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54 Roll-on dispensing device.

57 The invention provides a roll-on dispensing device for a viscous fluid or powder of the kind comprising a ball rotatably mounted in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein the housing is provided with a plurality of arcuate projections extending from the inlet side to the outlet side of the ball, serving to support the ball and to retain the ball in place, said projections having spaces in between through which fluid or powder can be fed by rotation of the ball.

The device is used to dispense viscous fluids, especially depilatories, and powders. A method of removing hair is also described.

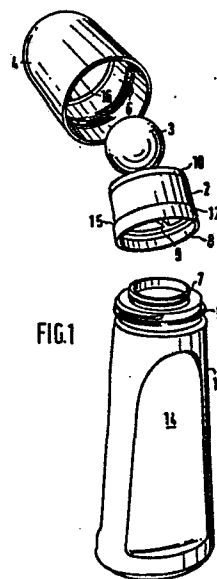


FIG.1

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ROLL-ON DISPENSING DEVICE

The invention relates to roll-on dispensing devices for use in applying viscous fluids or powders to the body and to methods of removing body hair by means of depilatories.

5 It is common practice to remove unwanted body hair by means of depilatories in the form of creams, lotions or sprays. A recent survey showed that the vast majority of people who remove body hair from the armpits use a razor rather than a depilatory. This may be due to
10 difficulty of applying conventional creams or lotions to this part of the body.

Although it is common to apply deodorants and antiperspirants to the armpits by means of special applicators such as the so called roll-on applicators, this means
15 of applying depilatories has not been used to the best of our knowledge.

In the course of our researches we have investigated the possibility of applying depilatories to the armpits by means of roll-on applicators. It was found that the
20 standard type of roll-on applicator such as that used for deodorants or antiperspirants is unsuitable for application of depilatories. We have devised a novel form of applicator which is particularly suitable for the application of depilatory fluids such as creams or lotions
25 to the body and especially the armpits. It may also be used for application of other viscous fluids, especially thixotropic fluids, including cosmetic formulations e.g. deodorants and antiperspirants, which may be in powder form, and also for talc.

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In one aspect the invention provides a roll-on dispensing device for a viscous fluid or powder of the kind comprising a ball rotatable mounted in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein the housing is provided with a plurality of arcuate projections extending from the inlet side to the outlet side of the ball, serving to support the ball and to retain the ball in place, said projections having spaces in between through which fluid or powder can be fed by rotation of the ball.

Preferably the arcuate projections comprise radially inwardly protruding ribs formed in the housing and extending axially from the inlet side to the outlet side of the ball and the radially inner edges of the ribs jointly define a zone of a sphere. Preferably in this construction the ball is a substantially smooth sphere.

In a preferred embodiment the device is provided with a cap, the cap having therein a head space above the ball, which permits the ball to be bathed with fluid when the device is shaken. In this construction the housing is preferably provided with a bevelled edge and the cap is provided with an internal rim or ledge which mates with said bevelled edge to provide a liquid tight seal.

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In another aspect the invention provides a roll-on dispensing device containing a depilatory fluid, said device being specially adapted to dispense said depilatory fluid.

5 In this aspect the device may comprise a ball rotatably mounted in a cavity in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein either the ball or the housing is provided with radial protrusions the radial
10 extremities of which define a spherical surface and the other of the ball and the housing has a spherically curved surface for rolling engagement with the extremities of the protrusions, the protrusions operating as radial spacers forming spaces through which fluid can be fed by rotation of the ball.

15 In this device the ball is formed with a multiplicity of radially outwardly projecting protrusions, the radially outer extremities of which define a sphere and engage the surface of said cavity, which is smoothly spherically curved.

20 In the above embodiments the housing may be formed integrally with the neck of the container for the depilatory, or it may be a separate unit which is located at the neck of the container or it may even form the neck of the container.

25 If a separate unit, the housing may have internal screw threads or other means for attachment to the body of the container, such as a groove for mating with a corresponding rib on the body of the container. Preferably the housing for the ball is made of a relatively
30 resilient plastics material such as polyethylene and is

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designed so that the ball can be pushed into place by slight deformation of the walls of the housing which then spring back into shape thereby gripping the ball.

