Title: DEVICES FOR SPRAYING A FRAGRANCING COMPOSITION COMPRISING AT LEAST ONE VOLATILE LIQUID LINEAR ALKANE; FRAGRANCING PROCESSES

Abstract: The present invention relates to a particular spraying device comprising a fragrancing liquid composition comprising at least one fragrance, at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes. The present invention relates to an assembly comprising: (A) a liquid fragrancing composition comprising, in a physiologically acceptable medium: (i) at least 1% by weight of a perfume concentrate relative to the total weight of the composition; (ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes; (B) a spraying device comprising a container containing the said composition, and a spraying mechanism comprising at least one spraying orifice having a particular diameter. The present invention also relates to a process for fragrancing human keratin materials and especially the skin, the lips, the hair, the scalp or the nails, comprising at least one step of spraying a fragrancing composition using a device as defined in any one of the preceding claims. The present invention also relates to a process for fragrancing ambient air, comprising at least one step of spraying a fragrancing composition using a device as defined in any one of the preceding claims.
DEVICES FOR SPRAYING A FRAGRANCING COMPOSITION COMPRISING AT LEAST ONE VOLATILE LIQUID LINEAR ALKANE; FRAGRANCING PROCESSES

The present invention relates to a particular spraying device comprising a fragrancing liquid composition comprising at least one fragrance, at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes.

The invention also relates to a process for fragrancing human keratin materials and especially the skin, the lips, the hair, the scalp or the nails, comprising at least one step of spraying a fragrancing composition using the said spraying device.

The invention also relates to a process for fragrancing ambient air, comprising at least one step of spraying a fragrancing composition using the said spraying device.

It is known that a perfume is a combination of different odoriferous substances that evaporate at different periods. Each perfume has what is known as a "head note", which is the odour that diffuses first when the perfume is applied or when the receptacle containing it is opened, a "heart or body note", which corresponds to the full fragrance (given off for a few hours after the "head note") and a "base note", which is the most persistent odour (given off for several hours after the "body note"). The persistence of the base note corresponds to the remanence of the fragrance.

Human beings have always sought to perfume themselves and to perfume the objects surrounding them or their environments, both to mask strong and/or unpleasant odours and to give a nice odour.

Perfumes are applied on various supports.

1) In cosmetics: for example in body hygiene (shower gel, shampoos, etc.), fragrancing products (eaux fraîches, eaux de toilette, eaux de parfum, and fragranced extracts, care products and makeup products for the face and body;
2) Functional perfumery and ambience perfumery concern candles, fragranced ceramics, fragranced bouquets and perfume diffusers.

Perfumery often makes use of spraying devices comprising a receptacle containing a liquid fragrancing composition, equipped with a mechanism for spraying the said composition in the form of droplets. Mention may be made, inter alia, of pump-dispensing bottles, aerosols based on propellant gas, electrostatic spraying systems WO 2005/075 095, and piezoelectric devices that nebulize the fragrancing liquid composition under the action of ultrasonic energy of appropriate frequency and power, the energy being produced by a piezoelectric material (transducer) excited by a high-frequency electrical signal.

The fragrancing formulations present in these types of device generally comprise a perfume concentrate comprising volatile organic compounds (VOC), at least one solvent for the said perfume; the viscosity of the liquid composition being adapted to allow the diffusion of the said perfume.
The problems frequently encountered in the various types of spraying devices for diffusing perfumes are:

(1) avoiding or substantially reducing the fouling or obstruction of the perfume dispensing means of the apparatus: orifice of the dispensing nozzle, perforated membrane;

(2) uncontrolled evaporation of the fragrancing solution from its reservoir or cartridge, resulting in longevity of the product that the user finds unsatisfactory;

(3) obtaining a good quality of diffusion cloud, in terms of height and volume ("puff").

The choice of solvents used is paramount. It must unite various characteristics:
- they must not foul the diffuser,
- they must allow good diffusion in terms of height and volume,
- they must be volatile enough to carry the odoriferous substances without evaporating too quickly,
- they must be odourless so as not to denature the desired olfactory properties,
- they must dissolve the perfume.

The perfume diffusers most commonly used comprise liquid fragrancing formulations based on volatile alcohol and more particularly ethanol. Ambience perfumes mainly contain glycol ethers. On account of its high volatility, the alcohol has a tendency to cause drying and clogging of the perfume dispensing means of the apparatus. The diffusion qualities in terms of height and volume are not fully satisfactory. Ethanol has a tendency to impair the olfactory characteristics of the fragrancing ingredients, on account not only of its powerful odour but also of its capacity to react, in the presence of water, with the fragrancing ingredients and thus to modify their odour and/or colour.

The object of the present invention is to find novel fragrancing formulations conditioned in suitable perfume diffusers, in which at least one of the various problems stated previously has been overcome.

In the course of its numerous investigations, the Applicant has discovered, surprisingly, that this objective can be achieved by using in a spraying device a liquid composition comprising, in a physiologically acceptable medium:

(i) at least 1% by weight of a fragrancing substance relative to the total weight of the composition;

(ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes.

This discovery forms the basis of the invention.

One subject of the invention is thus an assembly comprising:

(A) a liquid fragrancing composition comprising, in a physiologically acceptable medium:

(i) at least 1% by weight of a perfume concentrate relative to the total weight of the composition;

(ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes;
(B) a spraying device comprising a container containing the said composition, and a spraying mechanism comprising at least one spraying orifice with a diameter of greater than 500 μm.

A subject of the invention is also an assembly comprising:
(A) a liquid fragrancing composition comprising, in a physiologically acceptable medium:
(i) at least 1% by weight of a perfume concentrate relative to the total weight of the composition;
(ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes;

(B) a spraying device comprising a container containing the said composition, and a spraying mechanism comprising at least one spraying orifice with a diameter of less than 500 μm.

The invention also relates to a process for fragrancing human keratin materials and especially the skin, the lips, the hair, the scalp or the nails, comprising at least one step of spraying a fragrancing composition using a device as defined previously.

The invention also relates to a process for fragrancing ambient air, comprising at least one step of spraying a fragrancing composition using a device as defined previously.

The term "fragrancing composition" means any composition, mixture of pure concentrate, of solvents and of additives necessary for conserving the composition.

The term "liquid composition" means any composition that is liquid at room temperature (25°C) and atmospheric pressure (760 mmHg).

The term "perfume concentrate" means any odoriferous substance in its simple form or in the form of a mixture, the two possible forms comprising the solvents necessary for transforming the natural material and/or for obtaining the mixture. The perfume concentrate applied to a support gives a fragrancing composition. This support may be cosmetic, dermatological, alcoholic, aqueous-alcoholic, or a mixture of solvents.

