US 20020182409A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2002/0182409 A1

Gueret (43) Pub. Date: Dec. 5, 2002

(54) FIBER AND DEVICE FOR APPLYING A PRODUCT, AND METHOD OF MANUFACTURING DEVICE

(76) Inventor: **Jean-Louis H. Gueret**, Paris (FR)

Correspondence Address:
Thomas L. Irving
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P.
1300 I Street, N.W.
Washington, DC 20005-3315 (US)

(21) Appl. No.: **10/161,726**

(22) Filed: **Jun. 5, 2002**

(30) **Foreign Application Priority Data**

Jun. 5, 2001 (FR) 01 07308

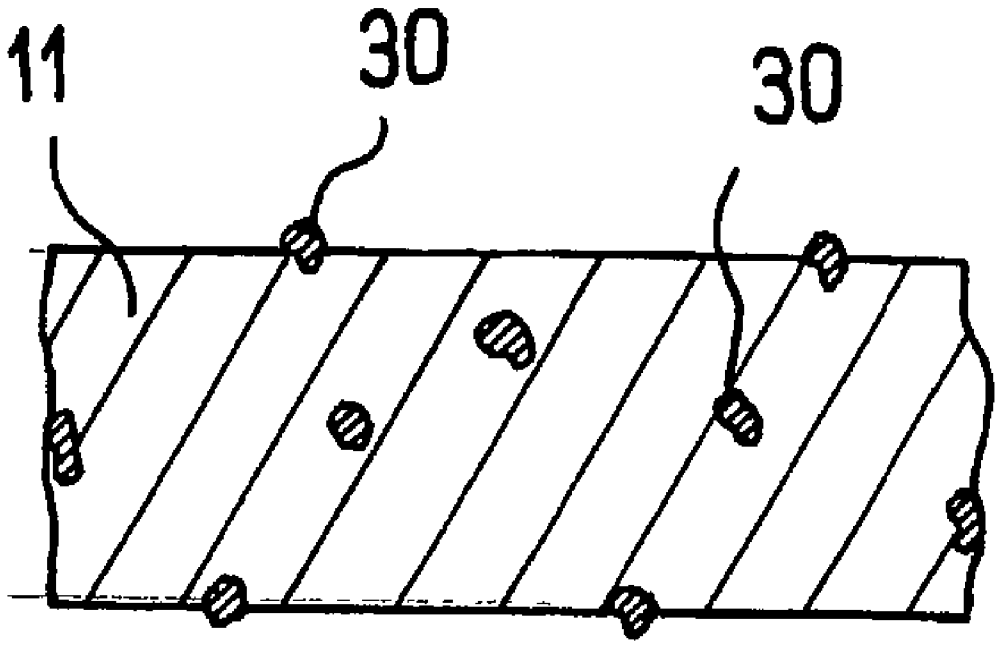
Publication Classification

(51) **Int. Cl.**[7] **A46B 15/00**; D02G 3/00

(52) **U.S. Cl.** **428/364**; 15/207.2; 401/129; 132/218; 132/320; 428/375

(57) **ABSTRACT**

The disclosure relates to a fiber and a product application device including a plurality of fibers for applying a product. In one disclosed example of the device, at least one of the fibers includes particles configured to be capable of at least one of absorbing at least one of an amount of a liquid having a weight at least equal to a weight of the particles and a compound in solution in a liquid, and dissolving in a liquid. The particles may lack cotton.



