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(71) Applicant (for AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, IN, KE, KN, KW, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SA, SC, SD, SG, SL, SZ, TT, TZ, UG, VC, ZA, ZM, ZW only): **UNILEVER PLC** [GB/GB]; Unilever House, 100 Victoria Embankment, London Greater London EC4Y 0DY (GB).

(71) Applicant (for all designated States except AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, IN, KE, KN, KW, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SA, SC, SD, SG, SL, SZ, TT, TZ,

UG, US, VC, ZA, ZM, ZW): **UNILEVER N.V.** [NL/NL]; Weena 455, 3013 AL Rotterdam (NL).

(71) Applicant (for US only): **CONOPCO, INC., D/B/A UNILEVER** [US/US]; 800 Sylvan Avenue AG West, S. Wing, Englewood Cliffs, New Jersey 07632 (US).

(72) Inventors: **MCKEOWN, Robert**; Unilever R&D, Port Sunlight Quarry Road East, Bebington, Wirral Merseyside CH63 3JW (GB). **ROBSON, Scott**; Unilever R&D, Port Sunlight Quarry Road East, Bebington, Wirral Merseyside CH63 3JW (GB).

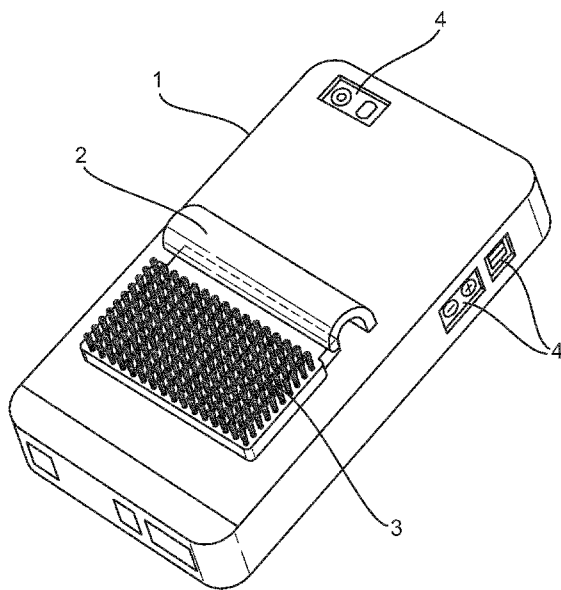
(74) Agent: **CHISEM, Janet**; Unilever Patent Group Colworth House, Sharnbrook, Bedford Bedfordshire MK44 1LQ (GB).

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(54) Title: DEVICE

Fig. 2



(57) Abstract: A system comprising a hand held electronic device and an attachment for the hand held electronic device, said electronic device comprising an accelerometer, a signal processor and an output interface, said attachment comprising: i) a holding device, and ii) a probing device, wherein the holding device holds the probing device and wherein the attachment is non- electronic; and methods of using the system provide information to the user about the condition of surfaces.

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DEVICE

Field of Invention

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The present invention relates to an attachment for use with an accelerometer-equipped electronic device, where said attachment utilises the accelerometer of the device to create consumer relevant information; and methods of assessing a surface using the attachment and device. The invention has particular application in the field of smart mobile phones and the field of personal care, particularly in the assessment of static-dynamic friction on hair, skin and teeth.

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Background and Prior Art

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Various large laboratory based instruments for the analysis of surfaces are commercially available. For example, a PC linked Texture Analyser (TA) can be used to measure surface roughness.

20

Devices that can differentiate a variety of properties of surfaces are known. The following are concerned with sensors for assessing the condition of hair and/or skin and converting a signal from the sensor:

25

EP 1 691 195A (Kao) discloses a hair sensor for detecting a sliding sound of hair to estimate hair characteristics. The sound is transmitted to a microphone.

30

WO 12/020043 (Unilever) discloses apparatus, method and a computer program for evaluating the condition of the skin, scalp and hair. Sensors assess the hair and produce an analog signal which is converted into an audio signal and related to a computer or mobile device.

JP 2004-159830 (Lion) discloses a hair evaluation system comprising a comb or a brush with a microphone attached, which receives the signal of the combing sound, amplifies it and outputs it as sound.

- 5 US 2003/233861 (P&G) discloses a method for assessing the friction of hair using a device comprising a comb means and a noise sensor arranged to capture frictional noise generated by passage of comb means through hair.

US2015/0342515 discloses a system comprising a hairstyling tool and a remote entity
10 which can be connected to the hairstyling tool by a wireless connection, the hairstyling tool is a comb or hairbrush type comprising: a handle and a body, provided with teeth, a battery for storing electricity, at least one movement sensor or accelerometer, an electronic control unit, configured to capture and format signals provided by said sensor, a wireless communication means suitable for data transmission to the remote entity, which is
15 configured to send back information about the hair being styled to the user.