The term "volatile solvent" means any solvent of the perfume concentrate having a vapour pressure of greater than or equal to 0.01 kPa at 293.15 K or greater than 0.1 mmHg.

The term "volatile organic compound" means any organic compound having a vapour pressure of greater than or equal to 0.01 kPa at 293.15 K or greater than 0.1 mmHg.

In the composition of the invention, the term "physiologically acceptable medium" means a non-toxic medium that can be applied to human keratin materials including the skin, the face, the lips, the nails, the hair and the scalp or that can be
diffused into the atmosphere, in the ambient air.

**SPRAYING DEVICES**

5 The strain devices of the invention include a spraying mechanism comprising at least one outlet orifice for the fragrancing product.

The spraying mechanism may comprise a single orifice or may comprise several orifices and especially a plurality of perforations in a membrane (in the case of piezoelectric devices).

Among the spraying devices that may be used according to the invention, mention may be made of:

15 (i) pressurized devices of aerosol type that comprise at least one container comprising the fragrancing composition and at least one propellant gas. Mounted on the said container is a diffusion mechanism equipped with a valve and a push button comprising a conduit for feeding one or more spraying orifices. The said orifice(s) may be defined by a connected nozzle. The nozzle may be of the direct output type or a vortex-channel nozzle. The diameter of the nozzles generally ranges from 150 $\mu\text{m}$ to 1000 $\mu\text{m}$.

(ii) devices equipped with a pump that comprise at least one container comprising the fragrancing composition. Mounted on the said container is a diffusion mechanism that comprises a pump and a push button comprising a conduit for feeding one or more spraying orifices. The said orifice(s) may be formed directly in the push button or via a connected nozzle. The diameter of the spraying nozzle(s) may range from 150 $\mu\text{m}$ to 1000 $\mu\text{m}$.

(iii) aerographs such as those described in patent application EP-A1-0 208 247, patents US 5 255 852, US 5 713 519, US 1 430 506, CA-A-2 152 406, FR-A-2 781 208 and US 4 742 963, patent application JP-A-63-287 711 and patent application EP 1 355 613, which are spraying devices in which the product is sprayed by means of the suction created by the Venturi effect by a carrier gas. This type of device comprises a reserve of product to be sprayed and a container containing a carrier gas, and also a valve which, when actuated, allows the product to be sprayed.

(iv) electrostatic spraying devices as described in patent application WO 2005/075095 in which the composition is subjected to an electrostatic field to expel it from the device via a conduit for feeding one or more spraying orifices; the composition also needing to contain ingredients that can be polarized.

- devices of piezoelectric type that generally comprise a plurality of spraying orifices within a perforated membrane.

Preferentially, the diameter of the spraying orifice(s) will be less than or equal to 150 $\mu\text{m}$, more preferentially from 4 to 150 $\mu\text{m}$, even more preferentially from 2 to
50 μη and more particularly from 5 to 20 μη.

**PIEZOELECTRIC SPRAYING DEVICE**

According to one particularly preferred form, a spraying device will be used comprising a container containing the said liquid cosmetic composition, equipped with a piezoelectric spraying mechanism for spraying the cosmetic composition in the form of droplets.

For the purposes of the present patent application, the term "piezoelectric spraying system" means a system that nebulizes a liquid under the action of an ultrasonic energy of suitable frequency and power, the energy being produced by a piezoelectric material (transducer) excited by a high-frequency electrical signal.

According to one preferential embodiment of the invention, the piezoelectric spraying device may comprise:
- a perforated membrane, the perforations of the membrane connecting the interior of the container with the external environment,
- an actuator for making the membrane vibrate,
- a means for bringing the liquid cosmetic composition contained in the container into contact with an inner surface of the membrane, the cosmetic composition, under the effect of the vibrations of the membrane, flowing through the perforations as far as an outer surface of the membrane, from which it emerges in the form of droplets.

The perforations of the membrane preferably have inverted conicity, i.e. a surface area in cross section that is greater on the outer surface of the membrane, facing the external environment, than on the inner surface, facing the interior of the container.

The spraying device may also comprise a pressure offset means, as described in patent application WO 95/15822, providing reduced pressure to the liquid in contact with the inner surface of the membrane. The reduced pressure may vary from zero pressure to the pressure at which the air is sucked through the perforations of the membrane in contact with the composition.

Preferably, the perforations, on the outer surface of the membrane, are not touching.

More preferably, the actuator is a piezoelectric actuator, for example designed to make the membrane vibrate within a frequency range that may be, for example, from 20 kHz to 7 MHz. The energy required to operate the piezoelectric actuator may be obtained by means of an electric generator, for example an electric cell, a battery or a photovoltaic cell that may be optionally coupled to an electronic circuit.

In the spraying device defined above, the means for conveying the liquid cosmetic composition to the surface of the membrane may comprise a capillary-action feed mechanism, or alternatively a bubble-generating feed mechanism or a pump of peristaltic, membrane, piston or gear type. Such mechanisms are described, for example, in international patent application WO 95/15822.
According to one particular embodiment of the invention, all the perforations have inverted conicity, or, conversely, the membrane furthermore comprises perforations of normal conicity.

For the purposes of the present invention, the term "perforations of normal conicity" means perforations whose surface area in cross section is smaller on the outer surface of the membrane, facing the external environment, than on the inner surface, facing the interior of the container.

When perforations of normal conicity are present, they are preferably arranged around and to the exterior of the perforations of inverted conicity.

The means for conveying the liquid cosmetic composition to the surface of the membrane may be designed to convey the said composition onto the inner surface of the said membrane, or, conversely, may be designed to convey the said composition onto the outer surface of the said membrane. Such variants of the spraying device are described, for example, in international patent application WO 95/1 5822.

By way of example, the membrane may be formed from a circular disc 8 mm in diameter, of electroformed nickel 70 µm thick, having a plurality of perforations. The perforations may have a surface area in cross section in the form of a circular disc whose diameter ranges from 4 to 150 µm on the outer surface of the membrane, facing the external environment, and, on the inner surface, facing the interior of the container, a surface area in cross section in the form of a circular disc whose diameter ranges from 2 to 50 µm, for example from 10 to 20 µm.

During the use of the device, the cosmetic composition emerges in the form of droplets whose mean diameter is preferably between 20 and 100 µm and even more preferably between 30 and 60 µm.

Technologies corresponding to this device have especially been described in patent applications WO 93/1 091 0, US 5 487 378, FR-A-2 665 572, US 4 533 082; US 5 518 179, US 6 113 001 and WO 06/066 671.

For the diffusion of a fragranced composition, it may prove desirable to have a device that allows easy replacement of a cartridge containing one product to be diffused with another cartridge containing a different product, while at the same time having cartridges made at a cost that is compatible with large-scale diffusion.

