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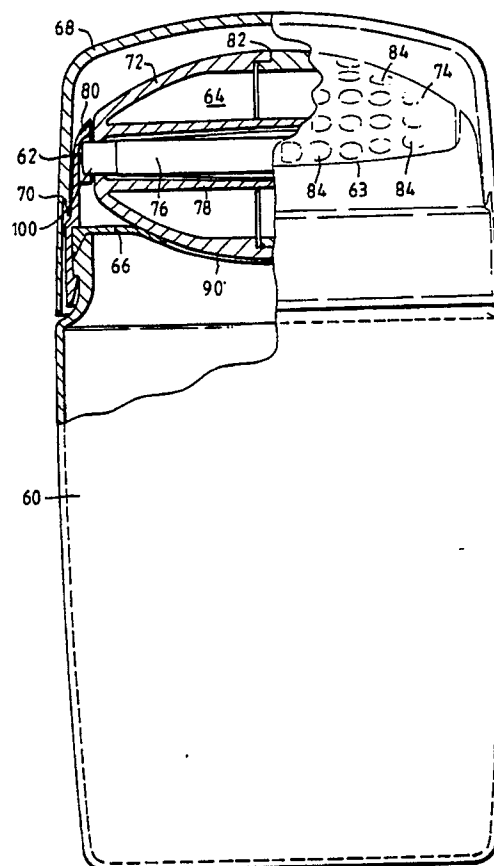
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Watford Hertfordshire WD1 7HE(GB)(54) **Roll-on dispensers.**

(57) A roll-on dispenser for a liquid deodorant product is of oval cross-section and has an elongated applicator ball (14). The applicator ball (14) is journaled for rotation on the dispenser body (10).

The ball (14) is held in permanent engagement with an apertured seat which together with the ball (14) closes the top end of the product reservoir (11). Little or no product loss can therefore occur when the ball is not rotating. For dispensing product the surface of the ball is formed with hollow depressions (32) each capable of transferring a quantity surface as the ball rotates. Each depression (32) can be completely closed off by the seat so as not to provide a leakage path past the seat when the ball is stationary.

Fig.5.**EP 0 437 042 A2**

"ROLL-ON DISPENSERS"

This invention relates to roll-on dispensers, that is to say, dispensing containers having a rotatable ball the exterior surface of which provides a carrier enabling a liquid product held in a reservoir within the body of the dispenser to be distributed over a user surface against which the ball is rotated by stroking action the dispenser. The invention has particular application and advantage for the dispensing of liquid (ie fluent) products such as under-arm deodorant liquids, but it may be applied to the dispensing of non-fluent (eg viscous or pasty) products if desired.

Roll-on dispensers are known having balls which are spherical or elongated along their axis of rotation. Usually, spherical balls are provided for dispensers of circular cross-section, and elongated balls are used for dispensers of generally oval cross-section. The balls are held captive in the dispenser body, and may be mounted for rotation by opposed bosses, cups (or similar male or female features) which engage them at their polar regions. As an alternative the balls may be freely rotatable but held captive within the dispenser body by an intumed lip at which the dispenser body engages them beyond their transverse meridian, that is to say, on the side of the transverse meridian remote from the product reservoir.

For transit and display and when not in use, circular roll-on dispensers for liquid products are usually provided with a cap by which the spherical ball is protected from dust and other contamination, and product evaporation is reduced to a minimum. The prime function of the cap is to prevent leakage of the products past the ball when the dispenser is lying on its side or inverted. For that purpose the dispenser body has an apertured seat against which the ball is forced by the cap when the cap is fitted in position.

The seat engages the ball at a continuous line of engagement lying within the transverse meridian of the ball (ie on the side of the transverse meridian nearest to the product reservoir), and prevents leakage by isolating the reservoir from the ball surface beyond the seat. For use, the cap is removed and the ball becomes free to rotate and transfer product to the user surface via a clearance which is formed between the ball and the seat. The seat is therefore ineffectual.