There remains a need for portable hand held devices, rather than specialised equipment, which are accessible to the everyday consumer without the need for cumbersome setting up or for heavy and specialised equipment. The need extends to devices that can be
20 easily and quickly used by the individual consumer when and where required, for example at point of sale, in the home or on the move.

Such devices should be capable of measuring a range of properties and of quickly providing information about a range of different consumer related surfaces. . Such devices
25 should provide customisable features that enable the user to tailor the device to give the type of information desired by that individual consumer.

The present invention provides the consumer with a personalised measure of properties of surfaces, for example hair, and enables the consumer to track changes in the properties of
30 the surface, via different treatment regimes and product uses, over a period of time. The present invention offers interchangeable probing devices that are capable of making a range of measurements and signals thus providing a diversity not known in the prior art.

Because it is so accessible and easy to use, measurements can be performed many times a day, to provide a powerful tool in the hands of the everyday consumer. Thus, the invention provides a means of getting sophisticated information to the consumer about the condition, health and properties of surfaces, thus enabling them to make informed
5 (product) choices for those surfaces.

The device of the invention operates as a single unit such that no electronic connection to another device is required. The device that picks up data also analyses it and communicates and displays it, providing a simple device that can be easily and quickly
10 used by the individual consumer when and where required. Unlike the prior art, the device comprises a non-electronic attachment for the generation of vibrations. This invention provides an unexpectedly convenient, flexible and sophisticated tool that does not require additional electronics or power sources over that already present in the hand held electronic device which forms part of the system.

15

Furthermore, the device is used insitu, with no stresses on the surface.

We have found that the use of an accelerometer provides an accurate measure of small vibrations that are generated when moving a probing device across a surface, such as
20 hair, skin and teeth. The vibrations generated vary according to the nature of the surface. The measurement of the “squeaky clean” state of the surface provides a particular advantage to the user of the device, in the evaluation of the condition of that surface.

“Squeaky clean” is a term used by consumers to describe a condition of their hair, skin or
25 teeth. In hair, it is typically evaluated by rubbing the fingers on the surface of the hair, commonly during washing. It can be seen as a positive or negative state, depending on the individual and the characteristics of their hair, both technical (objective) and self-perceived. Some people take a squeaky clean feel as an indication that their hair is really clean and free from oils, grease and silicones, so they are satisfied that their hair is clean.
30 Others take it to mean that their hair is over-cleaned and “stripped” of beneficial materials such as conditioning silicones and “good” oils. When consumers use this as an indication

that their hair is dry and lacking moisturisation they will often apply a moisturising or silicone based product.

5 Similarly, in teeth, a squeaky clean feel can be taken as an indication that the teeth are properly clean and/or shiny. Or it may be an indication of damage on the surface of the enamel.

This is described in, for example, "Squeaky clean: Study finds sound of tooth brushing can affect thoroughness", Dental Product Report,
10 www.dentalproductsreport.com, which describes a Japanese study where researchers in Japan discovered that how effectively individuals clean their teeth and how satisfied they are with the brushing job depends a lot on the sound of the bristles scrubbing against the enamel.

15 Squeaky clean is caused by repeating successive static and dynamic friction along a direction of movement, known in the field as "stick-slip" movement. Stick-slip can be described as surfaces alternating between sticking to each other and sliding over each other, with a corresponding change in the force of friction. Typically, the static friction coefficient between two surfaces is larger than the kinetic friction coefficient, which is the "stick" component. If an applied force is large enough to overcome the static friction, then
20 the remaining kinetic friction can cause a sudden jump in the velocity of the movement; this is the "slip" component.

Smooth sliding is when a fluid film, by virtue of viscous forces, is formed. This film maintains a gap that ensures the applied load (for example a finger, a cloth, a probe) is
25 fully supported by the lubricant within the space or gap between the parts in motion relative to one another, and solid-solid contact is avoided. So smooth sliding occurs rather than stick-slip.

We have found that the present invention enables the individual user to make an accurate
30 and useful assessment of the squeaky clean property of surfaces, easily and quickly, when and where required, for example at point of sale, in the home or on the move.

The present invention also allows the assessment of the effect of different films or deposits on a surface. The films or deposits may be provided by a product or treatment regime, for example one that is remedial or beneficial.

5 Definition of the Invention

In a first aspect of the invention there is provided a system comprising a hand held electronic device and an attachment for the hand held electronic device, said electronic device comprising an accelerometer, a signal processor and an output interface, said
10 attachment comprising:

- i) a holding device, and
- ii) a probing device,

wherein the holding device holds the probing device and wherein the attachment is non-electronic.

15

In a second aspect of the invention, there is provided a method of assessing a surface using the first aspect of the invention, comprising the steps of:

- i) contacting the surface with the probing device,
- ii) causing relative movement between the surface and the probing device such that
20 static-dynamic friction is generated, causing a vibration,
- iii) capturing the vibration resulting from steps ii) by means of the accelerometer,
- iv) converting the vibration into consumer relevant information, by means of the signal processor, and
- v) using the output interface to communicate the consumer relevant information to the
25 operator.