According to one particular embodiment of the invention, a spraying device as disclosed by WO 06/1 25 677 may be used. It is a spraying device comprising a ring made partially of piezoelectric material and a perforated membrane made to vibrate by the ring, in which device the perforated membrane is held in the ring by gripping; the piezoelectric device comprising a container for feeding the perforated membrane with product to be sprayed.

According to another particular embodiment of the invention, a spraying assembly such as the one disclosed in US 4 702 418 may be used. This assembly
comprises an apparatus provided with an exciting member and a cartridge received in the apparatus, comprising a pressure chamber delimited on one side by a deformable wall that comes into contact with the exciting member and on the other side by a perforated grille via which droplets of product are ejected, in the axis of the region of the deformable wall that comes into contact with the exciting member. The exciting member may be an integral part of a housing receiving the cartridge.

VOLATILE LINEAR ALKANES

The composition according to the invention contains one or more liquid volatile linear alkane(s). The term "one or more liquid volatile linear alkane(s)" means, without preference, "one or more liquid volatile linear alkane oil(s)".

A volatile linear alkane that is suitable for use in the invention is liquid at room temperature (about 25°C) and at atmospheric pressure (760 mmHg).

The term "volatile linear alkane" that is suitable for use in the invention means a cosmetic linear alkane, which is capable of evaporating on contact with the skin in less than one hour, at room temperature (25°C) and atmospheric pressure (760 mmHg), i.e. 101 325 Pa), which is liquid at room temperature, especially having an evaporation rate ranging from 0.01 to 15 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg).

Preferably, the "volatile linear alkanes" that are suitable for use in the invention have an evaporation rate ranging from 0.01 to 3.5 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg).

Preferably, the "volatile linear alkanes" that are suitable for use in the invention have an evaporation rate ranging from 0.01 to 1.5 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg).

More preferably, the "volatile linear alkanes" that are suitable for use in the invention have an evaporation rate ranging from 0.01 to 0.8 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg).

Even more preferably, the "volatile linear alkanes" that are suitable for use in the invention have an evaporation rate ranging from 0.01 to 0.3 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg).

The evaporation rate of a volatile alkane in accordance with the invention (and more generally of a volatile solvent) may especially be evaluated by means of the protocol described in WO 06/013 413, and more particularly by means of the protocol described below.

15 g of volatile hydrocarbon-based solvent are placed in a crystallizing dish (diameter: 7 cm) placed on a balance that is in a chamber of about 0.3 m³ with
regulated temperature (25°C) and hygrometry (50% relative humidity).

The liquid is allowed to evaporate freely, without stirring, while providing ventilation by means of a ventilator (Papst-Motoren, reference 8550 N, rotating at 2700 rpm) placed vertically above the crystallizing dish containing the volatile hydrocarbon-based solvent, the blades being directed toward the crystallizing dish, 20 cm away from the bottom of the crystallizing dish.

The mass of volatile hydrocarbon-based solvent remaining in the crystallizing dish is measured at regular time intervals.

The evaporation profile of the solvent is then obtained by plotting the curve of the amount of product evaporated (in mg/cm²) as a function of time (in minutes). The evaporation rate is then calculated, which corresponds to the tangent to the origin of the curve obtained. The evaporation rates are expressed in mg of volatile solvent evaporated per unit area (cm²) and per unit of time (minutes).

According to one preferred embodiment, the "volatile linear alkanes" that are suitable for use in the invention have a non-zero vapour pressure (also known as the saturating vapour pressure), at room temperature, in particular a vapour pressure ranging from 0.3 Pa to 6000 Pa.

Preferably, the "volatile linear alkanes" that are suitable for use in the invention have a vapour pressure ranging from 0.3 to 2000 Pa, at room temperature (25°C).

Preferably, the "volatile linear alkanes" that are suitable for use in the invention have a vapour pressure ranging from 0.3 to 1000 Pa, at room temperature (25°C).

More preferably, the "volatile linear alkanes" that are suitable for use in the invention have a vapour pressure ranging from 0.4 to 600 Pa, at room temperature (25°C).

Preferably, the "volatile linear alkanes" that are suitable for use in the invention have a vapour pressure ranging from 1 to 200 Pa, at room temperature (25°C).

More preferably, the "volatile linear alkanes" that are suitable for use in the invention have a vapour pressure ranging from 3 to 60 Pa, at room temperature (25°C).

According to one embodiment, a volatile linear alkane that is suitable for use in the invention may have a flash point that is in the range from 30 to 120°C and more particularly from 40 to 100°C. The flash point is in particular measured according to standard ISO 3679.

According to one embodiment, an alkane that is suitable for use in the invention may be a volatile linear alkane comprising from 7 to 14 carbon atoms.

Preferably, the "volatile linear alkanes" that are suitable for use in the invention comprise from 8 to 14 carbon atoms.
Preferably, the "volatile linear alkanes" that are suitable for use in the invention comprise from 9 to 14 carbon atoms.

Preferably, the "volatile linear alkanes" that are suitable for use in the invention comprise from 10 to 14 carbon atoms.

Preferably, the "volatile linear alkanes" that are suitable for use in the invention comprise from 11 to 14 carbon atoms.

According to one advantageous embodiment, the "volatile linear alkanes" that are suitable for use in the invention have an evaporation rate, as defined above, ranging from 0.01 to 3.5 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg), and comprise from 8 to 14 carbon atoms.

A volatile linear alkane that is suitable for use in the invention may advantageously be of plant origin.

Preferably, the volatile linear alkane or the mixture of volatile linear alkanes present in the composition according to the invention comprises at least one 14C (carbon-14) carbon isotope. In particular, the 14C isotope may be present in a 14C/12C ratio of greater than or equal to 1 * 10^-16, preferably greater than or equal to 1 * 10^-15, more preferably greater than or equal to 7.5 * 10^-14 and better still greater than or equal to 1.5 * 10^-13. Preferably, the ratio 14C/12C ranges from 6 x 10^-13 to 1.2 x 10^-12.

The amount of 14C isotopes in the volatile linear alkane or the mixture of volatile linear alkanes may be determined via methods known to those skilled in the art such as the Libby compacting method, liquid scintillation spectrometry or accelerator mass spectrometry.

Such an alkane may be obtained, directly or in several steps, from a plant raw material, such as an oil, a butter, a wax, etc.

As examples of alkanes that are suitable for use in the invention, mention may be made of the alkanes described in patents WO 2007/068 371 or WO 2008/1 55 059 of the company Cognis (mixtures of different alkanes differing by at least one carbon). These alkanes are obtained from fatty alcohols, which are themselves obtained from coconut oil or palm oil.

