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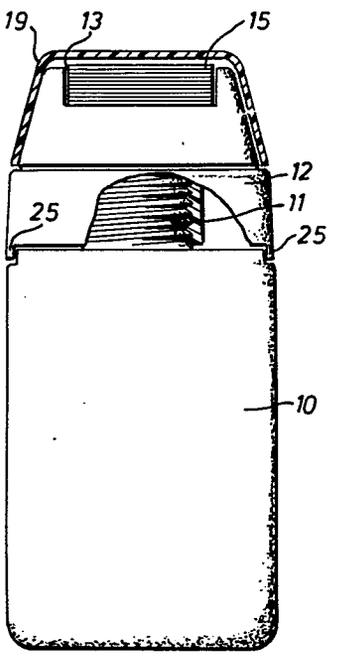
(54) Improvements in the application of depilatory materials.

(57) An applicator for applying a flowable depilatory chemical composition to the skin comprises a reservoir (10) charged with the composition, an applicator head (12) fastened to the reservoir having a flow passage for the composition leading from the reservoir to a mouth, and a generally cylindrical applicator roller (15) having an indented surface and journalled for rotation in the mouth. The reservoir (10) is removably connected to the applicator head (12) by a threaded neck (11) whose distal extremity is provided with a deformable circumferential flange (20) and the applicator head (12) has a bore (21) having a threaded portion that engages the neck (11) and that leads to a convergent portion (22) onto which the flange (20) seats as the applicator head (12) is screwed into position. The reservoir is charged with a flowable depilatory composition comprising up to 10% w/w of a sulphur-containing depilatory material, 0.5-30% w/w of an emulsifying wax to give an oils-in-water cream, 0.1-5% w/w of an inert cellulosic thickener that disperses in the aqueous phase and sufficient alkali to give a pH of 9.0-12.5 and also glucoheptanoic acid or a salt thereof and N-hydroxyethyl ethylene diamine triacetic acid or a salt thereof.



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IMPROVEMENTS IN THE APPLICATION OF DEPILATORY MATERIALS

The present invention relates to an improved applicator for depilatory materials, to a method of removing body hair and to a depilatory composition for use in the applicator.

Depilatory creams based on sulphur containing depilatory materials and alkalis have been known since the 1930's [see GB-A-484467 and US-A-1973130 and 2352524]. Generally speaking they are applied by hand or using a spatula as spreader which is a messy procedure. Ball applicators such as are commonly used in the toiletries industry are unsuitable for treatment of large or convex body areas such as the leg because they do not enable a sufficient area of the skin to be covered. A roller applicator has been described by Inverness International Corporation in Patent Specificaton No. GB-A-2113994, but only in the context of applying an epilatory wax at elevated temperatures.

Broadly stated the invention provides an applicator for applying a depilatory composition to the skin comprising a reservoir, a flowable chemical depilatory composition in the reservoir, an applicator head having a

flow passage for the composition leading from the reservoir to a mouth, and a generally cylindrical applicator roller having an indented surface and journalled for rotation in the mouth.

In order to prevent deterioration of the material in the reservoir, it is preferably air-tightly sealed with a removable and re-sealable closure until wanted. The roller applicator has been found to be particularly effective for treatment of the legs and the reservoir may suitably contain sufficient depilatory composition to enable a pair of legs to be treated twice, the reservoir being re-sealed between treatments. The reservoir may be removably connected to the applicator head by a threaded neck whose distal extremity is provided with a deformable circumferential flange, and the applicator head has a bore having a threaded portion that engages the neck and that leads to a convergent portion onto which the flange seats as the applicator head is screwed into position. Preferably a removable plug air-tightly seals the neck of the reservoir and is provided with a guard that seats on the end of the neck to limit insertion and that is formed with a deformable circumferential region that engages the convergent portion of the bore above the flange.

The invention further provides a method of removing body hair which comprises applying to an area of the skin a chemical depilatory composition by means of an applicator as aforesaid, allowing the composition to react with the hair, removing the loosened hair and rinsing the skin area.

The invention yet further comprises a flowable depilatory composition for use in an applicator as aforesaid comprising up to 10% w/w of a sulphur-containing depilatory material, 0.5-30% w/w of an emulsifying wax to give an oils-in-water cream, 0.1-5% w/w of an inert cellulosic thickener that disperses in the aqueous phase and sufficient alkali to give a pH of 9.0-12.5.