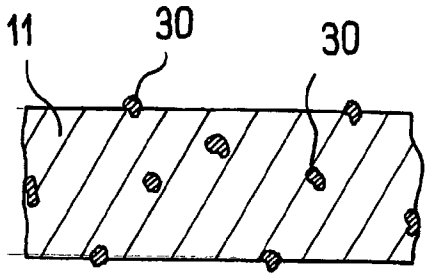


FIG_1A

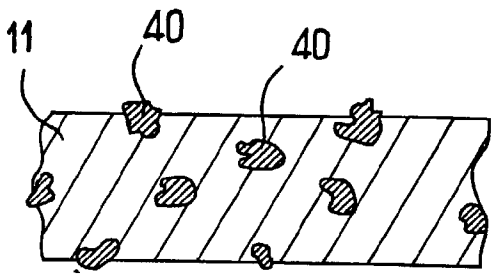


FIG_2A

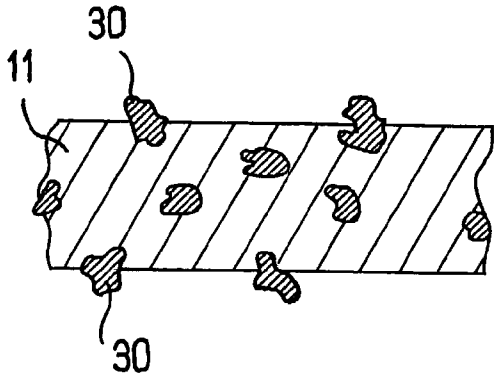


FIG_1B

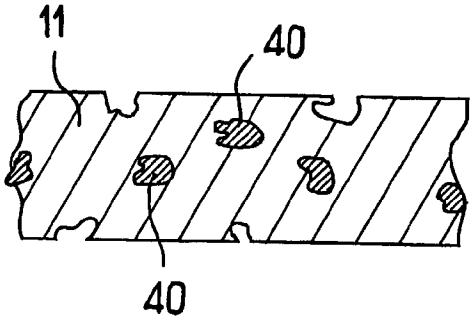


FIG_2B

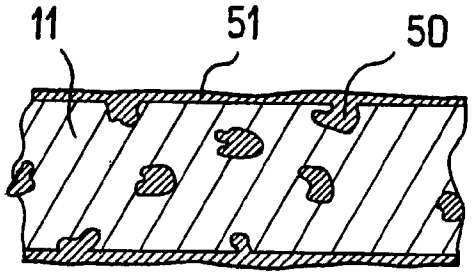


FIG_3

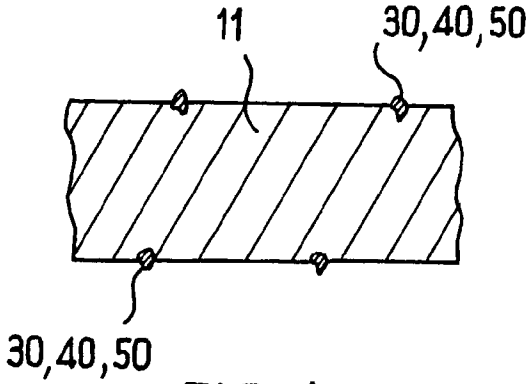


FIG_4

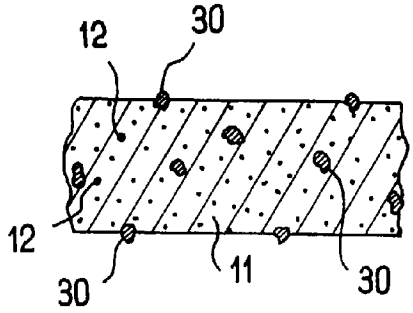


FIG_5A

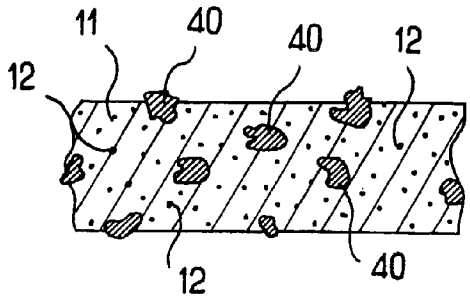


FIG_6A

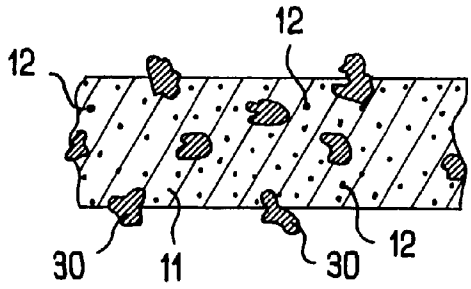


FIG_5B

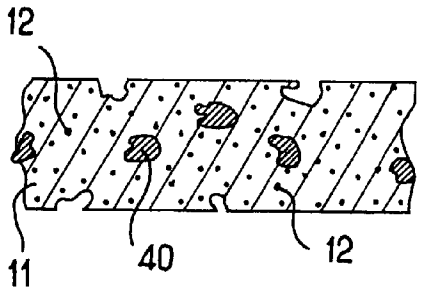


FIG_6B

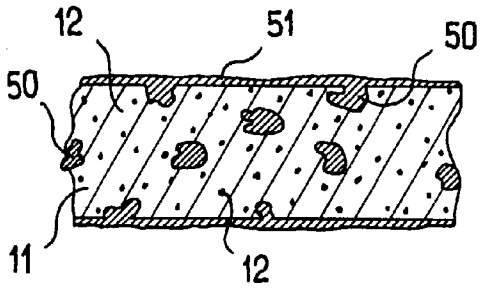


FIG_7

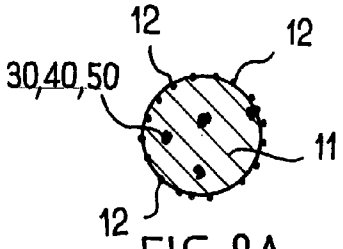


FIG_8A

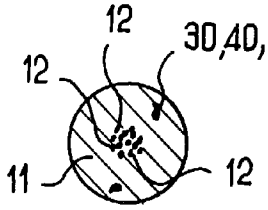


FIG_8B

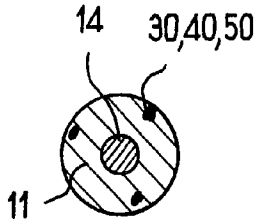


FIG_8C

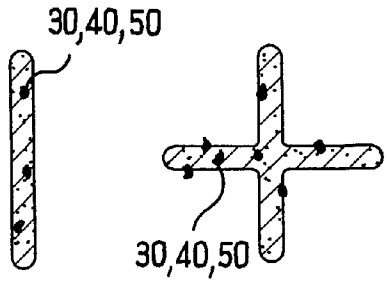