As examples of linear alkanes that are suitable for use in the invention, mention may be made of n-heptane (C7), n-octane (C8), n-nonane (C9), n-decane (C10), n-undecane (C11), n-dodecane (C12), n-tridecane (C13) and n-tetradecane (C14), and mixtures thereof. According to one particular embodiment, the volatile linear alkane is chosen from n-nonane, n-undecane, n-dodecane, n-tridecane and n-tetradecane, and mixtures thereof.

According to one preferred mode, mention may be made of mixtures of n-undecane (C11) and of n-tridecane (C13) obtained in Examples 1 and 2 of patent application WO 2008/1 55 059 of the company Cognis.
Mention may also be made of n-dodecane \((\text{C}_{12})\) and n-tetradecane \((\text{C}_{14})\) sold by Sasol under the respective references Parafol 12-97 and Parafol 14-97, and also mixtures thereof.

The volatile linear alkane may also be used alone.

Alternatively or preferentially, a mixture of two different volatile liquid linear alkanes, differing from each other by a carbon number \(n\) of at least 1, in particular differing from each other by a carbon number of 1 or 2, may be used.

According to a first embodiment, a mixture of at least two different volatile linear alkanes comprising from 10 to 14 carbon atoms and differing from each other by a carbon number of at least 1 may be used. Examples that may especially be mentioned include mixtures of volatile linear \(\text{C}_{10}/\text{C}_{11}\), \(\text{C}_{11}/\text{C}_{12}\), or \(\text{C}_{12}/\text{C}_{13}\) alkanes.

According to another embodiment, a mixture of at least two different volatile linear alkanes comprising from 10 to 14 carbon atoms and differing from each other by a carbon number of at least 2 may be used. By way of example, mention may be made especially of mixtures of volatile linear \(\text{C}_{10}/\text{C}_{12}\) or \(\text{C}_{12}/\text{C}_{14}\) alkanes, for an even carbon number \(n\), and the \(\text{C}_{11}/\text{C}_{13}\) mixture for an odd carbon number \(n\).

According to one preferred mode, a mixture of at least two different volatile linear alkanes comprising from 10 to 14 carbon atoms and differing from each other by a carbon number of at least 2, and in particular a mixture of \(\text{C}_{11}/\text{C}_{13}\) volatile linear alkanes or a mixture of \(\text{C}_{12}/\text{C}_{14}\) volatile linear alkanes, is used.

Other mixtures combining more than two volatile linear alkanes according to the invention, for instance a mixture of at least three different volatile linear alkanes comprising from 7 to 14 carbon atoms and differing from each other by a carbon number of at least 1, also form part of the invention, but mixtures of two volatile linear alkanes according to the invention are preferred (binary mixtures), the said two volatile linear alkanes preferably representing more than 95% and better still more than 99% by weight of the total content of volatile linear alkanes in the mixture. According to one particular mode of the invention, in a mixture of volatile linear alkanes, the volatile linear alkane having the smaller carbon number is predominant in the mixture.

According to another mode of the invention, a mixture of volatile linear alkanes in which the volatile linear alkane having the larger carbon number is predominant in the mixture is used.

As examples of mixtures that are suitable for use in the invention, mention may be made especially of the following mixtures:

- from 50% to 90% by weight, preferably from 55% to 80% by weight and more preferentially from 60% to 75% by weight of \(\text{C}_n\) liquid volatile linear alkane with \(n\) ranging from 7 to 14,
- from 10% to 50% by weight, preferably from 20% to 45% by weight and preferably from 24% to 40% by weight of \(\text{C}_{n+x}\) liquid volatile linear alkane with \(x\) greater than or equal to 1, preferably \(x = 1\) or \(x = 2\), with \(n+x\) between 10 and 14, relative to the total weight of alkanes in the said mixture.
In particular, the said mixture of alkanes according to the invention contains:
- less than 2% by weight and preferably less than 1% by weight of branched hydrocarbons,
- and/or less than 2% by weight and preferably less than 1% by weight of aromatic hydrocarbons,
- and/or less than 2% by weight, preferably less than 1% by weight and preferentially less than 0.1% by weight of unsaturated hydrocarbons in the mixture.

More particularly, a volatile linear alkane that is suitable for use in the invention may be used in the form of an n-undecane/n-tridecane mixture.

In particular, use will be made of a mixture of volatile linear alkanes comprising:
- from 55% to 80% by weight and preferably from 60% to 75% by weight of C_n liquid volatile linear alkane (n-undecane),
- from 20% to 45% by weight and preferably from 24% to 40% by weight of C_{13} liquid volatile linear alkane (n-tridecane),
relative to the total weight of alkanes in the said mixture.

According to one particular embodiment, the mixture of alkanes is an n-undecane/n-tridecane mixture. In particular, such a mixture may be obtained according to Example 1 or Example 2 of WO 2008/1 55 059.

According to another particular embodiment, the n-dodecane sold under the reference Parafol 12-97 by Sasol or under the references Vegelight 12 or Vegelight 12-99 by the company Biosynth is used.

According to another particular embodiment, the n-tetradecane sold under the reference Parafol 14-97 by Sasol or under the reference Vegelight 14 by the company Biosynth is used.

According to another embodiment, a mixture of n-dodecane and n-tetradecane is used. A mixture of volatile linear alkanes comprising at least n-dodecane and n-tetradecane in proportions representing at least 90% by weight of the said mixture, preferentially at least 95% by weight, in particular at least 97% by weight, relative to its total weight, of n-dodecane and n-tetradecane is used more particularly.

The mixture of alkanes in accordance with the invention may be formed solely from n-dodecane and n-tetradecane. In other words, the proportion of n-dodecane and n-tetradecane represents about 100% by weight of the said mixture.

The n-dodecane and the n-tetradecane that may be used to form the mixture of alkanes in accordance with the invention may be of natural or synthetic origin. They may advantageously be of plant origin.

According to another particular embodiment, an n-dodecane/n-tetradecane mixture (C_{12}/C_{14}) is used, comprising:
a) from 65% to 95% by weight and preferably from 70% to 90% by weight of C_{12} liquid volatile linear alkane (n-dodecane) and
b) from 5% to 35% by weight and preferably from 10% to 30% by weight of C_{14}...
volatile liquid linear alkane (n-tetradecane) relative to the total weight of alkanes in the said mixture.

According to one particularly preferred form, the mass content of n-tetradecane in the mixture of alkanes in accordance with the invention is strictly greater than 50% by weight relative to the weight of the said mixture. It is thus in particular strictly greater than the mass content of n-dodecane in this mixture.

