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(54) Cosmetic dispenser.

(57) A dispenser for fluent material, comprising a container (1), the effective volume of which decreases in accordance with the volume of material that is dispensed from the container (1), and in which means (2) pivotally mounted in the dispenser are arranged to act on a resiliently deformable diaphragm (4), simultaneously to unseal, temporarily and in a reversible manner, the container (1) and to initiate the dispensing of the material therefrom, in response to deformation of the diaphragm (4).

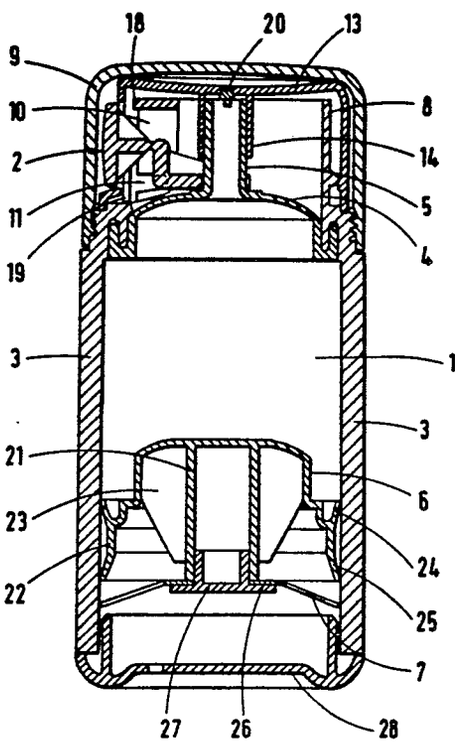

Fig. 1

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COSMETIC DISPENSER

This invention relates to dispensers for fluent materials and more particularly to a container the effective volume of which decreases in accordance with the volume of material that is dispensed from the container.

GB 1 442 491 describes dispensers comprising a resilient head, including discharge outlet, and a rigid circular body. An inner chamber is created within the dispenser by the incorporation of a piston member so that the volume defined by the head, the circular walls of the dispenser and the piston member is filled entirely by the material to be dispensed. Manual deformation of the head forces a portion of the material through the discharge outlet. When the head portion is restored to its original state, following the removal of the deforming force, a partial vacuum is created within the inner chamber, caused by the resistance to withdrawal of material from the discharge outlet into the inner chamber. Atmospheric pressure exerted on the rear of the piston member causes it to move in a forward direction towards the head to eliminate the partial vacuum and compensate for the volume of material dispensed. The piston member is prevented from rearward movement by the inclusion of a one-way latch that grips the inside wall of the dispenser.

US 3 088 636 describes a dispenser which differs from that of GB 1 442 491 in that a spring is attached to the resilient head and this is covered by a flexible outer covering which also includes a pair of lips. Deformation of the resilient head by compression of the spring, achieved by deformation of the outer covering also causes the lips to part to allow dispensed material to flow out from the dispenser. Removal of the deforming force causes the lips to seal, thereby creating a partial vacuum within the inner chamber, which is eliminated, as in GB 1 442 491, by the forward movement of the piston member.

The devices of GB 1 442 491 do not allow the carefully measured dispensing of material and are unsuitable for air-sensitive materials or materials that have to be kept sterile. The devices of US 3 388 636 are also unsatisfactory in that compression of the spring is awkward and there will be left, when the inner chamber is emptied of material, a reservoir of material within the outer head which cannot be easily dispensed.

It is an object of the present invention to overcome or at least partially mitigate the disadvantages of the prior art dispensers. It has been found that these disadvantages can be wholly or partially overcome by incorporating into the dispenser pivotally mounted means of deforming the resilient top of the inner chamber, such deformation also temporarily effecting the unsealing of the otherwise sealed discharge outlet. Sealing is then restored when the resilient head returns to its original shape.

