



(51) International Patent Classification:

A45D 40/26 (2006.01) A61K 8/02 (2006.01)
A46B 11/08 (2006.01) A61Q 1/10 (2006.01)

(21) International Application Number:

PCT/IB2009/053330

(22) International Filing Date:

30 July 2009 (30.07.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

0855332 1 August 2008 (01.08.2008) FR
61/096,398 12 September 2008 (12.09.2008) US

(71) Applicant (for all designated States except US): **L'OREAL** [FR/FR]; 14 rue Royale, F-75008 Paris (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ARDITTY, Stéphane** [FR/FR]; 4 résidence le Clos du Chateau, F-91160 Ballainvilliers (FR). **LAHOUSSE, Florence** [FR/FR]; 50 rue Victor Basch, F-94230 Thiais (FR). **JAGER LEZER, Nathalie** [FR/FR]; 19 allée des Petits-Champs, F-91370 Verrieres-le-Buisson (FR).

(74) Agent: **TANTY, François**; Nony & Partners, 3 rue de Penthièvre, F-75008 Paris (FR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHOD FOR TREATING HUMAN KERATINOUS FIBERS

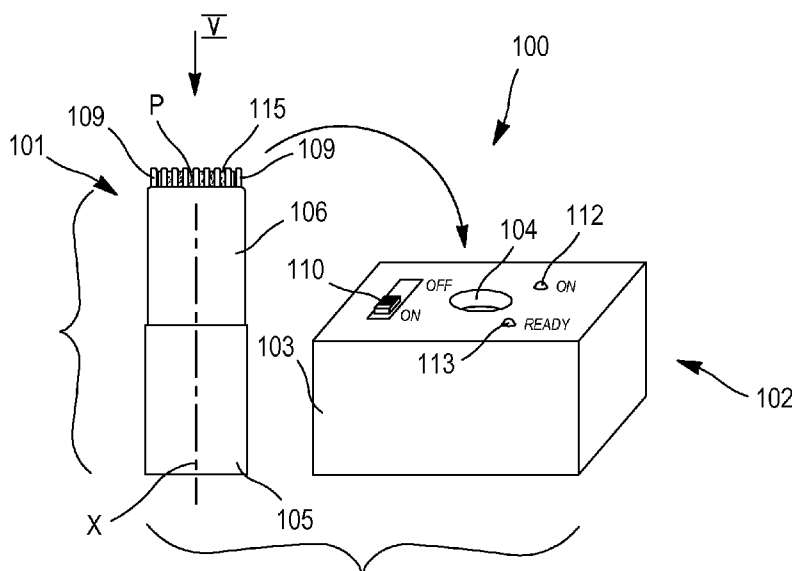


FIG. 4

(57) Abstract: The object of the invention is a method for cosmetic treatment of human keratinous fibers including the steps of: a) heating up in contact with or in the vicinity of a heating device, an outer surface of a piece of solid product, notably with hardness greater than or equal to 50g at 20°C so as to heat said piece in a localized way in order to only soften substantially said outer surface, and b) applying the thereby softened product on the fibers to be treated, notably the eyelashes.



Published:

— *without international search report and to be republished
upon receipt of that report (Rule 48.2(g))*

Method for treating human keratinous fibers

The present invention relates to a method for coating keratinous fibers with a make-up or care composition, notably mascara.

By « mascara », is designated a composition intended to be applied on
5 eyelashes. This may be a make-up composition for eyelashes, a make-up base for eyelashes (also called *base coat*), a composition to be applied on a mascara, a so-called *top-coat*, or else further a composition for cosmetic treatment of eyelashes. Mascara is more particularly intended for eyelashes of human beings, but also for false eyelashes.

The terms of « product » and « composition » are synonyms.

10 Generally, compositions for making up eyelashes or mascaras include at least one wax or a mixture of waxes dispersed in an aqueous liquid phase or an organic solvent. They generally have a pasty texture and are conditioned in a container comprising a reservoir provided with a wiper and an applicator, notably as a brush or a comb, and they are applied by picking up product in the reservoir with the applicator, passing the
15 applicator through the wiper in order to remove the excess product, and then having the applicator impregnated with the composition come into contact with the eyelashes.

For example, mascaras in a solid form so-called « cake mascaras » are known from US 2 007 245 or FR 2 833 163, which are compositions including a strong proportion of waxes, pigments and surfactants, disintegrable in water, i.e. they require, prior to their
20 application on the eyelashes, being put into contact with an aqueous phase so as to partly solubilize the mascara. The application is accomplished via a brush impregnated with water which is put into contact with the mascara and then the picked-up mixture is applied on the eyelashes with the brush.

US 5,856,653 describes a heating device for melting a mascara residue which
25 has dried and has become unusable.

US 5,775,344 describes a conditioning and application device for a pasty mascara provided with a heating device.

US 2008/0035165 A1 discloses a heating applicator using solid mascara.

US 2007/0286831 discloses a device in which solid mascara is deposited on a
30 heating applicator.

US 2005/0150509 A1, US 2007/0286665 A1, US 7,083,347 B2 describe heating applicators.

WO 2007/114551 discloses a heating device comprising a container filled with a liquid or creamy mascara composition likely to harden when drying.

FR 2 914 161 discloses a device comprising a stick of solid mascara. The device comprises an application head provided with a heating device to melt the stick and enable the melted material to flow through apertures of the application head.

There exists a need for improving the performances of a product in the form of a solid mass, both on the sensorial level and/or on the level of the make-up result, while retaining for the product mechanical properties compatible with the stick packaging or in another solid form and with the application by friction on the surface to be treated.

According to one of its aspects, the invention relates to a method for cosmetic treatment of human keratinous fibers, comprising:

a) heating with contact to or in the vicinity of a heating device, an outer surface of a piece of solid product, so as to heat said piece in a localized way in order to only substantially soften said outer surface, and

b) applying the thereby softened product on the fibers to be treated, for example eyelashes.

In exemplary embodiments, the outer surface that is softened by heat may be an apparent surface during the heating step.

There may be no movement of the softened product relative to the part remaining solid after heating until application.

The softening may either range or not up to local melting of the product.

The whole product is not melted, at least upon first use.

The outer surface, when the product is in the form of a stick, may be defined by the end of the latter; alternatively, the outer surface is defined by the side surface of the stick. The outer softened surface may be brought into contact with the region to be treated, then forming an application surface.

The invention, by means of localized heating on the outer surface, may allow application of a product in the form of a stick for example, while obtaining better results than those obtained without heating up the outer surface.

The rise in temperature of the product on the outer surface may make certain constituents of the product more easily compatible, for example leading to better hold and/or brightness.

The product may be a known product, the invention making it possible for example to obtain better flowability upon application, a greater deposit, a more intense color and/or more brightness.

The invention also provides new possibilities of formulation and/or packaging.

5 The invention may notably allow the use of a harder product, therefore more easier to package as a stick for example, without fearing insufficient transfer of the product upon application.

The piece of product may have a hardness greater than or equal to 45g, preferably greater than or equal to 50g, preferentially greater than or equal to 60g, 10 preferentially greater than or equal to 70g, still preferentially greater than or equal to 75g at 20°C.

The product may contain at least a cosmetic active substance, at least one organic or aqueous solvent, at least one coloring agent, notably a pigment generating color by an absorption and/or interferential phenomenon. The product may possibly include a 15 thermochrome coloring agent, allowing the user to view the heating-up of the outer surface.

The heating device used for softening the outer surface of the product is an artificial heat source, i.e. a heat source other than human or animal heat, the heat of the sun or the heat which may result from friction of the application surface on the keratinous 20 fibers upon application. The heat source may be other than the heat produced by combustion of a fuel in ambient air, for example the flame of a lighter or of a candle.

Providing heat to the outer surface for heating up the latter for example causes a local rise of at least 5°C of its temperature, better of at least 10°C, or even 20°C or 30°C.

The piece of product may retain a core remaining at a temperature less than or 25 equal to 30°C, during the application, for a room temperature of 20°C, at least when the piece of product includes the initial amount of product.

The product may be heated up by exposing it to infrared radiation, radiowave radiation, be heated up by blowing hot air, be heated up by being exposed to ultrasonic vibrations or be heated up by heat transfer upon contact with or in proximity to a hot 30 surface. The latter may be axially and/or radially pressed against the application surface, for example the end of the stick when the piece of product is in the form of a stick. The

heating device may heat up the product in a controlled way, by means of temperature control.

The hot surface may be flexible, if necessary.

5 The piece of product is solid at room temperature (20 °C), i.e. it retains the shape which was given to it when it was made and it does not flow under the effect of gravity.

The temperature T_f to which the outer surface of the product is heated, may be greater than or equal to 40 °C, better 50 °C, still better 60 °C, still better greater than or equal to 70 °C and still better greater than or equal to 80 °C.

10 The distal end of the piece of product may be heated to the temperature T_f . The outer surface may also be defined by a portion of the side surface of the piece of product.

The supply of energy for softening the outer surface of the product may occur for at least 60 s, better for less than 30 s, or even 10 s.

15 The application of the softened product may take place without the softened product flowing through apertures of the heating device.

The method may during the application of the product include the step of engaging the eyelashes between protruding members, for example teeth, for combing the eyelashes.

20 The protruding members may remain firmly attached to the piece of product during the application. The protruding members may be positioned so that the eyelashes contact both the outer softened surface and the protruding members.

The softened product may be brought into contact with the fibers while the softened product is borne by the piece of product. The softened product may be in contact only with the remaining piece of product, during the application of the softened product.

25 The softened product may also be brought into contact with the fibers after transferring the softened product onto a support used for the application. Such a support may be completely detached from the remaining solid piece of product during the application. The support may be used without any wiping between loading with softened product and application.

30 The heating device may further heat at least one surface of a material other than the product, being used for the application, and this surface being used for the application may include a row of protruding members.

The piece of product is originally packaged and offered to the user in a solid state.

The piece of product is in a solid state at the first use of the device, having a predetermined shape, for example a stick shape.

5 The invention further relates, according to another of its aspects, to a device for conditioning and applying a product intended to be applied on human keratinous fibers, this product being in the form of a solid piece, notably a stick, the product advantageously having a hardness greater than or equal to 45g at 20°C, better 50g at 20°C, the device including:

- 10
- a support of said solid piece of product, the latter having an outer surface;
 - means for assisting with application/finishing, notably in the form of teeth, hair, or reliefs for simultaneously or after the application of the product on the keratinous fibers, smoothing, combing and/or separating the latter,
 - a heating device which may be brought into contact with or to the vicinity of
- 15 said outer surface in order to heat said piece in a localized way, in order to only substantially soften said outer surface.

The means for assisting with application/finishing may include one or more rows of protruding members for combing the fibers.

20 The means assisting with application/finishing, notably the row of protruding members, may be heated by the heating device, for example to a temperature greater than or equal to 30 °C, or even 40 °C, or even 50 °C.

The means of assisting with application/finishing may be positioned or is capable of being positioned in the vicinity of the outer surface, notably around the whole or part of the latter.

25 The heating device may be integral with the piece of product during the use of the device in order to apply the product on the fibers.

The product may be packaged in a packaging device which may be sealably closed.

30 The piece of product may be initially molded into the desired shape, for example as a stick, without any frame, or on a frame and/or a gripping portion, being for example supported by a rod.

When a hot surface is used for heating up the product, the hot surface may be capable of being crossed by the piece of product, notably the stick, for example having an annular shape.

5 The hot surface may further come into contact with or face the application surface of the piece of product, notably the end face of the stick of product or at least a portion of its side surface.

The hot surface may be flexible and deformed by the piece of product when they are put into contact with each other.

10 The product may be heated up while the piece of product, notably the stick, is entirely contained in a packaging device.

The product may also be heated up while the piece of product, notably the stick, is at least partly exposed to ambient air.

15 The stick preferably has a smallest dimension in cross-section that is greater than 4 mm, better greater than or equal to 5 mm, for example lying in the range 4 to 14 mm or more. The cross-section may exceed 12 mm². The stick may have a diameter greater than 4 mm or more. The stick may have a kidney shape in cross-section. The stick may have a thickness that is greater than or equal to 4 mm. The stick may be loaded in the heating device from a same end as the end from which the softened product is delivered.

20 The product may be locally heated up to a temperature greater than or equal to 40 °C, or even greater than 45 °C or further greater than 50 °C. The temperature of the application surface, notably of the end of the stick, should not cause any risk of burns at the moment when it is applied. This is why a waiting period between the moment when the end is heated and the application of the keratinous materials may possibly be required.

25 The temperature T_f to which the product is initially heated up locally at the surface of application may be comprised between 40 °C and 95 °C, better from 45 °C to 85 °C, still better from 45 °C to 75 °C.

30 The temperature difference between the heated-up application surface, notably the end of the stick or its side surface, and the non-heated portion, for example the core of the stick, may be greater than or equal to 15 °C, or even greater than or equal to 20 °C, at least at the beginning of the application, or even greater than 30 °C. The end of the piece of product may be put into contact with a hot source, so that the temperature of this end at the surface over at least 0.5 mm for example, rises to T_f or more. The temperature T_f at which

the outer surface of the product is heated, may be greater than or equal to 40 °C, in particular greater than or equal to 45 °C. The temperature T_f may for example be measured at the surface by means of an infrared pyrometer.

During the application of the product, the keratinous fibers may be held against the soften product by a counter-surface, which may be at room temperature or be heated.

Heating of the counter-surface of the piece of product may be obtained by means of this counter-surface, if necessary. The counter-surface may for example be heated by an electric resistor.

The heating device may include a means for holding the counter-surface in a predefined position relatively to the piece of product.

During the application of the product, movement of the keratinous fibers relatively to the softened product may be obtained by manually displacing the product and/or by means of a motorized mechanism for driving the piece of product, for example by having it rotate on itself.

The movement of rotation may be carried out towards the tip of the eyelashes. If necessary, the movement of the product first allows a certain portion of the surface of the product to be exposed to a heat source and the thereby heated-up portion may then be moved away from the heat source in order to bring it into contact with the fibers, on which the product may then be deposited.

The product according to the invention may be a cosmetic composition with reversible solid/liquid state transition. The solid/liquid transition state may be due to melting of a crystalline fraction, for example one or more waxes.

As an illustration for suitable waxes for the invention, hydrocarbon waxes may be cited such as beeswax, lanolin wax, and China insect waxes, rice bran wax, carnauba wax, candelilla wax, ouricury wax, alfa wax, berry wax, shellac wax, Japan wax and sumac wax; montan wax, orange and lemon waxes, microcrystalline waxes, paraffins and ozokerite; polyethylene waxes, waxes obtained by Fisher-Tropsch synthesis and waxy copolymers as well as their esters.

By heating the product, the mechanical cohesion of the piece of the product may be reinforced by using a greater proportion of waxes, and/or using more structuring waxes, without the presence of waxes being detrimental to the application.

The piece of product, notably the stick, may during application of the product on the keratinous fibers be firmly attached to a sheath including a mechanism allowing gradual displacement of the piece of product, notably a mechanism including two rotary parts relatively to each other. The displacement of the product may be unidirectional or
5 bidirectional, depending on how the sheath is made.

The object of the invention is further, according to one of its aspects, a conditioning and application device of a solid piece of product intended for application on keratinous fibers, notably a stick product, comprising:

- a support of said solid piece of product, which may include protruding
10 elements for combing the keratinous fibers,
- a heating device firmly attached or which may be firmly attached to the conditioning and application device, in contact with, or which may be brought into contact with or in the vicinity of an outer surface of the piece of product, so as to heat said piece in localized way in order to only substantially soften said outer surface, for example over a
15 depth which may attain 0.5 mm to 5 mm, better 0.5 mm to 2 mm.

The object of the invention according to another of its aspects is further a conditioning and application device of a product intended for application on keratinous fibers and in the form of a solid piece of product, comprising:

- a support bearing the piece of product, notably a stick of product, so as to
20 allow application of the product by engaging the piece of product, notably the stick, with keratinous fibers,
- a device for heating an application surface of the piece of product, notably the end of the stick or of its side surface, firmly attached to the support or to its outer surface at least during heating of the application surface, allowing the application surface
25 to be heated to a temperature above that of a portion of the piece of product remaining solid during the application, the heating device being located outside the piece of product.

In other words, notably in the case of a heat transfer by conduction, convection or by infrared radiation, heat is not transmitted to the application surface from the core of the piece of product, but from the outside.

- 30 The heating device may be housed in a closure cap of the support, so that the application surface, notably the end of the stick, may be heated, with the cap in place on the support.

Alternatively, the heating device is housed in a casing on which the support may be engaged, so that heating may occur when the support is engaged into the casing. The casing may include an aperture into which the piece of product may be engaged, preferably without the whole of the support being positioned inside the casing. Still
5 alternatively, the heating device may be firmly attached to the support.

The device according to the invention may include a control means allowing the the user to control the operation of the heating device. This control means may include a switch present on the support or on a closure cap of the support.

Generally, the device may include an electric resistor for heating a surface
10 which may come into contact with the application surface or in proximity to the latter.

The device may include an infrared emitter laid out in order to subject the application surface, notably the end of the stick, to infrared light in order to heat up the latter.

The heating device may further include a means for emitting radiowave
15 radiation, for example microwaves, with which the temperature of the application surface may be raised, notably that of the end of the stick.

The heating device may include a fan for blowing hot air on the application surface, notably the end of the stick.

The heating device may include a source of ultrasound for heating the end of
20 the stick.

The heating device may include at least two components capable of producing an exothermic reaction when they are mixed. The thereby produced heat may be transferred to the outer surface being used for the application, notably to the end of the stick.

25 The product may be applied under dry conditions, i.e. the product is able to form a preferably adherent and covering deposit, on the keratinous fibers without requiring prior contact with an aqueous phase, as opposed to the caked mascaras which are disintegrable in water and should be partly solubilized beforehand in order to be applied on the fibers and form an adherent and covering deposit.

30 The piece of product may be obtained by pouring it in the liquid state into a mold and removing it in the solid state from the mold or by extrusion.

Measurement of hardness

The surface of the stick is cut with a scalpel so as to be completely planar. The texture analyzer TA/XT2 (from Stable Micro Systems Ltd), linked to the Texture Expert Exceed V2.12 software package [from Stable Micro Systems Ltd] measures the compressive force. Two measurements at different locations are conducted on each of the three samples, and the average of the measurements is then retained.

The characteristics of the measurement are the following:

- mobile: stainless steel cylinder with a diameter of 4 mm
- preliminary speed: 1 mm.s^{-1}
- detection threshold: 0.005 N
- measuring speed: 0.1 mm.s^{-1}
- penetration depth: 2 mm
- relaxation: 1 second
- withdrawal of the mobile at a speed of 1 mm.s^{-1}

The hardness expressed in g corresponds to the force just before withdrawing the mobile. This hardness expressed in g is converted into Newtons, by multiplying by $10^{-3} \times 9.8 \text{ N.kg}^{-1}$, and then normalized by the surface of the cylindrical mobile ($3.14 \times R^2$) wherein R is the radius of the cylindrical mobile, so as to be expressed in N.m^{-2} .