Following is a description by way of example and
5 with reference to the accompanying drawings of devices in accordance with the invention.

In the drawings:

- Figure 1 is an exploded perspective view of a dispensing device;
- 10 Figure 2 is an inverted plan view of the housing for the ball;
- Figure 2a shows a projection in cross section;
- Figure 2b is a plan view of the housing;
- Figure 3 is a cross sectional view showing the neck of
15 the device with the cap in place;
- Figure 4 illustrates, in perspective view, a housing similar to that used in the embodiment of Figures 1-3;
- Figure 5 is an axial section of Figure 4; and
- Figure 6 is a perspective view of a modified ball used
20 in another embodiment of the invention.

Referring to Figures 1 to 3 of the drawings the device comprises a container body 1, which may be made of moulded polyvinyl chloride, a housing 2, a ball 3, and a cap 4. The container body 1 has screw threads
25 5 for attachment of cap 4 by corresponding screw threads 6. The container body 1 has a circumferential rib 7 for attachment of housing 2 by a co-operating circumferential groove 8. The housing 2 is made of polyethylene and is pressed over rib 7 to provide a snap fit thereby
30 producing the neck of the container. As seen in Figure 2, the housing 2 has a series of equispaced projections 9 of arcuate shape (Fig. 2a). When in position the ball 3 sits on the base of arcuate projections 9 and is held in position by the arcuate shape of the projections 9.

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The housing 2 has a bevelled edge 10 at the top which mates with a corresponding rim 13 on cap 4.

The housing 2 is fitted on to body 1 by snap fit of groove 8 over circumferential rib 7. The ball 3 has a diameter slightly greater than the circle provided by the tops of projections 9 (Fig. 2b) and is pushed into the housing through the tops of the resiliently deformable projections 9, until it rests snugly in the housing held by the arcuate projections 9. The ball can rotate freely on the seat provided by the bases 9a of these projections yet is held firmly by them in view of the curve of the upper parts 9b of the projections. As shown in Figure 3 the cap 4 is screwed on to container body 1, enveloping the neck produced by housing 2. The bevelled edge 10 and rim or ledge 16 provide a liquid tight seal. The cap has another internal ledge 16, which abuts the ledge 15 of band 17 of the housing. As seen in Figure 3 there is a head space 18 in the cap above the ball 3. The body 1 may carry labelling on the flat portion 14 of its side or sides.

In use the container body 1 may be filled with a thixotropic depilatory lotion formulation such as one described in Harry's Cosmetology, published by Leonard Hill Books, 6th Edition 1976.

In use the cap is removed and the device is used to apply depilatory to the armpits or other body area. Before removal of the cap it is usually desirable to shake the container to ensure sufficient depilatory is covering the upper surface of the ball. This assist initial application of the depilatory. The headspace 18 is sufficient to enable depilatory lotion

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to bathe upper surface of ball 3 when the device is shaken with the cap on.

A device of the type described was tested against a standard pack of the roll-on deodorant type and a depilatory spray.

Empty roll-on deodorant packs of a standard type currently marketed in United Kingdom, such as that illustrated in UK Patent No. 740220, were filled with a depilatory lotion formulation instead of the deodorant formulation. It was found that this type of pack failed to deliver sufficient quantity of the depilatory to effect underarm depilation.

In a further trial 50 women were asked to carry out underarm depilation with A) an aerosol spray depilatory pack having a special angled nozzle and B) a roll-on applicator of the type described herein with reference to Figures 1 to 3 of the accompanying drawings.

49 of the 50 preferred the roll-on to the spray and of those women currently using either a razor or an electric razor for underarm hair removal 50% rated the roll-on better or much better than their current method.

Referring to Figures 4 and 5 of the drawings, there is shown a roll-on dispensing device comprising a ball 20 held captive, but rotatably mounted, in a housing 21 providing a snap-on fitment 22 by which the housing can be secured to the mouth of a container for a viscous fluid. When the container is tipped up to bring the fluid into contact with the ball, rotation of the ball in contact with a fixed surface causes fluid to be deposited on the surface.