The depilatory material present in the composition

may be derived from a thio compound such as thioglycollic acid, thiolactic acid, 3-mercaptopropionic acid and thioglycerol. The acids may be neutralised with alkali metals or alkaline earths such as lithium, sodium, potassium, calcium, barium and strontium. Calcium thioglycollate is the preferred material because it combines high depilatory activity with low skin irritation.

The depilatory composition is desirably formulated to achieve a low fat content and give hydrophilic properties to the composition so that it wets the skin and is easy to remove. Thus the cream or lotion base of the oil in water kind may be formed by incorporating into the composition 0.5-30% of a non-ionic emulsifying wax such as that sold by Henkel under the tradename Dehydag AO which contains 80% cetostearyl alcohol and 20% cetomacrogol. To reduce the harshness of the composition when applied to the skin there may be present other inert emollient waxes and oils such as pharmaceutical grade mineral oil (heavy liquid paraffin) in amounts of up to 20% w/w. The thixotropy of the composition is maintained at a minimum in order that it should stabilise at the correct viscosity for roller application and flow correctly through the reservoir and applicator head. A non-ionic thickener is therefore incorporated into the aqueous phase of the composition, and inert cellulosic thickeners that disperse in the aqueous phase such as hydroxyethyl cellulose may be used in amounts of 0.1-5% w/w. The latter material is film forming and protects the composition from yellowing due to atmospheric oxidation in the applicator head or on the surface of the applicator roller when the composition dries in air. The pH adjuster is preferably at least in part a solid material in order that it may perform the additional function of influencing the flow properties of the composition, and for this purpose the composition may contain up to 10% w/w of an alkaline earth oxide or hydroxide such as ground calcium

oxide together with up to 4% w/w of lithium hydroxide and a minor proportion of an alkali metal hydroxide such as sodium or potassium hydroxide to achieve the preferred pH of about 12.5.

The composition preferably also contains one or more sequestering agents that are effective for calcium ions at high pH values (i.e. pH 9 and above) and the sequestering agent may comprise a major proportion of sodium glucoheptonate and a minor proportion of N-hydroxyethyl ethylene diamine triacetic acid (HEEDTA) or a salt thereof such as the trisodium salt. The composition may also contain incidental ingredients such as perfumes, humectants, antioxidants, U-V absorbers and preservatives.

The invention is further described in the Example.

EXAMPLE

A hair removal composition for roller application to the skin was made by mixing together the following ingredients (% w/w):

Calcium thioglycollate trihydrate	7.5
Non-ionic emulsifying wax (Dehydrag AO)	6.0
Liquid paraffin (heavy)	7.0
Hydroxyethyl cellulose	0.6
Calcium hydroxide (fine ground)	2.0
Lithium hydroxide	1.5
Sodium hydroxide (as required, typically)	0.1
Sodium glucoheptonate	1.0
N-hydroxyethyl ethylene diamine triacetic acid trisodium salt solution	0.1
Perfume	0.3
Water	qsp 100

The above composition was charged into the reservoir of an applicator as further described below and was spread onto the skin to give uniform layers that engulfed the hairs and had an effective depilatory action, with minimised harshness to the skin and with minimised abrasive properties.

The invention will now be further described by way

of example only with reference to the accompanying drawings, in which:

Figures 1 and 2 are front and side elevations of the reservoir, applicator head and cover of an applicator according to the invention;

Figures 3, 4 and 5 are longitudinal and transverse sections of the applicator head and an underneath plan of the applicator head;

Figure 6 is a section of a removable plug that fits into the neck of the reservoir; and

Figure 7 is a section of part of the applicator head, the removable plug and the neck of the reservoir according to a second embodiment.

In the drawings an applicator comprises a reservoir 10 having a threaded neck 11 onto which is screwed an applicator head 12 having a cut-out defining a mouth 13 that is generally rectangular in plan. To either side of the mouth 13 are provided journal bearings 14 for stub axles of an applicator roller 15 having a pattern of axial splines or grooved indentations. Other patterns of indentations such as dots, circumferential grooves or oblique grooves could be used, but a smooth roller is not desirable because there is then insufficient material transported as the roller rotates. The clearance between the roller 15 and the head 12 is desirably in the range 0.1-0.5 mm preferably 0.25 mm. This range of clearances has been found to be effective to enable the roller 15 to spread depilatory material dispensed from reservoir 10 without the material tending to flow out spontaneously. When not in use the applicator roller 15 is protected by means of a transparent removable cover 19 that is a snap fit onto the applicator head 12.