For a measurement at room temperature, the apparatus is in an air-conditioned room at the room temperature of 20°C . For a hot measurement, the surface of the product is heated to the same temperature as for applying the method according to the invention and the mobile is heated to 30°C .

The composition may comprise a continuous oily phase or a continuous aqueous phase.

The composition used in the method according to the invention advantageously comprises a liquid fatty phase and at least one structuring agent of said liquid fatty phase, via which the hardness of the composition is adjusted.

Liquid fatty phase

By liquid fatty phase, in the sense of the invention, is meant a liquid fatty phase at room temperature (25°C) and under atmospheric pressure (760 mm Hg), consisting of

one or more liquid non-aqueous fats at room temperature also called oils, compatible with each other.

The oil may be selected from volatile oil and/or non-volatile oils and mixtures thereof.

5 The oil(s) may be present in the composition according to the invention in a content ranging from 5 to 85 % by weight based on the total weight of the composition, preferably from 10 to 70 % and still more preferably from 15 to 60 % by weight.

By « volatile oil », is meant in the sense of the invention, an oil capable of evaporating upon contact with the skin or the keratinous fiber in less than one hour, at
10 room temperature and under atmospheric pressure. The volatile organic solvent(s) and the volatile oils of the invention are organic solvents and volatile cosmetic oils, liquid at room temperature, with non-zero vapor pressure, at room temperature and under atmospheric pressure, in particular ranging from 0.13 Pa to 40,000 Pa (10^{-3} to 300 mm Hg), in particular ranging from 1.3 Pa to 13,000 Pa (0.01 to 100 mm Hg), and more particularly ranging from
15 1.3 Pa to 1,300 Pa (0.01 to 10 mm Hg).

By « non-volatile oil », is meant an oil remaining on the skin or on the keratinous fiber at room temperature and under atmospheric pressure for at least several hours and notably having a vapor pressure of less than 10^{-3} mm Hg (0.13 Pa).

20 These oils may be hydrocarbon oils, silicone oils, fluorinated oils, or mixtures thereof.

By « hydrocarbon oil », is meant an oil mainly containing hydrogen and carbon atoms and possibly oxygen, nitrogen, sulfur, phosphorus atoms. Volatile hydrocarbon oils may be selected from hydrocarbon oils having 8-16 carbon atoms, and notably from branched C_8 - C_{16} alkanes such as C_8 - C_{16} isoalkanes originating from petroleum (also called
25 isoparaffins) such as isododecane (further called 2,2,4,4,6-pentamethylheptane), isodecane, isohexadecane, and for example the oils sold under the trade names of Isopars or Permetyls, branched C_8 - C_{16} esters, iso-hexyl neopentanoate, and mixtures thereof. Other volatile hydrocarbon oils such as petroleum distillates, notably those sold under the name of Shell Solt by SHELL, may also be used.

30 The volatile solvent contained in the product may comprise, preferably mainly, a solvent of the linear volatile alkane(s) type. By “mainly” is to be understood that the solvent comprises at least 80% in weight, better at least 90% in weight, still better at least

95%, even better 98% in weight of linear volatile alkane(s) with respect to the total weight of hydrocarbons materials in the solvent.

In one exemplary embodiment, a volatile linear alkane suitable for the invention or a solvent of the linear volatile alkane(s) type may have a volatility such that the amount of solvent evaporated in 30 minutes at atmospheric pressure is less than 24 mg/cm², and more particularly is included in the range from 2.4 to 18 mg/cm², more particularly from 3 to 12 mg/cm², and more particularly from 3.3 to 6 mg/cm².

A volatility of less than 0.8 mg/cm²/min at 25 °C makes it possible, advantageously, to endow a composition of the invention with enhanced staying power.

The volatility of a volatile linear alkane in accordance with the invention or of a solvent of the linear volatile alkane(s) type may be evaluated especially by means of the protocol described in WO 06/013413, and more particularly by means of the protocol described below.

A crystallizing basin (diameter: 7 cm) placed on a balance which is located within a chamber of approximately 0.3 m³ whose temperature (25°C) and hygrometry (50% relative humidity) are regulated is charged with 15 g of volatile linear alkane or of a solvent of the linear volatile alkane(s) type.

The liquid is left to evaporate freely, without being stirred, with ventilation by a fan (PAPST-MOTOREN, article 8550 N, rotating at 2700 revolutions/minute) placed vertically above the crystallizing basin containing the volatile linear alkane, the blades being directed towards the crystallizing basin, at a distance of 20 cm relative to the base of the crystallizing basin.

Measurements are made at regular intervals of time of the mass of volatile linear alkane or volatile solvent of the linear alkane(s) type remaining in the crystallizing basin.

The evaporation rates are expressed in mg of volatile linear alkane and/or volatile solvent of the linear alkane(s) type evaporated per unit surface area (cm²) and per unit time (minute).

In exemplary embodiments, a volatile linear alkane and/or a volatile solvent of the linear alkane(s) type in accordance with the invention may have a flash point lying in the range 70 to 120°C, for example 80 to 100°C, for example about 89°C.

More particularly a volatile solvent of the linear alkane(s) type may be selected from volatile linear alkanes comprising from 9 to 15 carbon atoms, and in particular from 10 to 15 carbon atoms, and more particularly from 11 to 13 carbon atoms.

A volatile linear alkane may be of plant origin.

5 An alkane of this kind may be obtained, directly or in two or more steps, from a plant raw material such as an oil, a butter, a wax, etc.

Examples of alkanes suitable for the invention include the alkanes described in the Cognis patent application WO 2007/ 068371.

10 These alkanes are obtained from fatty alcohols, which in turn are obtained from copra oil or palm oil.

More particularly a composition of the invention may comprise a volatile solvent of the linear alkane(s) type comprising at least one linear alkane selected from n-nonane (C9), n-dodecane (C10), n-undecane (C11), n-dodecane (C12), n-tridecane (C13), n-tetradecane (C14), n-pentadecane (C15), and mixtures thereof.

15 More particularly a volatile linear alkane suitable for the invention may be employed in the form of an n-undecane/n-tridecane mixture.

Preferably in a mixture of this kind the n-undecane:n-tridecane weight ratio may be 50:50 to 90:10, preferably from 60:40 to 80:20, preferably from 65:35 to 75:25.

20 More particularly a composition according to the invention may comprise a volatile n-undecane:n-tridecane mixture in a weight ratio of 76:24 such as prepared in Example 1 of WO 2008/155059.

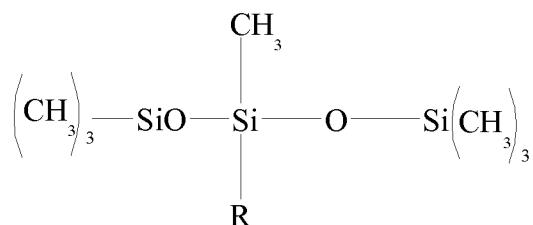
In exemplary embodiments, a composition in accordance with the present invention may comprise a volatile solvent of the linear alkane(s) type comprising a mixture of linear volatile alkanes comprising n-undecane(C11) and n-tridecane(C13), in particular
25 available from the company Cognis.

In exemplary embodiments, the product in accordance with the present invention comprises at least one volatile solvent, preferably selected among volatile hydrocarbon oils having 8 to 16 carbon atoms, still preferably among C₈-C₁₆ branched alkanes, linear alkanes comprising 9 to 15 carbons, such as described above, and mixtures
30 thereof.

As volatile oils, it is also possible to use volatile silicones, such as for example volatile linear or cyclic silicone oils, notably those having a viscosity ≤ 8 centistokes

($8 \cdot 10^{-6} \text{ m}^2/\text{s}$), and notably having 2-7 silicon atoms, these silicones possibly including alkyl or alkoxy groups having 1-10 carbon atoms. As a volatile silicon oil which may be used in the invention, mention may notably be made of octamethylcyclotetrasiloxane, decamethyl cyclopentasiloxane, dodecamethyl cyclohexasiloxane, heptamethyl hexyltrisiloxane, 5 heptamethyloctyl trisiloxane, hexamethyl disiloxane, octamethyl trisiloxane, decamethyl tetrasiloxane, dodecamethyl pentasiloxane and mixtures thereof.

It is also possible to mention the volatile linear alkyltrisiloxane oils of general formula (I):



10 wherein R represents an alkyl group comprising from 2 to 4 carbon atoms and one or more hydrogen atoms of which may be substituted with a fluorine or chlorine atom.

Among the oils of general formula (I), mention may be made of:

3-butyl 1,1,1,3,5,5,5-heptamethyl trisiloxane,

3-propyl 1,1,1,3,5,5,5-heptamethyl trisiloxane, and

15 3-ethyl 1,1,1,3,5,5,5-heptamethyl trisiloxane,

corresponding to the oils of formula (I) for which R is a butyl, propyl or ethyl group, respectively.

Fluorinated volatile solvents may also be used such as nonafluoromethoxybutane or perfluoromethylcyclopentane.

20 According to a particular embodiment, the composition comprises a volatile oil or a mixture of volatile oils, or a volatile liquid fatty phase, having in the composition an evaporation profile such that the mass of evaporated volatile oil(s) after thirty minutes ranges from 1.7 to $370 \text{ mg}/\text{cm}^2$, notably from 2 to $70 \text{ mg}/\text{cm}^2$, and in particular from 2 to $30 \text{ mg}/\text{cm}^2$.

25 The evaporation profile is measured according to the following procedure:

15 g of oil or of the mixture of oils to be tested are introduced into a crystallizer (diameter: 7 cm) placed on scales located in a temperature-controlled (25°C) enclosure of about 0.3 m^3 and with control of hygrometry (relative humidity 50%). The

liquid is left to freely evaporate, without stirring, by providing ventilation with a fan (PAPST -MOTOREN, reference 8550 N, rotating at 2,700 rpm) positioned vertically above the crystallizer containing the solvent, the blades being directed towards the crystallizer and at a distance of 20 cm from the bottom of the crystallizer. The mass of oil(s) remaining in the crystallizer is measured at regular intervals and in particular every thirty minutes. The evaporation rates are expressed in milligrams of evaporated oil per unit surface (cm^2) and per unit time (minute).

Still preferably, the composition comprises at least one volatile oil selected from volatile hydrocarbon oils having 8-16 carbon atoms, the volatile silicone oils having from 2 to 7 silicon atoms and mixtures thereof.

The composition may also comprise at least one non-volatile oil and notably selected from hydrocarbon and/or silicone and/or fluorinated non-volatile oils.

As a non-volatile hydrocarbon oil, mention may notably be made of:

- hydrocarbon oils of plant origin such as fatty acid and glycerol triesters, the fatty acids of which may have various chain lengths from C_4 to C_{24} , the latter may be linear or branched, saturated or unsaturated; these oils are notably wheat germ, sunflower, grape pip, sesame, maize, apricot, castor, shea, avocado, olive, soya, oils, sweet almond, palm, rapeseed, cotton, hazelnut, macadamia, jojoba, alfalfa, poppy, Hokkaido squash, sesame, pumpkin, rapeseed, black currant, evening primrose, millet, barley, quinoa, rye, safflower, candleberry tree, passion fruit, rosehip oil; or further triglycerides of caprylic/capric acids such as those sold by Stéarineries Dubois or those sold under the names of Miglyol 810, 812 and 818 by Dynamit Nobel,

- synthetic ethers having 10-40 carbon atoms;
- linear or branched hydrocarbons of mineral or synthetic origin such as Vaseline®, polydecenes, hydrogenated polyisobutene such as Parleam®, squalane, and mixtures thereof;

- synthetic esters such as the oils of formula R_1COOR_2 wherein R_1 represents the remainder of a linear or branched fatty acid including 1-40 carbon atoms and R_2 represents a notably branched hydrocarbon chain containing from 1 to 40 carbon atoms provided that $\text{R}_1 + \text{R}_2$ is ≥ 10 , such as for example Purcellin oil (ketostearyl octanoate), isopropyl myristate, isopropyl palmitate, C_{12} - C_{15} alcohol benzoate, hexyl laurate, diisopropyl adipate, isononyl isononanoate, 2-ethyl-hexyl palmitate, isostearate isostearate,

octanoates, decanoates or ricinoleates of alcohols or polyalcohols such as propylene glycol dioctanoate; hydroxylated esters such as isostearyl lactate, di-isostearyl malate; and pentaerythritol esters;

- fatty alcohols liquid at room temperature with a branched and/or unsaturated carbon chain having from 12 to 26 carbon atoms such as octyl dodecanol, isostearyl alcohol, oleic alcohol, 2-hexyldecanol, 2-butyloctanol, 2-undecylpentadecanol;
- higher fatty acids such as oleic acid, linoleic acid, linolenic acid;
- carbonates,
- acetals,
- citrates,
- and mixtures thereof.

The non-volatile silicone oils which may be used in the composition according to the invention may be non-volatile polydimethylsiloxanes (PDMS), the polydimethylsiloxanes including alkyl or alkoxy groups, pendant and/or at the ends of a silicon chain, groups each having from 2 to 24 carbon atoms, phenylated silicones such as phenyl trimethicones, phenyl dimethicones, phenyl trimethylsiloxy diphenylsiloxanes, diphenyl dimethicones, diphenyl methyl diphenyl trisiloxanes, 2-phenylethyl trimethylsiloxy silicates.

Fluorinated oils which may be used in the invention are notably fluorosilicone oils, fluorinated polyethers, fluorinated silicones as described in document EP-A-847752.

According to an embodiment, the fatty phase may comprise an ester oil, this ester oil may be selected from esters of monocarboxylic acids with monoalcohols and polyalcohols.

Advantageously, said ester fits the following formula (I):



wherein R_1 represents a linear or branched alkyl radical with 1 to 40 carbon atoms, preferably with 7 to 19 carbon atoms, optionally comprising one or more ethylenic double bonds, and optionally substituted.

R_2 represents a linear or branched alkyl radical with 1 to 40 carbon atoms, preferably with 3 to 30 carbon atoms and better with 3 to 20 carbon atoms, optionally comprising one or more ethylenic double bonds, and optionally substituted.

By « optionally substituted », is meant that R_1 and/or R_2 may bear one or more substituents, for example selected from groups comprising one or more heteroatoms selected from O, N and S, such as amino, amine, alkoxy, hydroxyl groups.

Preferably the total number of carbon atoms of $R_1 + R_2$ is ≥ 9 .

5 R_1 may represent the remainder of a fatty acid, preferably a higher, linear or preferably branched remainder, comprising 1 to 40 and better 7 to 19 carbon atoms and R_2 may represent a linear or preferably branched hydrocarbon chain containing 1 to 40, preferably 3 to 30 and better 3 to 20 carbon atoms. Again preferably the number of carbon atoms of $R_1 + R_2$ is ≥ 9 .

10 Examples of R_1 groups are those derived from fatty acids selected from the group formed by acetic, propionic, butyric, caproic, caprylic, pelargonic, capric, undecanoic, lauric, myristic, palmitic, stearic, isostearic, arachidic, behenic, oleic, linolenic, linoleic, eleostearic, arachidonic, erucic acids, and mixtures thereof.

Examples of esters are, for example, purcellin oil (ketostearyl octanoate),
15 isononyl isononanoate, isopropyl myristate, ethyl-2-hexyl palmitate, octyl 2-dodecyl stearate, octyl 2-dodecyl erucate, isostearyl isostearate, and heptanoates, octanoates, decanoates or ricinoleates of alcohols or polyalcohols, for example of fatty alcohols.

Advantageously, the esters are selected from compounds of formula (I) above, wherein R_1 represents a non-substituted branched or linear alkyl group, optionally
20 comprising one or more ethylenic double bonds, from 1 to 40 carbon atoms, preferably from 7 to 19 carbon atoms, and R_2 represents a non-substituted linear or branched alkyl group optionally comprising one or more ethylenic double bonds, from 1 to 40 carbon atoms, preferably from 3 to 30 carbon atoms, and better from 3 to 20 carbon atoms.

Preferably R_1 is a non-substituted branched alkyl group with 4 to 14 carbon
25 atoms, preferably 8 to 10 carbon atoms and R_2 is a non-substituted branched alkyl group with 5 to 15 carbon atoms, preferably from 9 to 11 carbon atoms. Preferably in formula (I), R_1 -CO- and R_2 have the same number of carbon atoms and derive from the same radical, preferably a non-substituted branched alkyl group, for example isononyl group, i.e. advantageously, the ester oil molecule is symmetrical.

30 The ester oil will be selected preferably from the following compounds:

- isononyl isononanoate,
- ketostearyl octanoate,

- isopropyl myristate,
- ethyl-2-hexyl palmitate,
- octyl 2-dodecyl stearate,
- octyl 2-dodecyl erucate,
- 5 - isostearyl isostearate,
- and mixtures thereof.

When the composition comprises a continuous oily phase, the liquid fatty phase may account for 5 to 85% by weight based on the total weight of the composition, preferably 10 to 70% and still more preferably 15 to 60 % by weight.

- 10 When the composition comprises a continuous aqueous phase, the liquid fatty phase may account for 0.1 to 15 % by weight, based on the total weight of the composition, preferably 0.1 to 10 % by weight.

Wax(es)

- 15 The composition according to the invention may comprise at least one wax.

The relevant wax within the scope of the present invention is generally a lipophilic, solid, deformable or non-deformable compound at room temperature (25 °C), with a reversible solid/liquid state transition, with a melting point above or equal to 30 °C which may range up to 200 °C and notably up to 120 °C.

- 20 By bringing the wax to the liquid state (by melting), it is possible to make it miscible to oils and to form a microscopically homogenous mixture, but upon bringing the temperature of the mixture back to room temperature, recrystallization of the wax is obtained in the oils of the mixture.

- 25 In particular, the suitable waxes for the invention may have a melting point greater than or equal to 45°C, and in particular greater than or equal to 55 °C.

- 30 In the sense of the invention, the melting temperature corresponds to the temperature of the most endothermic peak observed in thermal analysis (DSC) as described in the standard ISO 11357-3; 1999. The melting point of the wax may be measured by means of a differential scanning calorimeter (DSC), for example the calorimeter sold under the name of « MDSC 2920 » by TA Instruments.

The measuring procedure is the following:

A sample of 5 mg of wax positioned in a crucible is submitted to a first rise in temperature from -20 °C to 100 °C, at a heating rate of 10 °C/minute, and is then cooled down from 100 °C to -20 °C at a cooling rate of 10 °C/minute and finally submitted to a second rise in temperature from -20 °C to 100 °C at a heating rate of 5 °C/minute. During the second rise in temperature, the variation of the difference in power absorbed by the empty crucible and by the crucible containing the wax sample is measured versus temperature. The melting point of the compound is the value of the temperature corresponding to the apex of the peak of the curve representing the variation of the absorbed power difference versus temperature.

Waxes capable of being used in the compositions according to the invention are selected from waxes, solid at room temperature, of animal, plant, mineral or synthetic origin and mixtures thereof.

The waxes which may be used in the compositions according to the invention generally have a hardness ranging from 0.5 MPa to 15 MPa, notably above 1 MPa.