FIG_9A FIG_9B

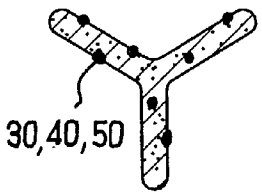


FIG_9C

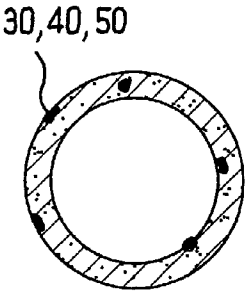


FIG_9D

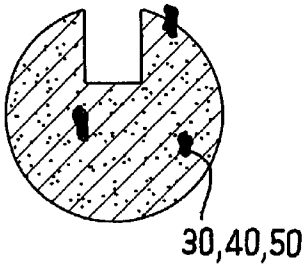


FIG_9E

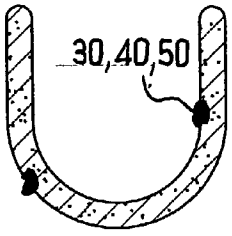


FIG_9F

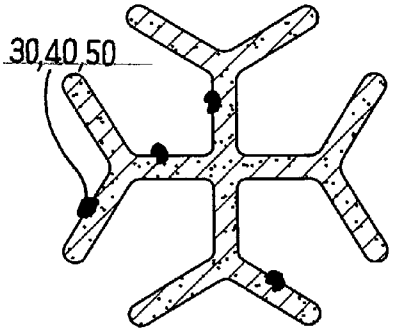


FIG_9G

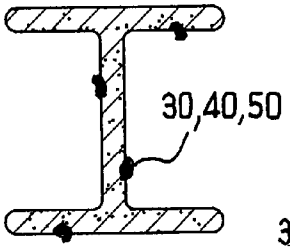


FIG_9H

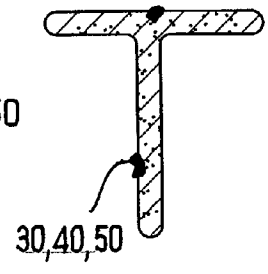


FIG_9I

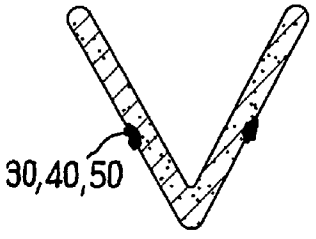


FIG_9J

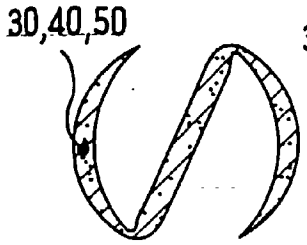


FIG_9K

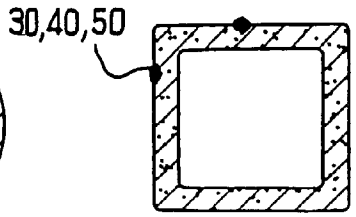


FIG_9L

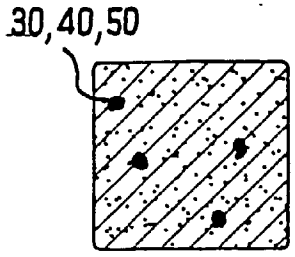


FIG_9M

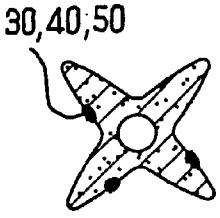


FIG_9N

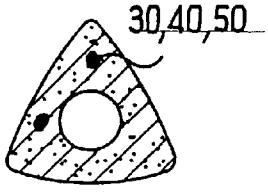
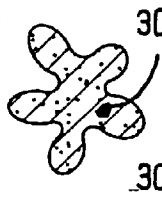
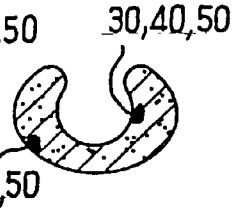