For liquid product dispensers with spherical balls, therefore, adequate sealing can be achieved by use of a cap, but this of course is ineffective if the cap is accidentally dislodged or not replaced properly after use. For liquid product dispensers with non-spherical balls moreover, efficient sealing engagement is difficult to achieve using a snap-

engagement or frictionally engaged cap; screw caps and the high closing forces which they can provide may be effective, but because of their essentially circular form they are not suited to dispensers with non-spherical balls. The present invention seeks to provide a dispenser arrangement which does not require engagement by the cap to achieve sealing and which is capable of achieving efficient sealing even with highly mobile products such as water-based and alcohol-based cosmetic liquids, irrespective of whether the ball is spherical or non-spherical.

In accordance with the invention there is provided a roll-on dispenser having an apertured seat with which the ball makes permanent sealing engagement so that in the absence of ball rotation the ball and seat close the product reservoir against escape of product, for enabling it to dispense product onto a user surface the surface of the ball being formed with a plurality of surface depressions each capable of receiving a quantity of the product from the reservoir through the aperture of the seat and of carrying it past the seat for dispensing as the ball rotates, the surface dimensions of each depression being such that the depression can be wholly closed by the seat for the retention of product therein.

The depressions may take many forms and may advantageously be arranged to form a regular pattern of pleasing appearance on the ball surface. Amongst the forms of depression which are possible are circular dimples, and elongate grooves which follow generating lines of the ball surface.

One example of roll-on dispenser for a liquid product is described in US Patent Specification No 3039132. The dispenser has a seat which underlies the dispensing ball, between the ball and the product reservoir, and product for dispensing passes through a hairline opening which is provided between the ball and the seat. This opening is closed against product escape by downward pressure exerted by a cap when the dispenser is not in use.

The ball of US 3039132 has no recesses formed in it. However, recesses in a dispensing ball are disclosed in French Patent Specification No 1301805, concerning a ballpoint pen. Amongst other benefits the recesses serve to increase the amount of ink dispensed by the ball, this increase being over and above the normal ink flow which occurs in the hairline clearance which is conventionally provided between the ball of the ballpoint pen and its seat. As with conventional ballpoint pens, any substantial loss of ink through the clearance when the pen is not in use is prevented by the substantial viscosity of the ink.

US Patent Specification No 3235900 describes a ball applicator with recessed ball for dispensing relatively viscous products such as creams and pastes. The product is pressurised for dispensing, and in order to prevent excessive product flow a seat is provided on the distal side of the ball (ie remote from the product reservoir), with which the ball is forced to make sealing engagement by pressure of the product. To achieve dispensing the ball is formed with recesses in which individual portions of the product are carried past the seat as the ball rotates.

In US Patent Specification No 2029056 a recessed ball for dispensing is journalled in a member which defines a discharge slot through which product may be fed to the underside of the ball from a collapsible tube. However, the product to be dispensed is of a pasty consistency such as a shaving cream, and, as with the dispensers of US 3039132 and US 3235900 discussed above, there is therefore no requirement for a seal to be made with the ball to prevent product escape when the dispenser is not in use.

In order that the invention may be more fully understood embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a first roll-on dispenser embodying the invention, as seen in side elevation and with its cap removed;

Figure 2 likewise shows the dispenser of Figure 1 in end elevation;

Figure 3 shows the dispenser of Figure 1 in enlarged vertical section taken along the line III-III in Figure 1;

Figure 4 is a view similar to Figure 3 of a second roll-on dispenser embodying the invention;

Figure 5 is a side elevational view, partly in section, of a third roll-on dispenser embodying the invention; and

Figure 6 is a top view of a seat member forming part of the dispenser of Figure 5.

Referring firstly to Figures 1 to 3 of the drawings, a roll-on dispenser for an underarm deodorant liquid has a body 10 forming a reservoir 11 for the deodorant product 12 (Figure 3), and a ball 14 of essentially circular cross-section which is rotatable about an axis XX to transfer product onto a user surface (not shown) along which the ball is moved by stroking action of the dispenser in known manner. The body and the ball are each moulded from a suitable polymeric material.

The dispenser is of oval cross-section, and the ball 14 is correspondingly of oblong spheroid form, with major axis XX. The ball substantially closes one end of the body, the top end as shown in the drawings. The opposite, bottom end of the body as shown is closed by an integral base 16 by which

the dispenser may be stood upright on a horizontal support surface when not in use.