Hardness is determined by measuring the compressive force at 20 °C with a texturometer sold under the name of TA-XT2 by Stable Micro Systems Ltd, equipped with a stainless steel cylinder with a diameter of 2 mm moving at the measuring speed of 0.1 mm/s, and penetrating the wax to a penetration depth of 0.3 mm.

The measurement procedure is the following:

The wax is melted at a temperature equal to the melting point of the wax + 10 °C. The molten wax is cast into a container of a diameter of 25 mm and a depth of 20 mm. The wax is recrystallized at room temperature (25 °C) for 24 hours so that the surface of the wax is planar and smooth, and the wax is then kept for at least 1 hour at 20 °C before conducting the measurement of hardness and tackiness.

The mobile of the texturometer is moved at the speed of 0.1 mm/s, and then it penetrates the wax to a penetration depth of 0.3 mm. When the mobile has penetrated the wax to a depth of 0.3 mm, the mobile is held fixed for 1 second (corresponding to the relaxation time) and then withdrawn at the speed of 0.5 mm/s.

The value of the hardness is the maximum compressive force divided by the surface of the cylinder of the texturometer in contact with the wax.

Use may notably be made of hydrocarbon waxes such as beeswax, lanolin wax, and China insect waxes; rice bran wax, carnauba wax, candelilla wax, ouricury wax, alfa

wax, cork fiber wax, sugarcane wax, Japan wax, berry wax, shellac wax, and sumac wax; montan wax, microcrystalline waxes, paraffins and ozokerite; polymethylene, polyethylene, propylene waxes and waxes of their ethylene/propylene copolymers, waxes obtained by Fisher-Tropsch synthesis and waxy copolymers as well as their esters, waxes
5 from the reaction of fatty acids on carbohydrates, such as disaccharides of the sucrose type, such as sucrose polybehenate, marketed by Croda under the name of Cromaderm B.

Mention may also be made of waxes from fatty alcohols selected from saturated or non-saturated fatty alcohols, either branched or not, including 20 to 60 carbon atoms or mixtures comprising at least 30 % of said fatty alcohols, for example with
10 polyethylene, such as for example the wax marketed under reference PERFORMACOL® 550 L by NEW PHASE TECHNOLOGIES.

Mention may also be made of waxes obtained by catalytic hydrogenation of animal or plant oils having linear or branched C₈-C₃₂ fatty chains.

Among the latter, mention may notably be made of hydrogenated jojoba oil,
15 hydrogenated sunflower oil, hydrogenated castor oil, hydrogenated coconut oil and hydrogenated lanolin oil, di-(trimethylol-1,1,1-propane) tetrastearate sold under the name of "HEST 2T-4S" by HETERENE, di-(trimethylol-1,1,1 propane) tetrabeheenate sold under the name of HEST 2T-4B by HETERENE.

Silicone waxes may further be mentioned such as alkyl ou alkoxy-dimethicone
20 waxes having 16 to 45 carbon atoms, fluorinated waxes.

Use may also be made of the wax obtained by hydrogenation of esterified olive oil with stearyl alcohol sold under the name of "PHYTOWAX Olive
18 L 57" or else further the waxes obtained by hydrogenation of esterified castor oil with cetyl alcohol sold under the name of "PHYTOWAX castor 16L64 and 22L73", by
25 SOPHIM. Such waxes are described in the application FR-A- 2792190.

According to a particular embodiment, the compositions according to the invention may comprise at least one wax, a so-called tacky wax i.e. having tackiness greater than or equal to 0.7 N.s and a hardness less than or equal to 3.5 MPa.

30 By using a tacky wax, it is notably possible to obtain a cosmetic composition which is easily applied on eyelashes, having good adherence to the eyelashes and which leads to the formation of a smooth, homogenous and thickening make-up.

The tacky wax may notably have tackiness ranging from 0.7 N.s to 30 N.s, in particular greater than or equal to 1 N.s, notably ranging from 1 N.s to 20 N.s, in particular greater than or equal to 2 N.s, notably ranging from 2 N.s to 10 N.s, and in particular ranging from 2 N.s to 5 N.s.

5 The tackiness of the wax is determined by measuring the change in the force (compressive force or tensile force) over time, at 20 °C with the texturometer sold under the name of "TA-TX2i®" by RHEO, equipped with a cone-shaped mobile in acrylic polymer forming an angle of 45°.

The measurement procedure is the following:

10 The wax is melted at a temperature equal to the melting point of the wax + 10 °C. The melted wax is cast into a container with a diameter of 25 mm and a depth of 20 mm. The wax is recrystallized at room temperature (25 °C) for 24 hours so that the surface of the wax is planar and smooth, and the wax is then kept for at least 1 hour at 20 °C before conducting the measurement of tackiness.

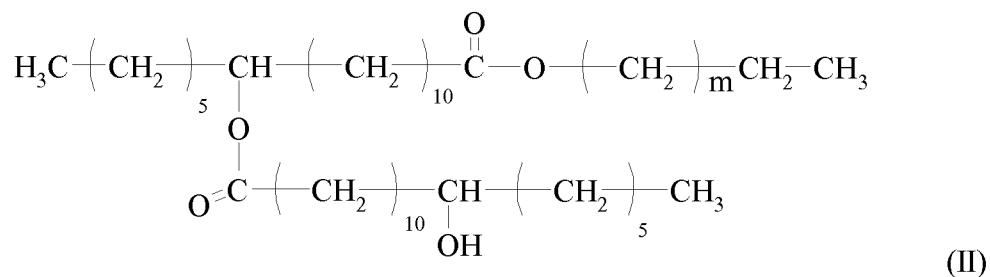
15 The mobile of the texturometer is moved at a speed of 0.5 mm/s, and then penetrates the wax up to a penetration depth of 2 mm. When the mobile has penetrated the wax to the depth of 2 mm, the mobile is held fixed for 1 second (corresponding to the relaxation time) and is then withdrawn at the speed of 0.5 mm/s.

20 During the relaxation time, the force (compressive force) strongly decreases until it becomes zero and then, upon withdrawal of the mobile, the force (tensile force) becomes negative and then increases again to the value of 0. Tackiness corresponds to the integral of the force versus time for the portion of the curve corresponding to the negative values of the force (tensile force). The value of tackiness is expressed in N.s.

25 The tacky wax which may be used generally has a hardness less than or equal to 3.5 MPa, in particular ranging from 0.01 MPa to 3.5 MPa, notably ranging from 0.05 MPa to 3 MPa, or even further ranging from 0.1 MPa to 2.5 MPa.

Hardness is measured according to the procedure described earlier.

30 As a tacky wax, a C₂₀-C₄₀ alkyl (hydroxystearoxy)stearate (the alkyl comprising from 20 to 40 carbon atoms), may be used alone or as a mixture, in particular a C₂₀-C₄₀ alkyl 12-(12'-hydroxystearoxy)stearate of formula (II) :



wherein m is an integer ranging from 18 to 38, or a mixture of compounds of formula (II).

Such a wax is notably sold under the names of "Kester Wax K 82 P®" and "Kester Wax K 80 P®" by KOSTER KEUNEN.

The waxes mentioned above generally have an initial melting point below 45 °C.

It is also possible to use the microcrystalline wax marketed under the reference SP18 by STRAHL and PITSCH which has a hardness of about 0.46 MPa and a tackiness value of about 1 N.s.

The wax(es) may be present as an aqueous wax microdispersion. By aqueous wax microdispersion is meant an aqueous dispersion of wax particles, in which the size of said wax particles is less than or equal to about 1 µm.

Wax microdispersions are stable dispersions of wax colloidal particles and are notably described in "Microemulsions Theory and Practice", L.M. Prince Ed., Academic Press (1977) pages 21-32.

In particular, these wax microdispersions may be obtained by melting wax in the presence of a surfactant and optionally of a portion of water, and then by gradually adding hot water under stirring. The intermediate formation of an emulsion of the water-in-oil type is observed, followed by phase inversion while finally obtaining a micro-emulsion of the type oil-in-water type. Upon cooling, a stable microdispersion of solid colloidal wax particles is obtained.

The wax microdispersions may also be obtained by stirring the mixture of wax, surfactant and water with a stirring means such as ultrasonic waves, a high pressure homogenizer, turbines.

The particles of the wax microdispersion preferably have average sizes less than 1 µm (notably ranging from 0.02 µm to 0.99 µm), preferably less than 0.5 µm (notably ranging from 0.06 µm to 0.5 µm).

These particles essentially consist of wax or a mixture of waxes. However they may comprise in a minority proportion, oily and/or pasty fatty additives, a surfactant and/or a usual liposoluble additive/active.

According to an advantageous embodiment, the composition according to the invention comprises at least one wax selected from microcrystalline waxes, paraffin waxes, polyethylene waxes, in particular the wax marketed under reference WAX AC 617 by Honeywell, ozokerite, carnauba wax, candellila wax, rice bran wax, beeswax, fatty alcohol waxes comprising 20 to 60 carbon atoms and mixture thereof.

According to an embodiment of the invention, the composition comprises at least one liquid fatty phase comprising at least one volatile hydrocarbon oil selected from isoparaffins having 8 to 16 carbon atoms, and notably isododecane, at least one wax selected from polyethylene waxes, and at least one wax selected from fatty alcohol waxes.

According to another embodiment of the invention, the composition comprises at least one liquid fatty phase comprising at least one volatile silicon oil selected from volatile cyclic silicon oils, notably those having a viscosity ≤ 8 centistokes ($8 \cdot 10^{-6} \text{ m}^2/\text{s}$), and notably cyclopentadimethylsiloxane, at least one wax selected from polyethylene wax, and at least one wax selected from beeswax.

The wax(es) may account for 1 to 50% by weight based on the total weight of the composition, preferably 5 to 40% and still more preferably 7.5 to 35 % by weight.

Semi-crystalline polymers

By polymer, is meant compounds including at least two units, preferably at least 3 units, and especially at least 10 recurrent units. By « semi-crystalline polymer », is meant polymers including a crystallizable portion, a pendant crystallizable chain or a crystallizable sequence in the backbone, and an amorphous portion in the backbone and having a reversible phase transition temperature of the first order, in particular for melting (solid-liquid transition). When the crystallizable portion is in the form of a crystallizable sequence of the polymeric backbone, the amorphous portion of the polymer is in the form of an amorphous sequence; the semi-crystalline polymer is in this case a block copolymer, for example of the two-block, three-block or multi-block, including at least one crystallizable sequence and at least one amorphous sequence. By « sequence », is generally meant at least 5 identical recurrent units. The crystallizable sequence(s) are then of a

chemical nature different from that of the amorphous sequence(s).

The semi-crystalline polymer has a melting temperature greater than or equal to 30 °C (notably ranging from 30 °C to 80 °C), preferably ranging from 30 °C to 60 °C. This melting temperature is a state transition temperature of the first order.

5 This melting temperature may be measured by any known method and in particular with a differential scanning calorimeter (DSC).

Advantageously, the semi-crystalline polymer(s) to which the invention is applied have a number average molecular mass greater than or equal to 1,000. Advantageously, the semi-crystalline polymers of the composition of the invention have a
10 number average molecular mass $\overline{M}_n$ ranging from 2,000 to 800,000, preferably from 3,000 to 500,000, better from 4,000 to 150,000, notably less than 100,000, and better from 4,000 to 99,000. Preferably, they have a number average molecular mass above 5,600, ranging for example from 5,700 to 99,000. By « crystallizable chain of sequence », is meant in the sense of the invention, a chain or sequence which if it were alone, would pass
15 from the amorphous state to the crystalline state reversibly, depending on whether it is above or below the melting temperature. A chain in the sense of the invention is a group of atoms which is pendant or lateral relatively to the backbone of the polymer. A sequence is a group of atoms belonging to the backbone, a group forming one of the recurrent units of the polymer. Advantageously, the « crystallizable pendant chain » may be a chain
20 including at least 6 carbon atoms.

The semi-crystalline polymer may be selected from block copolymers including at least one crystallizable sequence and at least one amorphous sequence, homopolymers and copolymers bearing at least one crystallizable lateral chain per recurrent unit, and mixtures thereof.

25 Such polymers are described for example in document EP 1396259.

According to a more particular embodiment of the invention, the polymer derives from a monomer with a crystallizable chain selected from saturated C₁₄ à C₂₂ alky(meth)acrylates.

As a particular example of a structuring semi-crystalline polymer which may
30 be used in the composition according to the invention, the products Intelimer[®] of Landec described in the brochure « Intelimer[®] polymers », Landec IP22 (Rev. 4-97) may be mentioned. These polymers are in solid form at room temperature (25 °C). They bear

crystallizable lateral chains and have the previous formula X.

The semi-crystalline polymer(s) may account for 1 to 50% by weight based on the total weight of the composition, preferably from 5 to 40% and still more preferably from 7.5 to 35 % by weight.

5

Lipophilic gelling agents

The gelling agents which may be used in the composition according to the invention, may be polymeric or molecular organic or mineral lipophilic gelling agents.

As a mineral lipophilic gelling agent, mention may be made of optionally
10 modified clays such as hectorites modified by a C₁₀-C₂₂ fatty acid ammonium chloride, such as the hectorite modified by di-stearyl di-methyl ammonium chloride, like for example the one marketed under the name of Bentone 38V[®] by ELEMENTIS.

Mention may also be made of pyrogenated silica optionally treated so as to be hydrophobic at the surface, the particle size of which is less than 1 µm. It is actually
15 possible to chemically modify the surface of silica, by a chemical reaction generating a reduction in the number of silanol groups present at the surface of the silica. Silanol groups may notably be substituted with hydrophobic groups: hydrophobic silica is then obtained. The hydrophobic groups may be:

- trimethylsiloxyl groups, which are notably obtained by treating
20 pyrogenated silica in the presence of hexamethyldisilazane. Thereby treated silicas are designated as « Silica silylate » according to CTFA (6th edition, 1995). They are for example marketed under references Aerosil R812[®] by DEGUSSA, CAB-O-SIL TS-530[®] by CABOT,

- dimethylsilyloxyl or polydimethylsiloxane groups, which are notably
25 obtained by treating pyrogenated silica in the presence of polydimethylsiloxane or dimethyldichlorosilane. Thereby treated silicas are designated as « Silica diméthyl silylate » according to CTFA (6th edition, 1995). They are for example marketed under references Aerosil R972[®], and Aerosil R974[®] by DEGUSSA, CAB-O-SIL TS-610[®] and CAB-O-SIL TS-720[®] by CABOT.

30 The hydrophobic pyrogenated silica in particular has a particle size which may be from nanometric to micrometric, for example ranging from about 5 to 200 nm.

It is also possible to use non-polymeric molecular organic gelling agents, also called organo-gelling agents, associated with a liquid fatty phase (which may be the liquid fatty phase of the composition according to the invention), which are compounds for which the molecules are capable of establishing between them physical interactions leading to self-aggregation of the molecules with formation of a supra-molecular 3D lattice which is responsible for the gelling of the liquid fatty phase.

The supra-molecular lattice may result from the formation of a fibril lattice (due to stacks or aggregations of organo-gelling agent molecules), immobilizing the molecules of the liquid fatty phase.

The capacity of forming this fibril lattice and therefore of gelling, depends on the nature (or chemical class) of the organo-gelling agent, on the nature of the substituents borne by its molecules for a given chemical class and on the nature of the liquid fatty phase.

The physical interactions are diverse but exclude co-crystallization. These physical interactions are in particular interactions of the self-complementary hydrogen interaction type, π interactions between unsaturated rings, dipolar interactions, coordination bonds with organometal derivatives and their associations. Generally, each molecule of an organogelling agent may establish several types of physical interactions with a neighboring molecule. Also, advantageously, the molecules of the organogelling agents according to the invention include at least one group capable of establishing hydrogen bonds and better at least two groups capable of establishing hydrogen bonds, at least one aromatic ring and better at least two aromatic rings, at least one or more ethylenically unsaturated bonds, and/or at least one or more asymmetrical carbons. Preferably, the groups capable of producing hydrogen bonds are selected from hydroxyl, carbonyl, amine, carboxylic acid, amide, urea, benzyl groups and combinations thereof.

The organo-gelling agent(s) are soluble in the liquid fatty phase after heating until a transparent homogenous liquid phase is obtained. They may be solid or liquid at room temperature and under atmospheric pressure.

The molecular organo-gelling agents which may be used in the composition according to the invention are notably those described in document « Specialist Surfactants », edited by D. Robb in 1997, p.209-263, Chapter 8 of P. Terech, European

applications EP-A-1068854 and EP-A-1086945 or further in the application WO-A-02/47031.

Among these organo-gelling agents, mention may notably be made of amides of carboxylic acids, in particular tri-carboxylic acids such as cyclohexanetricarboxamides (see European patent application EP-A-1068854), diamides having hydrocarbon chains each containing from 1 to 22 carbon atoms, for example from 6 to 18 carbon atoms, said chains being non-substituted or substituted with at least one substituent selected from ester, urea and fluoro groups (see application EP-A-1086945) and notably diamides resulting from the reaction of diaminocyclohexane, in particular diaminocyclohexane in the *trans* form, and of an acid chloride, such as for example N,N'-bis (dodecanoyl)-1,2-diaminocyclohexane, the amides of N-acylamino acids such as diamides resulting from the action of N-acylamino acid with amines including 1 to 22 carbon atoms, such as for example those described in document WO-93/23008 and notably the amides of N-acylglutamic acid where the acyl group represents a C₈-C₂₂ alkyl chain, such as dibutylamide of N-lauroyl-L-glutamic acid, made or marketed by Ajinomoto under the name of GP-1 and mixtures thereof.

The polymeric organic lipophilic gelling agents are for example:

- partly or totally cross-linked elastomeric organopolysiloxanes, with a three-dimensional structure, like those marketed under the names of KSG6[®], KSG16[®] and KSG18[®] by SHIN-ETSU, Trefil E-505C[®] and Trefil E-506C[®] by DOW-CORNING, Gransil SR-CYC[®], SR DMF10[®], SR-DC556[®], SR 5CYC gel[®], SR DMF 10 gel[®] and SR DC 556 gel[®] by GRANT INDUSTRIES, SF 1204[®] and JK 113[®] by GENERAL ELECTRIC;

- the ethylcellulose such as the one sold under the name of Ethocel[®] by DOW CHEMICAL;

- polycondensates of the polyamide type resulting from the condensation between (α) at least one acid selected from dicarboxylic acids comprising at least 32 carbon atoms, such as dimeric fatty acids, and (β) an alkylene diamine and in particular ethylene diamine, wherein the polyamide polymer comprises at least one terminal carboxylic acid group esterified or amidified with at least one linear and saturated mono-alcohol or mono-amine comprising 12-30 carbon atoms, and in particular, the copolymers of ethylene diamine /stearyl dilinoleate such as the one marketed under the

name of Uniclear 100 VG[®] by ARIZONA CHEMICAL;

- silicone polyamides of the polyorganosiloxane type such as those described in documents US-A-5,874,069, US-A-5,919,441, US-A-6,051,216 and US-A-5,981,680 such as for example those marketed under the reference Dow Corning 2-8179 Gellant by DOW CORNING;

- galactomannans including from one to six, and in particular from two to four, hydroxyl groups per ose, substituted with a saturated or non-saturated alkyl chain, such as guar gum alkylated with C₁-C₆ alkyl chains, and in particular C₁-C₃ alkyl chains, and mixtures thereof;

- block copolymers, optionally hydrogenated, of the « diblock », « triblock » or « radial » type, in particular with styrene blocks and ethylene/ C₃-C₄ alkylene blocks.