In a third aspect of the invention, there is provided a method of assessing changes in the properties of a surface using a system of the first aspect comprising the steps of:

- i) contacting the surface with the probing device,
- 30 ii) causing relative movement between the surface and the probing device such that static-dynamic friction is generated, causing a vibration,
- iii) capturing the vibration resulting from step ii) by means of the accelerometer,

- iv) converting the vibration into consumer relevant information, by means of the signal processor,
- v) using the output interface to communicate the consumer relevant information to the operator,
- 5 vi) applying a treatment to the surface,
- vii) repeating steps i) – v), and
- viii) comparing the results obtained from successive steps iv).

Brief Description of the Figures

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Embodiments of the invention will now be described with reference to the following non-limiting drawings in which:

15

Figure 1 is a perspective view of a system in accordance with the invention, where the attachment is a cover or case for a mobile phone and the probing device is a rubber coated metal cylinder.

Figure 1 a shows an alternative probing device, which is a tooth brush head.

20

Figure 2 is a perspective view of a system in accordance with the invention where the holding device is located in the centre of the attachment and the probing device is a brush.

25

Figure 1 is a perspective view of the system comprising an attachment (1), which is a cover or case for an electronic device (a mobile phone) (4); an integrally attached holding device (2) and a probing device (3). An accelerometer (5) is shown internal to the electronic device (4). The alternative probing device in Figure 1a may be substituted for the probing device (3) shown in Figure 1.

30

Figure 2 is a perspective view of a system in accordance with the invention comprising an attachment (1), which is a cover or case for a mobile phone (the electronic device (4)); an integrally attached holding device (2) and a probing device (3).

Detailed Description of Invention

The system of the invention comprises an attachment and an electronic device.

5

The Electronic Device

The hand held electronic device comprises an accelerometer, a signal processor and an output interface.

10

The accelerometer is preferably an integral accelerometer. Accelerometers are used, for example, in mobile phones to allow the movement of the phone to be measured.

15

Preferably, the signal processor calculates a coefficient of friction. This is used to characterise the surface and make a product recommendation.

The output interface is preferably selected from a screen, a cable, bluetooth and wifi.

The hand held electronic device is preferably a mobile phone.

20

The Attachment

The attachment comprises a holding device, and a probing device.

25

The holding device holds the probing device in a fixed position. The probe should be located in the orientation that provides the best sensitivity for that particular surface interaction and ergonomics of a given process. For example, a tooth probe would be located at the end of the holding device.

30

The attachment can be stuck directly onto the electronic device but is preferably integral to a case or cover for the electronic device. Movement of the attachment relative to the electronic device can cause interference in the vibration generated. Thus, preferably, the attachment is rigidly fixed.

The attachment is removably attached to the electronic device. The attachment is not permanently attached to the electronic device but is interchangeable.

5 The attachment is non-electronic. That is to say that the attachment itself has no electronic functionality. It does not, therefore, comprise electronic components or a power source.

The probing device is preferably selected from a probe (for example a rubber finger), a comb, a brush (for example tooth brush or a hair brush) and a stylus.

10 A preferred probe is a rubber finger because the finger is one of the most important "probes" that a consumer uses to interact with many surfaces. Such a probe is preferably made such that the probe had the surface texture similar to that of a finger pad and also a similar softness to a finger pad.

15 This probe may be assembled by replicating a finger pad using a liquid such a SIFLO, <http://store.cuderm.com/r100-replica-silflo-resin/>. The replica is then measured for surface texture using a profilometer, an example of which is the Sensofar S neox profilometer that can produce a 3D image of the surface. The profilometer software, for example sensoSCAN v5 can export a file ".dat" that is a
20 list of all the X, Y, Z, coordinates of each point. This data is then reconstructed in a suitable CAD package which can then be used to "print" an exact replica of the finger pad using a soft skin like material.

The Method

25

The method of the invention is used to assess a surface using the system described above. The method comprises the steps of:

- i) contacting the surface with the probing device,
- ii) causing relative movement between the surface and the probing device such that
30 static-dynamic friction is generated, causing a vibration,
- iii) capturing the vibration resulting from steps ii) by means of the accelerometer,

- iv) converting the vibration into consumer relevant information, by means of the signal processor, and
- v) using the output interface to communicate the consumer relevant information to the operator.

5

The assessment can be, for example, the assessment of softness, friction, smoothness, roughness, stiffness, abrasion, lubricity, damage or porosity.

10 The relative movement between the surface and the probing device can be, for example, rubbing, sweeping, pushing, combing or pulling, such that static-dynamic vibration is generated.

The consumer relevant information is preferably an indication of damage, softness, moisturisation level, cleaning level and/or longevity of a given property.