The ball 14 is held captive by shallow cups 18 which are moulded in mutual opposition on the body and into which the ball is snap-engaged at its end. The cups serve to journal the ball for rotation, and define its rotational-axis XX.

The free edge of the body 10 adjacent the ball 14 is generally denoted in the drawings by the reference numeral 20. Adjacent the cups 18 this free edge extends beyond the transverse - (in relation to the dispenser) - meridian of the ball, that is to say, the side of the transverse meridian remote from the product reservoir 11. Between the cups, however, the free edge is cut away in a smoothly curving and visually pleasing manner so as to reveal a substantial part of the surface of the ball for engagement with the user surface. Thus the free edge is located in part beyond the transverse meridian of the ball but in part falls short of that meridian.

Figure 3 shows the dispenser in central vertical section taken through the ball equator. From Figure 3 it will be seen that a generally plane and apertured seat member 22 moulded from a suitable polymeric material is supported by the body 10 for engagement with the undersurface of the ball. The seat member is fitted securely into the open top end of the body before the ball is fitted, and for that purpose has a peripheral groove 24 in which a rib 26 formed around the interior surface of the body is snap-engaged by relative downward movement of the seat member. The groove and rib thereafter form a fluid-tight connection between the body and the seat member around the whole of the body periphery.

The seat member is relatively massive at the groove 24, but from there tapers inwardly to a resilient feather edge 28 defining an aperture 30 by which the reservoir 11 is communicated with the underside of the ball.

The cups 28 hold the ball 14 in such a way that the feather edge 28 makes permanent and resilient engagement with the ball around the whole periphery of the aperture 30, and in the absence of rotation of the ball this engagement forms a seal preventing product escape from the reservoir irrespective of the orientation of the dispenser and whether or not the dispenser is fitted with a cap. When not in use, therefore, the dispenser is subject to little product loss by leakage or evaporation.

As is visible in Figures 1 to 3, in order to enable the dispenser to operate to dispense product despite the seal provided by the seat member 22, the ball 14 is formed with a plurality of exterior recesses in the form of shallow depressions or hollows 32 which are disposed about its periphery, preferably in an artistically pleasing, regular pattern

as shown. The depressions may be of differing shapes and/or depths; they may be confined to an equatorial region of the ball as shown, or they may be more widely distributed along the axis XX.

Each depression 32 has such dimensions at the ball surface ("surface dimensions") that the feather edge 28 is capable of making sealing engagement with the ball around the whole of the periphery of the depression, with the result that no depression (or series of interconnected depressions) is able to span the feather edge and so enable product from the reservoir to escape past it when the ball is not rotating. As the ball rotates against the user surface, however, each depression can pick up a small quantity of the deodorant product from the reservoir 11 at the aperture 30, and carry the product past and beyond the seat member 22 for subsequent application to the user surface. Spreading action of the ball then ensures substantially uniform distribution.

In a non-illustrated modification of the dispenser of Figures 1 to 3, the externally recessed ball is journaled for rotation about the axis XX by inwardly projecting and aligned bosses which are moulded on the dispenser body and snap-engaged into recesses formed in the ends of the ball.

Figure 4 illustrates a second roll-on dispenser which is a modified version of the dispenser shown in Figures 1 to 3. In the dispenser shown in Figure 4, the externally recessed ball is held captive by a continuous and inwardly inclined resilient lip 50 which forms the free edge 20' of the body and the engages the ball surface beyond its transverse meridian. The lip holds the ball resiliently against the seat member 22, the lip and seat together determining the rotational axis XX of the ball, no specific rotary mounting features such as the cups 18 of Figures 1 to 3 being provided on or in the body or the ball. Depressions 32 in the ball surface provide for product transfer past, in series, the seat member and the lip generally in the manner of the first embodiment.