As a diblock copolymer, preferably hydrogenated, mention may be made of copolymers of styrene-ethylene/propylene, styrene-ethylene/butadiene copolymers. Diblock polymers are notably sold under the name of Kraton[®] G1701E by Kraton Polymers.

As a triblock copolymer, preferably hydrogenated, mention may be made of copolymers of styrene-ethylene/propylene-styrene, copolymers of styrene-ethylene/butadiene-styrene, copolymers of styrene-isoprene-styrene, copolymers of styrene-butadiene-styrene. Triblock polymers are notably sold under the names of Kraton[®] G1650, Kraton[®] G1652, Kraton[®] D1101, Kraton[®] D1102, Kraton[®] D1160 by Kraton Polymers.

A mixture of hydrogenated triblock styrene-butylene/ethylene-styrene copolymer and of a hydrogenated star ethylene-propylene-styrene polymer may also be used, such a mixture being notably in isododecane. Such mixtures are for example sold by PENRECO under the trade names of VERSAGEL[®] M5960 and VERSAGEL[®] M5670.

Mention may also be made of polystyrene/polyisoprene, polystyrene/polybutadiene copolymers such as those marketed under the name of Luvitol HSB[®] by BASF.

Among the lipophilic gelling agents which may be used in the compositions according to the invention, mention may further be made of esters of dextrin and of a fatty acid, such as dextrin palmitates, notably such as those marketed under the names of

Rheoparl TL[®] or Rheoparl KL[®] by CHIBA FLOUR.

The lipophilic gelling agent(s) may account for 1 to 50% by weight based on the total weight of the composition, preferably from 5 to 40% and still more preferably from 7.5 to 35 % by weight.

5

Pasty compound

The composition according to the invention may comprise at least one pasty compound.

By « pasty » in the sense of the present invention, is meant a lipophilic fatty
10 compound with a reversible solid/liquid state transition and including a liquid fraction and a solid fraction at the temperature of 23°C.

The pasty compound preferably has hardness at 20°C ranging from 0.001 to 0.5 MPa, preferably from 0.002 to 0.4 MPa.

The hardness is measured according to a method with penetration of a probe in
15 a compound sample and in particular by means of a texture analyzer (for example TA-XT2i from Stable Micro Systems Ltd) equipped with a stainless steel cylinder with a diameter of 2 mm. The hardness measurement is carried out at 20°C at the centre of 5 samples. The cylinder is introduced into each sample with a preliminary speed of 1 mm/s and then with a measuring speed of 0.1 mm/s, the penetration depth being 0.3 mm. The
20 measured value of the hardness is that of the peak maximum.

This pasty compound further is at the temperature of 23 °C, in the form of a liquid fraction and of a solid fraction. In other words, the initial melting temperature of the pasty compound is less than 23 °C. The liquid fraction of the pasty compound measured at 23°C accounts for 23 to 97 % by weight of the compound. This liquid fraction at 23°C
25 preferably accounts for between 40 and 85 % by weight of the compound.

The liquid fraction by weight of the pasty compound at 23°C is equal to the ratio of the consumed melting enthalpy at 23°C over the melting enthalpy of the pasty compound.

The melting enthalpy of the pasty compound is the enthalpy consumed by the
30 compound for passing from the solid state to the liquid state. The pasty compound is said to be in the solid state when the whole of its mass is in solid form. The pasty compound is said to be in the liquid state when the whole of its mass is in liquid form.

The melting enthalpy of the pasty compound is equal to the area under the curve of the thermogram obtained by means of a differential scanning calorimeter (DSC), such as the calorimeter sold under the name of MDSC 2920 by TA Instrument, with a rise in temperature of 5 or 10°C per minute, according to the ISO 11357-3:1999 standard. The melting enthalpy of the pasty compound is the amount of energy required for having the compound pass from the solid state to the liquid state. It is expressed in J/g.

The melting enthalpy consumed at 23 °C is the amount of energy absorbed by the sample in order to pass from the solid state to the state which it has at 23 °C consisting of a liquid fraction and of a solid fraction.

The liquid fraction of the pasty compound measured at 32 °C preferably accounts for 40 to 100 % by weight of the compound, preferably for 50 to 100 %, preferably 80 to 100 %, still preferably for 90 to 100 % by weight of the compound. When the liquid fraction of the pasty compound measured at 32°C is equal to 100%, the temperature of the end of the melting range of the pasty compound is less than or equal to 32 °C.

The liquid fraction of the pasty compound measured at 32°C is equal to the ratio of the consumed melting enthalpy at 32°C over the melting enthalpy of the pasty compound. The melting enthalpy consumed at 32°C is calculated in the same way as the melting enthalpy consumed at 23 °C.

The pasty compound is preferably selected from synthetic compounds and compounds of plant origin. A pasty compound may be obtained by synthesis starting with products of plant origin.

The pasty compound is advantageously selected from:

- lanolin and its derivatives, such as lanolin alcohol, oxyethylenated lanolins, acetylated lanolin, lanolin esters such as isopropyl lanolate, oxypropylenated lanolins,

- polymeric or non-polymeric silicone compounds, such as polydimethylsiloxanes with high molecular masses, polydimethylsiloxanes with side chains of the alkyl or alkoxy type having 8-24 carbon atoms, notably stearyl dimethicones, ,

- polymeric or non-polymeric fluorinated compounds

- vinyl polymers, notably:

- olefin homopolymers
 - olefin copolymers
 - hydrogenated diene homopolymers and copolymers
 - linear or branched oligomers, homo- or copolymers of alkyl (meth)acrylates preferably having a C₈-C₃₀ alkyl group
 - oligomers, homo- and copolymers of vinyl esters having C₈-C₃₀ alkyl groups
 - oligomers, homo- and copolymers or vinyl ethers having C₈-C₃₀ alkyl groups,
- 10 - liposoluble polyethers resulting from polyetherification between one or more C₂-C₁₀₀, preferably C₂-C₅₀ diols,
- polyol ethers selected from pentaerythritol polyalkylene glycol ethers, fatty ethers of fatty alcohol and sugar, and mixtures thereof, the pentaerythritol and polyethylene glycol ether including 5 oxyethylenated units (5 EO) (CTFA name: PEG-5 Pentaerythrityl Ether), the pentaerythritol and polypropylene glycol ether including 5 oxypropylenated units (5 PO) (CTFA name: PPG-5 Pentaerythrityl Ether), and mixtures thereof and especially the PEG-5 Pentaerythrityl Ether, the PPG-5 Pentaerythrityl Ether and soya bean oil mixture, marketed under the name of « Lanolide » by Vevy, a mixture where the constituents are found in a weight ratio of 46/46/8: 46 % of PEG-5 Pentaerythrityl Ether,
- 20 46 % of PPG-5 Pentaerythrityl Ether and 8 % of soya bean oil,
- esters and polyesters,
 - and mixtures thereof

The pasty compound is preferably a polymer, notably a hydrocarbon polymer.

25 A preferred silicone and fluorinated pasty compound is polymethyl trifluoropropyl methylalkyl dimethylsiloxane, made under the name of X22-1088 by SHIN ETSU.

When the pasty compound is a silicone and/or fluorinated polymer, the composition advantageously comprises a compatibilization agent such as short chain esters like isodecyl neopentanoate.

30 Among the liposoluble polyethers, the copolymers of ethylene oxide and/or propylene oxide with long chain C₆-C₃₀ alkylene oxides are particularly preferred, further preferably such that the weight ratio of ethylene oxide and/or propylene oxide with

alkylene oxides in the copolymer is from 5:95 to 70:30. In this family, mention will notably be made of copolymers such that the long chain alkylene oxides are positioned as blocks with an average molecular weight from 1,000 to 10,000, for example a block copolymer of polyoxyethylene/polydodecyl glycol, such as the ethers of dodecanediol (22 mol) and polyethylene glycol (45 EO) marketed under the brand of ELFACOS ST9 by Akzo Nobel.

Among the esters, are notably preferred

- esters of an oligomeric glycerol, notably esters of diglycerol, in particular condensates of adipic acid and of glycerol, for which a portion of the hydroxyl groups of the glycerols have reacted with a mixture of fatty acids such as stearic acid, capric acid, stearic acid, and isostearic acid and 12-hydroxystearic acid, notably reflecting those marketed under the brand Softisan 649 by Sasol

- phytosterol esters,
- pentaerythritol esters,

- esters formed from:

- at least one alcohol, at least one of the alcohols being a Guerbet alcohol and
- from a diacid dimer formed from at least one unsaturated fatty acid,
- like the ester of tallol fatty acid dimer comprising 36 carbon atoms and a mixture i) of Guerbet alcohols comprising 32 carbon atoms and ii) behenyl alcohol; the ester of linoleic acid dimer and of a mixture of two Guerbet alcohols, 2-tetradecyl-octadecanol (32 carbon atoms) and 2-hexadecyl-eicosanol (36 carbon atoms).

- non-crosslinked polyesters resulting from polycondensation between a dicarboxylic acid and a linear or branched C₄-C₅₀ carboxylic polyacid and a diol or a C₂-C₅₀ polyol,

- polyesters which result from esterification, by a polycarboxylic acid of an ester of aliphatic carboxylic hydroxyl acid such as Risocast DA-L and Risocast DA-H marketed by the Japanese corporation KOKYU ALCOHOL KOGYO, which are esters resulting from the esterification reaction of hydrogenated castor oil with dilinoleic acid or isostearic acid

- ester aliphatic esters resulting from esterification of an ester of aliphatic hydroxy carboxylic acid by an aliphatic carboxylic acid; (Salacos HCIS (V)-L marketed by Nishing Oil).

The aliphatic carboxylic acid comprises 4 to 30 and preferably from 8 to 30 carbon atoms. It is preferably selected from hexanoic acid, heptanoic acid, octanoic acid, ethyl-2-hexanoic acid, nonanoic acid, decanoic acid, undecanoic acid, dodecanoic acid, tridecanoic acid, tetradecanoic acid, pentadecanoic acid, hexadecanoic acid, hexyldecanoic acid, heptadecanoic acid, octadecanoic acid, isostearic acid, nonadecanoic acid, eicosanoic acid, isoarachidic acid, octyldodecanoic acid, heneicosanoic acid, docosanoic acid, and mixtures thereof.

The aliphatic carboxylic acid is preferably branched.

The aliphatic hydroxyl carboxylic acid ester is advantageously derived from a hydroxylated aliphatic carboxylic acid including from 2 to 40 carbon atoms, preferably from 10 to 34 carbon atoms and better from 12 to 28 carbon atoms and from 1 to 20 hydroxyl groups, preferably from 1 to 10 hydroxyl groups and better from 1 to 6 hydroxyl groups. The ester of aliphatic hydroxyl carboxylic acid is selected from:

- a) partial or total esters of saturated linear monohydroxylated aliphatic monocarboxylic acids;
- b) partial or total esters of unsaturated monohydroxylated aliphatic monocarboxylic acids;
- c) partial or total esters of saturated monohydroxylated aliphatic polycarboxylic acids;
- d) partial or total esters of unsaturated polyhydroxylated aliphatic polycarboxylic acids;
- e) partial or total esters of C₂-C₁₆ aliphatic polyols having reacted with a mono- or poly-hydroxylated aliphatic mono- or poly-carboxylic acid, and mixtures thereof.

The ester aliphatic esters are advantageously selected from:

- the ester resulting from the esterification reaction of hydrogenated castor oil with isostearic acid in proportions of 1 to 1 (1/1) or hydrogenated castor oil monoisostearate,

- the ester resulting from the esterification reaction of hydrogenated castor oil with isostearic acid in proportions of 1 to 2 (1/2) or hydrogenated castor oil diisostearate,
- the ester resulting from the esterification reaction of hydrogenated castor oil with isostearic acid in proportions of 1 to 3 (1/3) or hydrogenated castor oil triisostearate,
- 5 - and mixtures thereof.

The pasty compound may also be of plant origin. In this case, mention may notably be made of isomerized jojoba oil such as *trans*-isomerized partly hydrogenated jojoba oil made or marketed by Desert Whale under the trade name reference Iso-Jojoba-50®, orange wax such as for example, the one which is marketed under
10 reference Orange Peel Wax by Koster Keunen, shea butter, partly hydrogenated olive oil such as for example the compound marketed under reference Beurrolive by Soliance, cocoa butter, mango oil, such as for example Lipex 302 from Aarhuskarlshamn.

The pasty compound preferably accounts for 0.5 to 85 %, better 1 to 60 %, better 2 to 30 % and still better 3 to 15 % by weight of the composition.

15

Aqueous phase

The composition according to the invention may comprise an aqueous phase which may essentially consist of water; it may also comprise a mixture of water and of a solvent miscible with water (a water miscibility greater than 50% at 25 °C) such as lower
20 mono-alcohols having 1-5 carbon atoms such as ethanol, isopropanol, glycols having from 2 to 8 carbon atoms such as propylene glycol, ethylene glycol, 1,3-butylene glycol, dipropylene glycol, C₃-C₄ ketones, en C₂-C₄ aldehydes and mixtures thereof.

According to an embodiment, the composition comprises an aqueous phase with a content of less than 10%, preferably 5% by weight, and better less than 2% by
25 weight based on the total weight of the composition.

According to another embodiment, the composition comprises an aqueous phase with a content ranging from 5% to 95% by weight, based on the total weight of the composition, preferably ranging from 10 % to 80 % by weight, and preferentially ranging from 15 % to 60 % by weight.

30

Emulsifying system

The composition according to the invention may contain emulsifying

surfactants notably present in a proportion ranging from 0.01 to 30 % by weight based on the total weight of the composition, better from 1 to 15 % and better from 2 to 10 %.

According to the invention, an emulsifier is generally used, suitably selected for obtaining an oil-in-water emulsion. In particular, it is possible to use an emulsifier
5 having at 25°C an HLB (hydrophilic-lipophilic balance) in the sense of GRIFFIN, greater than or equal to 8.

The HLB value according to GRIFFIN is defined in J. Soc. Cosm. Chem. 1954 (Vol. 5), pages 249-256.

These surfactants may be selected from non-ionic, anionic, cationic,
10 amphoteric surfactants and their combinations. Reference may be made to the document « Encyclopedia of Chemical Technology, KIRK-OTHMER », Vol. 22, p. 333-432, 3rd edition, 1979, WILEY, for the definition of the properties and (emulsifying) functions of surfactants, in particular p. 347-377 of this reference, for anionic, amphoteric and non-ionic surfactants.

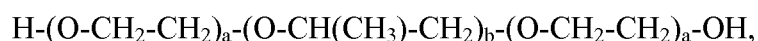
15 The surfactants preferentially used in the composition according to the invention are selected from:

a) non-ionic surfactants with an HLB greater than or equal to 8 at 25°C, used alone or as a mixture; mention may notably be made of:

- esters and ethers of oses such as the mixture of cetylstearyl glucoside and
20 cetyl and stearyl alcohols like Montanov 68 from Seppic;
- oxyethylenated and/or oxypropylenated ethers (which may include 1 to 150 oxyethylenated and/or oxypropylenated groups) of glycerol;
- oxyethylenated and/or oxypropylenated ethers (which may include from 1
to 150 oxyethylenated and/or oxypropylenated groups) of fatty alcohols (notably C₈-C₂₄
25 alcohols and preferably C₁₂-C₁₈ alcohols) such as the oxyethylenated ether of cetearyl alcohol with 30 oxyethylenated groups (CTFA name "Ceteareth-30"), oxyethylenated ether of stearyl alcohol with 20 oxyethylenated groups (CTFA name "Steareth-20"), and oxyethylenated ether of the mixture of C₁₂-C₁₅ fatty alcohols including 7 oxyethylenated groups (CTFA name "C₁₂-C₁₅ Pareth-7") marketed under the name of NEODOL 25-7[®] by
30 SHELL CHEMICALS,

- esters of a fatty acid (notably of C₈-C₂₄ acids, and preferably C₁₆-C₂₂ acids) and of polyethylene glycol (which may comprise 1 to 150 ethylene glycol units) such as PEG-50 stearate and PEG-40 monostearate marketed as MYRJ 52P[®] by ICI UNIQUEMA,
- esters of a fatty acid (notably of C₈-C₂₄ acids, and preferably C₁₆-C₂₂ acids) and of oxyethylenated and/or oxypropylenated glycerol ethers (which may include 1 to 150 oxyethylenated and/or oxypropylenated groups), such as PEG-200 glyceryl monostearate sold under the name of Simulsol 220 TM[®] by SEPPIC; polyethoxylated glyceryl stearate with 30 ethylene oxide groups such as the product TAGAT S[®] sold by GOLDSCHMIDT, polyethoxylated glyceryl oleate with 30 ethylene oxide groups like the product TAGAT O[®] sold by GOLDSCHMIDT, polyethoxylated glyceryl cocoate with 30 ethylene oxide groups like the product VARIONIC LI 13[®] sold by SHEREX, polyethoxylated glyceryl isostearate with 30 ethylene oxide groups like the product TAGAT L[®] sold by GOLDSCHMIDT and polyethoxylated glyceryl laurate with 30 ethylene oxide groups like the product TAGAT I[®] from GOLDSCHMIDT,
- esters of a fatty acid (notably C₈-C₂₄ acids, and preferably C₁₆-C₂₂ acids) and of oxyethylenated and oxypropylenated sorbitol ethers (which may include from 1 to 150 oxyethylenated or oxypropylenated groups) like polysorbate 20 sold under the name of Tween 20[®] by CRODA, polysorbate 60 sold under the name of 60[®] by CRODA,
- dimethicone copolyol, such as the one sold under the name of Q2-5220[®] by DOW CORNING,
- dimethicone copolyol benzoate (FINSOLV SLB 101[®] and 201[®] from FINTEX),
- copolymers of propylene oxide and ethylene oxide, also called EO/PO polycondensates,
- and mixtures thereof.

The EO/PO polycondensates are more particularly copolymers consisting in polyethylene glycol and polypropylene glycol blocks, such as for example polyethylene glycol/polypropylene glycol/polyethylene glycol tri-block polycondensates. These tri-block polycondensates for example have the following chemical structure:



formula wherein a ranges from 2 to 120 and b ranges from 1 to 100.

