of the two chambers;

means for opening and closing the one end portion to allow the introduction of a liquid into the corresponding chamber;

the second end wall portion having a small port allowing the slow passage of a liquid from the one chamber to the other chamber;

a disc adhered to the end wall containing the small port and covering said port to prevent passage of the liquid through the port;

said disc being rupturable to allow passage of the liquid when pressure is applied to the end wall; and

a cavity which receives the liquid after a rupture of the rupturable partition wall to allow the slow application of the liquid to a surface to be treated.

2. The dispenser according to Claim 1 comprising:

a peripheral wall with an elongate axis;

a first closed end wall portion at a first end of the peripheral wall;

a second end wall portion axially spaced from the first closed end wall portion;

a rupturable partition wall disposed axially between the first closed end wall and the second end wall portion;

a sealed chamber which contains a fluid and which is disposed axially between the rupturable partition wall and the first closed end wall; and

a cavity which receives the fluid after a rupture of the rupturable partition wall and which is disposed axially between the rupturable partition wall and the second end wall portion

3. The dispenser of claim 2, wherein the disk has a relatively smaller thickness than the thickness of the wall portion.

4. The dispenser of claim 2, wherein the second chamber receives a swab which has an underside application surface for contacting the fluid in the cavity and for applying the fluid after removal from the cavity.

5. The dispenser of claim 2, wherein the second chamber supports a dropper which has a spout with a passageway for dispensing droplets and which has a cup-shaped portion which overlaps the second end wall portion.

6. The dispenser of claim 1, wherein a foam applicator is positioned adjacent to the rupturable portion to absorb the liquid as it is discharged through the rupturable portion.

7. The dispenser of claim 6 wherein the foam applicator forms the bottom portion of a container which surrounds the first chamber and serves as a handle for applying the fluid from the foam applicator to a surface to be treated.