15

A further preferred method of the invention involves assessing changes in the properties of a surface, for example, where a property is getting worse (for example due to an assault) or better (for example due to the application of a product treatment regime).

20 The method involves at least two measurements separated by a time period relevant to the treatment or assault applied.

The method comprises the steps of:

- 25 i) contacting the surface with the probing device,
- ii) causing relative movement between the surface and the probing device such that static-dynamic friction is generated, causing a vibration,
- iii) capturing the vibration resulting from step ii) by means of the accelerometer,
- iv) converting the vibration into consumer relevant information, by means of the signal processor,
- 30 v) using the output interface to communicate the consumer relevant information to the operator,
- vi) applying a treatment to the surface,

vii) repeating steps i) – v), and
viii) comparing the results obtained from successive steps iv).
Steps vi) – viii) can be repeated multiple times.

- 5 The present invention thus provides the consumer with a personalised measure of properties of surfaces, for example hair, and enables the consumer to track changes in the properties of the surface, via different treatment regimes and product uses, over a period of time.
- 10 Assaults include general wear and tear, mechanical (such as combing, brushing), heat and straightening treatments, environmental (such as exposure to UV light or pollutants), chemical (such as bleach, colour), styling and cleaning assaults.

Preferred treatments for hair (step vi) are rinse off and leave on products. Preferred hair
15 treatment compositions are selected from a shampoo, a rinse-off hair conditioner, a hair mask, a leave-on conditioner composition, and a pre-treatment composition, more preferably selected from a rinse-off hair conditioner, a hair mask, a leave-on conditioner composition, and a pre-treatment composition, for example an oil treatment, and most preferably selected from a rinse-off hair conditioner, a hair mask and a leave-on
20 conditioner composition.

Rinse off conditioners for use in the invention are conditioners that are typically left on wet hair for 1 to 2 minutes before being rinsed off.

- 25 Hair masks for use in the present invention are treatments that are typically left on the hair for 3 to 10 minutes, preferably from 3 to 5 minutes, more preferably 4 to 5 minutes, before being rinsed off.

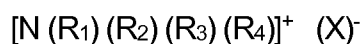
Leave-on conditioners for use in the invention are typically applied to the hair and left on
30 the hair for more than 10 minutes, and preferably are applied to the hair after washing and not rinsed out until the next wash.

Treatments compositions for use in the method of the current invention preferably comprise conditioning agents. Conditioning agents are preferably selected from cationic surfactants, used singly or in admixture.

- 5 Cationic surfactants useful in compositions for use in the method of the invention contain amino or quaternary ammonium hydrophilic moieties which are positively charged when dissolved in aqueous composition.

Examples of suitable cationic surfactants are those corresponding to the formula:

10



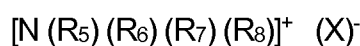
in which R₁, R₂, R₃ and R₄ are independently selected from (a) an aliphatic group of from 1 to 22 carbon atoms, or (b) an aromatic, alkoxy, polyoxyalkylene, alkylamido, hydroxyalkyl, 15 aryl or alkaryl group having up to 22 carbon atoms; and X is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate, and alkylsulphate radicals.

The aliphatic groups can contain, in addition to carbon and hydrogen atoms, ether 20 linkages, and other groups such as amino groups. The longer chain aliphatic groups, e.g., those of about 12 carbons, or higher, can be saturated or unsaturated.

The most preferred cationic surfactants for compositions for use in the method of the present invention are monoalkyl quaternary ammonium compounds in which the alkyl 25 chain length is C₈ to C₁₄.

Suitable examples of such materials correspond to the formula:

30



in which R₅ is a hydrocarbon chain having 8 to 14 carbon atoms or a functionalised hydrocarbyl chain with 8 to 14 carbon atoms and containing ether, ester, amido or amino

moieties present as substituents or as linkages in the radical chain, and R₆, R₇ and R₈ are independently selected from (a) hydrocarbyl chains of from 1 to about 4 carbon atoms, or (b) functionalised hydrocarbyl chains having from 1 to about 4 carbon atoms and containing one or more aromatic, ether, ester, amido or amino moieties present as substituents or as linkages in the radical chain, and X is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate and alkylsulphate radicals.

The functionalised hydrocarbyl chains (b) may suitably contain one or more hydrophilic moieties selected from alkoxy (preferably C₁-C₃ alkoxy), polyoxyalkylene, alkylester, and combinations thereof.

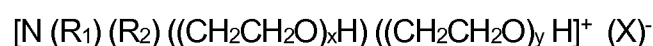
Preferably the hydrocarbon chains R₁ have 12 to 14 carbon atoms, most preferably 12 carbon atoms. They may be derived from source oils which contain substantial amounts of fatty acids having the desired hydrocarbyl chain length. For example, the fatty acids from palm kernel oil or coconut oil can be used as a source of C₈ to C₁₂ hydrocarbyl chains.