According to one embodiment, the mass proportion of n-tetradecane may be, for example, greater than or equal to 52% by weight, for example between 52% and 98% by weight, in particular greater than or equal to 54% by weight, for example between 54% and 96% by weight, for example greater than or equal to 56% by weight, for example between 56% and 94% by weight, for example greater than or equal to 60% by weight, for example greater than or equal to 70% by weight, for example greater than or equal to 80% by weight, for example greater than or equal to 90% by weight, relative to the total weight of the mixture of alkanes in accordance with the invention.

According to one embodiment, the mass proportion of n-dodecane may be, for example, less than or equal to 48% by weight, for example between 2% and 48% by weight, for example less than or equal to 46% by weight, for example between 4% and 46% by weight, for example less than or equal to 44% by weight, for example between 6% and 44% by weight, for example less than or equal to 40% by weight, for example less than or equal to 30% by weight for example less than or equal to 20% by weight, for example less than or equal to 10% by weight, relative to the total weight of the mixture of alkanes in accordance with the invention.

The [n-tetradecane/n-dodecane] mass ratio may range, for example, from 1.01 to 9, for example from 1.01 to 4, for example from 1.01 to 3, for example from 1.01 to 2, for example from 1.01 to 1.80, preferably from 1.02 to 1.60 and in particular from 1.05 to 1.4.

For example, n-tetradecane may represent 51% to 98% by weight of the said mixture, preferably from 51% to 90% by weight of the said mixture example from 51% to 80% by weight of the said mixture, for example from 51% to 70% by weight of the said mixture, for example from 51% to 60% by weight of the said mixture, or even from 52% to 55% by weight of the said mixture, and the n-dodecane from 2% to 49% by weight of the said mixture, for example from 10% to 49% by weight of the said mixture, for example from 20% to 49% by weight of the said mixture, for example from 30% to 49% by weight of the said mixture, for example from 40% to 49% by weight, or even from 45% to 48% by weight of the said mixture.

Needless to say, other associated constituents, for instance impurities such as other hydrocarbons (especially decane, hexane or isohexadecane) may, however, be present in trace amount, i.e. in proportions of less than 5% by weight, for example less than 3% by weight and preferably less than 2% by weight, relative to the total weight of the said mixture.
The volatile linear alkane(s) in accordance with the invention are preferably present in contents ranging from 60% to 99% by weight and preferably from 60% to 79% by weight relative to the total weight of the composition.

**FRAGRANCING SUBSTANCES**


They may be natural products (essential oils, absolutes, resinoids, resins or concretes) and/or synthetic products (terpene or sesquiterpene hydrocarbons, alcohols, phenols, aldehydes, ketones, ethers, acids, esters, nitriles and peroxides, which are saturated or unsaturated, and aliphatic or cyclic).

According to the definition given in international standard ISO 9235 and adopted by the Commission of the European Pharmacopoeia, an essential oil is an odoriferous product generally of complex composition, obtained from a botanically defined plant raw material, either by steam entrainment, or by dry distillation, or via an appropriate mechanical process without heating (cold pressing). The essential oil is usually separated from the aqueous phase via a physical process that does not result in any significant change in the composition.

**Modes for obtaining essential oils**

The choice of technique depends mainly on the starting material: its original state and its characteristics, its actual nature. The "essential oil/plant starting material" yield may be extremely variable depending on the plant: 15 ppm to more than 20%. This choice conditions the characteristics of the essential oil, in particular viscosity, colour, solubility, volatility, richness or poorness in certain constituents.

**Steam entrainment**

Steam entrainment corresponds to vaporization in the presence of steam of a sparingly water-miscible substance. The starting material is placed in contact with boiling water or steam in an alambic. The steam entrains the essential oil vapour, which is condensed in the condenser and recovered as a liquid phase in a Florentine vase (or essence jar) where the essential oil is separated from the water by settling. The aqueous distillate that remains after the steam entrainment, once the separation of the essential oil has been performed, is known as the "aromatic water" or "hydrolate" or "distilled floral water".

**Dry distillation**

The essential oil is obtained by distillation of woods, barks or roots, without addition of water or steam, in a closed chamber designed so that the liquid is recovered at the bottom. Cade oil is the best known example of a product obtained in this way.
Cold pressing

This production method applies only to citrus fruits (Citrus spp.) via mechanical processes at room temperature. Principle of the method is as follows: the zests are torn into pieces and the contents of the secretory sacs that have been broken are recovered by a physical process. The standard process consists in exerting an abrasive action on the entire surface of the fruit under a stream of water. After removal of the solid waste, the essential oil is separated from the aqueous phase by centrifugation. The majority of industrial installations allow simultaneous or sequential recovery of the fruit juices and of the essential oil.

Physicochemical characteristics

Essential oils are generally volatile and liquid at room temperature, which distinguishes them from "set" oils. They are more or less coloured and their density is generally less than that of water. They have a high refractive index and most of them deflect polarized light. They are liposoluble and soluble in the usual organic solvents, entrainable with steam, and very sparingly soluble in water.

Among the essential oils that may be used according to the invention, mention may be made of those obtained from plants belonging to the following botanical families:

Abietaceae or Pinaceae: conifers
Amaryllidaceae
Anacardaceae
Anonaceae: ylang ylang
Apiaceae (for example Umbelliferae): dill, angelica, coriander, sea fennel, carrot, parsley
Araceae
Aristolochiaceae
Asteraceae: yarrow, artemisia, camomile, helichrysum
Betulaceae
Brassicaceae
Burseraceae: frankincense
Carophyllaceae
Canellaceae
Cesalpiniaceae: copaífera (copaiba balsam)
Chenopodaceae
Cistaceae: rock rose
Cyperaceae
Dipterocarpaceae
Ericaceae: gaultheria (wintergreen)
Euphorbiaceae
Fabaceae
Geraniaceae: geranium
Guttiferae
Hamamelidaceae
Hernandiaceae
Hypericaceae: St-John's wort
Iridaceae
Juglandaceae
Lamiaceae: thyme, oregano, monarda, savory, basil, marjorams, mints, patchouli, lavenders, sages, catnip, rosemary, hyssop, balm
Lauraceae: ravensara, sweet bay, rosewood, cinnamon, litsea
Liliaceae: garlic
Magnoliaceae: magnolia
Malvaceae
Meliaceae
Monimiaceae
Moraceae: hemp, hop
Myricaceae
Myristicaceae: nutmeg
Myrtaceae: eucalyptus, tea tree, paperbark tree, cajuput, backhousia, clove, myrtle
Oleaceae
Piperaceae: pepper
Pittosporaceae
Poaceae: lemon balm, lemongrass, vetiver
Polygonaceae
Renonculaceae
Rosaceae: roses
Rubiaceae
Rutaceae: all citrus plants
Salicaceae
Santalaceae: sandalwood
Saxifragaceae
Schisandraceae
Styracaceae: benjoin
Thymelaceae: agar wood
Tilliaceae
Valerianaceae: valerian, spikenard
Verbenaceae: lantana, verbena
Violaceae
Zingiberaceae: galangal, turmeric, cardamom, ginger
Zygophyllaceae.