The EO/PO polycondensate preferably has an average weight molecular weight ranging from 1,000 to 15,000, and better from 2,000 to 13,000. Advantageously, said EO/PO polycondensate has a cloud temperature at 10 g/L in distilled water, greater than or equal to 20°C, preferably greater than or equal to 60°C. The cloud temperature is measured according to the ISO 1065 standard. As a EO/PO polycodensate which may be used according to the invention, mention may be made of polyethylene glycol / polypropylene glycol / polyethylene glycol tri-block polycondensates sold under the names of SYNPERONIC[®] such as SYNPERONIC PE/ L44[®] and SYNPERONIC PE/F127[®] by ICI.

b) the non-ionic surfactants with HLB of less than 8 at 25°C, optionally associated with one or more non-ionic surfactants with an HLB above 8 at 25°C, as mentioned above, such as:

- esters and ethers of oses such as sucrose stearate, sucrose cocoate, sorbitan stearate and their mixtures such as Arlatone 2121[®] marketed by ICI;

- oxyethylenated and/or oxypropylenated ethers (which may include 1 to 150 oxyethylenated and/or oxypropylenated groups) of fatty alcohols (notably C₈-C₂₄ alcohols and preferably C₁₂-C₁₈ alcohols) such as the oxyethylenated ether of stearyl alcohol with two oxyethylenated groups (CTFA name "Steareth-2");

- esters of fatty acids (notable of C₈-C₂₄ acids, and preferably C₁₆-C₂₂ acids) and of polyol, notably glycerol or sorbitol, such as glyceryl stearate, glyceryl stearate such as the product sold under the name TEGIN M[®] from GOLDSCHMIDT, glyceryl laurate such as the product sold under the name of IMWITOR 312[®] by HULS, polyglyceryl-2 stearate, sorbitan tristearate, glyceryl ricinoleate;

- lecithins, such as soya bean lecithins, (like Emulmetik 100 J from Cargill, or Biophilic H from Lucas Meyer);

- the cyclomethicone/dimethicone copolyol mixture sold under the name of Q2-3225C[®] by DOW CORNING.

c) anionic surfactants such as:

- the salts of C₁₆-C₃₀ fatty acids notably those derived from amines, such as triethanolamine stearate and/or amino-2-methyl-2-propane di-ol-1,3 stearate;

- the salts of polyoxyethylenated fatty acids, notably those derived from amine or alkaline salts, and mixtures thereof;

- phosphoric esters and their salts such as "DEA oleth-10 phosphate" (Crodafos N 10N from CRODA) or monopotassium monocetyl phosphate (Amphisol K from Givaudan);
 - sulfosuccinates such as "Disodium PEG-5 citrate lauryl sulfosuccinate" and
 - 5 "Disodium ricinoleamido MEA sulfosuccinate";
 - alkylethersulfates such as sodium lauryl ether sulfate;
 - isethionates;
 - acylglutamates such as "Disodium hydrogenated tallow glutamate" (AMISOFT HS-21 R[®] marketed by AJINOMOTO) and sodium stearyl glutamate
 - 10 (AMISOFT HS-11 PF[®] marketed by AJINOMOTO) and mixtures thereof;
 - derivatives of soya bean such as potassium soyate;
 - citrates, such as glyceryl stearate citrate (Axol C 62 Pellets from Degussa);
 - proline derivatives such as sodium palmitoyl proline (Sepicalm VG from Seppic), or the mixture of sodium palmitoyl sarcosinate, magnesium palmitoyl glutamate,
 - 15 palmitic acid and palmitoyl proline (Sepifeel One from Seppic);
 - lactylates, such as sodium stearyl lactylate (Akoline SL from Karlshamns AB);
 - sarcosinates, such as sodium palmitoyl sarcosinate (Nikkol sarcosinate PN) or the mixture of stearyl sarcosine et myristoyl sarcosine
 - 20 75/25 (Crodasin SM from Croda) ;
 - sulfonates, such as sodium secondary C₁₄₋₁₇ alkyl sulfonate (Hostapur SAS 60 from Clariant);
 - glycinate, such as sodium cocoyl glycinate (Amilite GCS-12 from Ajinomoto).
 - 25 Triethanolamine stearate is most particularly suitable for the invention. It is generally obtained by simply mixing stearic acid and triethanolamine.
- The composition according to the invention may also contain one or more amphoteric surfactants such as N-acyl-aminoacids such as N-alkyl-aminoacetates and disodium cocoamphodiacetate and amine oxides such as stearamine oxide or further
- 30 silicone surfactants such as dimethicone copolyols phosphates such as the one sold under the name of PECOSIL PS 100[®] by PHOENIX CHEMICAL.

The usable surfactant may also be a polymeric surfactant, notably a thermogelling polymer.

Hydrophilic gelling agent

When it comprises an aqueous phase, the composition according to the invention may comprise a hydrophilic gelling agent.

Hydrophilic gelling agents which may be used in the compositions according to the invention may be selected from:

- homo- or copolymers of acrylic or methacrylic acids or their salts and their esters and in particular the products sold under the names of VERSICOL F[®] or VERSICOL K[®] by ALLIED COLLOID, UTRAHOLD 8[®] by CIBA-GEIGY, polyacrylic acids of the SYNTHALEN K type,

- copolymers of acrylic acid and acrylamide sold as their sodium salt under the names of RETEN[®] by HERCULES, sodium polymethacrylate sold under the name of DARVAN N[°]7[®] by VANDERBILT, sodium salts of polyhydroxycarboxylic acids sold under the name of HYDAGEN F[®] by HENKEL,

- polyacrylic acid/alkyl acrylate copolymers of the PEMULEN type,
- AMPS (polyacrylamidomethyl propane-sulfonic acid partly neutralized with ammonia and highly crosslinked) marketed by CLARIANT,

- AMPS/acrylamide of the SEPIGEL[®] or SIMULGEL[®] type marketed by SEPPIC, et

- polyoxyethylenated AMPS/alkyl methacrylate (either cross-linked or not), and mixtures thereof.

- The water-soluble film-forming polymers mentioned hereinbelow may also play the role of a hydrophilic gelling agent.

- The hydrophilic gelling agent may also be present in the composition according to the invention as a dry material content ranging from 0.01 % to 30 % by weight, preferably from 0.5 % to 20 % by weight, better from 1 % to 15 % by weight based on the total weight of the composition.

Film-forming polymer

The composition according to the invention may comprise according to a particular embodiment, at least one film-forming polymer.

The film-forming polymer may be present in the composition according to the invention with a dry material content (or of active materials) ranging from 0.1 % to 30 % by weight based on the total weight of the composition, preferably from 0.5 % to 20 % by weight, and better from 1 % to 15 % by weight.

5 In the present invention, by « film-forming polymer », is meant a polymer capable of forming alone in the presence of an auxiliary « filmification » agent, a macroscopically continuous film adherent to the eyelashes, and preferably a cohesive film, or still better a film, the cohesion and mechanical properties of which are such that said film may be isolated and handled individually, for example when said film is made by
10 casting on an anti-adhesive surface such as a teflon or silicone surface.

Among the film-forming polymers which may be used in the composition of the present invention, synthetic polymers may be mentioned, of the radical type or of the polycondensate type, polymers of natural origin, and mixtures thereof.

By radical film-forming polymer is meant a polymer obtained by
15 polymerization of notably ethylenically unsaturated monomers, each monomer being capable of homopolymerization (unlike polycondensates).

Film-forming polymers of the radical type may notably be vinyl polymers or copolymers, notably acrylic polymers.

Film-forming vinyl polymers may result from the polymerization of
20 ethylenically unsaturated monomers having at least one acid group and/or esters of these acid monomers and/or amides of these acid monomers.

As a monomer bearing an acid group, α,β -ethylenic unsaturated carboxylic acids may be used, such as acrylic acid, (meth)acrylic acid, crotonic acid, maleic acid, itaconic acid. Use is preferably made of (meth)acrylic acid and crotonic acid, and more
25 preferentially (meth)acrylic acid.

The esters of acid monomers are advantageously selected from esters of (meth)acrylic acid (further called (meth)acrylates), notably alkyl (meth)acrylates, in particular C₁-C₃₀, preferably C₁-C₂₀ alkyl (meth)acrylates, aryl (meth)acrylates, in particular C₆-C₁₀ aryl (meth)acrylates, hydroxyalkyl (meth)acrylates, in particular C₂-C₆
30 hydroxyalkyl (meth)acrylates.

Among alkyl (meth)acrylates, mention may be made of methyl methacrylate, ethyl methacrylate, butyl methacrylate, isobutyl methacrylate, ethyl-2-hexyl methacrylate,

lauryl methacrylate, cyclohexyl methacrylate.

Among the hydroxyalkyl (meth)acrylates, mention may be made of hydroxyethyl acrylate, 2-hydroxypropyl acrylate, hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate.

5 Among aryl (meth)acrylates, mention may be made of benzyl acrylate and phenyl acrylate.

The particularly preferred esters of (meth)acrylic acid are alkyl (meth)acrylates.

10 According to the present invention, the alkyl group of the esters may be either fluorinated or perfluorinated, i.e. part or all the hydrogen atoms of the alkyl group are substituted with fluorine atoms.

As amides of acid monomers, mention may for example be made of (meth)acrylamide and notably N-alkyl (meth)acrylamides, in particular C₂-C₁₂ alkyl (meth)acrylamides. Among N-alkyl (meth)acrylamides, mention may be made of N-ethyl
15 acrylamide, N-t-butyl acrylamide, N-t-octyl acrylamide and N-undecylacrylamide.

Film-forming vinyl polymers may also result from homopolymerization or copolymerization of monomers selected from vinyl esters and styrene monomers. In particular, these monomers may be polymerized with acid monomers and/or their esters and/or their amides, as those mentioned earlier.

20 As an example of vinyl esters, mention may be made of vinyl acetate, vinyl neodecanoate, vinyl pivalate, vinyl benzoate and vinyl t-butyl benzoate.

As styrene monomers, mention may be made of styrene and alpha-methyl styrene.

25 Among the film-forming polycondensates, mention may be made of polyurethanes, polyesters, polyester amides, polyamides, and epoxy ester resins, polyureas.

Polyurethanes may be selected from anionic, cationic, non-ionic or amphoteric polyurethanes, acrylic polyurethanes, poly-urethane-polyvinylpyrrolidones, polyester-polyurethanes, polyether-polyurethanes, polyureas, polyurea-polyurethanes, and mixtures thereof.

30 The polyesters may be obtained in a known way by polycondensation of dicarboxylic acids with polyols, notably diols.

The dicarboxylic acid may be aliphatic, alicyclic or aromatic. Mention may for

example be made of such acids: oxalic acid, malonic acid, dimethylmalonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, 2,2-dimethylglutaric acid, azelaic acid, suberic acid, sebacic acid, fumaric acid, maleic acid, itaconic acid, phthalic acid, dodecanedioic acid, 1,3-cyclohexanedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, isophthalic acid, terephthalic acid, 5-norbornane-dicarboxylic acid, diglycolic acid, thiodipropionic acid, 2,5-naphthalenedicarboxylic acid, 2,6-naphthalenedicarboxylic acid. These dicarboxylic acid monomers may be used alone or as a combination of at least two dicarboxylic acid monomers. Among these monomers, phthalic acid, isophthalic acid, terephthalic acid are preferentially selected.

The diol may be selected from aliphatic, alicyclic, aromatic diols. Preferably a diol is used, selected from: ethylene glycol, diethylene glycol, triethylene glycol, 1,3-propanediol, cyclohexane dimethanol, 4-butanediol. Like other polyols, glycerol, pentaerythritol, sorbitol, trimethylol propane may be used.

The amide polyesters may be obtained in an analogous way to polyesters, by polycondensation of diacids, with diamines or amino alcohols. As a diamine, ethylenediamine, hexamethylenediamine, *meta*- or *para*-phenylenediamine may be used. As an amino alcohol, monoethanolamine may be used.

The polyester may further comprise at least one monomer bearing at least one $-\text{SO}_3\text{M}$ group, with M representing a hydrogen atom, an ammonium ion NH_4^+ or a metal ion, such as for example a Na^+ , Li^+ , K^+ , Mg^{2+} , Ca^{2+} , Cu^{2+} , Fe^{2+} , Fe^{3+} ion. A bifunctional aromatic monomer including such a $-\text{SO}_3\text{M}$ group may notably be used.

The aromatic ring of the bifunctional aromatic monomer further bearing a $-\text{SO}_3\text{M}$ group as described above may be selected for example from benzene, naphthalene, anthracene, diphenyl, oxydiphenyl, sulfonyldiphenyl, methylenediphenyl rings. As an example of a bifunctional aromatic monomer further bearing a $-\text{SO}_3\text{M}$ group, mention may be made of sulfoisophthalic acid, sulfoterephthalic acid, sulfophthalic acid, 4-sulfonaphthalene-2,7-dicarboxylic acid.

Copolymers based on isophthalate/sulfoisophthalate are preferably used and more particularly copolymers obtained by condensation of di-ethyleneglycol, cyclohexane di-methanol, isophthalic acid, sulfoisophthalic acid.

Polymers of natural origin, possibly modified, may be selected from shellac resin, sandarac gum, dammar gums, elemi gums or resins, copal resins, cellulose polymers

and mixtures thereof

According to a first embodiment of the composition according to the invention, the film-forming polymer may be a water-soluble polymer and may be present in an aqueous phase of the composition; the polymer is therefore solubilized in the aqueous phase of the composition.

According to another alternative embodiment of the composition according to the invention, the film-forming polymer may be a polymer solubilized in a liquid fatty phase comprising organic oils or solvents such as those described earlier (it is then stated that the film-forming polymer is a liposoluble polymer). Preferably, the liquid fatty phase comprises a volatile oil, optionally mixed with a non-volatile oil, the oils may be selected from the oils mentioned earlier.

As an example of liposoluble polymer, mention may be made of copolymers of vinyl ester (the vinyl group being directly linked to the oxygen atom of the ester group and the vinyl ester having a linear or branched saturated hydrocarbon radical with 1 to 19 carbon atoms, bound to the carbonyl of the ester group) and of at least another monomer which may be a vinyl ester (different from the vinyl ester already present), an α -olefin (having 8-20 carbon atoms), an alkylvinylether (the alkyl group of which includes 2-18 carbon atoms), or an allyl or methallyl ester (having a linear or branched saturated hydrocarbon radical, with 1-19 carbon atoms, bound to the carbonyl of the ester group).

These copolymers may be cross-linked by means of cross-linking agents which may be of the vinyl type or of the allyl or methallyl type, such as tetraallyloxyethane, divinylbenzene, divinyl octanedioate, divinyl dodecanedioate, and divinyl octadecanedioate.

As examples of these copolymers, mention may be made of the copolymers: vinyl acetate/allyl stearate, vinyl acetate/vinyl laurate, vinyl acetate/vinyl stearate, vinyl acetate/octadecene, vinyl acetate/octadecylvinylether, vinyl propionate/allyl laurate, vinyl propionate/vinyl laurate, vinyl stearate/octadecene-1, vinyl acetate/dodecene-1, vinyl stearate/ethylvinylether, vinyl propionate/cetylvinylether, vinyl stearate/allyl acetate, vinyl dimethyl-2,2-octanoate/vinyl laurate, allyldimethyl-2,2-pentanoate/vinyl laurate, vinyl dimethyl propionate/vinyl stearate, allyl dimethyl propionate/vinyl stearate, vinyl propionate/vinyl stearate, cross-linked with 0.2 % of divinylbenzene, vinyl dimethyl propionate/vinyl laurate, cross-linked with 0.2 % of divinylbenzene, vinyl

acetate/octadecylvinylether cross-linked with 0.2% of tetraallyloxyethane, vinyl acetate/allyl stearate, cross-linked with 0.2% of divinylbenzene, vinyl acetate/octadecene-1 cross-linked with 0.2% of divinyl benzene and allyl propionate/allyl stearate cross-linked with 0.2% of divinyl benzene.

5 As liposoluble film-forming polymers, mention may also be made of liposoluble copolymers, and in particular those resulting from copolymerization of vinyl esters having 9 to 22 carbon atoms or of alkyl acrylates or methacrylates, the alkyl radicals having 10 to 20 carbon atoms.

Such liposoluble copolymers may be selected from copolymers of polyvinyl
10 stearate, of polyvinyl stearate cross-linked with divinyl benzene, of diallylether or diallylphthalate, copolymers of stearyl poly(meth)acrylate, polyvinyl laurate, polylauryl (meth)acrylate, these poly(meth)acrylates may be cross-linked with ethyleneglycol or tetraethyleneglycol dimethacrylate.

The liposoluble copolymers defined earlier are known and notably described in
15 application FR-A-2232303; they may have an average weight molecular weight ranging from 2,000 to 500,000 and preferably from 4,000 to 200,000.

As liposoluble film-forming polymers which may be used in the invention, mention may also be made of polyalkylenes and notably copolymers of C₂-C₂₀ alkenes, such as polybutene, alkylcelluloses with a saturated or unsaturated linear or branched
20 C₁-C₈ alkyl radical such as ethylcellulose and propylcellulose, copolymers of vinylpyrrolidone (VP) and notably copolymers of vinylpyrrolidone and of C₂-C₄₀ and better C₃-C₂₀ alkenes. As an example of a VP copolymer which may be used in the invention, mention may be made of the copolymer of VP/vinyl acetate, VP/ethyl methacrylate, butylated polyvinylpyrrolidone (PVP), VP/ethylmethacrylate/methacrylic
25 acid, VP/eicosene, VP/hexadecene, VP/triacontene, VP/styrene, VP/acrylic acid/lauryl methacrylate.

Mention may also be made of silicone resins, generally soluble or swellable in silicone oils, which are polymers of cross-linked polyorganosiloxanes. The nomenclature of silicone resins is known as « MDTQ », the resin being described according to different
30 siloxane monomeric units which it comprises, each of the letters « MDTQ » characterizing a unit type.

As examples of commercially available polymethylsilsesquioxane resins,

mention may be made of those which are marketed:

- by Wacker under reference Resin MK such as Belsil PMS MK:
- by SHIN-ETSU under references KR-220L.
- As siloxysilicate resins, mention may be made of trimethylsiloxysilicate

5 resins (TMS) such as those marketed under reference SR1000 by General Electric or under reference TMS 803 by Wacker. Mention may further be made of trimethylsiloxysilicate resins marketed in a solvent such as cyclomethicone, sold under the name of « KF-7312J » by Shin-Etsu, « DC 749 », « DC 593 » by Dow Corning.

10 Mention may also be made of copolymers of silicone resins such as those mentioned above with polydimethylsiloxanes, such as pressure-sensitive adhesive copolymers marketed by Dow Corning under the reference BIO-PSA and described in document US 5,162,410 or further silicone copolymers from the reaction of a silicone resin, such as those described above, and of a diorganosiloxane as described in document WO 2004/073626.

15 According to an embodiment of the invention, the film-forming polymer is a film-forming linear block ethylene polymer, which preferably comprises at least one first block and at least one second block having different glassy transition temperatures (T_g), said first and second blocks being linked together by an intermediate block comprising at least one constitutive monomer of the first block and at least one constitutive monomer of
20 the second block.

Advantageously, the first and second blocks of the block polymer are incompatible with each other.

Such polymers are described for example in documents EP 1411069 or WO04/028488.

25 The film-forming polymer may also be present in the composition as dispersed particles in an aqueous phase or in a non-aqueous solvent phase generally known as latex or pseudo-latex. The preparation techniques of these dispersions are well-known to one skilled in the art.