Typical monoalkyl quaternary ammonium compounds of the above general formula for use in compositions for use in the method of the invention include:

(i) Lauryl trimethylammonium chloride (available commercially as Arquad C35 ex Akzo); cocodimethyl benzyl ammonium chloride (available commercially as Arquad DMCB-80 ex-Akzo)

25

(ii) Compounds of the formula:



wherein:

30 x + y is an integer from 2 to 20;

R₁ is a hydrocarbyl chain having 8 to 14, preferably 12 to 14, most preferably 12 carbon atoms and containing ether, ester, amido or amino moieties present as substituent's or as linkages in the radical chain;

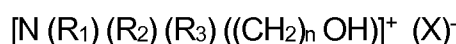
5 R₂ is a C₁-C₃ alkyl group or benzyl group, preferably methyl, and

X is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate, methosulphate and alkylsulphate radicals.

10

Suitable examples are PEG-n lauryl ammonium chlorides (where n is the PEG chain length), such as PEG-2 cocomonium chloride (available commercially as Ethoquad C12 ex-Akzo Nobel); PEG-2 cocobenzyl ammonium chloride (available commercially as Ethoquad CB12 ex-Akzo Nobel); PEG-5 cocomonium methosulphate (available
 15 commercially as Rewoquat CPEM ex Rewo); PEG-15 cocomonium chloride (available commercially as Ethoquad C/25 ex-Akzo).

(iii) Compounds of the formula:



20 wherein:

n is an integer from 1 to 4, preferably 2;

25 R₁ is a hydrocarbyl chain having 8 to 14, preferably 12 to 14, most preferably 12 carbon atoms;

R₂ and R₃ are independently selected from C₁ – C₃ alkyl groups, and are preferably methyl, and

30 X- is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate, alkylsulphate radicals.

Suitable examples are lauryldimethylhydroxyethylammonium chloride (available commercially as Prapagen HY ex-Clariant).

Mixtures of any of the foregoing cationic surfactants compounds may also be suitable. Examples of suitable cationic surfactants for use in hair compositions for use in the method of the invention include cetyltrimethylammonium chloride, behenyltrimethylammonium chloride, cetylpyridinium chloride, tetramethylammonium chloride, tetraethylammonium chloride, octyltrimethylammonium chloride, dodecyltrimethylammonium chloride, hexadecyltrimethylammonium chloride, octyldimethylbenzylammonium chloride, decyldimethylbenzylammonium chloride, stearyldimethylbenzylammonium chloride, didodecyldimethylammonium chloride, dioctadecyldimethylammonium chloride, tallowtrimethylammonium chloride, cocotrimethylammonium chloride, and the corresponding hydroxides thereof. Further suitable cationic surfactants include those materials having the CTFA designations Quaternium-5, Quaternium-31 and Quaternium-18. Mixtures of any of the foregoing materials may also be suitable. A particularly useful cationic surfactant is cetyltrimethylammonium chloride, available commercially, for example as DEHYQUART, ex Henkel.

15

The level of cationic surfactant is preferably from 0.01 to 10, more preferably 0.05 to 5, most preferably 0.1 to 2 w.t. % of the total composition.

20

A preferred conditioner comprises a conditioning gel phase. Such conditioners and methods for making them are described in WO2014/016354, WO2014/016353, WO2012/016352 and WO2014/016351.

25

The conditioning compositions may also comprise other optional ingredients. Such ingredients include, but are not limited to; fatty material, deposition polymers and further conditioning agents.

30

Conditioner compositions preferably additionally comprise fatty materials. The combined use of fatty materials and cationic surfactants in conditioning compositions is believed to be especially advantageous, because this leads to the formation of a structured lamellar or liquid crystal phase, in which the cationic surfactant is dispersed.

By "fatty material" is meant a fatty alcohol, an alkoxyated fatty alcohol, a fatty acid or a mixture thereof.

Preferably, the alkyl chain of the fatty material is fully saturated.

5

Representative fatty materials comprise from 8 to 22 carbon atoms, more preferably 16 to 22. Examples of suitable fatty alcohols include cetyl alcohol, stearyl alcohol and mixtures thereof. The use of these materials is also advantageous in that they contribute to the overall conditioning properties of compositions.

10

Alkoxyated, (e.g. ethoxyated or propoxyated) fatty alcohols having from about 12 to about 18 carbon atoms in the alkyl chain can be used in place of, or in addition to, the fatty alcohols themselves. Suitable examples include ethylene glycol cetyl ether, polyoxyethylene (2) stearyl ether, polyoxyethylene (4) cetyl ether, and mixtures thereof.

15

The level of fatty material in conditioners is suitably from 0.01 to 15, preferably from 0.1 to 10, and more preferably from 0.1 to 5 percent by weight of the total composition. The weight ratio of cationic surfactant to fatty alcohol is suitably from 10:1 to 1:10, preferably from 4:1 to 1:8, optimally from 1:1 to 1:7, for example 1:3.