Referring now to Figure 5 and 6, there is shown a third and preferred roll-on dispenser for an underarm deodorant. The dispenser comprises a body formed in two parts, namely a main body part 60 and a collar part 62, a ball 64, an apertured seat member 66 and a cap 68. The main body part 60, collar part 62, and cap 68 are each of oval cross-section. The main body part 60 and the collar part 62 are snap-engaged together and the apertured seat member 66 is held between the main body part 60 and the collar part 62. The free edge 63 of collar part 62 is cut away between the ends of ball 64. The cap 68 has an internal sealing lip 70. When the dispenser is not in use, the cap 70 protects the ball 64 from contamination and helps to prevent product loss by evaporation. Each part of the dis-

penser is moulded from a suitable polymeric material.

As viewed in Figure 5, the ball 64 is formed from a left hand part 72 and a right hand part 74 which are assembled together after moulding. This right hand part 74 has a central shaft 76 which is received in a sleeve 78 of the left hand part and extends beyond the left hand part as a boss 100. A further boss (not shown) extends from the right hand end of the right hand part 74 in alignment with the boss 100. The ball 64 is mounted for rotation by engagement of the bosses in a pair of downwardly facing C-shaped protrusions formed in the collar part 62. The left hand protrusion is denoted by reference numeral 80. These protrusions act as bearings for the ball 64. The inner edge of the left hand part 72 mates with and overlies the inner edge of the right hand part 74. The inner edges of the left and right hand parts together define a groove 82 in which the mould parting lines of the ball parts 72,74 are located remote from the surface of seat member 66.

The exterior surface of ball 64 has the shape of an ellipsoid or elongated spheroid which is flattened at its poles. In each part of ball 64, the exterior surface is provided with five latitudinal rows of recesses or dimples. Each row of dimples extends entirely around the ball 64 and some of the dimples are indicated by reference 84.

The seat member 66 is resiliently engaged with the undersurface of ball 64. As shown in Figure 6, the seat member 66 has a pair of apertures 90,92 disposed on opposite sides of, and spaced from, groove 82. In the absence of rotation of ball 64, the engagement between the ball 64 and seat member 66 forms a seal around each of the apertures 90,92 and these seals prevent escape of the product from main body part 60. When in use, as the ball 64 rotates, the dimples 84 carry the product beyond the seat member 66 for subsequent application to the user surface.

In a modified version of the dispenser shown in Figures 5 and 6, the ball 64 is made as a one piece moulding. However, in this modified version, the ball 64 retains its equatorial groove as location for the mould parting line and the seat member 66 retains its pair of apertures.

The invention is not limited in application to roll-on dispensers having elongated balls as particularly described, but may have application to roll-on dispensers having spherical balls. The embodiment of Figure 4 is particularly valuable in this respect, since the absence of any rotary mounting features on the ball it enables the ball to rotate without constraint; the product-transferring depressions are therefore preferably distributed in a regular pattern about the whole of the ball surface.

Claims

1. A roll-on dispenser having an apertured seat with which the ball makes permanent sealing engagement so that in the absence of ball rotation the ball and seat close the product reservoir against escape of product, for enabling it to dispense product onto a user surface the surface of the ball being formed with a plurality of surface depressions each capable of receiving a quantity of the product from the reservoir through the aperture of the seat and of carrying it past the seat for dispensing as the ball rotates, the surface dimensions of each depression being such that the depression can be wholly closed by the seat for the retention of product therein.

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2. A dispenser as claimed in Claim 1, wherein the ball is journaled for rotation by engagement at polar regions thereof.

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3. A dispenser as claimed in Claim 2, wherein the polar regions of the ball are snap-engaged into recesses of the dispenser body.

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4. A dispenser as claimed in Claim 2, wherein the polar regions of the ball are formed with recesses into which male members of the dispenser body are snap-engaged.

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5. A dispenser as claimed in Claim 1, wherein the ball is held against the seat by a continuous lip formed on the dispenser body and which engages the ball beyond the transverse meridian thereof in relation to the product reservoir.

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6. A dispenser as claimed in Claim 1, wherein the ball is non-spherical.

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7. A dispenser as claimed in Claim 1, wherein the seat is snap-engaged into the container body.

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8. A dispenser as claimed in Claim 1, wherein the seat has a feather edge portion which defines the aperture thereof and with which the ball makes resilient contact.

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9. A dispenser as claimed in Claim 1, wherein the depressions are distributed over the surface of the ball in a regular pattern.