FIG_9O





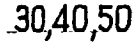


FIG_9P FIG_9Q

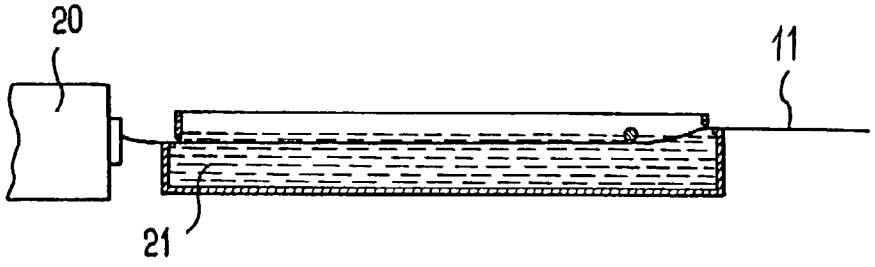


FIG_10

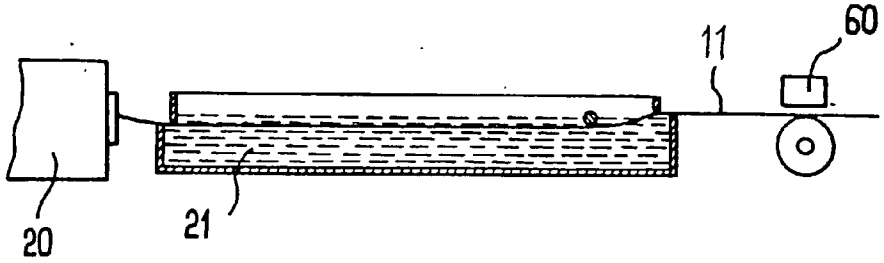


FIG_11

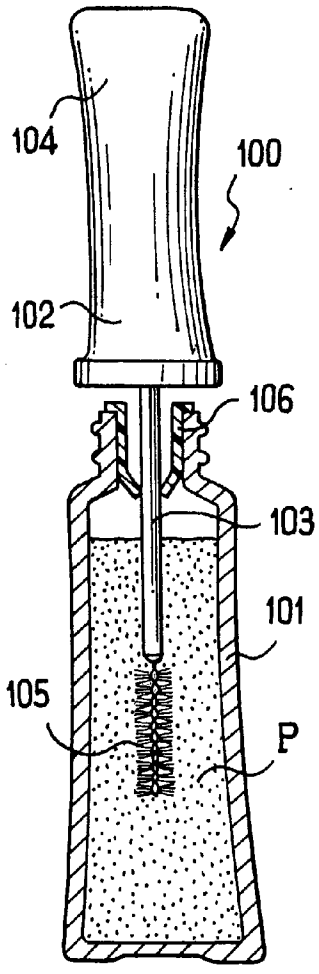


FIG_12

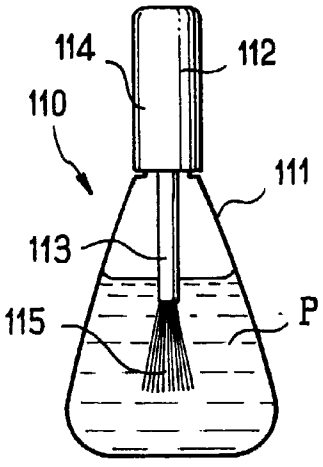


FIG_13

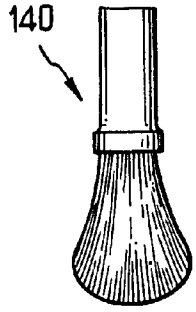


FIG_16

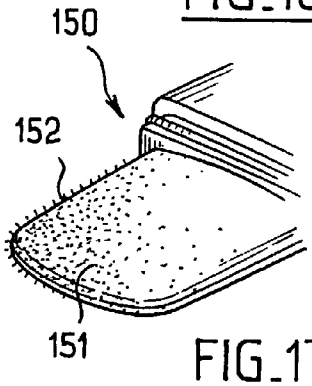


FIG_17

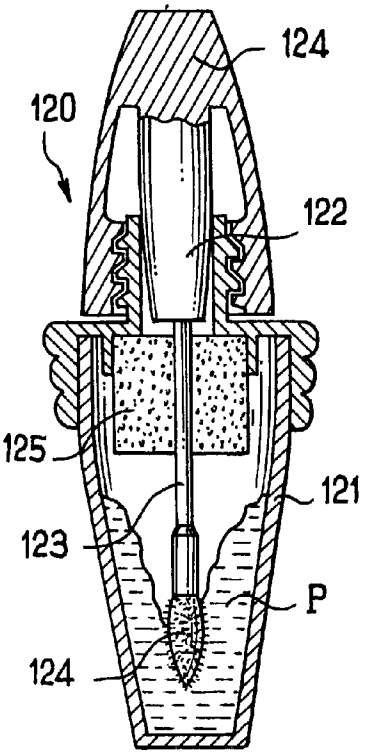


FIG_14

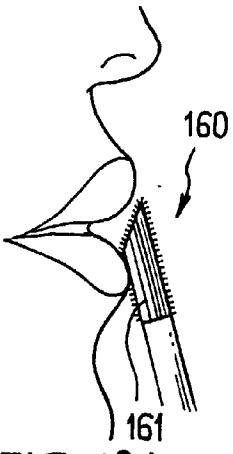


FIG_18A

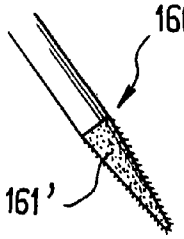


FIG_18B

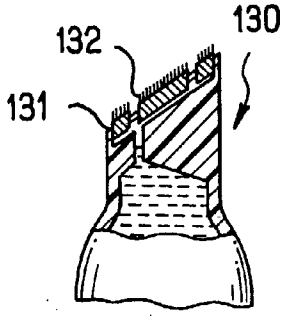


FIG_15

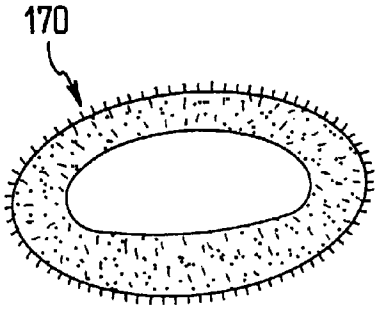


FIG_19

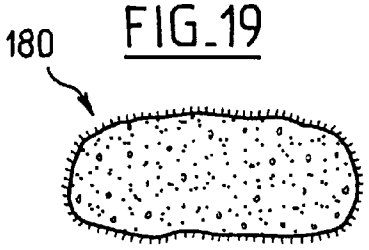


FIG_20

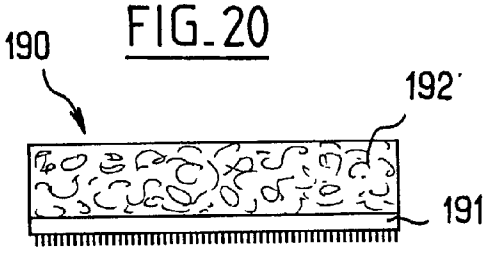


FIG_21

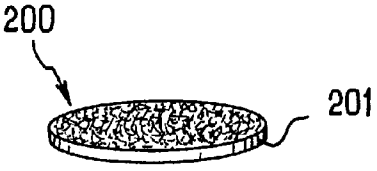


FIG_22

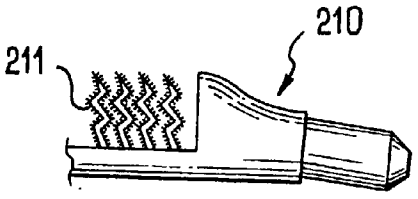


FIG_23

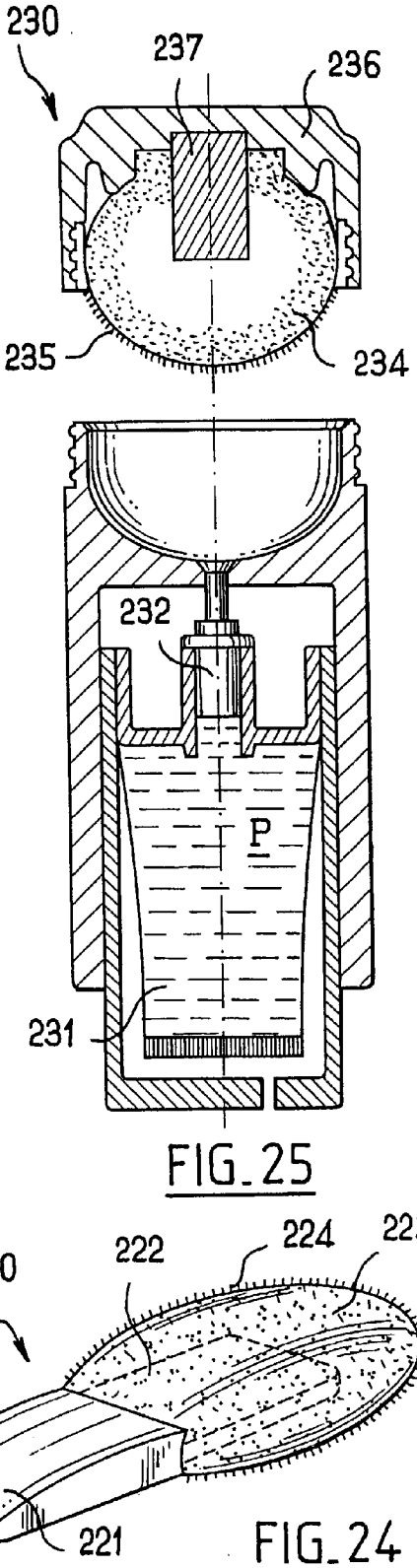


FIG_25

FIG_24

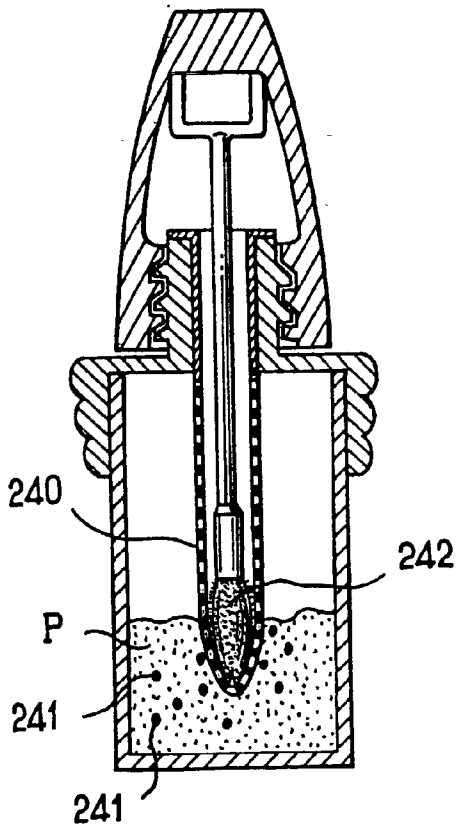


FIG. 26

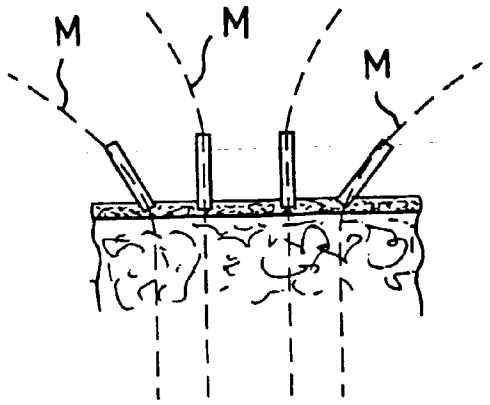


FIG. 27

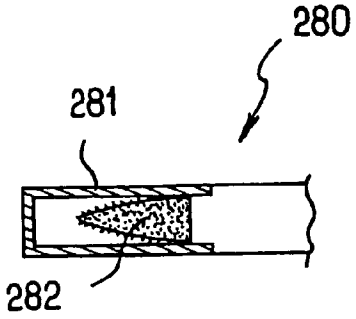