Mention may also be made of the essential oils extracted from flowers (lily, lavender, rose, jasmine, ylang ylang, neroli), from stems and leaves (patchouli, geranium, petitgrain), from fruit (coriander, aniseed, cumin, juniper), from fruit peel (bergamot, lemon, orange), from roots (angelica, celery, cardamom, iris, rattan palm, ginger), from wood (pinewood, sandalwood, gaiac wood, rose of cedar, camphor), from grasses and gramineae (tarragon, rosemary, basil, lemongrass, sage, thyme), from needles and branches (spruce, fir, pine, dwarf pine) and from resins and balms (galbanum, elemi, benjoin, myrrh, olibanum, opopanax).

Examples of fragranscating substances are especially: geraniol, geranyl acetate, farnesol, borneol, bornyl acetate, linolool, linalyl acetate, linalyl propionate, linalyl butyrate, tetrahydrolinolool, citronellol, citronellyl acetate, citronellyl formate,
citronellyl propionate, dihydromyrcenol, dihydromyrcenyl acetate, tetrahydromyrcenol, terpineol, terpinyl acetate, nopol, nopyl acetate, nerol, neryl acetate, 2-phenylethanol, 2-phenylethyl acetate, benzyl alcohol, benzyl acetate, benzyl salicylate, styrryl acetate, benzyl benzoate, amyl salicylate, dimethylbenzylcarbinol, trichlormethylphenoxyacetyl acetate, p-tert-butylcyclohexyl acetate, isononyl acetate, vetiveryl acetate, α-hexylcinnamaldehyde, 2-methyl-3-(p-tert-butylphenyl)propanal, 2-methyl-3-(p-isopropylphenyl)propanal, 3-(p-tert-butylphenyl)propanal, 2,4-dimethylcyclohex-3-enylcarboxaldehyde, tricyclodecenyl acetate, tricyclodecenyl propionate, 4-(4-hydroxy-4-methylpentyl)-3-cyclohexene carboxaldehyde, 4-(4-methyl-3-pentenyl)-3-cyclohexene carboxaldehyde, 4-acetoxy-3-pentyltetrahydroquin, 3-carboxymethyl-2-pentylcyclopentanone, 2-n-4-heptylcyclopentanone, 3-methyl-2-pentyl-2-cyclopentenone, menthone, carvone, tagetone, geranylacetone, n-decanal, n-dodecanal, 9-decen-1-ol, phenoxyethyl isobutyrate, phenylacetaldheyde diethyl acetal, phenylacetaldheyde diethyl acetal, geranonitrile, citronellonitrile, cedryl acetate, 3-isocamphylcyclohexanol, cedryl methyl ether, isolongifolanone, aubepinonitrile, aubepine, heliotropin, coumarin, eugenol, vanillin, diphenyl ether, citral, citronellall, hydroxycitronellall, damascone, ionones, methylionones, isomethylionones, solanone, irones, cis-3-hexenol and esters thereof, musk-indans, musk-tetralins, musk-isochromans, macrocyclc ketones, musk-macrolactones, aliphatic musks and ethylene brassylate, and mixtures thereof.

According to one preferred embodiment of the invention, a mixture of different fragrancing substances that generate in common a note that is pleasant to the user is used.

The fragrancing substances will preferably be chosen such that they produce notes (head, heart and base) in the following families:

citrine, ambery, floral, spicy, woody,
gourmand, chypre, fougere, leathery, musky.

The fragrancing compositions of the invention preferably contain from 1% to 40% by weight of fragrancing substance, better still from 2% to 30% by weight and in particular from 2% to 20% by weight relative to the total weight of the composition.

**GALENICAL FORMS**

The fragrancing compositions of the invention may be in aqueous form and may also contain at least one volatile alcohol.

The term "volatile alcohol" means any compound containing at least one hydroxyl
group and in which more than 95% by weight of the compound is capable of evaporating in less than one hour at room temperature (25°C) and atmospheric pressure (760 mmHg) on contact with a keratin materials such as the skin or the hair.

The volatile alcohols in accordance with the present invention are preferably chosen from lower monoalcohols, which may be chosen from methanol, ethanol, propanol, isopropanol, n-butanol, isobutanol and t-butanol, and more particularly ethanol. Their viscosity at 20°C, measured with a Haake RheoStress 600 machine, with a rotor 60 mm in diameter, an angle of 2° and a shear rate of 200 s⁻¹, is preferably from 0.3 to 3 mPa.s.

Any aqueous galenical form for topical use that is suited to spraying devices may be used.

The aqueous fragrancing compositions may especially be in the form of an aqueous-organic solution, or an emulsion obtained by dispersing a fatty phase in an aqueous phase (O/W) or conversely (W/O). According to preferred embodiments of the invention, the composition is in the form of an aqueous-organic lotion.

The fragrancing compositions according to the invention may also be in anhydrous form, which may contain at least one volatile alcohol as defined previously.

The term "anhydrous composition" means a composition containing less than 5% by weight of water relative to the total weight of the composition, preferably less than 1% by weight of water, even more preferentially less than 0.5% by weight of water, and will especially be free of water.

According to one particular form of the invention, the fragrancing anhydrous composition will contain less than 5% by weight of volatile alcohol relative to the total weight of the composition, preferably less than 1% by weight of volatile alcohol, even more preferentially less than 0.5% by weight of volatile alcohol, and will especially be free of volatile alcohol.

According to another particular form of the invention, the fragrancing anhydrous composition will contain more than 5% by weight of volatile alcohol relative to the total weight of the composition. The volatile alcohol(s) are present in this case in amounts preferably ranging from 5% to 80%, more preferentially in amounts ranging from 10% to 50% and more particularly from 10% to 30% by weight, relative to the total weight of the composition.

VISCOSITY

According to one particularly preferred form, the viscosity of the fragrancing composition is less than or equal to 8 mPa.s and will vary as a function of its use (skin or ambient air). It will preferably range from 1 to 8 mPa.s. This viscosity is measured at 20°C using a Haake RheoStress 600 machine with a rotor 60 mm in
diameter, an angle of 2° and a sandy coating at a shear rate of 200 s⁻¹. The machine gives an average of the values, over a time interval of 2 minutes.