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10. A dispenser as claimed in Claim 1, wherein the ball is journaled for rotation by engagement at polar regions thereof, the ball has an equatorial groove, and the seat has a pair of apertures on opposite sides of the equatorial groove.

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11. A dispenser as claimed in Claim 10, wherein the ball is of generally elongated spheroidal shape.

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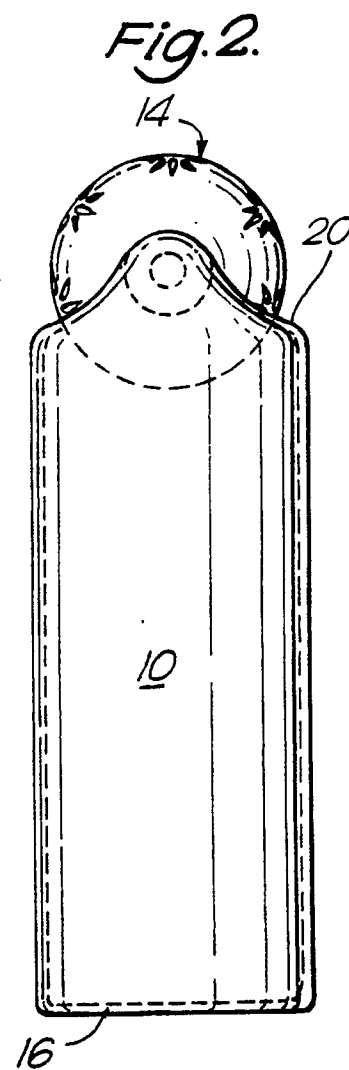
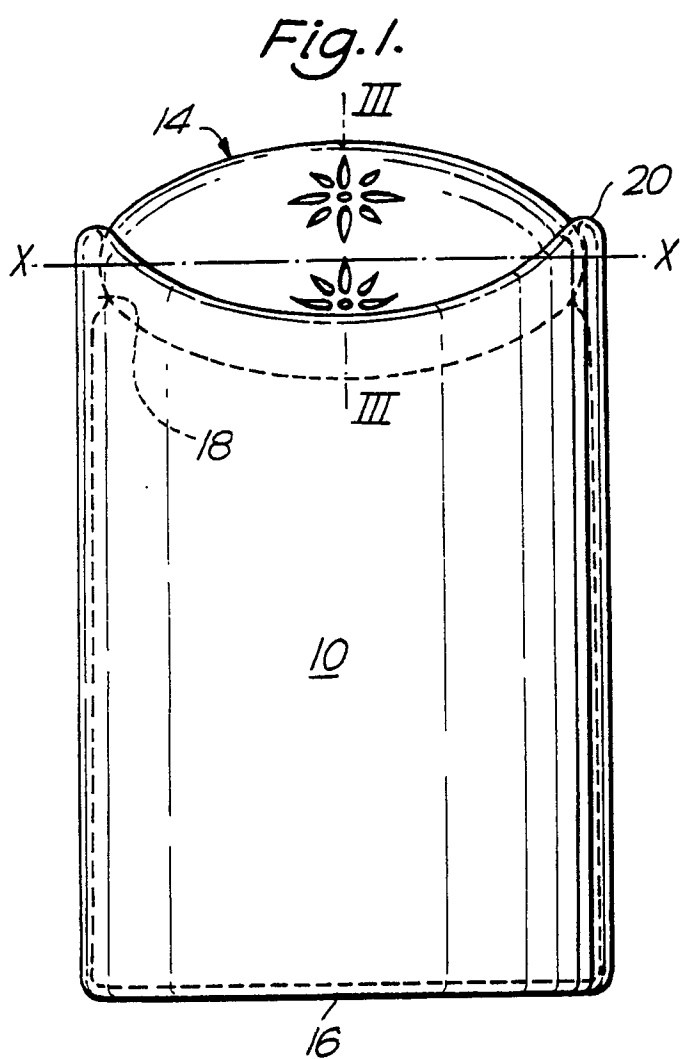


Fig.3.

