(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 509 754 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **92303332.8**

(22) Date of filing : **14.04.92**

(51) Int. Cl.[5] : **A61J 1/00,** A61M 31/00

(30) Priority : **18.04.91 US 687351**

(43) Date of publication of application :
21.10.92 Bulletin 92/43

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IT LI LU NL PT SE

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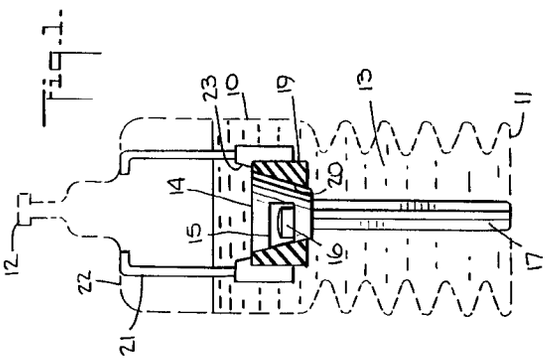
(54) Dispenser device.

(57) A single chambered plastic bottle is provided with a dislodgeable holder device having a recess to hold a solid medicament free of contact with a liquid filling the bottle, whereby components of a mixture may be maintained separately until comingling is desired. The holder device is dislodged by means of a plunger activated by depression of the flexible bottom of the bottle.

Fig.1.



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BACKGROUND OF THE INVENTION

Dispenser devices having multiple compartments for separately enclosed materials to be mixed prior to use are disclosed in U.S. patents 3,340,873, 3,354,883, 3,397,694, 3,411,503, 4,331,146, 4,412,836, 4,330,531 and 4,950,237. These systems are complex, contain many parts, and are expensive to manufacture.

OBJECTS OF THE INVENTION

It is an object of the invention to provide a single-compartment dispenser device having means to hold a solid and a liquid separately until the time of administration. Another object is to provide a less expensive dispenser device for maintaining a solid and a liquid separately until the time of administration. Still another object is to provide a more easily manufactured dispenser device for maintaining a solid and a liquid separately until the time of administration. A further object is to provide a simplified and inexpensive ophthalmic dispenser. There and other objects of th present invention will be apparent from the following description.

SUMMARY OF THE INVENTION

This invention relates to fluid dispensing devices in which constituents of the fluid mixture can be maintained in isolation from one another and in which the separated constituents can be mixed in vitro, when desired, by placing the constituents in communication with one another. A dislodgeable holder serves to maintain separation of the mixture components but can be dislodged by a plunger which is activated by the depression of the flexible bottom of the device. Thereby a mixture having a limited effective life once mixed may be preserved indefinitely by maintaining separate components until use is desired. While one of the constituents must be liquid the other component is a solid, for example a pharmaceutical tablet. The valve is operated manually by the patient and the dispenser either inverted or shaken to cause the until now separated substances to mix.

The body of the dispenser, which may be provided with a removable cap, can thereafter be squeezed thereby causing droplet, flow or jet of mixed fluid to be emitted from an outlet nozzle of the dispenser. Alternatively, the dispenser includes a septum to permit withdrawal of the mixed substances using a hypodermic needle or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a cross-sectional side elevation of the dispenser device of this invention before mixing the components.

Figure 2 is a cross-sectional side elevation of the dispenser device of this invention after mixing the components.

It should be understood that the drawings are not necessarily to scale and that the embodiments are sometimes illustrated by graphic symbols, phantom lines, diagrammatic representations and fragmentary views. In certain instances, details which are not necessary for an understanding of the present invention or which render other details difficult to perceive may have been omitted. It should be understood, of course, that the invention is not necessarily limited to the particular embodiments illustrated herein.

DETAILED DESCRIPTION

The dispenser device of the present invention preferably is made of a plastic material, for example, low density polyethylene, by a conventional blow molding technique to produce the bottom and mid body section, inserting the tablet containing means, and subsequently molding the body section to produce the upper section of the dispenser device. If, however, the neck is sufficiently wide to permit insertion of the holder device, the entire bottle can be made in one step. It is to be understood that the present invention is not limited to the specific material from which the dispenser device of the present invention is made, or the particular process by which it is made as it will be understood by those skilled in the art that many different materials and various manufacturing techniques may be employed.

The dispensing device of the present invention has a bellows bottom to permit in situ mixing of the contents at time of use, and a dropper dispenser tip calibrated to deliver predetermined amount of solution. Both bellows bottom vials and dropper dispenser tips are known in the art.

The dispensing device of the present invention comprises a bottle means 10 having bellows bottom 11 and dispenser means 12, for example, a dropper tip. Bottle 10 is filled with a liquid 13, such as, for example, a physiologically acceptable ophthalmic liquid. Tablet holding means 14 is an enlongated member having a cut-out section 15 for holding a solid medicament 16. The holding means 14 may have a constant, or tapered cross section and the circumference or outer wall of holding means 14 may be circular or non-circular, e.g., cylindrical or oval. The holding 14 means 14 preferably has a tapered cross section, such as, for example, a frustoconical member, to facilitate both seating and unseating against seating means 19. A push member 17 extends from the bottom of member 15 to or near to the bottom of bottle 10.