The neck 11 has a proximal threaded region and at its distal end has a circumferential deformable flange 20 of generally triangular profile. Correspondingly the head 12 has a threaded bore 21 into which the neck 11 is engaged and that leads to a convergent frustoconical

region with a cone angle of about 15 degrees. The flange 20 seats on the region 22 as the head 12 is screwed home and provides an effective seal against outflow of the viscous depilatory composition in the reservoir 10. The combination of a deformable flange and a seat enables an effective seal to be maintained over a range of relative axial positions of the head 12 and reservoir 10 that accommodates manufacturing tolerances and means that it is not critical how tightly the head 12 is screwed home after removal. The top of the reservoir 10 is a flattened oval in plan and the head 12 has a skirt 23 conforming to the outline of the top of the reservoir. Depending lugs 25 on the sides of the skirt 23 snap engage in indentations in the upper sides of the reservoir 10 to locate the head 12 relative to the reservoir 10. The user can make an effective seal with the skirt 23 aligned with the top of the reservoir 10 and the provision of locking means defined by the lugs 25 and indentations defines the aligned position and helps to prevent the head 12 from being accidentally unscrewed from the reservoir 10 while the composition is being applied.

For storage the neck 11 is closed by a removable bung 30 having circumferential deformable ribs 31 and a handle 32 of reduced diameter that fits without mechanical interference in the convergent region 22 of the applicator head 12. The removable bung is preferred to other forms of closure so that the applicator shall have an adequate shelf life and the reservoir can be resealed as required. The removable bung or stopper 30 is an injection moulding in low density polyethylene, the cover 19 is a moulding in clear polystyrene and the reservoir 10, applicator head 12 and roller 15 are mouldings in an anti-static grade of an acrylonitrile-butadiene-styrene copolymer (ABS).

The applicator is sold with the reservoir 10 charged with the composition of the Example, with the stopper 30 in place and with the head 12 and cover 19 in place as in Figures 1 and 2. To use the applicator the customer is

instructed to unscrew the head 12, remove the plug 30 and then return the head 12. The volume of material in the reservoir 10 is more than is needed for a single treatment and the customer is instructed to remove and wash the head 12 and to replace the stopper 30 between treatments.

The arrangement of Figure 7 is generally similar except that the bung 30 has a guard flange 35 that sits on top of the neck 11 of the reservoir and has been extended and finished with an acute angle repeating the same acute angle as the flange 20 on the neck of the reservoir. The circumference of the flange 35 has been extended just so far as to come in contact with the cone 22 of the applicator head at the same time that the neck of the reservoir comes into contact with the cone. As the applicator head 12 is screwed downwards, as has already been described the point B is deflected as the cone 22 interfaces with it to form a seal, and the same thing now happens at point A on the flange 35 to form a second seal. Should any liquid therefore seep up past the vanes on the bung 30 and leak out between the plug flange 35 and the top of the reservoir neck 11, it will be trapped in the small gap between points A and B, past which it cannot continue. Furthermore the action of screwing on the cap causing a downward motion of the cone 22 not only deflects points A and B as stated above,but in itself creates downward pressure on point A of the plug 30, thereby forcing the flange 35 and the top of the reservoir tightly together in a similar way that an ordinary cap would trap a wad onto the top of an ordinary bottle.

CLAIMS:

1. An applicator for applying a depilatory composition to the skin comprising a reservoir (10), a flowable chemical depilatory composition in the reservoir, an applicator head (12) having a flow passage for the composition leading from the reservoir to a mouth (13), and a generally cylindrical applicator roller (15) having an indented surface and journalled for rotation in the mouth (13).

2. An applicator according to Claim 1, wherein the reservoir is removably connected to the applicator head by a threaded neck (11) whose distal extremity is provided with a deformable circumferential flange (20), and the applicator head has a bore (21) having a threaded portion that engages the neck and that leads to a convergent portion (22) onto which the flange (20) seats as the applicator head (12) is screwed into position.

3. An applicator according to Claim 2, wherein the convergent portion (22) of the bore in the applicator head is frustoconical with a cone angle of about 15^{o} and the clearance between the applicator roller (15) and the applicator head (12) is 0.1-0.5mm.

4. An applicator according to Claim 2 or 3, wherein a removable and re-sealable closure air-tightly seals the reservoir until the composition is to be dispensed, said closure being a removable plug (30) that seals the neck (11) of the reservoir (10) and is provided with a guard (35) that seats on the end of the neck (11) to limit insertion and that is formed with a deformable circumferential region that engages the convergent portion of the bore above the flange (A, B).

5. An applicator according to any preceding claim, wherein the upper end of the reservoir (10) is generally oval and the applicator head is surrounded by a skirt (23) conforming at its base to the upper end of the reservoir, the skirt having depending lugs (25) to either side thereof that snap engage indentations in the reservoir

(10) to maintain the applicator head (12) aligned with the reservoir.