FIG. 1

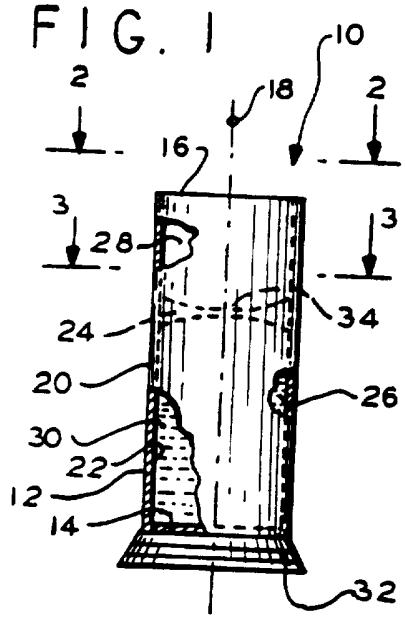


FIG. 2

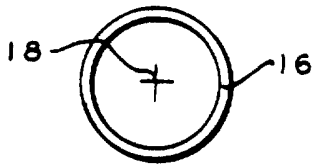


FIG. 3

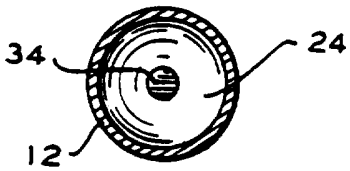


FIG. 4

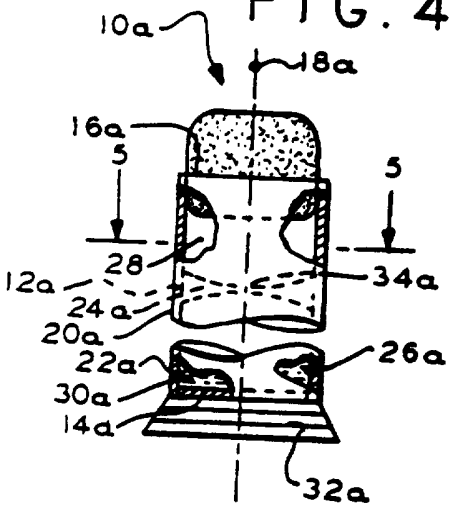


FIG. 5

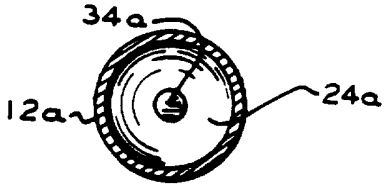


FIG. 6

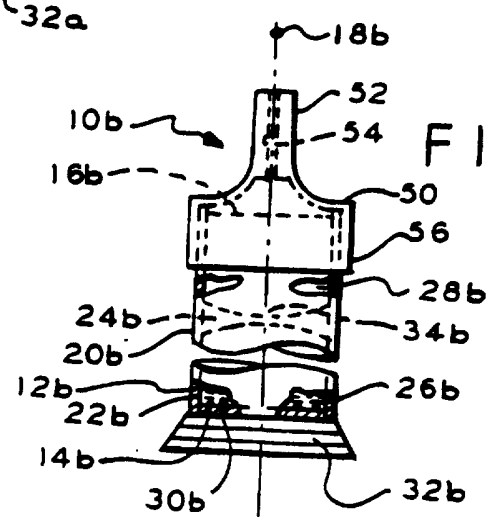


FIG. 7

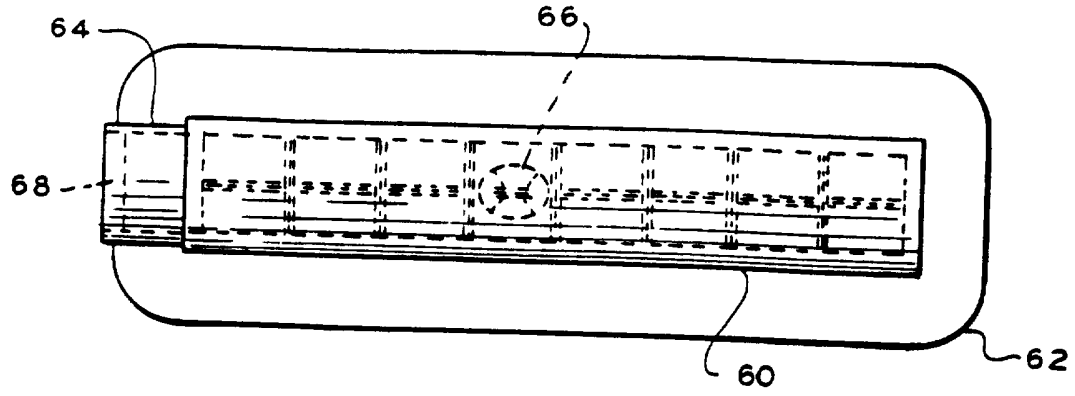


FIG. 8

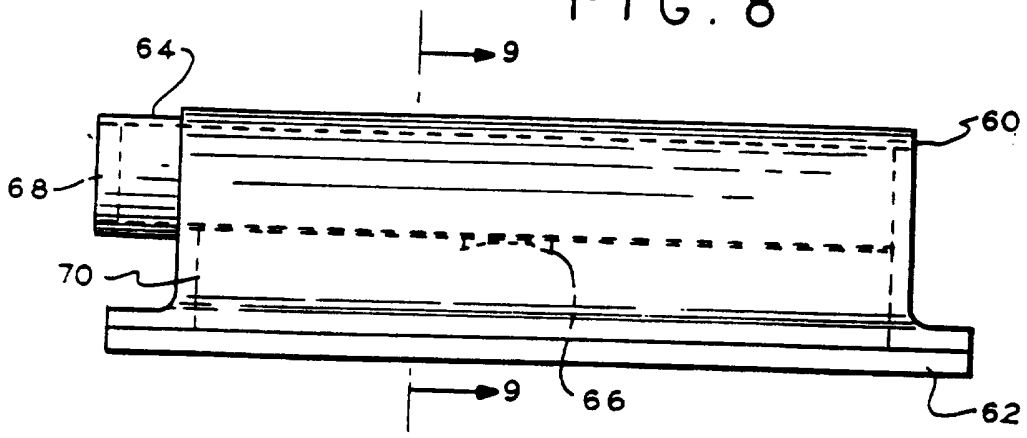
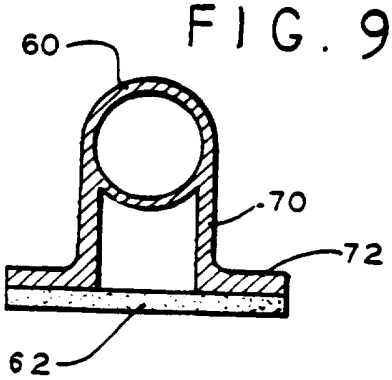


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/03049

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61M 35/00; B65D 47/18
US CL :222/420; 401/119, 132, 196
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 222/420; 401/119, 132, 196

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 3,759,259 (TRUHAN) 18 September 1973, see entire document.	1-7
Y	US, A, 5,490,736 (HABER ET AL.) 13 February 1996, see entire document.	1-7
Y	US, A, 2,311,367 (L. A. CHAMBERS) 16 February 1943, see element (23).	4
Y	FR, A, 5,017,779 (A. MOUSSALLI ET AL.) 31 March 1951, see Fig. 2.	5
Y	DE, A, 32 46 406 (LACK ET AL.) 20 June 1984, see Fig. 8.	6, 7

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Date of the actual completion of the international search
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