30 As an aqueous dispersion of film-forming polymer, it is possible to use acrylic dispersions sold under the names of Neocryl XK-90[®], Neocryl A-1070[®], Neocryl A-1090[®], Neocryl BT-62[®], Neocryl A-1079[®] et Neocryl A-523[®] by AVECIA-NEORESINS, Dow Latex 432[®] by DOW CHEMICAL, Daitosol 5000 AD[®] or Daitosol 5000 SJ[®] by

DAITO KASEY KOGYO; Syntran 5760[®] by Interpolymer, Allianz OPT by ROHM & HAAS, aqueous dispersions of acrylic or styrene/acrylic polymers sold under the brand name JONCRYL[®] by JOHNSON POLYMER or further aqueous dispersions of polyurethanes sold under the names of Neorez R-981[®] and Neorez R-974[®] by AVECIA-NEORESINS, Avalure UR-405[®], Avalure UR-410[®], Avalure UR-425[®], Avalure UR-450[®], Sancure 875[®], Sancure 861[®], Sancure 878[®] and Sancure 2060[®] by GOODRICH, Impranil 85[®] by BAYER, Aquamere H-1511[®] by HYDROMER; sulfopolyesters sold under the brand name of Eastman AQ[®] by Eastman Chemical Products, vinyl dispersions such as Mexomere PAM[®] from CHIMEX and mixtures thereof.

As examples of non-aqueous dispersions of film-forming polymer, mention may be made of acrylic dispersions in isododecane such as Mexomere PAP[®] from CHIMEX, dispersions of particles of grafted ethylene polymer, preferably an acrylic polymer, in a liquid fatty phase, the ethylene polymer being advantageously dispersed in the absence of additional stabilizer at the surface of the particles, as notably described in document WO 04/055081.

The composition according to the invention may comprise a plasticizer promoting the formation of a film with the film-forming polymer. Such a plasticizer may be selected from all the compounds known to one skilled in the art as being capable of fulfilling the sought function.

Coloring material

The composition according to the invention may also comprise at least one coloring material such as powdery materials, liposoluble coloring agents, hydrosoluble coloring agents.

The powdery coloring materials may be selected from pigments and mothers of pearls.

The pigments may be white or colored, mineral and/or organic, coated or not. Among the mineral pigments, mention may be made of titanium dioxide, optionally surface-treated, zirconium, zinc or cerium oxides, as well as iron or chromium oxides manganese violet, ultramarine blue, chromium hydrates and ferric blue. Among the organic pigments, mention may be made of carbon black, pigments of the D & C type, and lacquers based on cochineal carmine, barium, strontium, calcium, aluminium.

The mothers of pearls may be selected from white iridescent pigments such as mica coated with titanium or with bismuth oxychloride, colored iridescent pigments such as titanium mica with iron oxides, titanium mica with notably ferric blue or chromium oxide, titanium mica with an organic pigment of the aforementioned type, as well as
5 iridescent pigments based on bismuth oxychloride.

The liposoluble coloring agents are for example Sudan red, D&C Red 17, D&C Green 6, β -carotene, soya bean oil, Sudan brown, D&C Yellow 11, D&C Violet 2, D&C Orange 5, quinoline yellow, annatto.

These coloring materials may be present with a content ranging from 0.01 to
10 30 % by weight based on the total weight of the composition.

Fillers

The composition of the invention may further comprise one filler.

Fillers may be selected from those well-known to one skilled in the art and
15 currently used in cosmetic compositions. The fillers may be mineral or organic, lamellar or spherical. Mention may be made of talc, mica, silica, kaolin, polyamide powders such as Nylon[®] marketed under the name of Orgasol[®] by Atochem, powders of poly- β -alanine and of polyethylene, the powders of tetrafluoroethylene polymers such as Teflon[®], lauroyl-lysine, starch, boron nitride, expanded polymeric hollow microspheres such as those of
20 polyvinylidene/acrylonitrile chloride like those marketed under the name of Expancel[®] by Nobel Industrie, acrylic powders such as those marketed under the name of Polytrap[®] by Dow Corning, polymethyl methacrylate particles and silicone resin microbeads (Tospearls[®] from Toshiba, for example), precipitated calcium carbonate, magnesium carbonate and hydrocarbonate, hydroxyapatite, hollow silica microspheres (Silica Beads[®]
25 from MAPRECOS), glass or ceramic microcapsules, metal soaps derived from organic carboxylic acids having 8-22 carbon atoms, and in particular 12-18 carbon atoms, for example zinc, magnesium or lithium stearate, zinc laurate, magnesium myristate.

A compound capable of swelling with heat and notably thermo-expansible particles such as non-expanded microspheres of vinylidene chloride/
30 acrylonitrile/methylmethacrylate copolymer or acrylonitrile homopolymer copolymer may also be used, such as for example those marketed under references Expancel[®] 820 DU 40 and Expancel[®] 007WU by AKZO NOBEL, respectively.

The fillers may account for 0.1 to 25 %, in particular for 1 to 20 % by weight based on the total weight of the composition.

The coloring agent or the filler may further be present as a « particle paste ».

The composition according to the invention, when it contains solid particles at
5 room temperature, may be prepared by introducing them into the composition as a colloidal dispersion also called « particle paste », as described in application WO 02/39961, the contents of which is incorporated by reference into the present application.

By colloidal dispersion or « particle paste », is meant in the sense of the
10 invention a concentrated colloidal dispersion of particles either coated or not in a continuous medium, stabilized with a dispersant or optionally without any dispersant. These particles may be selected from pigments, mothers of pearls, solid fillers and mixtures thereof. These particles may be of any shape notably of a spherical or elongated shape, like fibers. They are insoluble in the medium.

15 The dispersant is used for protecting the dispersed particles against their agglomeration or flocculation. The dispersant concentration generally used for stabilizing a colloidal dispersion is from 0.3 to 5 mg/m², preferably from 0.5 to 4 mg/m², of particle surface. This dispersant may be a surfactant, an oligomer, a polymer or a mixture of several of them, bearing one or more functionalities having strong affinity for the surface
20 of the particles to be dispersed. In particular, they may physically or chemically adhere to the surface of the pigments. These dispersants further have at least one functional group compatible with or soluble in the continuous medium. In particular, esters of hydroxyl-12-stearic acid in particular, and of a C₈-C₂₀ fatty acid and of a polyol such as glycerol, diglycerol, such as the stearate of poly(12-hydroxystearic) acid with a molecular weight of
25 about 750g/mol are used, such as the one sold under the name of Solsperse 21 000 by Avecia, polyglyceryl-2 dipolyhydroxystearate (CTFA name) sold under the reference of Dehymyls PGPH by Henkel or further polyhydroxystearic acid like the one sold under reference Arlcel P100 by Uniqema and mixtures thereof.

As another dispersant which may be used in the composition of the invention,
30 mention may be made of quaternary ammonium derivatives of poly-condensed fatty acids such as Solsperse 17 000 sold by Avecia, mixtures of poly dimethylsiloxane/oxypropylene such as those sold by Dow Corning under references DC2-5185, DC2-5225 C.

Polydihydroxystearic acid and esters of hydroxy-12-stearic acid are preferably intended for a hydrocarbon or fluorinated medium, while mixtures of oxyethylenated/oxypropylenated dimethylsiloxane are preferably intended for a silicone medium.

5 The colloidal dispersion is a suspension of particles of generally micron size ($<10\text{ }\mu\text{m}$) in a continuous medium. The volume fraction of particles in a concentrated dispersion is from 20 % to 40 %, preferably greater than 30 %, which corresponds to a weight content which may range up to 70% depending on the density of the particles.

10 The particles dispersed in the medium may consist of mineral or organic particles or of their mixtures as those described hereafter.

 The continuous medium of the paste may be any medium and contain any solvent or liquid fat and mixtures thereof. Advantageously, the liquid medium of the particle paste is one of the liquid fats or oils, the use of which is desired in the composition, thereby being part of the liquid fatty phase.

15 Advantageously, the « particle paste » or colloidal dispersion is a « pigment paste » containing a colloidal dispersion of colored, coated or non-coated particles. These colored particles are pigments, mothers of pearls, or a mixture of pigments and/or mother of pearls.

20 Advantageously, the colloidal dispersion accounts for 0.5 to 30 % by weight of the composition, better for 2 to 20 % and even better 2 to 15 %.

 The composition of the invention may further comprise any additive usually used in cosmetics such as antioxidants, preservatives, fibers, perfumes, neutralizers, thickeners, vitamins, moisturizers, in particular solar filters, coalescence agents, plasticizers, and mixtures thereof

25 Of course, one skilled in the art will make sure that the optional complementary additives and/or their amount are selected in such a way that the advantageous properties of the composition according to the invention are not or substantially not altered by the contemplated adjunction.

30 The compositions according to the invention may be prepared according to methods known to one skilled in the art.

The invention will be better understood upon reading the detailed description which follows of exemplary non-limiting embodiments thereof, and upon examining the appended drawing, wherein:

- 5 - Figs. 1 to 3 are block diagrams illustrating exemplary methods according to the invention,
- Fig. 4 schematically illustrates an exemplary device for applying the invention,
- Fig. 5 is a top view along V of Fig. 4,
- Fig. 6 illustrates the heating-up of the composition with the heating device
10 of Fig. 4,
- Fig. 7 illustrates a conditioning and application device incorporating a heating device,
- Fig. 8 is an axial, schematic and partial section of an alternative embodiment of the heating device,
- 15 - Fig. 9 illustrates in a perspective view another exemplary embodiment of a conditioning and application device incorporating a heating device,
- Fig. 10 illustrates the device of Fig. 9 after removing the closure cap,
- Fig. 11 is a top view of the device of Fig. 10,
- Fig. 12 is a view analogous to Fig. 10, the composition block having been
20 taken out,
- Fig. 13 illustrates in an elevational view, another exemplary conditioning and application device integrating a heating device,
- Fig. 14 schematically illustrates, partly as an axial sectional view, the heating device of Fig. 13,
- 25 - Fig. 15 illustrates the contacting of the product with the heating device of Fig. 14,
- Fig. 16 schematically illustrates in a perspective view, another example of conditioning and application device made according to the invention,
- Fig. 17 is a transverse section along XVII-XVII of Fig. 16,
- 30 - Fig. 18 illustrates in an elevational view another exemplary embodiment of the conditioning and application device,

- Fig. 19 is a schematic and partial sectional view of the device of Fig. 18, when making up the eyelashes,

- Figs. 20 and 21 schematically and partly illustrate other examples of devices for making up eyelashes made according to the invention,

5 - Fig. 22 schematically and partly illustrates an exemplary layout of the heating device relatively to a composition stick, and

- Fig. 23 illustrates another exemplary device, made according to the invention.

10 In the following, exemplary devices will be described allowing i.a. the application of methods for cosmetic treatment of keratinous fibers.

These methods may include, as illustrated in Fig. 1:

15 a) a first step 10 consisting of heating up an application surface of a solid piece of product by means of an artificial heat source located on the outside of the piece of product, notably an application surface of a product stick, in order to bring it to a temperature above that of a portion of the product mass, away from the application surface and which remains solid during the application, and

b) a second step 20 consisting of applying the thereby heated-up application surface on a region to be treated in order to transfer the product.

In an alternative embodiment of the invention, the method may include:

20 a) a first step 30 consisting of heating an application member,

b) a second step 40 consisting of picking up the composition on a solid piece of composition by means of the thereby heated-up application member, the application member causing upon contact with the composition, local melting of the outer surface of the composition piece, and

25 c) a third step 50 consisting of applying the composition on the keratinous fibers.

Further alternatively, as illustrated in Fig. 3, the method may include:

a) a first step 10 identical with that of the method described with reference to Fig. 1, and then

30 b) a second step 60 consisting of transferring the heated-up composition onto an application member, and

c) a third step 70 consisting of applying the composition thereby transferred on the application member, onto the keratinous fibers, preferably while the composition is still at a temperature clearly above room temperature, for example by more than 15°C.

The application member on which the composition is transferred may be a heating member if necessary.

An application device 100 is illustrated in Fig. 4, which may be used for applying for example the method described with reference to Fig. 1.

This device 100 includes a conditioning and application device 101 of the product P and a heating device 102, which in the relevant example is independent of the device 101 and for example includes a casing 103 provided with an aperture 104 for at least partly introducing the device 101 in order to heat up the product P. The latter for example is an eyelash make-up composition, the formulation of which was described above.

The device 101 may exist under various forms and defines a grip surface for the user by which he/she may handle the product P without any direct contact with fingers.

The device 101 may also allow the product P to be moved relatively to the grip surface gradually as the product P is consumed.

The product P for example appears within the device 101 in the form of an elongated stick along an axis X, for example with a circular cross-section.

Various mechanisms may be used for causing this relative displacement and the device 101 for example includes a mechanism including two portions 105 and 106 which may rotate relatively to each other, and means by which the relative rotation of the portions 5 to 6 may be transformed into an axial displacement along the X axis.

The stick is for example borne within the aforementioned mechanism, by a cup not shown, including lugs engaged into two parts respectively belonging to the portions 105 and 106, one of which includes longitudinal rectilinear slots and the other one helical slots, so that a rotation of these two parts is accompanied by an axial displacement of the cup and of the stick. Examples of mechanisms which may be suitable, are described in publications US 6,340,258, US 6,086,276, US 6,371,673, US 5,171,096 and US 7,293,926, the contents of which are incorporated by reference.

The conditioning and application device 101 may include protruding elements, for combing the eyelashes, for example as teeth 109, which may be positioned for example along a row all around the stick of product P, as this is seen in Fig. 5.

5 The height of the teeth 109 may be comprised between 1 and 10 mm. The teeth 109 may be molded as a single part in plastic material. The teeth 109 may if necessary be molded as a single part with the upper portion 106 of the device 101. The teeth 109 may be fixed relatively to their support.

The casing 103 houses an electric source or includes a means for connection to an electric source, for example the mains via a low voltage transformer.

10 The casing 103 may also include starting means 110, such as for example an on/off switch, as well as one or more indicators 111 and 112 for signaling that it is switched on and/or the end of the warm-up of the product P.

The aperture 104 allows the end 115 of the stick to be brought in proximity to a heating means 120 present in the casing 103, as illustrated in Fig. 6.

15 The aperture 104 is for example of a section adapted to the device 101, so that the engagement of the latter into the casing brings the end 115 of the stick into a predefined position, at least along two spatial directions, relatively to the heating means 120.

20 The heating device 102 may include any adapted sensor 121 with which placement of the device 101 on the casing and optionally the positioning of the stick relatively to the heating means 120 may be detected.

The heating device 102 may include any adapted sensor, capable of evaluating the distance between the end 115 of the stick and the heating means 120, in order to only allow starting of the latter when a predefined distance is observed and/or in order to adjust
25 the heating power according to the distance between the heating means and the piece of product.

The heating means 120 may be a heating system by emission of infrared radiation towards the end 115 of the stick, for example by means of a halogen or incandescent lamp or by blowing hot air towards the end 115.

30 The end 115 of the stick may further be heated up by exposure to radiowave radiation, for example microwaves, focussed on the end 115 of the stick or by ultrasonic vibrations.

The heating of the end of the stick may further take place by conduction, upon contact with a hot surface. In this case, the heating means includes a heating surface which may be brought to the adequate temperature by any heating means, for example an electric resistor.

5 Once the end 115 is heated up, for example brought to a temperature greater than or equal to 45°C, the upper end 115 of the stick may be brought into contact with the eyelashes to be made up. If necessary, a movement is exerted in order to displace the product along the eyelashes to their contact.

10 In the alternative embodiments of Figs. 7-9, the heating device includes a heating means which is integral with the conditioning and application device 101 and which may include, as illustrated, a ring-shaped heating member, crossed by the stick. The heating member is for example of a section greater than or equal to that of the stick.

15 The heating device for example includes a control member 171 on which the user may press in order to switch on operation of the heating member. The latter for example includes a heating resistor which may heat up the end of the stick by conduction, convection and/or radiation.

In order to use the device illustrated in Fig. 7, the user brings the end of the stick to the level of the heating member and switches on the heating by pressing on the control member 171.

20 The heating device may include an indicator lamp signaling to the user that the heating member is operating and/or that the temperature of use is reached.

The user may optionally switch off the heating when he/she notices visually that the end of the stick has changed its aspect following the rise in temperature, for example has become bright.

25 The user may then bring the surface of the softened product into contact with the eyelashes.

In the alternative illustrated in Fig. 8, the stick at its upper end passes through an aperture 174 with a shrunk section with respect to the section of the body of the stick.

30 Softening of the stick upon contacting the heating member, may be accompanied, in this example, by deformation of the end of the stick and allows the product to flow out.

The shrunk aperture may increase the precision for applying the product and prevent the stick from being moved forward relatively to the heating member as long as sufficient softening has not been achieved.

5 In the alternative of Figs. 9-12, the heating device is integrated to the conditioning device, for example in proximity to the upper portion of the conditioning device, bearing the element 109 for combing the eyelashes.

The conditioning device may include a body 180 which houses the stick of product P, which for example has, as this may notably be seen in Fig. 11, a general flattened shape in cross-section.

10 The stick of product P may have a transverse kidney-shaped section of curvilinear major axis C, in order to follow the natural curvature of the fringe of the eyelashes.

The product may be borne by a supporting part which may be displaced to the body 180 by a cursor 181 maneuvered by the user, which may for example slide between
15 two longitudinal grooves 182.

The device may include a base 185 which for example houses the electric source and supports an on/off switch 186 and if necessary one or more indicators 187 relating to the operation of the device.

20 Fig. 13 illustrates an alternative embodiment of the device 100 wherein the heating device 102 is integrated into a cap 190 with which the end 115 of the stick of product P may be heated up prior to its application on the keratinous materials.

The heating device 102 may house a non-apparent electric source, for example consisting of one or more battery cells or batteries, and a heating member for example including an electric resistor powered by the electric source.

25 Examples of heating members which are suitable, are disclosed US 2007/0286665 A1, for example.

The heating member is positioned so as to raise the temperature of a heating surface 200 which, in the example of Figs. 13-15, may come into contact with the stick, as illustrated in Fig. 15, in order to raise the temperature of distal end 115 of the latter.

30 The heating device 102 may include a switch 110 allowing the user to start or stop the heating device as well as an indicator 201 of operation, for example an indicator lamp which is lit when the heating surface is being heated. The heating device 102 may

optionally include any means for controlling the temperature at the surface 200, so that the latter does not exceed a predefined value.

The heating device 102 may optionally comprise any means for controlling the temperature of the heating surface 200, so that the latter does not exceed a predefined value.

When the heating surface is inaccessible to the user, a relatively high heating temperature but compatible with the product may be accepted. On the other hand, when the heated surface may be contacted by the user, a temperature not exceeding 65°C is preferred.

The heating device 102 may also, if necessary, include a timer so that the piece of product can only be heated up for a predefined time, in order to avoid premature wearing out of the electric power source and/or avoid bringing the whole of the piece of product to an excessive temperature .