The present invention thus provides a dispenser for fluent material, comprising a container, the effective volume of which decreases in accordance with the volume of material that is dispensed from the container, and in which means pivotally mounted in the dispenser are arranged to act on a resiliently deformable diaphragm, simultaneously to unseal, temporarily and in a reversible manner, the container and to initiate the dispensing of the material therefrom, in response to deformation of the diaphragm. The advantages offered by a dispenser according to the invention is that the pivotally mounted means permit dispensing in a controlled and semi-quantitive manner and also ensure that the material therein is maintained in an air-free atmosphere which is particularly useful for biologically and/or chemically sensitive materials.

Preferably, in use, the unsealing of the container occurs simultaneously with the deformation of the diaphragm.

Preferably, the pivotal means are adapted to initiate dispensing of material in the container by applying pressure thereto.

Most preferably, the pivotal means is in the form of a bell crank, the fulcrum thereof being mounted in the dispenser with one arm providing an activating member to which pressure may be applied and the other arm arranged to deform the resilient diaphragm.

Advantageously, means mounted on the diaphragm are adapted to cooperate with means fixed relative to the dispenser to define a passageway which is open only when the diaphragm is depressed.

More advantageously, the means mounted on the diaphragm is a discharge outlet, to provide an exit channel for the container, which outlet is equipped at the end remote from the diaphragm with a stopper suspended therein, which stopper sealingly cooperates with a complementary orifice which is provided on the dispenser wall, when the diaphragm is in a non-deformed state.

Yet more advantageously, the discharge outlet is substantially coaxial with a longitudinal axis of the dispenser; with the orifice located in a wall of the dispenser which is substantially normal to a longitudinal axis of the dispenser.

Preferably, the said wall is concave.

In a preferred embodiment, the container is defined by the walls of the dispenser, a resilient

diaphragm including discharge outlet, cooperating with the walls of the dispenser, and a piston member which is movable forwardly toward the outlet and against the material in the container, such that the volume thus defined is fully occupied by the fluent material, and which includes means to resist rearward movement of the piston member away from the outlet in all positions of the piston member. The means pivotally mounted in the dispenser preferably cooperate with that surface of the resilient diaphragm which is not in contact with the fluent material so that, in use, manual activation of said means causes deformation of the diaphragm, thereby forcing material out of the container and through the discharge outlet, the unsealing of which is temporarily effected by activation of the pivotally mounted means.

Temporary and reversible unsealing of the container, by activation of the means pivotally mounted in the dispenser may be effected by mounting in the discharge outlet a stopper, such that a passage way for the flow of material through the outlet is maintained, which stopper cooperates with a complimentary shaped orifice in a wall of the dispenser. Activation of the means pivotally mounted in the dispenser wall causes deformation of the diaphragm in the area surrounding the discharge outlet so that the discharge outlet moves away from the dispenser wall, thereby removing the stopper from the orifice to allow material caused to be dispensed by the deformation of the diaphragm to flow out of the container to the exterior of the dispenser. When the activating force is removed, the resilient diaphragm will resume its original shape, causing the discharge outlet to return to its original position and thereby restore the stopper to cooperation with the orifice, reforming the seal.

A specific embodiment of the invention will now be described, by way of example only and with reference to the accompanying drawings in which:

FIGURE I shows a longitudinal sectional view of a dispenser embodying the invention,

FIGURE 2 shows a top plan view of the dispenser of Figure 1,

FIGURE 3 shows a side view of a dispensing button mechanism of the dispenser of Figure 1, and

FIGURE 4 shows a top plan view of the dispensing button mechanism of Figure 3.

As illustrated in FIGURE 1, the dispenser comprises a container 1 occupied by fluent material and actuating means 2 pivotally mounted in the dispenser. The container 1 is defined by the walls 3 of the dispenser, a resilient diaphragm 4 including an elongate discharge outlet member 5 (in the form of a tube) and a piston member 6. Means 7 are provided which resist rearward movement of the piston member 6, away from the outlet 5.

The dispenser comprises a cylindrical main body of any suitable rigid material which is divided into a lower section defined by the wall 3 and an upper section 8. Between the two sections is an external screw thread, to engage with a complimentary thread on the inner surface of an outer cap 9.