6. A flowable depilatory composition for use in an applicator as claimed in any of claims 1-5, comprising up to 10% w/w of a sulphur-containing depilatory material, 0.5-30% w/w of an emulsifying wax to give an oils-in-water cream, 0.1-5% w/w of an inert cellulosic thickener that disperses in the aqueous phase and sufficient alkali to give a pH of 9.0-12.5.

7. A composition according to Claim 6, wherein:

the depilatory material is calcium thioglycollate;

the composition further comprises pharmaceutical grade mineral oil in an amount of up to 20% w/w;

the alkali comprises up to 4% w/w of lithium hydroxide, up to 10% w/w of ground calcium oxide and a minor proportion of sodium or potassium hydroxide;

the thickener is hydroxyethyl cellulose; and

the depilatory material further comprises 0.1-5% w/w of a salt of N-hydroxyethyl ethylene diamine triacetic acid or sodium glucoheptonate or a mixture thereof or of another calcium sequestering agent that is effective at a pH above 9.

8. A flowable depilatory composition for use in an applicator as claimed in any of claims 1-5, comprising a sulphur-containing depilatory material, glucoheptanoic acid or a salt thereof and/or N-hydroxyethyl ethylene diamine triacetic acid or a salt thereof.

9. An applicator as claimed in any of Claims 1-5, whose reservoir contains a composition as claimed in any of claims 6-8.

10. A method of removing body hair which comprises applying to the leg or to another area of the skin a chemical depilatory composition as claimed in any of claims 6-8, by means of an applicator as claimed in any of Claims 1-5, allowing the composition to react with the hair, removing the loosened hair and rinsing the skin area.