In certain exemplary embodiments, the heating device 102 may include adapted sensor allowing the operation of the heating to be initiated only in the case of effective contact of the heating surface with the piece of the product.

For example, the heating device 102 may include a contact pressure sensor between the heating surface 200 and the stick and only allow heating of the heating surface 20 in the case of proven contact with the stick.

The heating surface 200 may for example be defined by a contact part 210, for example axially mobile along the X axis relatively to the body 205 of the heating device against the return action of an elastic return member 206, such as for example a spring housed inside the contact part 210, as illustrated in Fig. 15.

In this figure 15, a heating device is illustrated, including an electric resistor 215 flattened down in the bottom of the contact part 210, in order to be as close as possible to the heating surface 200.

The contact part 210 is for example made in a good heat-conductive metal, with small wall thickness, so as to have low thermal inertia, for example aluminium.

In this example like in the previous ones, the stick may have a transverse cross-section comprised between 0.1 and 5 cm².

The device may be used by first switching on the heating device 102 and then waiting for the required time so that the end 115 of the stick which defines the application surface is raised to the sought temperature.

Setting of the temperature may for example be signaled by the indicator 201,
5 which may for example pass from a continuous lit-up state signaling the starting of the device to a blinking lit-up state or may change color when the sought temperature is reached.

Once the end of the stick is heated up, the device 101 may be separated from the cap 190 and the user may apply the product on the eyelashes. Softening of the product
10 at the end 115 of the stick ensures comfortable application, good transfer on the eyelashes with a thick deposit.

The body of the stick is at room temperature or a at a slightly higher temperature, but not sufficient for compromising the mechanical strength required for withstanding the mechanical forces generated by the making of the device 101 and the
15 application.

The temperature difference between the application surface and the body of the stick, notably opposite to the application surface, for example is of at least 20 °C, or even at least 30 °C, when the stick has its initial length, upon first use.

The device 100 illustrated in Fig. 16 combines a conditioning and application
20 device 101 and a heating device 102. The product appears for example as a stick, which may be solid or hollow and supported by a core in a different material, for example a thermoplastic material.

In the example of Fig. 16, the application surface is defined by the side surface 310 of the product stick, this side surface being for example a portion of an axisymmetrical
25 cylinder. The device 100 may include a handle 312 which may for example house an electric source formed by one or more battery cells or batteries. The handle is extended with a wall 314 which may bear or define elements 109 for combing the eyelashes, as seen in Fig. 16.

The device 100 may include, opposite to the handle 312, a thumb wheel 316
30 which may for example allow the user to rotate the product relatively to the heating device 102.

The latter is for example positioned, as this is seen in Fig. 17, on an internal face of the wall 314 and for example includes one or more resistive wires 318. In an exemplary embodiment, the wall 314 may rotate relatively to the handle, which may for example allow a portion covered by the wall 314 to be heated up and then once the sought
5 temperature is reached, this portion may be exposed by rotating the wall 314 so as to be able to use it for combing keratinous fibers.

In one alternative, rotation of the thumb wheel 316 causes displacement of the piece of product P, the wall 314 being fixed relatively to the handle 312.

In another non-illustrated alternative, the product stick extends in the extension
10 of the handle with its longitudinal axis coinciding with that of the handle and the side surface of the product stick is heated up by means of the heating device housed in a closure cap which will be fixed onto the handle and will cover the product stick.

In certain exemplary embodiments, notably as described above, the heated-up surface of the piece of product may be moved on the eyelashes by the user, for example
15 moving it towards the tip of the eyelashes. The eyelashes may not be pressed against the product.

In the alternative embodiment illustrated in Figs. 18 and 19, the eyelashes H may be nipped between the piece of product P on the one hand and the heating device on the other hand. The eyelashes may be engaged in between the teeth 109 or another element
20 for combing eyelashes while they are held by the heated device 102 against the piece of product, as illustrated in Fig. 19.

In the exemplary embodiment of Fig. 18, the heating device 102 may be moved away from the piece of product or closer to it, the device being for example mounted on rods 330 which may slide in the device 101, for example against the return action of an
25 elastic member such as a spring. A cursor 332 may allow displacement of the piece of product P within the device 101 in order to have it move up gradually during its wear. The hot surface of the heating device 102 is borne by a part 334 which is mounted on the rod 330 and which may be brought closer to the piece of product when the user presses thereon.

In order to use the device of Fig. 18, the user may for example press on the part
30 334 so as to bring the hot surface 336 of the heating device 102 into contact with the end face of the piece of product P, and then once the product has sufficiently softened at the

surface, to move the part 334 away in order to allow engagement of the eyelashes between this part and the piece of product and the part 334 may then again be brought closer to the piece of product in order to press the eyelashes against the piece of product, as illustrated in Fig. 19.

5 In the alternative of Fig. 20, the piece of product appears as a sleeve borne by a core 340 which may be rotary, in order to create a relative movement between the eyelashes and the surface of the product without having the user displace the product.

 The eyelashes H may be flattened against the product by a press roll 350 which may include a heating device or be heated up by a heating device. The product P on the
10 one hand and the press roll on the other hand may for example be borne by two branches of a claw, which allows them to be moved away from each other or brought closer to each other at will.

 An alternative embodiment is illustrated in Fig. 21, wherein the product is not directly applied by contact of the eyelashes H on the piece of product but via a transfer
15 member 360. In this example, the transfer member is for example heated to a sufficient temperature for softening the product and picking up some of it, and it may transfer the product on the eyelashes for example by rotating both when contacting the product and the eyelashes, as illustrated in Fig. 21. The piece of product P may optionally be flattened
20 against the transfer member 360 by a spring 361, which makes it possible to guarantee a contact with the product and with the transfer member in spite of the wear of the product. In one alternative, the product is heated at its contact surface with the transfer member 360, the latter not being heated.

 In the alternative of Fig. 22, the fact that the product may appear as a block of product, the side surface 370 of which is used for application on the eyelashes, is
25 illustrated and the heating device 102 may include a resistive element 371 wound around the stick of product in order to heat up its side surface.

 In Fig. 23, the possibility for the heating device 102 of including one or more application elements 372, for example teeth, hair or ribs, is illustrated. The application
30 elements allow the eyelashes to be combed. A hot source is for example positioned under these application elements in order to sufficiently raise their temperature and during the contact of the application member 373 of the heat device 102 with the piece of the product P, allowing a certain amount of it to be picked up and the eyelashes may then be

made up with it. The application member 312 is for example connected through a rod 374 to a handle 375 which may house an electric source formed by one or more battery cells or batteries.

In another alternative, the device is similar to the one of Fig. 16, the product being set into rotation relatively to the handle by a mechanical system, a portion of its side surface thereby passing automatically from a position where it is located facing the heating device and may be heated by the latter, to a position away from the heating device, for example diametrically opposite to where it may contact the eyelashes. A means for selecting the direction of rotation may be provided in order to allow a movement of rotation from the middle towards the tip of the eyelashes.

PROPOSED EXAMPLE

The example which follows is presented as an illustration and is not a limitation to the invention. Unless indicated otherwise, the proportions are by mass.

Example 1

black iron oxide	7.30 %
MQ resin ⁽¹⁾	25.0 %
bentone gel in isododecane (Bentone Gel ISD V from Elementis)	6 %
isododecane	33.85 %
Nylon-611/Dimethicone copolymer ⁽²⁾	14.00 %
polyethylene wax ⁽³⁾	9.20 %
mixture of fatty alcohols and hydrocarbons (INCI name: C30-50 alcohols) ⁽⁴⁾	2.25 %
silica microspheres ⁽⁵⁾	1 %
isopropyl alcohol	1.4 %

(1) Trimethylsiloxysilicate SR1000 from Momentive Performance Materials

(2) Dow Corning 2-8179 Gellant from Dow Corning

(3) Performalene 500-L Polyethylene from New Phase Technologies

(4) Performacol 550-L Alcohol from New Phase Technologies

(5) Sunsphere H 51 from AGC SI-TECH

Operating procedure:

The MQ resin is dispersed in isododecane, and then at 105°C, the Nylon-611/Dimethicone copolymer is added, and then the waxes, isopropyl alcohol, silica, pigments and bentone gel.

The stick is hot-cast in a mold or directly in a packaging article and then sudden cooling is carried out in the freezer.

The hardness of the stick has the value of 86 g (i.e. 67,170Nm⁻²) at 20°C and 22 g (i.e. 17,180 Nm⁻²) at 60-70°C (heating temperature of the surface of the product).

The composition of Example 1 is evaluated from a make-up point of view in the following way:

- a specimen of false eyelashes (A) is made up with the composition of Example 1 at room temperature (23°C), by accomplishing 10 passages of the stick over the eyelashes;
- another specimen of false eyelashes (B) is made up with the composition of Example 1 heated beforehand at the surface to 73°C, and after one passage of the stick on the eyelashes.

It is noticed that the specimen (B) comprises eyelashes which are much more loaded with composition than the specimen (A).

Example 2

Black iron oxyde	7,30 %
resin MQ ⁽¹⁾	25,0 %
Bentone gel in isododecane (Bentone Gel ISD V from Elementis)	6 %
Mixture of undecane: tridecane (76 :24) such as made in accordance with example 1 of WO2008/155059	qsp 100 %
Nylon-611/Dimethicone copolymer ⁽²⁾	14,00 %
polyethylene wax ⁽³⁾	9,20 %
Mixture of fatty alcohols and hydrocarbons (INCI : C30-50 alcohols) ⁽⁴⁾	2,25 %
Silica beads ⁽⁵⁾	1 %
isopropyl alcohol	1,4 %

- (1) Trimethylsiloxysilicate SR1000 from Momentive Performance Materials
- (2) Dow Corning 2-8179 Gellant from Dow Corning
- (3) Performalene 500-L Polyethylene from New Phase Technologies
- (4) Performacol 550-L Alcohol from New Phase Technologies
- 5 (5) Sunsphere H 51 from AGC SI-TECH

Operating mode:

The MQ resin is dispersed in isododecane, and then at 105°C, the Nylon-611/Dimethicone copolymer is added, and then the waxes, isopropyl alcohol, silica,
10 pigments and bentone gel.

The stick is hot-cast in a mold or directly in a packaging article and then sudden cooling is carried out in the freezer.

The hardness value of the stick measured with the protocol given above (with a detection threshold of 0,005 N) is 96g (i.e. 74 942 Nm⁻²) at 20°C (product + measuring
15 mobile at 20°C and of 1g at surface of the product at 60-70°C (measuring mobile at 30°C).

The method according to the invention therefore allows a greater deposit to be obtained on the eyelashes.

The invention is not limited to the described example.

The piece of product may for example be made with still other shapes.

20 The expression « including one or comprising one » should be understood as a synonym of « including at least one or comprising at least one ».

CLAIMS

1. A method for cosmetic treatment of human keratinous fibers, comprising:
 - a) heating up with contact to or in the vicinity of a heating device, an outer
5 surface of a solid piece of product, preferably with a hardness greater than or equal to 45g at 20°C, for example greater than or equal to 50g at 20 °C, so as to heat said piece in a localized way with view to only substantially soften said outer surface, and
 - b) applying the thereby softened product on the fibers to be treated.
2. The method according to claim 1, the temperature to which the outer
10 surface is brought being greater than or equal to 40 °C, better 50 °C, still better 60 °C, preferably greater than or equal to 70 °C, and even preferably to 80 °C.
3. The method according to claim 1 or 2, the piece of product having the shape of a stick.
4. The method according to the preceding claim, the heated-up outer surface
15 being defined by the distal end of the piece of product.
5. The method according to claim 3, the heated-up outer surface being defined by at least one portion of the side surface of the piece of product.
6. The method according to any of the preceding claims, the piece of product having a core remaining at a temperature less than or equal to 30 °C during the application,
20 for a room temperature of 20 °C.
7. The method according to any of the preceding claims, the softened product being brought into contact with the keratinous fibers while the softened product is borne by the piece of product.
8. The method according to any of claims 1 to 6, the softened product being
25 brought into contact with the fibers after transfer of the softened product on a support used for the application.
9. The method according to any of the preceding claims, the heating device heating at least one surface of a material other than the product used for the application.
10. The method according to any one of claims 1 to 9, the product comprising
30 a volatile solvent.

11. The method according to the preceding claim, the keratinous fibers being engaged in between protruding elements for combing the fibers during application of the product.

12. A device for conditioning and applying a product intended for application
5 on human keratinous fibers as a solid piece, the piece of product having a hardness greater than 45g at 20°C, for example greater than or equal to 50 g at 20 °C, comprising:

- a support of said solid piece of product, the latter having an outer surface;
- means for assisting with application/finishing, for example in the form of teeth, hair, or reliefs for, simultaneously with or after applying the product on the
10 keratinous fibers, smoothing, combing and/or separating the latter,

- a heating device which may be brought into contact with or in the vicinity of said outer surface for heating said piece in a localized way, in order to only substantially soften said outer surface.

13. The device according to the preceding claim, the means for assisting with
15 application/finishing including a row of protruding elements for combing the fibers.

14. The device according any of the two immediately preceding claims, the means for assisting with application/finishing being positioned or capable of being positioned in the vicinity of the outer surface, for example around all or part of the latter.

15. The device according to any of claims 11 to 13, the means for assisting
20 with application/finishing being heated by the heating device.

16. The device according any of the four immediately preceding claims, the heating device being firmly attached to the piece of product during the use of the device for applying the product on the fibers.

1 / 5

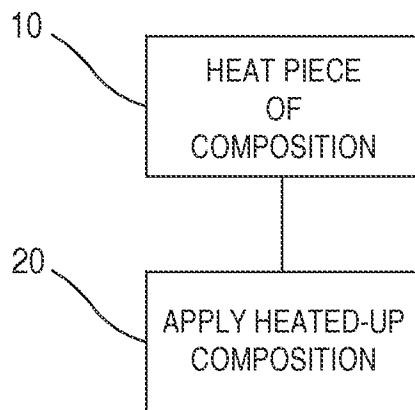


FIG. 1

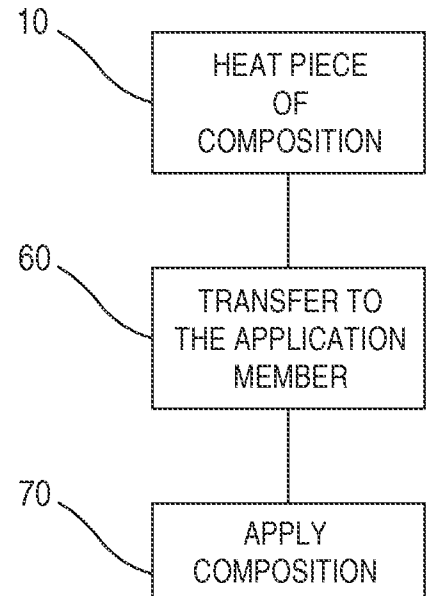


FIG. 3

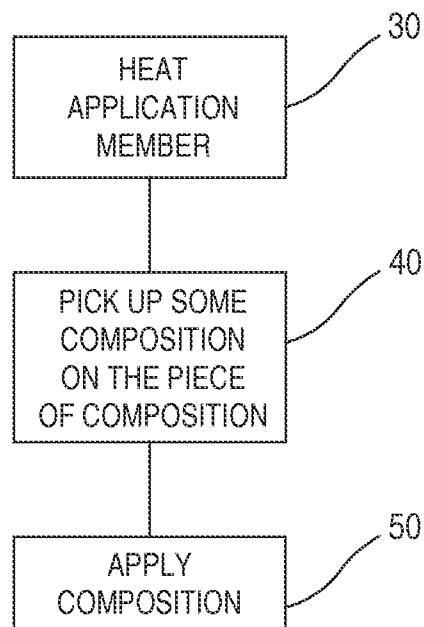


FIG. 2

2 / 5

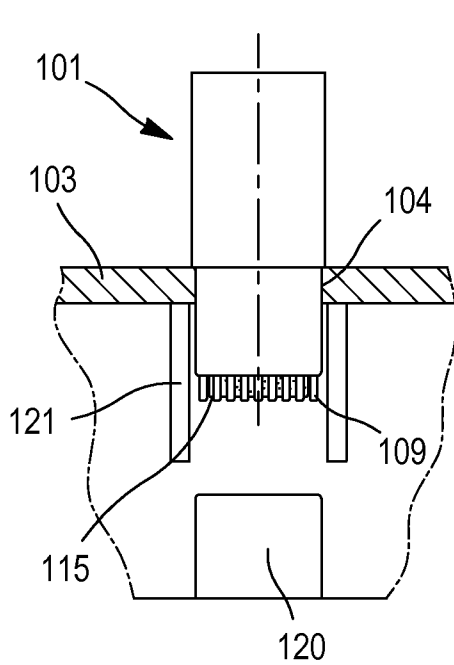
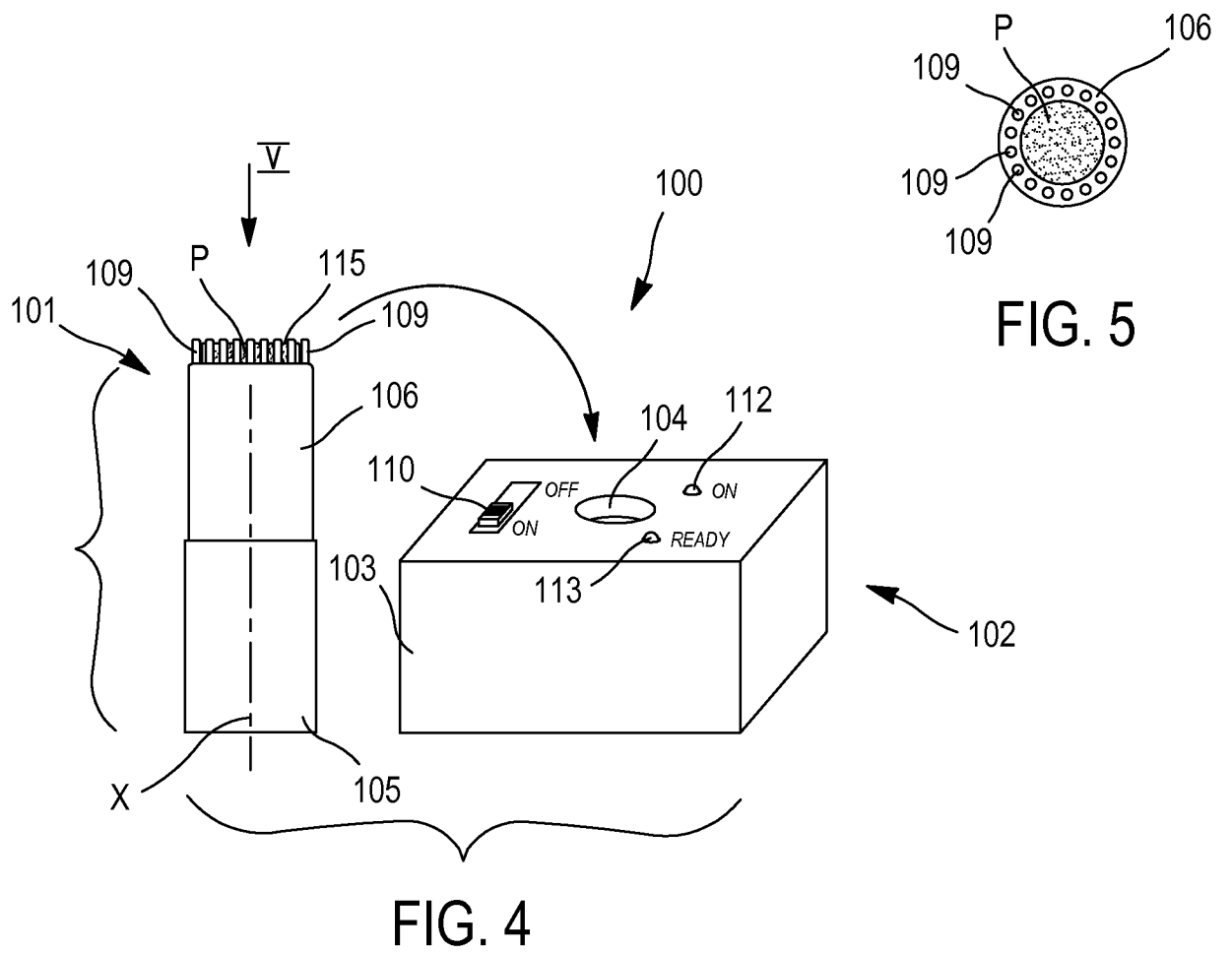