**ADDITIVES**

The composition of the invention may also comprise any additive usually used in the field of perfumes, chosen especially from antioxidants, fatty substances such as oils (plant, mineral or synthetic oils such as esters or perfluoroethers), cosmetic or dermatological active agents, for instance emollients or softeners such as sweet almond oil or apricot kernel oil, moisturizers such as glycerol, calmatives such as ascc-bisabolol, allantoin or Aloe vera; vitamins, essential fatty acids, insect repellents, propellants, peptizers, fillers, non-volatile solvents, UV-screening agents, stabilizers or preserving agents, structuring agents, gelling agents or thickeners, dyes, nacres and glitter flakes, and mixtures thereof. When they are present in the composition of the invention, these additives may be present in an amount ranging from 0.001 % to 10% and better still from 0.01 % to 5% by weight relative to the total weight of the composition.

Among the antioxidants, examples that may be mentioned include BHA (tert-butyl-4-hydroxyanisole), BHT (2,6-bis-tert-butyl-p-cresol), and tocopherols such as vitamin E and derivatives thereof, for instance tocopheryl acetate.

The composition according to the invention may especially comprise at least one dyestuff such as liposoluble dyes and water-soluble dyes.

The soluble dyes are, for example: caramel, Yellow 5, Acid Blue 9/Blue 1, Green 5, Green 3/Fast Green FCF 3, Orange 4, Red 4/Food Red 1, Yellow 6, Acid Red 33/Food Red 12, Red 40, cochineal carmine (Cl 15850, CI 75470), Ext. Violet 2, Red 6-7, Ferric Ferrocyanide, Ultramarines, Acid yellow 3/Yellow 10, Acid Blue 3, Yellow 10.

The liposoluble dyes are, for example, Sudan red, D&C Red 17, D&C Green 6, β-carotene, soybean oil, Sudan Brown, D&C Yellow 11, D&C Violet 2, D&C Orange 5, quinoline yellow and annatto.

The non-volatile solvents in accordance with the present invention are preferably chosen from esters, ethers, polyols and fatty alcohols. Their viscosity will preferably range from 1 to 120 mPa.s. This viscosity is measured at 20°C using a Haake RheoStress 600 machine with a rotor 60 mm in diameter, an angle of 2° and a sandy coating at a shear rate of 200 s⁻¹. Their density is preferably less than 1. This density may be measured at 20°C using a Mettler-Toledo DE 45 densimeter.

Examples of non-volatile solvents that may be mentioned include 2-octyldecyl neopentanoate, isodecyl neopentanoate, dicaprylyl ether, octyldecanol, triethyl citrate, dicaprylyl carbonate, isononyl isononanoate, isopropyl myristate, isopropyl palmitate and 2-ethylhexyl palmitate.

A subject of the invention is also a cosmetic process for fragrancing keratin materials or a textile material (clothing), comprising the application to the keratin
materials of the composition as defined above.

A subject of the invention is also a process for fragrancing ambient air, comprising at least one step of spraying a fragrancing composition using a device as defined previously.

The invention will now be described with reference to the examples that follow, which are given as non-limiting illustrations. In these examples, unless otherwise indicated, the amounts are expressed as weight percentages.
EXAMPLES: Perfume diffusion tests:

<table>
<thead>
<tr>
<th>Diffuser composition</th>
<th>Ingredients</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (invention)</td>
<td>Perfume A</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>85% dodecane/15% tetradecane mixture</td>
<td>71%</td>
</tr>
<tr>
<td>2 (outside the invention)</td>
<td>Perfume A</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Ethanol</td>
<td>71%</td>
</tr>
<tr>
<td>3 (invention)</td>
<td>Perfume B</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>85% dodecane/15% tetradecane mixture</td>
<td>50%</td>
</tr>
<tr>
<td>4 (outside the invention)</td>
<td>Perfume B</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Ethanol</td>
<td>50%</td>
</tr>
<tr>
<td>5 (invention)</td>
<td>Perfume B</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Undecane/tridecane mixture obtained in Examples 1 and 2 of patent application WO 2008/155 059.</td>
<td>50%</td>
</tr>
<tr>
<td>6 (invention)</td>
<td>Perfume B</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>50% dodecane/50% tetradecane mixture</td>
<td>50%</td>
</tr>
</tbody>
</table>

Each of these fragrancing formulations is incorporated into a piezoelectric spraying device as described in patent application WO 06/125 677, comprising a cartridge for feeding the perforated membrane with product to be sprayed. The cartridges are filled with 5 g of each of formulae 1 to 6.

The assembly [piezoelectric diffuser + cartridge] is weighed at $T_0$.

The diffusion is performed in comparison, two formulae in two machines are evaluated comparatively.

Each machine in position 2: $T_0 N = 60$ ms and $T_{off} = 4$ seconds.

The diffusion begins at $T_0$, then each $T = 30$ min up to $T = 3$ hours, the assembly [machine + cartridge] is weighed each time.

The flow rate (mg/hour) is thus noted.

At $T = 3$ hours, the machine is stopped, and the next day the diffusion is restarted by pressing only the ON button. The ease of resumption of diffusion and the ability of the machine to restart by itself are thus observed. It is observed that certain solvents promote obstruction of the diffusion grille.

To avoid any influence of the machine, the cartridges are inverted and the same test is performed, and thus each cartridge is used in each diffuser before concluding.
The following are noted during diffusion:
- the volume of the spray cloud
- the height of the spray cloud

The spray cloud represents the cloud of perfume formed above the diffuser for each puff of fragrancing solution.

The following are observed and noted:
- the volume of the spray cloud during diffusion
- the height of the spray cloud during diffusion
- the ease of restart of the machine after stoppage of diffusion (restart without priming)

<table>
<thead>
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<th>Diffuser composition</th>
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</tr>
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<tr>
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<td>Perfume A</td>
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</tr>
<tr>
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</tr>
<tr>
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<td></td>
<td>85% dodecane/15% tetradecane mixture</td>
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<td>4 (outside the invention)</td>
<td>Perfume B</td>
</tr>
<tr>
<td></td>
<td>Ethanol</td>
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</tr>
<tr>
<td></td>
<td>50% dodecane/50% tetradecane mixture</td>
</tr>
</tbody>
</table>

It is observed that the spraying devices 1, 3, 5 and 6 of the invention comprising a fragrancing formulation based on a volatile linear C7-C14 alkane or mixture of alkanes show excellent resumption of diffusion after stoppage, in contrast with the spraying devices 2 and 4 based on an alcoholic fragrancing formulation, which require priming in order to function again. The nature of the perfume A or B has no influence on the results obtained.
CLAIMS

1. Assembly comprising:
   (A) a liquid fragrancing composition comprising, in a physiologically acceptable medium:
   (i) at least 1% by weight of a perfume concentrate relative to the total weight of the composition;
   (ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes;
   (B) a spraying device comprising a container containing the said composition, and a spraying mechanism comprising at least one spraying orifice with a diameter of less than 500 $\mu\text{m}$.