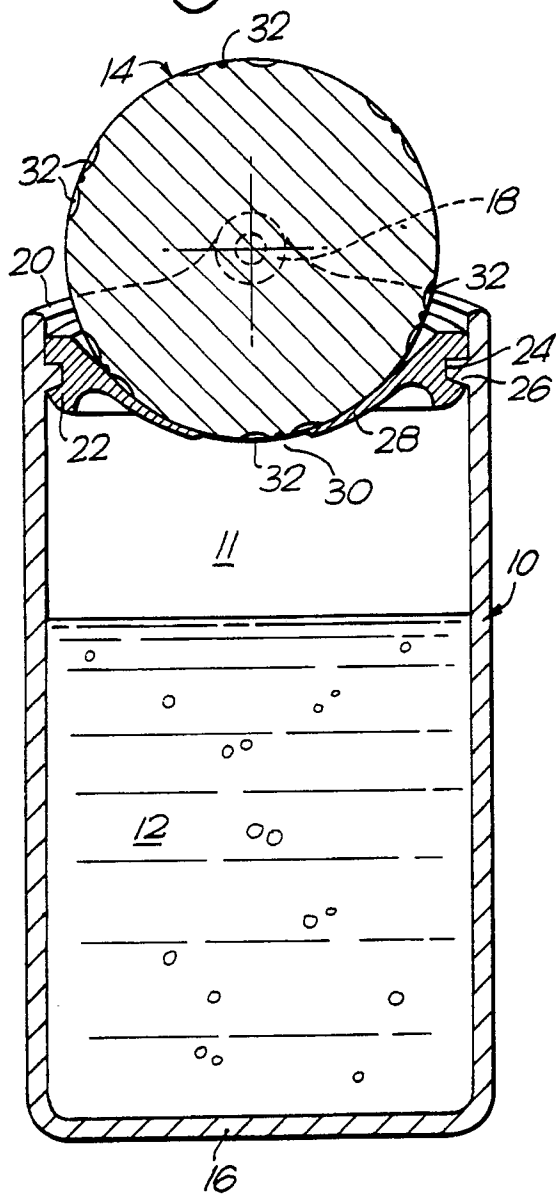


Fig.4.

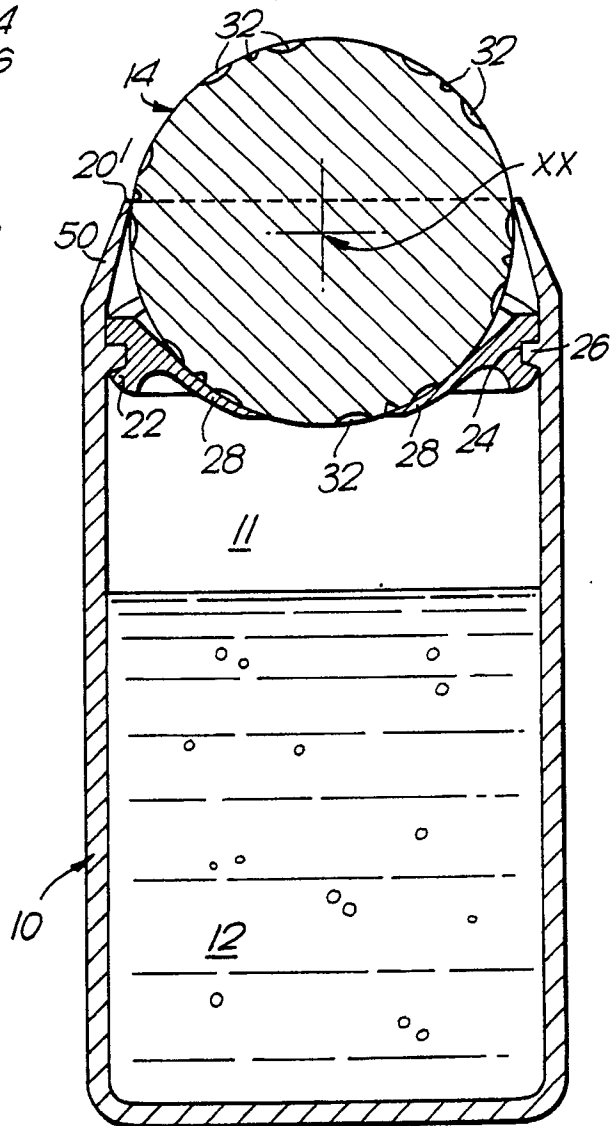


Fig.5.