20

Further conditioning ingredients include esters of fatty alcohol and fatty acids, such as cetyl palmitate.

A conditioning composition for use in the present invention may preferably comprise a miscellar structured liquid.

25

The pH of a conditioner comprising the present composition is preferably 3-5. More preferably the pH of the composition is 4.5 - 5.5.

30

Where the composition has a pH of less than 3.10 it is preferred that it is in the form of a conditioning mask for intense treatment.

Further conditioning ingredients include conditioning oils, preferably selected from coconut oil and olive oil.

5 The treatment may be an oral care composition. Preferably, the oral care composition comprises water, thickener, surfactant and abrasive. Suitable thickeners include silicas and calcium carbonate. The preferred thickener is silica. Suitable surfactants include the alkali-metal alkyl sulphate surfactants such as the sodium alkyl sulphates, the most preferred being sodium laurylsulphate.

10 Preferred abrasive materials include silicas, aluminas, calcium carbonates, dicalcium phosphates, calcium pyrophosphates, hydroxyapatites, trimetaphosphates, insoluble hexametaphosphates and so on, including agglomerated particulate abrasive materials, usually in amounts between 3 and 60% by weight of the oral care composition. The most preferred abrasives are calcium carbonate and silica, especially silica.

15 Preferably, the oral care composition for use in the invention comprises a plurality of visually distinct formulations. By this is meant that the composition comprises separate and different formulations which are adjacent one another when extruded from a tube or the like. Typical examples include a composition which comprises a stripe formulation and
20 a base formulation. Another example includes a composition comprising a core formulation and a sheath formulation. The core formulation is preferably located coaxially within the sheath formulation. The term 'coaxially' means substantially central in cross section and is not meant to represent any mathematical accuracy.

25 Preferably, the oral care composition comprises a first formulation located co-axially within a second formulation, the first formulation comprising blue pigment and the second formulation comprising a pearlescer, preferably mica.

30 The oral care compositions according to the invention may comprise further ingredients which are common in the art, such as:

antimicrobial agents, e.g. Triclosan, chlorhexidine, copper, zinc, and stannous salts such as zinc citrate, zinc sulphate, zinc glycinate, sodium zinc citrate and stannous pyrophosphate, sanguinarine extract, metronidazole, quaternary ammonium compounds, such as cetylpyridinium chloride; bis-guanides, such as chlorhexidine digluconate,
5 hexetidine, octenidine, alexidine; and halogenated bisphenolic compounds, such as 2,2' methylenebis-(4-chloro-6-bromophenol);

anti-inflammatory agents such as ibuprofen, flurbiprofen, aspirin, indomethacin etc.;

10 anti-caries agents such as sodium- and stannous fluoride, aminefluorides, sodium monofluorophosphate, sodium trimeta phosphate and casein;

plaque buffers such as urea, calcium lactate, calcium glycerophosphate and strontium polyacrylates;

15

vitamins such as Vitamins A, C and E;

plant extracts;

20 desensitising agents, e.g. potassium citrate, potassium chloride, potassium tartrate, potassium bicarbonate, potassium oxalate, potassium nitrate and strontium salts;

anti-calculus agents, e.g. alkali-metal pyrophosphates, hypophosphite-containing polymers, organic phosphonates and phosphocitrates etc.;

25

biomolecules, e.g. bacteriocins, antibodies, enzymes, etc.;

flavours, e.g. peppermint and spearmint oils;

30 proteinaceous materials such as collagen;

preservatives;

opacifying agents;

5 colouring agents;

pH-adjusting agents;

sweetening agents;

10

pharmaceutically acceptable carriers, e.g. starch, sucrose, water or water/alcohol systems etc.;

humectants such as glycerol, sorbitol, propyleneglycol, xylitol, lactitol etc.;

15

binders and thickeners such as sodium carboxymethyl-cellulose, xanthan gum, gum arabic etc. as well as synthetic polymers such as polyacrylates and carboxyvinyl polymers such as Carbopol®;

buffers and salts to buffer the pH and ionic strength of the oral care composition; and

20

other optional ingredients that may be included are e.g. bleaching agents such as peroxy compounds e.g. potassium peroxydiphosphate, effervescent systems such as sodium bicarbonate/citric acid systems, colour change systems, and so on.

25

Liposomes may also be used to improve delivery or stability of active ingredients.

The oral care compositions may be in any form common in the art, e.g. toothpaste, gel, mousse, aerosol, chewing gum, lozenge, powder, cream, and may also be formulated into systems for use in dual-compartment type dispensers.