The upper section 8 is apertured and the aperture is defined by two side members 10, integrally formed with the upper section 8, each of which includes a groove 11 to accomodate a cylindrical lug 12 on each side of the dispensing button mechanism, to effect the pivot mounting.

An inner cap 13, made of a suitable flexible material fits over the upper section 8 of the main body of the dispenser, a ridge on the inner surface engaging a circumferential ridge on the upper section 8. The inner cap 13 has a concave upper surface, at the centre of which is an orifice through which the fluent material emerges from within the dispenser. Connected to the interior surface of the inner cap 13 is an elongate tube 14 which fits tightly around the discharge outlet 5, so that material emerging from the container 1 can only flow out through the aperture. A circular cut out is provided in the side wall of the cap 13, to accomodate the dispensing button mechanism 2.

The dispensing button mechanism 2 is illustrated in FIGURES 3 and 4 and is moulded in one piece from a suitable material such as a plastics material. A main body 15 is flexibly connected to the front body 16 which includes a button 17. A slot with a semicircular end is provided in the main body 15 so that when the push button mechanism 2 is in place, the main body 15 sits on top of the surface of the resilient diaphragm 4 and around the base of the elongate outlet 5. The circular lugs 12, attached to each side of the main body 15 are accommodated in the grooves 11, previously described, so that the dispensing button as a whole is pivotally mounted on the side of the dispenser. The range of movement of the button 17 is limited in the inward direction by a stop 18 and in the downward direction by legs 19.

The dome-shaped resilient diaphragm 4 and the discharge outlet 5 are moulded in one piece from a suitable material such as a plastics material and are accommodated in a groove moulded to the walls 3, to effect an airtight seal. Located in the centre of the discharge outlet 5 is a conical shaped stopper 20 suspended by radial members, so that a passage exists for the egress of fluent material from the container 1. The stopper 20 registers with the orifice in the inner cap 13 so that a seal is formed.

The piston member 5 is moulded in one piece

from a suitable flexible material such as a plastics material and comprises a central hub 21 and an outer rim 22 with intervening stiffener ribs 23 interconnecting the two parts for relative rigidity. The outer rim 22 is provided with a forward lip seal 24, extending laterally outwardly of the rim 22 and a rearward lip seal 25, extending laterally outward from the rim. These lip seals have sufficient flexibility so that they sealingly engage the inner surface of the wall 8.

The forward lip seal 24 will be forced by the pressure of the material in the container I against the dispenser wall 3, whilst the rearward lip seal 25 sealingly engages the inner surface of the wall 8 to prevent atmospheric air leaking forwardly of the piston member 6.

A one-way gripper 7 made of a suitable flexible material is attached to the piston to prevent rearward movement of the piston member 5. As disclosed, the one-way gripper 7 includes a central portion 26 attached to the hub 21 by a press-fit button 27. Integral with the central portion 26 are radial fingers, extending thereform in a rearward direction, with their outer ends engaging the inner surface of the wall 3. The arrangement is such that the fingers merely slide along the inner surface of the wall 3 when the piston member 8 moves in a forward direction under the influence of atmospheric pressure but any tendency of the piston member 8 to move rearwardly causes the outer ends of the radial fingers to grip against the inner surface of the wall 3.

Thus the piston member 6 can move freely in a forward direction, but is prevented from moving in a rearward direction.

The dispenser includes a bottom piece 28, attached to the walls 3 by push-fit means, and includes a hole to allow atmospheric pressure to be exerted on the rear of the piston member.

In use, the inner chamber is substantially filled with a suitable fluent material and the piston member 6 moved forward manually so that the volume between the piston member 6 and the diaphragm 4 is completely filled by the material. Manual activation of the dispensing button mechanism 2 causes pivoting about the circular lug 12 and translation of the lateral motion into a longitudinal motion, so that the main body 15 presses against the diaphragm 4, causing also the withdrawal of the stopper 20 from the aperture in the inner cap. Thus the seal is removed and material caused to be dispensed by the depression of the diaphragm flows out along the outlet 4, through the orifice and onto the concave surface of the inner cap. When the dispensing button is released, the resilient diaphragm returns to its original shape and in doing so, restores the outlet tube 5 and the stopper 20 to their original positions, thereby reforming the seal.