2. Assembly comprising:
   (A) a liquid fragrancing composition comprising, in a physiologically acceptable medium:
   (i) at least 1% by weight of a perfume concentrate relative to the total weight of the composition;
   (ii) at least one liquid volatile linear alkane or a mixture of liquid volatile linear alkanes;
   (B) a spraying device comprising a container containing the said composition, and a spraying mechanism comprising at least one spraying orifice with a diameter of greater than 500 $\mu\text{m}$.

3. Assembly according to Claim 1 or 2, in which the spraying device is chosen from:
   (i) pressurized devices of aerosol type which comprise at least one container comprising the fragrancing composition and at least one propellant gas; mounted on the said container is a spraying mechanism equipped with a valve and a push button comprising a conduit for feeding one or more spraying orifices; the said orifice(s) possibly being defined by a connected nozzle;
   (ii) devices equipped with a pump, which comprise at least one container comprising the fragrancing composition; mounted on the said container is a spraying mechanism which comprises a pump and a push button comprising a conduit for feeding one or more spraying orifices; the said orifice(s) may be formed directly in the push button or via a connected nozzle;
   (iii) aerographs in which the product is sprayed by means of the suction created by the Venturi effect by a carrier gas; this type of device comprising a reserve of product to be sprayed and a container containing a carrier gas, and also a valve which, when actuated, allows the product to be sprayed;
   (iv) electrostatic spraying devices in which the composition is subjected to an electrostatic field to expel it from the device a conduit for feeding one or more spraying orifices; the composition also needing to contain ingredients that can be polarized;
   (v) devices of piezoelectric type that comprise a plurality of spraying orifices within a perforated membrane.

4. Assembly according to any one of Claims 1 to 3, in which the diameter of the spraying orifices(s) is less than or equal to 150 $\mu\text{m}$, more preferentially from 4 to
150 µm, even more preferentially from 2 to 50 µm and more particularly from 5 to 20 µm.

5. Assembly according to any one of Claims 2 to 4, in which the spraying device is a spraying device comprising a container containing the said liquid cosmetic composition, equipped with a piezoelectric spraying mechanism for spraying the cosmetic composition in the form of droplets.

6. Assembly according to Claim 5, characterized in that the container equipped with a spraying mechanism comprises:
- a perforated membrane, the perforations of the membrane connecting the interior of the container with the external environment,
- a piezoelectric transducer,
- a means for bringing the liquid cosmetic composition contained in the container into contact with an inner surface of the membrane,
the cosmetic composition, under the effect of the vibrations, flowing through the perforations as far as an outer surface of the membrane, from which it emerges in the form of droplets.

7. Assembly according to Claim 5 or 6, comprising a piezoelectric spraying device comprising a ring made at least partially of piezoelectric material and a perforated membrane made to vibrate by the ring, in which device the perforated membrane is held in the ring by gripping; the piezoelectric device comprising a container for feeding the perforated membrane with product to be sprayed.

8. Assembly according to Claim 5 or 6, comprising a piezoelectric spraying device provided with an exciting member and a cartridge received in the apparatus, comprising a pressure chamber delimited on one side by a deformable wall that comes into contact with the exciting member and on the other side by a perforated grille via which droplets of product are ejected, in the axis of the region of the deformable wall that comes into contact with the exciting member; the exciting member possibly being an integral part of a housing receiving the cartridge.

9. Assembly according to any one of Claims 1 to 8, in which the volatile alkane(s) comprise from 7 to 14 carbon atoms, preferably from 8 to 14 carbon atoms and more preferentially from 11 to 14 carbon atoms.

10. Assembly according to any one of Claims 1 to 9, in which the volatile linear alkane(s) have an evaporation rate at room temperature (25°C) and atmospheric pressure (760 mmHg) ranging from 0.01 to 0.8 mg/cm²/minute, at room temperature (25°C) and atmospheric pressure (760 mmHg), preferably ranging from 0.01 to 0.3 mg/cm²/minute and more preferentially ranging from 0.01 to 0.12 mg/cm²/minute.

11. Assembly according to any one of Claims 1 to 10, in which the volatile linear alkane(s) are of plant origin.

12. Assembly according to any one of Claims 1 to 11, in which the fragrancing composition comprises a mixture of n-undecane (Cn) and of n-tridecane (C13).
13. Assembly according to any one of Claims 1 to 12, in which the volatile linear alkane is chosen from n-dodecane (C12) and n-tetradecane (C14), or mixtures thereof.

14. Assembly according to Claim 13, in which the fragrancing composition comprises an n-dodecane/n-tetradecane mixture (C12/C14) in which the mass content of n-tetradecane in the mixture of alkanes is strictly greater than 50% by weight, relative to the weight of the said mixture.

15. Assembly according to any one of Claims 1 to 14, in which the fragrancing composition is in an aqueous form that may contain at least one volatile alcohol, in particular a C1-C5 lower monoalcohol and more particularly ethanol.

16. Assembly according to any one of Claims 1 to 14, in which the fragrancing composition is in an anhydrous form that may contain at least one volatile alcohol, in particular a C1-C5 lower monoalcohol and more particularly ethanol.

17. Process for fragrancing human keratin materials and especially the skin, the lips, the hair, the scalp or the nails, comprising at least one step of spraying a fragrancing composition using a device as defined in any one of Claims 1 to 8.

18. Process for fragrancing ambient air, comprising at least one step of spraying a fragrancing composition using a device as defined in any one of Claims 1 to 8.
A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K8/31 A61Q13/00 B05B11/00 B05B17/06

ADD.

According to International Patent Classification (IPC) and both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols):

A61Q A61K B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched:

Electronic data base consulted during the international search (name of data base and, where practical, search terms used):

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>GB 2 165 150 A (INT FLAVORS &amp; FRAGRANCES INC) 9 April I 1986 (1986-04-09) example VI</td>
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</table>

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "A" document member of the same patent family

Date of the actual completion of the international search: 25 July 2011

Date of mailing of the international search report: 03/08/2011

Name and mailing address of the ISA:
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax. (+31-70) 340-3016

Authorized officer: Szarek, Sophie
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<td>FR 2 933 319 A1 (OREAL [FR])&lt;br&gt;8 January 2010 (2010-01-08) page 6, line 8 - line 15</td>
<td>1-18</td>
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<tr>
<td>Patent document cited in search report</td>
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