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The ball is a smooth sphere, but the cavity 23 in which the ball is held captive has a plurality of radially-inwardly extending ribs 24 whose radially inner edges together define a spherical surface supporting the ball for rotation and holding it captive. Five ribs 24 are provided in the illustrated construction. The ribs 24 space the ball 20 from the cavity wall and enable a thick film of fluid to be carried by the ball in the areas between the ribs 24. This construction has been found to be particularly useful in dispensing thixotropic substances.

Referring now to Figure 6, a ball 30 for a roll-on dispenser is shown which has a multiplicity of radial protrusions 31. These protrusions have flat tops which together define a sphere. Such a ball is rotatably mounted in and held captive in a cavity in a housing of the known kind. The protrusions 31 act as spacers to accommodate between the spherical surface of the ball and the smooth spherically-curved wall of the cavity a relatively thick film of the fluid to be dispensed. This construction has been found particularly useful in dealing with fluids which tend to lubricate the ball to such an extent that a smooth ball glides over the surface without rotating. The protrusions on the ball 30 produce a frictional driving effect on the ball when it is moved across the surface.

When the device is not in use, a sealing cover is placed over the ball and housing.

Thus liquid substances which could previously not be applied by the roll-on method can now be applied by devices as described and illustrated.

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In the embodiments shown the ball preferably has a diameter of at least 25 mm.

The invention also provides a method of removing body hair which comprises applying to an area of the
5 body a depilatory fluid by means of a roll-on device, adapted to dispense depilatory fluid, allowing said fluid to react with the hair for a sufficient period of time, removing the loosened hair and rinsing the body area.

10 Preferably the roll-on device is of the type described herein.

The method is especially useful for removal of hair from the armpits. The depilatory fluid is usually allowed to react with the hair for up to 10 minutes, e.g.
15 1-10 minutes or up to 5 minutes may be sufficient.

The devices of the invention may also be used to apply viscous liquid, cream or powder formulations, including topical pharmaceutical formulations, to other parts of the body besides the armpits.

CLAIMS

1. A roll-on dispensing device for a viscous fluid or powder of the kind comprising a ball rotatably mounted in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein the housing is provided with a plurality of arcuate projections extending from the inlet side to the outlet side of the ball, serving to support the ball and to retain the ball in place, said projections having spaces in between through which fluid or powder can be fed by rotation of the ball.
2. A roll-on dispensing device as claimed in Claim 1, wherein the arcuate projections comprise radially inwardly protruding ribs formed in the housing and extending axially from the inlet side to the outlet side of the ball and the radially inner edges of the ribs jointly define a zone of a sphere.
3. A roll-on dispensing device as claimed in Claim 1 or Claim 2 wherein the ball is a smooth sphere.
4. A roll-on dispensing device as claimed in Claim 1 or Claim 2, wherein the ball is a substantially smooth sphere.

5. A roll-on dispensing device as claimed in any one of the preceding claims wherein the device is provided with a cap, the cap having therein a head space above the ball, which permits the ball to be bathed with fluid when the device is shaken.
6. A roll-on dispensing device as claimed in Claim 5, wherein the housing is provided with a bevelled edge and the cap is provided with an internal rim or ledge which mates with said bevelled edge to provide a liquid tight seal.
7. A roll-on dispensing device as claimed in any one of the preceding claims when containing a depilatory fluid.
8. A method of removing body hair which comprises applying to an area of the body a depilatory fluid by means of a roll-on device adapted to dispense depilatory fluid, allowing said fluid to react with the hair for a sufficient period of time, removing the loosened hair and rinsing the body area.
9. A method of removing body hair from the armpits which comprises applying to the armpits a depilatory fluid by means of a roll-on device adapted to dispense depilatory fluid, allowing said fluid to react with underarm hair for a sufficient period of time, removing the loosened hair and rinsing the armpits.
10. A method as claimed in Claim 9, wherein the fluid is allowed to react with underarm hair for a period of up to 10 minutes.