FIG. 6

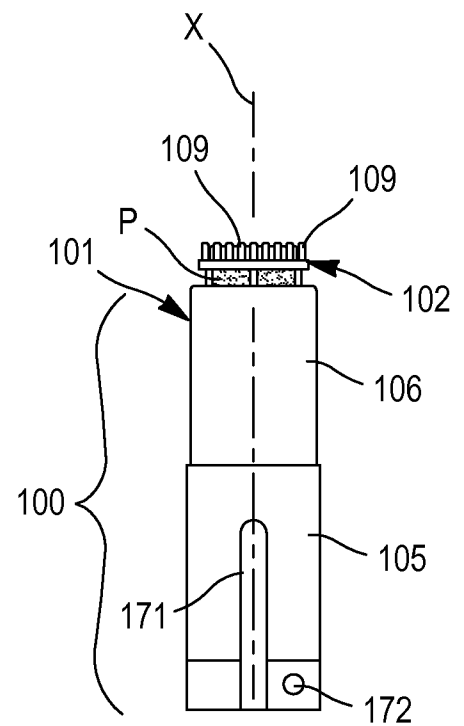


FIG. 7

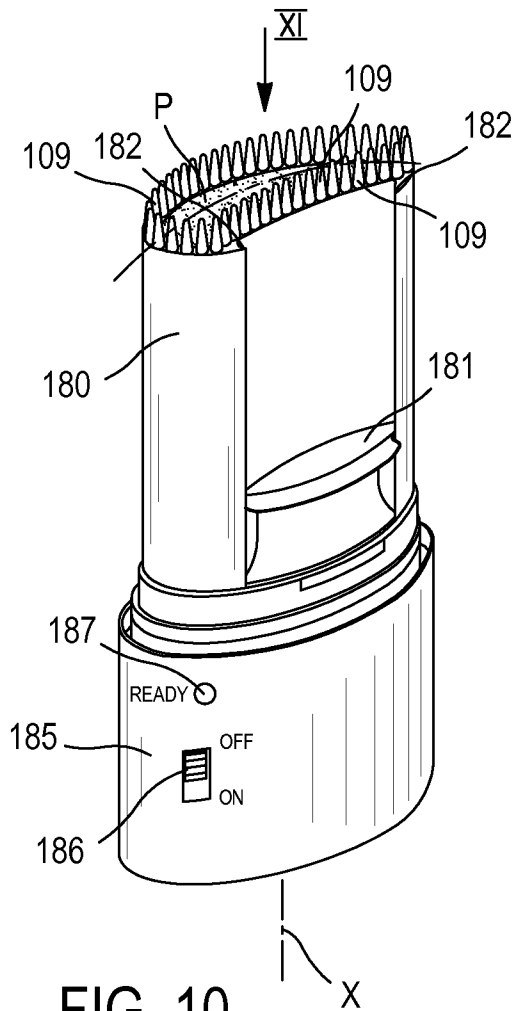


FIG. 10

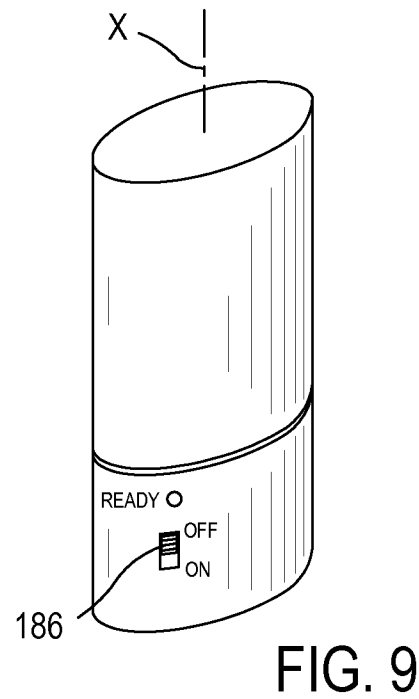


FIG. 9

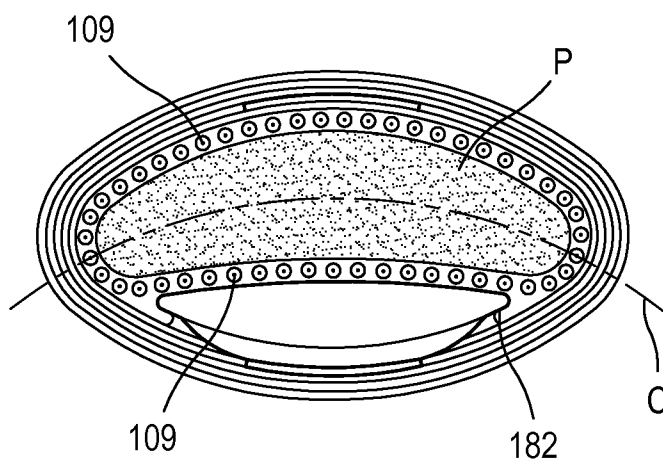


FIG. 11

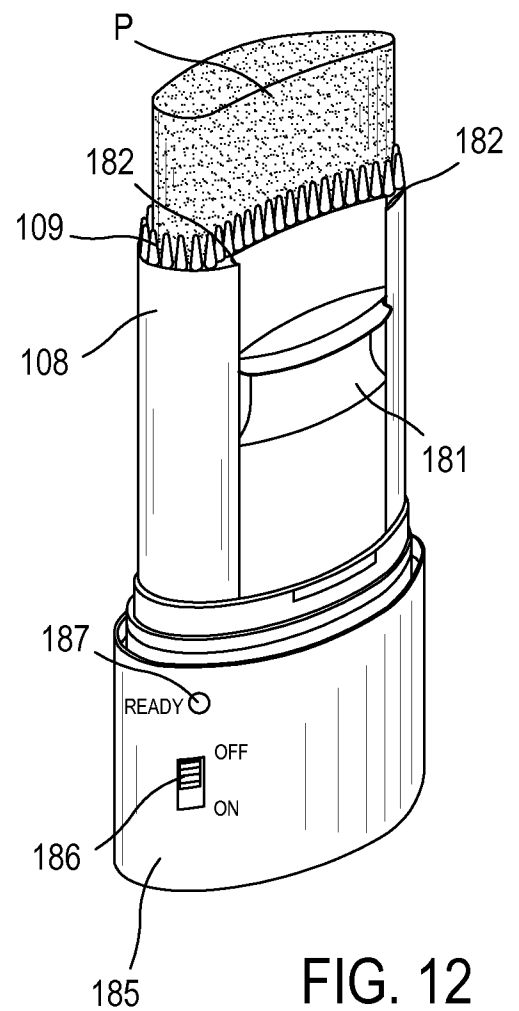


FIG. 12

4 / 5

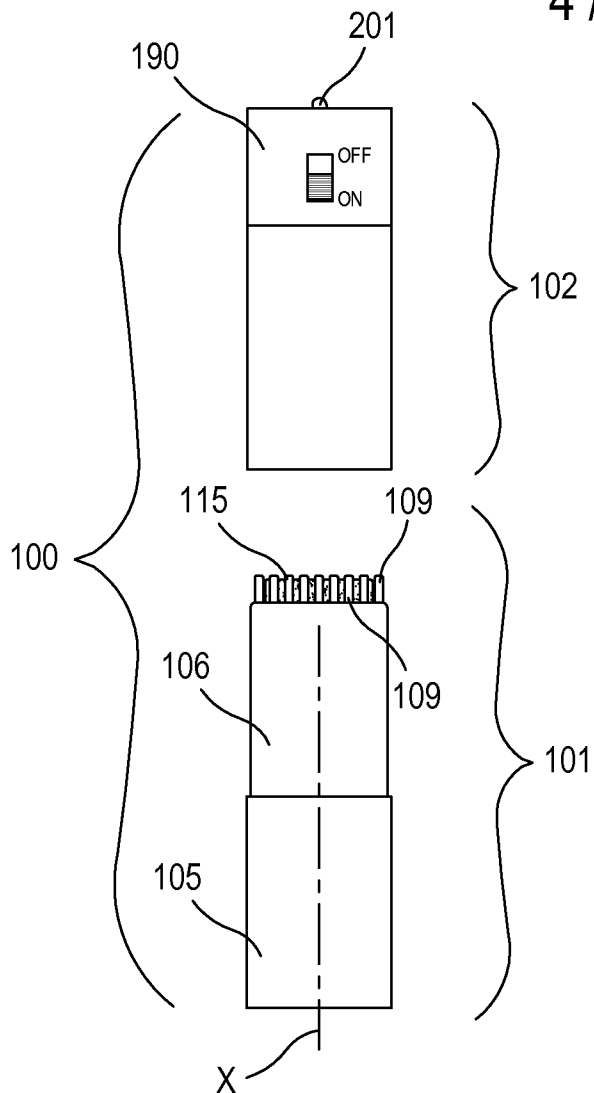


FIG. 13

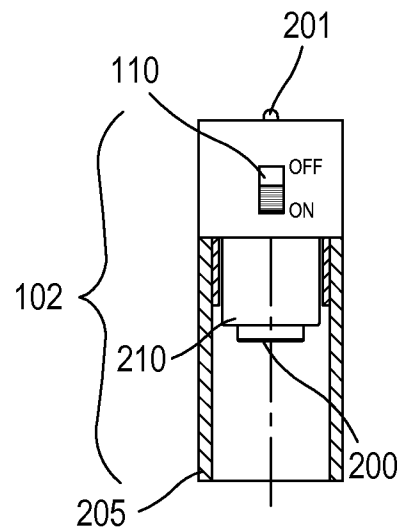


FIG. 14

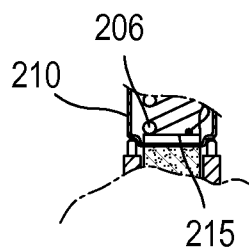


FIG. 15

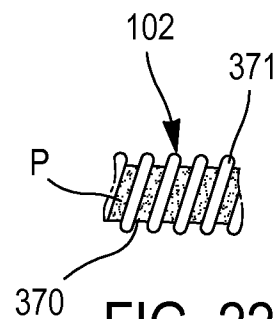


FIG. 22

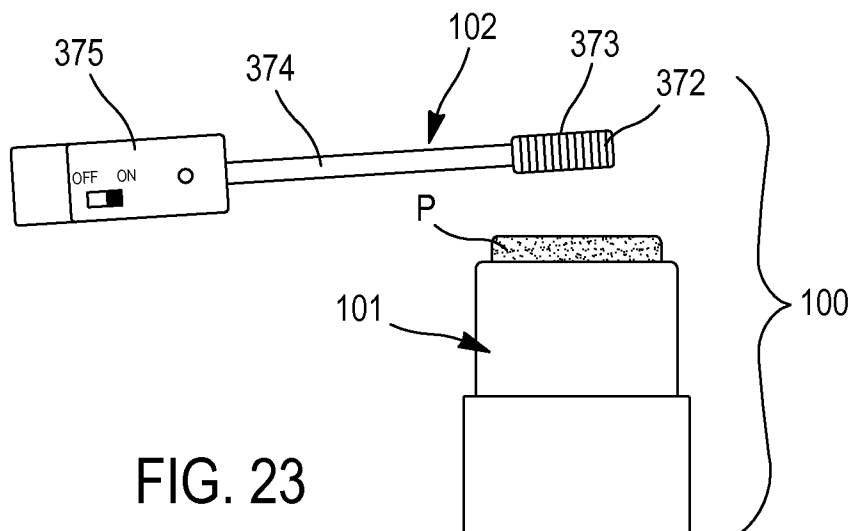


FIG. 23

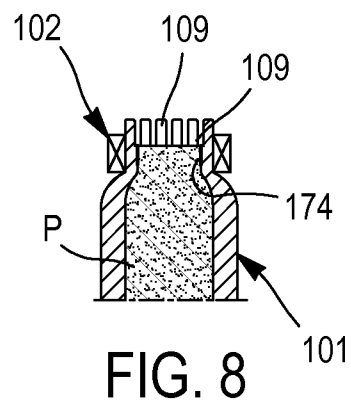


FIG. 8

5 / 5

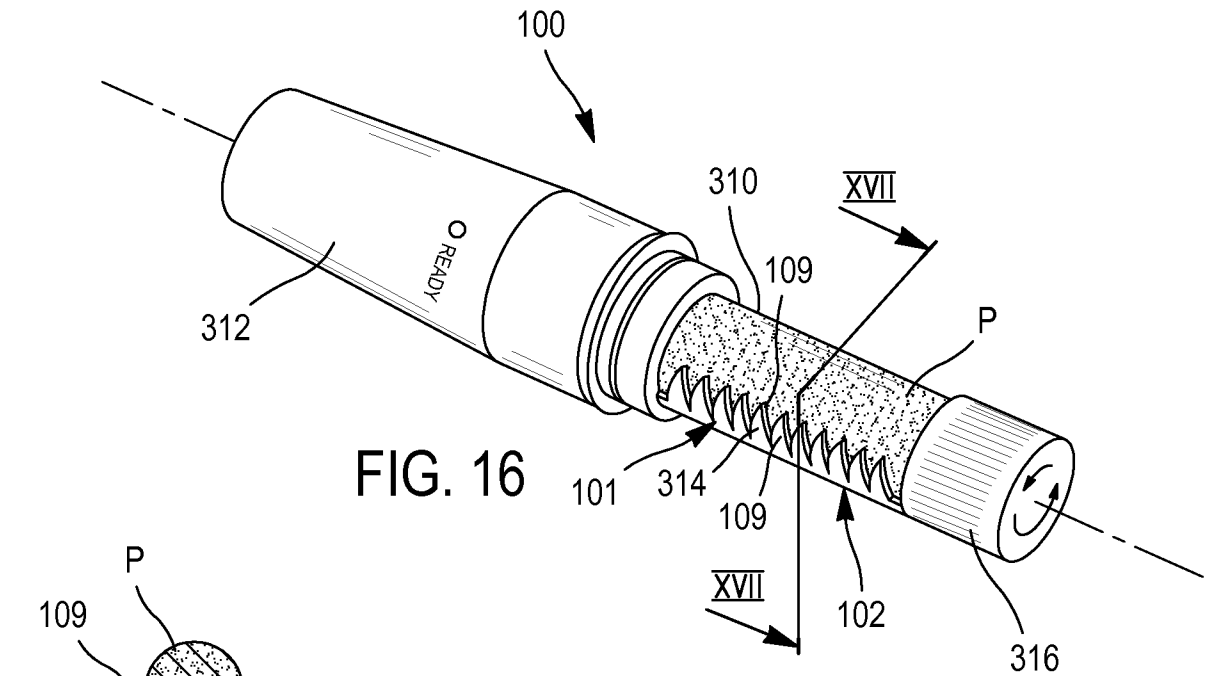


FIG. 16

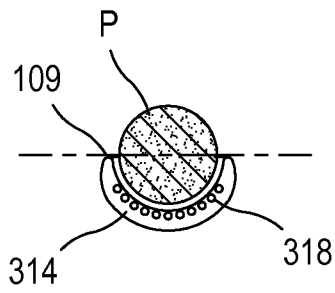


FIG. 17

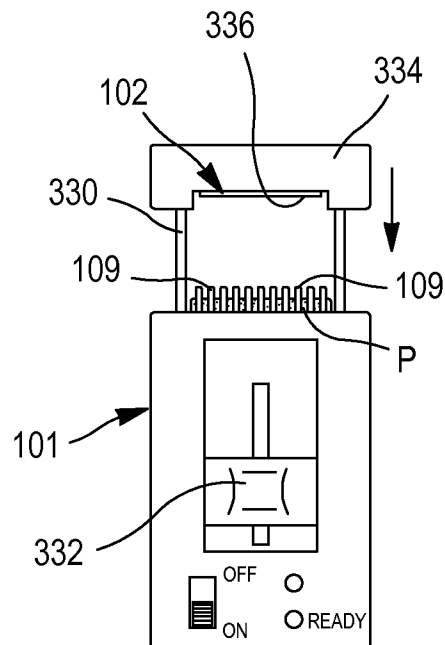


FIG. 18

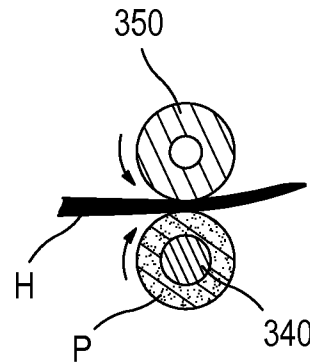


FIG. 20

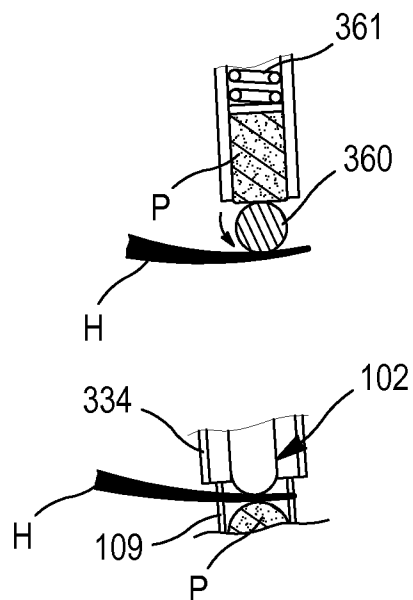


FIG. 21

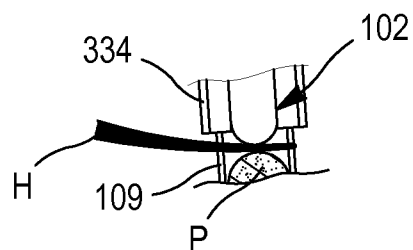


FIG. 19