The diaphragm having returned to its original shape, a partial vacuum is created inside the container 1. Atmospheric pressure exerted on the rear of the piston member causes the piston member to move forward, sweeping out a volume equal to the volume of material dispensed and thereby eliminating the partial vacuum. The checks imposed on the movement of the dispensing button by the legs 19 and the stop 18 limit the amount of material that can be dispensed to a small but finite volume, which is particularly useful for a cosmetic which is used in only small quantitites. The exclusion of air from the container 1 that the sealing mechanism permits is particularly useful for maintaining a sterile environment which some cosmetic material might require.

Claims

1. A dispenser for fluent material, comprising a container, the effective volume of which decreases in accordance with the volume of material that is dispensed from the container, and in which means pivotally mounted in the dispenser are arranged to act on a resiliently deformable diaphragm, simultaneously to unseal, temporarily and in a reversible manner, the container and to initiate the dispensing of the material therefrom, in response to deformation of the diaphragm.

2. A dispenser as claimed in claim 1 in which, in use, unsealing of the container occurs simultaneously with the deformation of the diaphragm.

3. A dispenser as claimed in claim 1 or claim 2 in which the pivotal means are adapted to initiate dispensing of material in the container by applying pressure thereto.

4. A dispenser as claimed in any one of claims 1 to 3 in which the pivotal means is in the form of a bell crank, the fulcrum thereof being mounted in the dispenser, with one arm providing an activating member to which pressure may be applied and the other arm arranged to deform the resilient diaphragm.

5. A dispenser as claimed in any one of claims 1 to 4 in which the means mounted on the diaphragm are adapted to cooperate with means fixed relative to the dispenser to define a passageway which is open only when the diaphragm is depressed.

6. A dispenser as claimed in claim 5 in which the means mounted on the diaphragm is a discharge outlet, to provide an exit channel for the container, which outlet is equipped at the end thereof remote from the diaphragm with a stopper suspended therein, which stopper sealingly coop-

erates with a complementary orifice which is provided in the dispenser wall, when the diaphragm is in a non-deformed state.

7. A dispenser as claimed in claim 6 in which the discharge outlet is substantially coaxial with a longitudinal axis of the dispenser; with the said orifice located in a wall of the dispenser which is substantially normal to the longitudinal axis of the dispenser.

8. A dispenser as claimed in claim 7 in which the said wall is concave.

9. A dispenser as claimed in any one of claims 1 to 8 in which the container is defined by the walls of the dispenser; a resilient diaphragm including discharge outlet, cooperating with the walls of the dispenser; and a piston member which is movable forwardly toward the outlet and against the material in the container, such that the volume thus defined is fully occupied by the fluent material and which includes means to resist rearward movement of the piston member away from the outlet in all positions of the piston member.

10. A dispenser as claimed in any one of claims 1 to 9 in which the means pivotally mounted in the dispenser cooperate with that surface of the resilient diaphragm which is not in contact with the fluent material.