11. A method as claimed in Claim 8, Claim 9 or Claim 10 wherein the dispensing device comprises a ball rotatably mounted in a cavity in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein either the ball or the housing is provided with radial protrusions the radial extremities of which define a spherical surface and the other of the ball and the housing has a spherically curved surface for rolling engagement with the extremities of the protrusions, the protrusions operating as radial spacers forming spaces through which fluid can be fed by rotation of the ball.
12. A method as claimed in Claim 11, wherein the ball is formed with a multiplicity of radially outwardly projecting protrusions, the radially outer extremities of which define a sphere and engage the surface of said cavity, which is smoothly spherically curved.
13. A method as claimed in Claim 9 or Claim 10, wherein the dispensing device is a device as defined in any one of claims 1 to 7.
14. A roll-on dispensing device for dispensing a fluid, said device comprising a ball rotatably mounted in a cavity in a housing which provides an inlet and an outlet for fluid or powder dispensed by rotation of the ball, wherein either the ball or the housing is provided with radial protrusions the radial extremities of which define a spherical surface and the other of the ball and the housing has a spherically curved surface for rolling engagement with the extremities of the protrusions, the protrusions operating as radial

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spacers forming spaces through which fluid can be fed by rotation of the ball, said device containing a depilatory fluid.

15. A roll-on dispensing device as claimed in Claim 14, wherein the depilatory fluid is a thixotropic depilatory lotion.

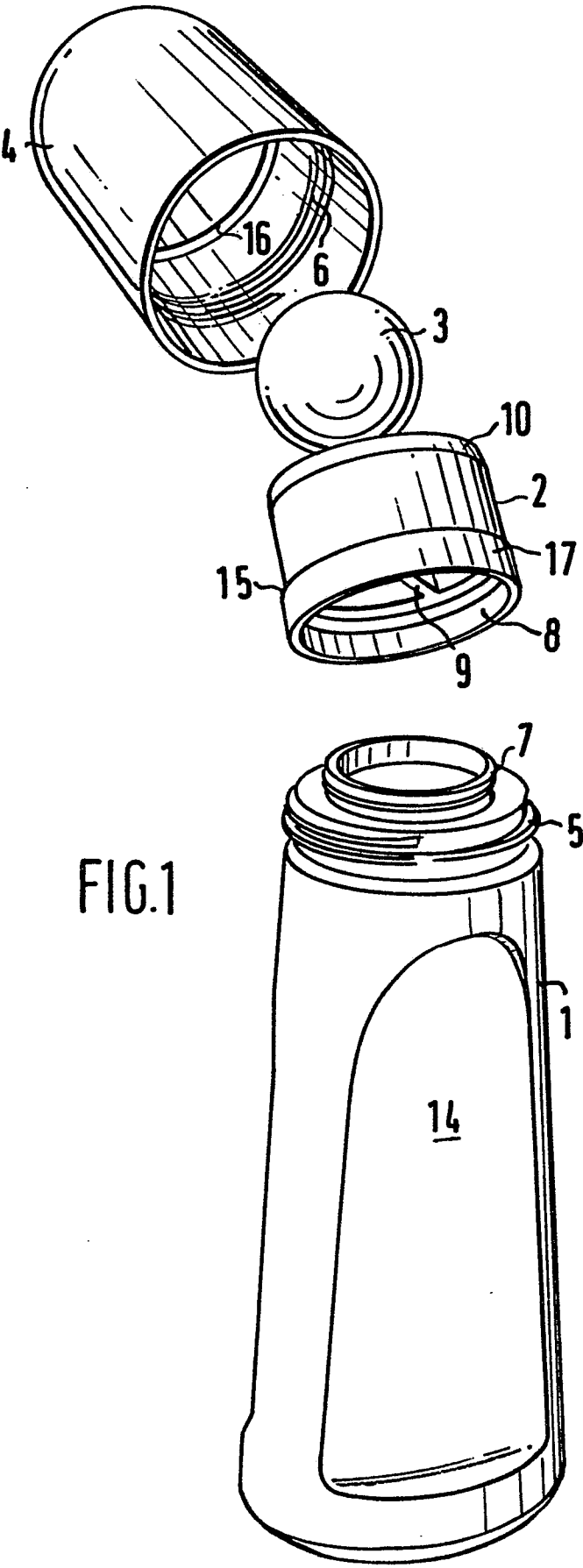


FIG.1

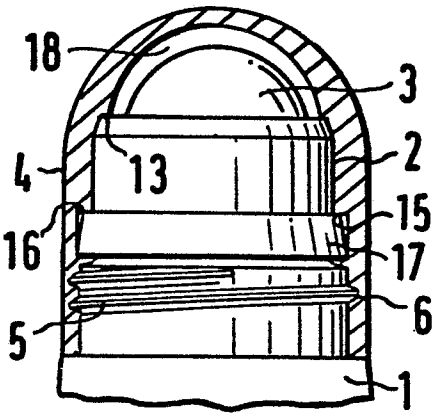


FIG.3

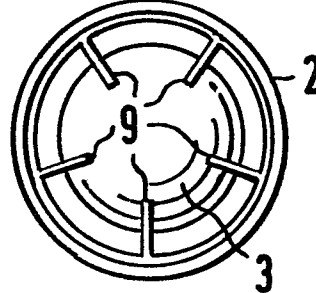


FIG.2



FIG.2a

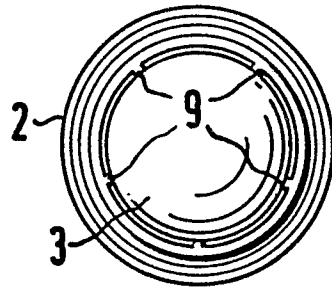


FIG.2b

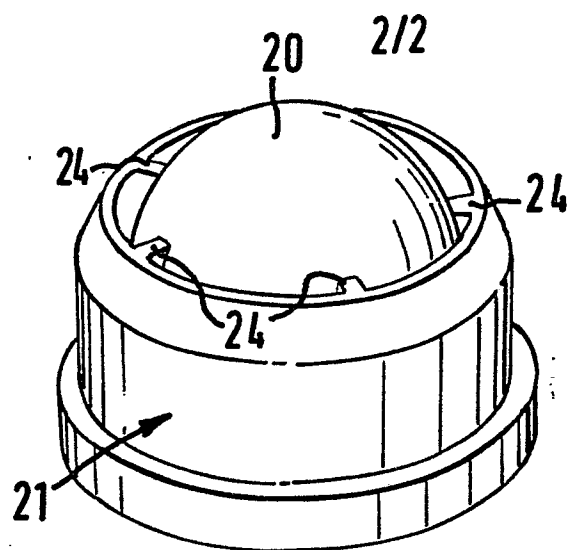


FIG. 4

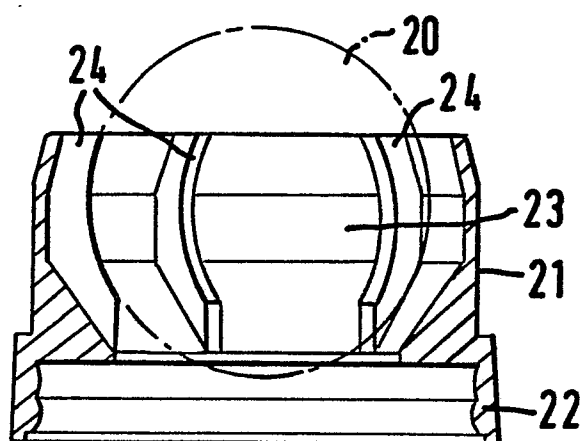


FIG. 5

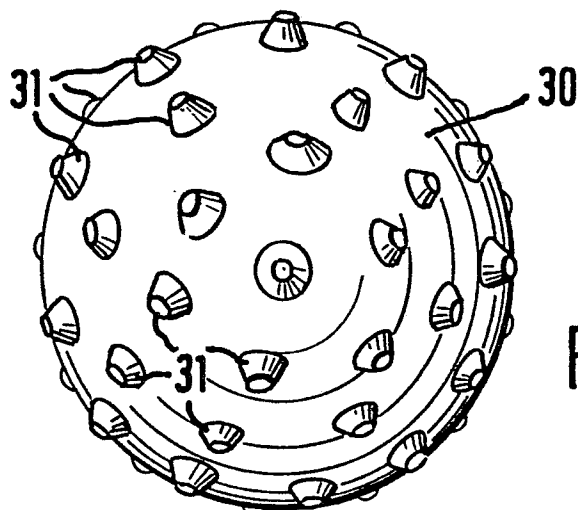


FIG. 6