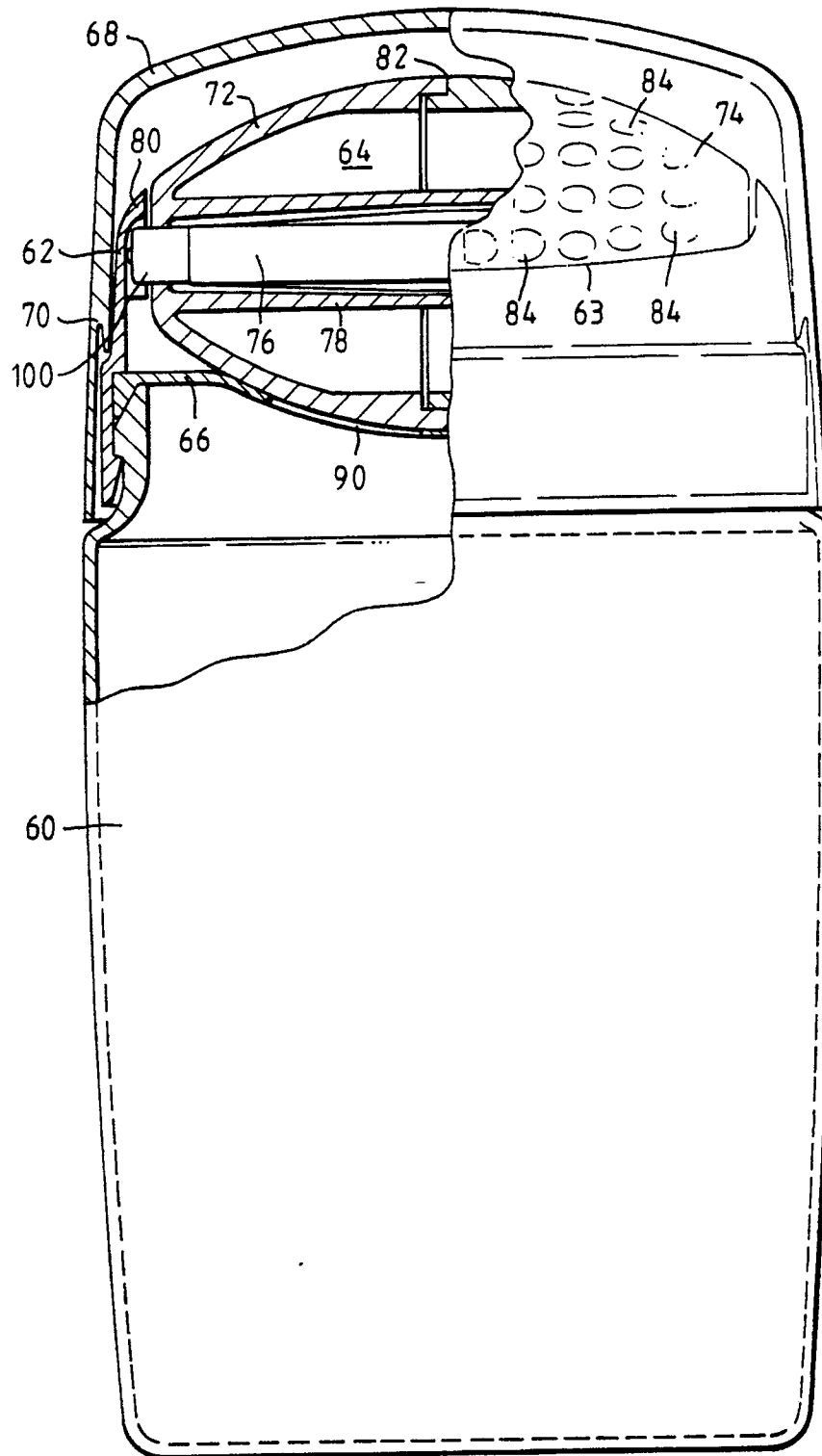


Fig. 6.