30

Claims

1. A system comprising a hand held electronic device and an attachment for the hand held electronic device, said electronic device comprising an accelerometer, a signal processor and an output interface, said attachment comprising:
- 5
- i) a holding device, and
 - ii) a probing device,
- wherein the holding device holds the probing device and wherein the attachment is non-electronic
- 10
2. A system as claimed in claim 1, wherein the probing device is selected from a probe, a comb, a brush and a stylus.
3. A system as claimed in claim 1, wherein the holding device is integral with a case for the electronic device.
- 15
4. A system as claimed in any preceding claim, wherein the holding device is rigidly attached.
- 20
5. A system as claimed in any preceding claim, wherein the probe is rigidly attached to the holding device.
6. A system as claimed in any preceding claim, wherein the probing device is either integral with the holding device or detachable from the holding device.
- 25
7. A method of assessing a surface using a system as defined in any one of claims 1 to 6, said method comprising the steps of:
- i) contacting the surface with the probing device,
 - 30 ii) causing relative movement between the surface and the probing device such that static-dynamic friction is generated, causing a vibration,
 - iii) capturing the vibration resulting from steps ii) by means of the accelerometer,

iv) converting the vibration into consumer relevant information, by means of the signal processor, and

v) using the output interface to communicate the consumer relevant information to the operator.

5

8. A method of using a system as defined in any of claims 1 to 6, to track changes in the properties of a surface, comprising the steps of:

i) contacting the surface with the probing device,

10 ii) causing relative movement between the surface and the probing device such that static-dynamic friction is generated, causing a vibration,

iii) capturing the vibration resulting from step ii) by means of the accelerometer,

iv) converting the vibration into consumer relevant information, by means of the signal processor,

15 v) using the output interface to communicate the consumer relevant information to the operator,

vi) applying a treatment to the surface,

vii) repeating steps i) – v), and

viii) comparing the results obtained from successive steps iv).

20

9. The method of claim 7 or claim 8, wherein the surface is selected from hair, skin and teeth, preferably hair.

10. The method of claim 8 or claim 9, wherein the treatment is a hair treatment

25 composition.