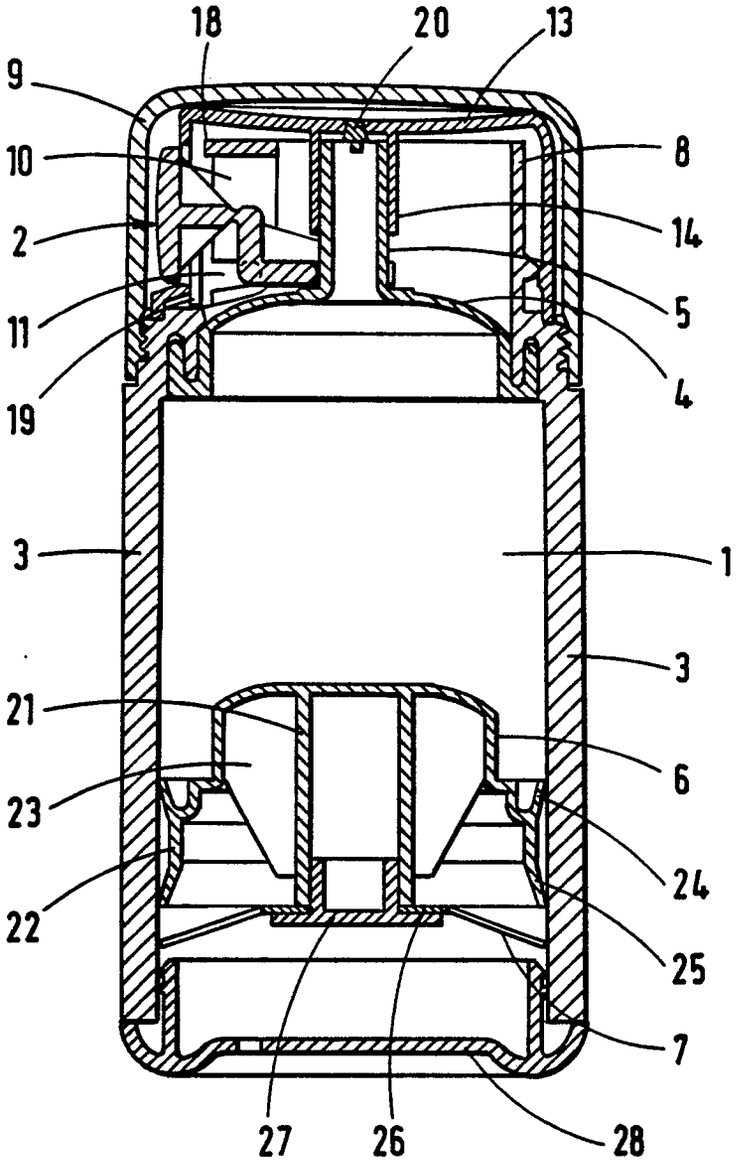

Fig. 1

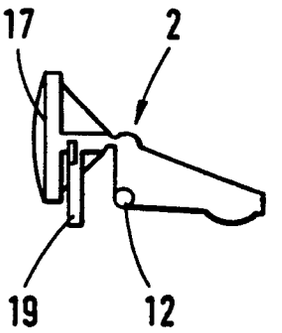

Fig. 3

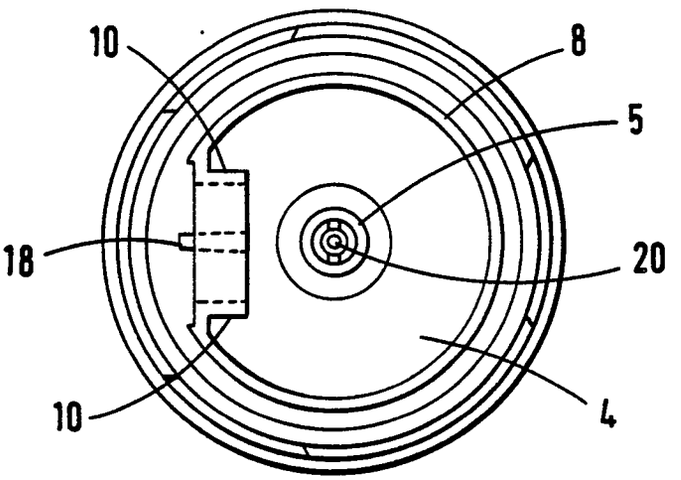

Fig. 2

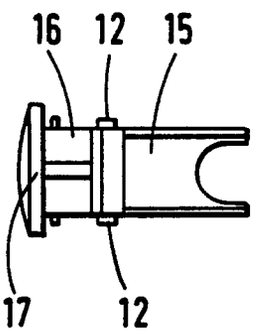

Fig. 4