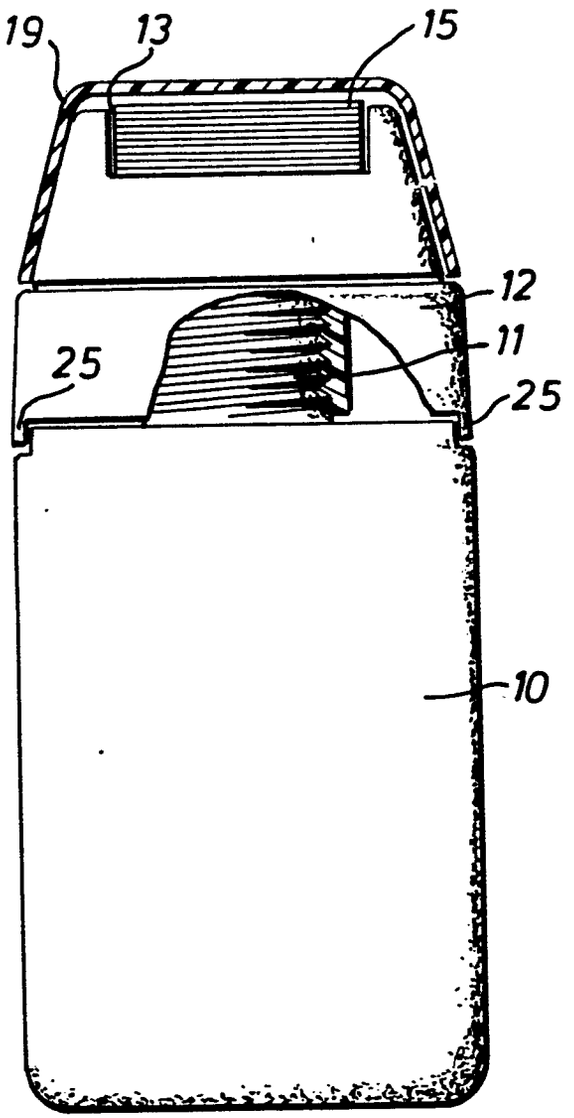

FIG.1

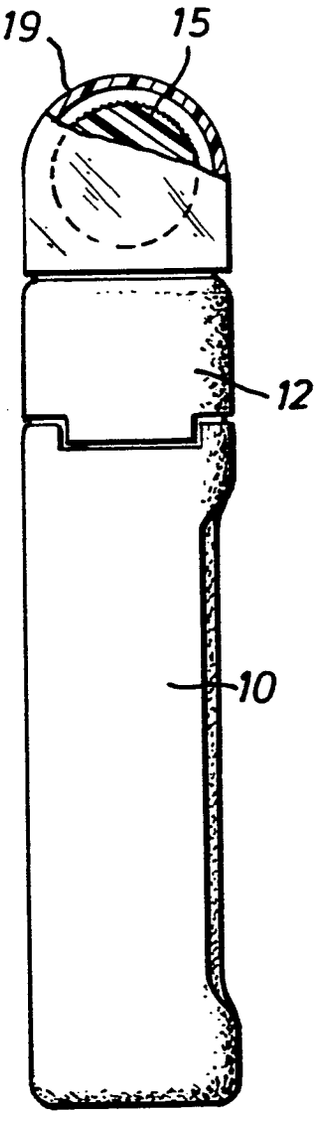

FIG.2

FIG.3

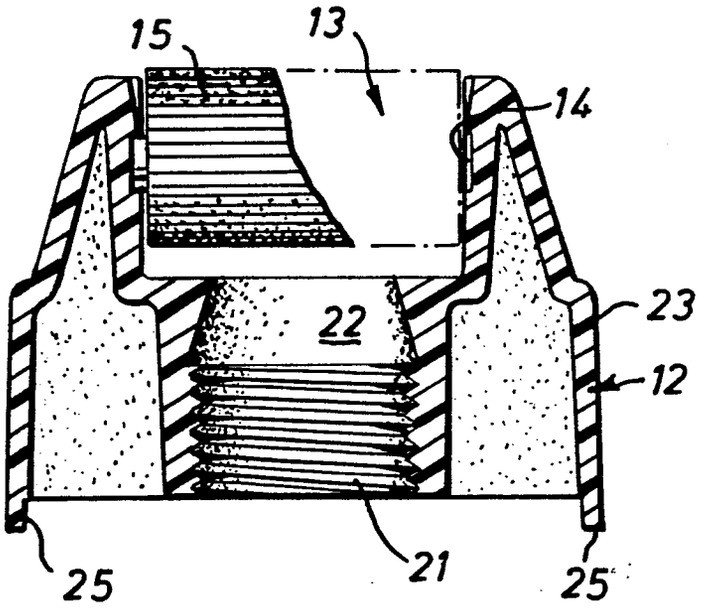

FIG.4

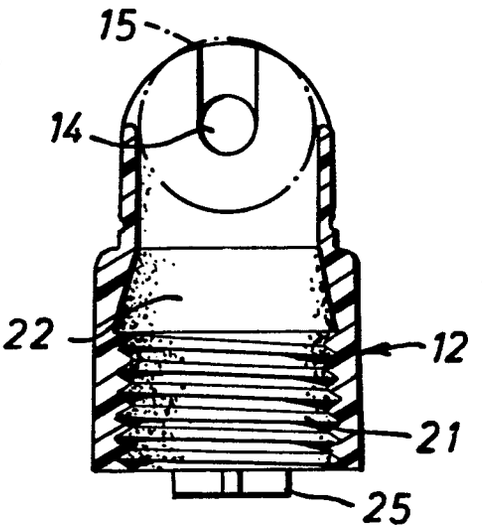

FIG.5

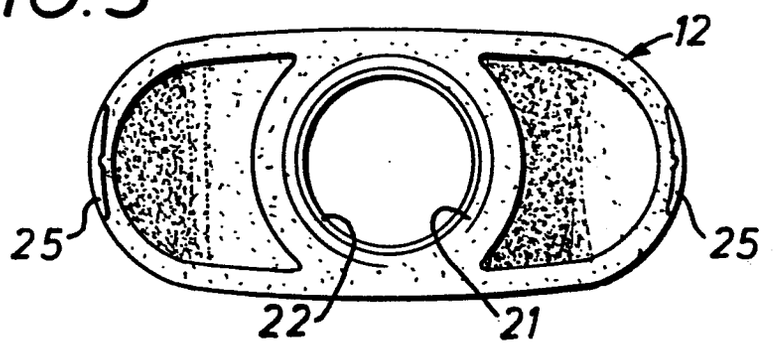

FIG.6

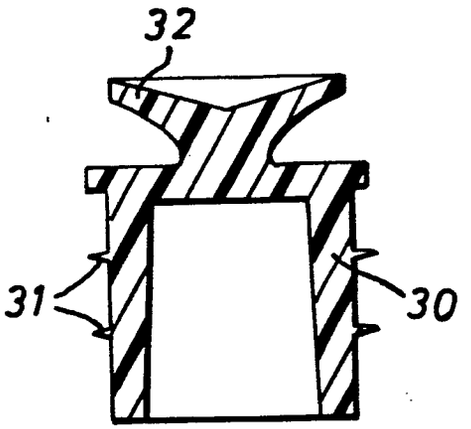

FIG.7