Fig. 1

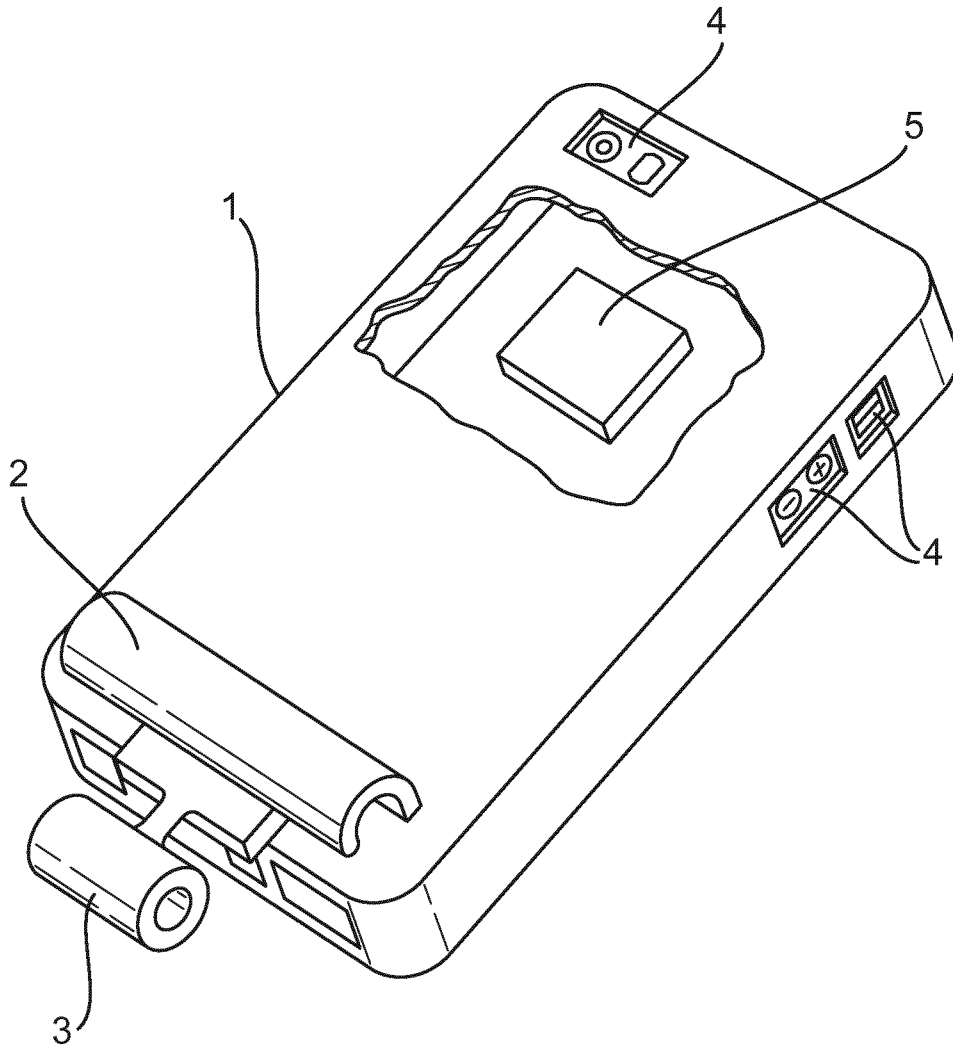


Fig. 1a

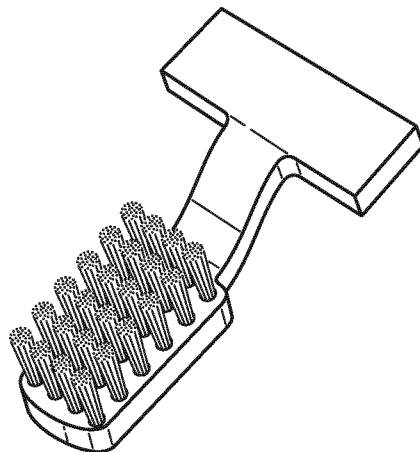
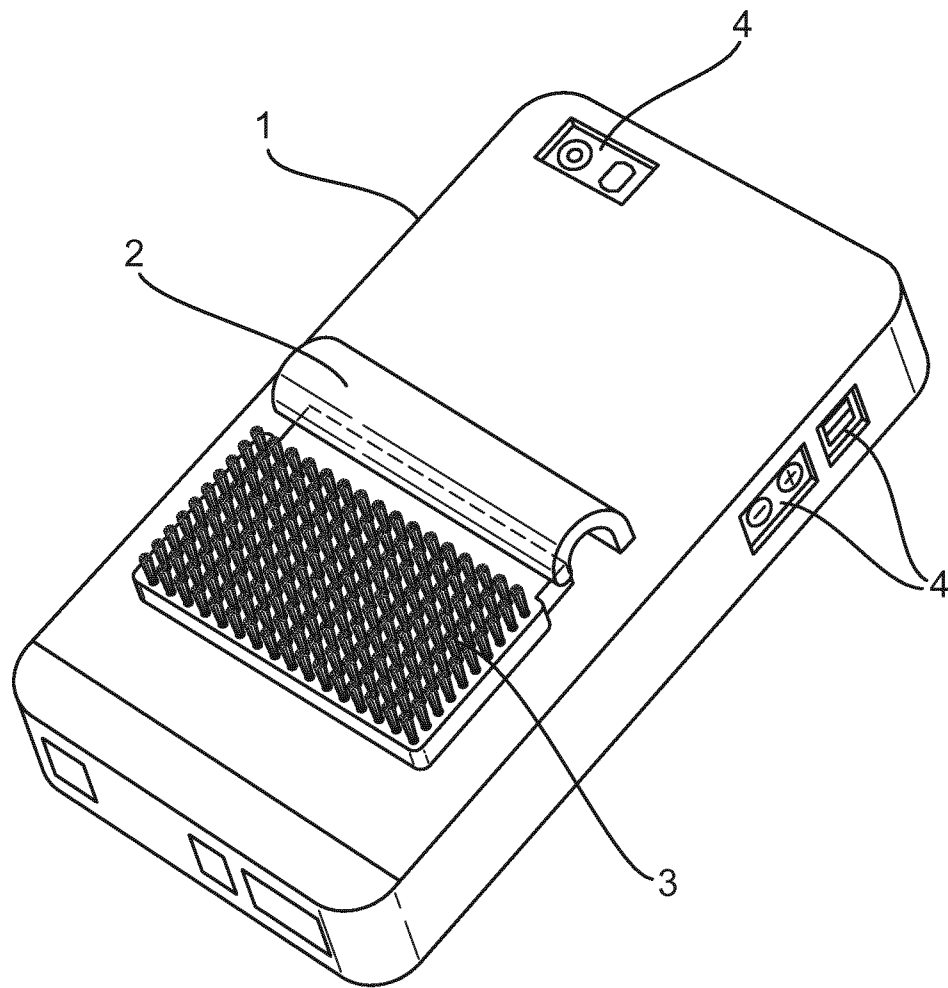


Fig. 2



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/057386

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61B5/00 A45D24/00
 ADD. A61B10/02 G01N33/483

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 A61B G01N A45D A46B

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 practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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X	US 2016/022393 A1 (YOSHIDA KAZUAKI [JP] ET AL) 28 January 2016 (2016-01-28) paragraphs [0042] - [0045], [0050] - [0051], [0055], [0072] - [0073] figures 1-2	1-10
A	US 2015/342515 A1 (HUTCHINGS CEDRIC [FR] ET AL) 3 December 2015 (2015-12-03) the whole document	1-10
A	US 2006/184068 A1 (SHIBUICHI SATOSHI [JP] ET AL) 17 August 2006 (2006-08-17) the whole document	1-10

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
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- "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
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- "&" document member of the same patent family

Date of the actual completion of the international search 20 June 2017	Date of mailing of the international search report 28/06/2017
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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 Faymann, Juan
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