Seating means 19 has inner wall 20 that is complementary in shape to the outer wall of member 14 and is thereby adapted to form a seal preventing liquid 13 from contacting medicament 16. Seating means 19

is held by one or more support means 21 extending from shoulder 22 of bottle 10 to the member 15. The bottom of support 21 is provided with flange means 23 to prevent seating means 19 from movement. In this position cut-out section 15 is surrounded by inner walls 20 of seating means 21 and is not in contact with liquid 13.

To dissolve the medicament 16, as shown in figure 2, the bellows bottom 11 of bottle 10 is pushed up thereby moving push member 17 in the same direction and lifting member 14 away from its seated position. The cut-out section of member 14 and medicament 16 are now in contact with liquid 13. When medicament 16 is fully dissolved, the medicament solution is ready to be dispersed from dispenser means 12.

As indicated previously, the drawings are not necessarily to scale and the solid medicament supporting and receiving means within the bottle have been enlarged to facilitate an understanding of the invention. These means, however, are preferably small enough to pass through the neck of the bottle whereby the bottle is conveniently manufactured in one step.

Claims

1. A single chamber bottle having top liquid dispensing means, a neck, a shoulder and a bellows bottom, support means extending downwardly from the upper region of the bottle and joined to a seating member, receiving means to receive a solid medicament seated within the seating member, and means disposed between the receiving means and the bellows bottom for unseating the receiving means.

2. A bottle according to claim 1 wherein the seating member and the receiving member are complementary in shape.

3. A bottle according to claim 2 wherein the receiving member comprises an elongated member having constant or tapered cylindrical, or non-cylindrical cross-section.

4. A bottle according to claim 3 wherein the receiving member is a frustoconical or cylindrical member.

5. A bottle according to claim 4 wherein the receiving member is frustoconical.

6. A bottle according to claim 1 wherein the support means extend downwardly from about the shoulder of the bottle.

7. A bottle according to claim 1 wherein the unseating means comprises an elongated member disposed between the receiving member and the bellows bottom.

8. A bottle according to claim 1 wherein the chamber is filed with an ophthalmic liquid.

9. A bottle according to claim 1 wherein the receiving means contains a solid medicament.

10. A bottle according to claim 9 wherein the medicament is an opthalmic medicament.

11. A bottle according to claim 9 wherein the medicament is in the form of a tablet.

12. A single chamber bottle having top dropper dispensing means, a neck, a shoulder and a bellows bottom, support means extending downwardly from the shoulder of the bottle supporting a frustoconical seating member, a frustoconical receiving member having means to receive a solid medicament seated within the seating member, and an elongated member for unseating the seating member disposed between the frustoconical receiving member and the bellows bottom.

13. A bottle according to claim 12 wherein the chamber is filled with an ophthalmic liquid.

14. A bottle according to claim 12 wherein the receiving means contains a solid medicament.

15. A bottle according to claim 9 wherein the medicament is an ophthalmic medicament.

16. A bottle according to claim 9 wherein the medicament is in the form of a tablet.

Fig.2.

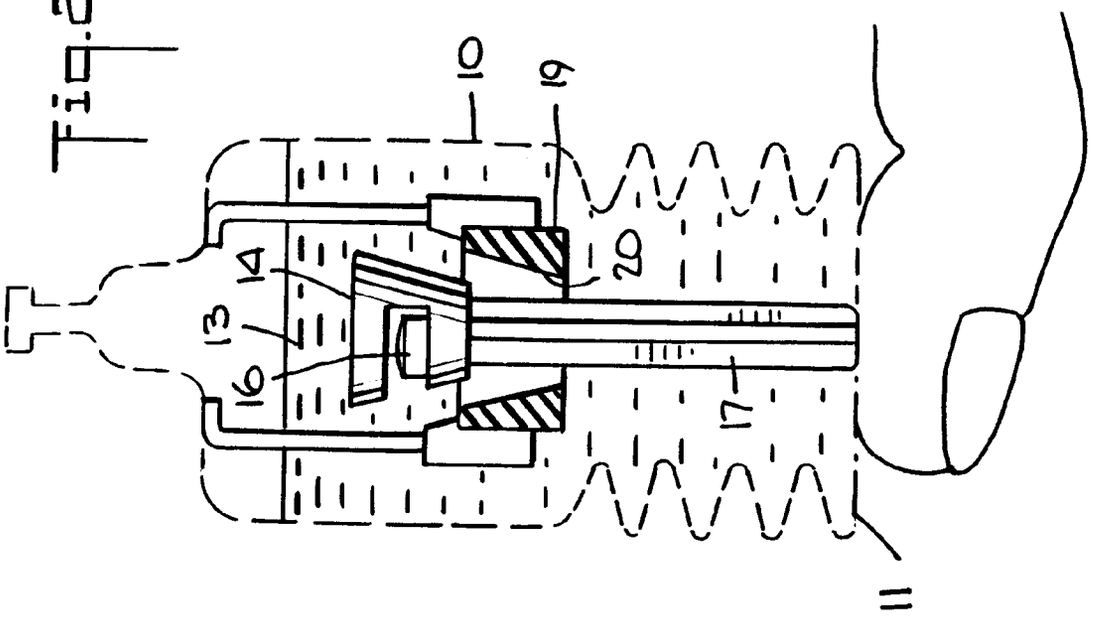

Fig.1.