FIG. 30

FIG. 28A

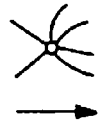


FIG. 28B

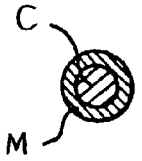


FIG. 31

FIG. 29A

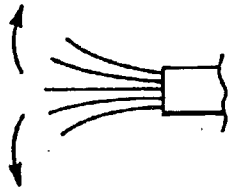


FIG. 29B

FIG. 32

FIBER AND DEVICE FOR APPLYING A PRODUCT, AND METHOD OF MANUFACTURING DEVICE

[0001] The present invention relates to a device for applying a product, such as, for example, a cosmetic product (e.g., make-up) and/or a care product, to the skin, hair, eyelashes, fingernails, and/or toe nails. For example, the device may be used to apply cosmetic products such as those defined in Counsel Directive 93/35/EEC (European Economic Community) dated Jun. 14, 1993, which provides merely one example of a definition of cosmetic products and should not be considered as limiting. The present invention also relates, for example, to a fiber used for applying a substance and/or a fiber used as a filler in a substance.

[0002] There exists a need to improve the ease with which fibers, for example, fibers of a brush or a flocking, can take up a relatively large quantity of a product, for example, in order to enable an applicator comprising at least some of the fibers to continue to be used for a greater period of time.

[0003] There also exists a need for bristles in a mascara brush to be capable of catching hold of the eyelashes, for example, in order to smooth out the product on the surface of the eyelashes and/or in order to curve them. There also exists a need to improve conservation of a cosmetic product and/or a care product. There also exists a need to create novel conditions of application for a cosmetic product and/or a care product by means of fibers, and to create novel makeup effects. There also exists a need to reduce the rate at which a cosmetic product and/or a care product dries out on an applicator, for example, when the applicator is not reinserted quickly into its receptacle or when the applicator is kept in moist conditions via a leaktight cap.

[0004] Although the present invention may obviate one or more shortcomings of the related art, it should be understood that some aspects of the invention might not necessarily obviate one or more of those shortcomings.

[0005] In the following description, certain aspects of the invention will become evident. It should be understood that those aspects are intended to be exemplary and that the invention, in its broadest sense, could be practiced without having one or more of these aspects.

[0006] In one aspect, as embodied and broadly described herein, the invention includes a device for applying a product. The device includes a plurality of fibers for applying the product. At least one of the fibers may include particles configured to be capable of at least one of absorbing at least one of an amount of a liquid having a weight at least equal to a weight of the particles and a compound in solution in a liquid, and dissolving in a liquid. The particles may lack cotton.

[0007] When determining the amount of liquid absorbed by a given particle, the weight of the particle prior to being placed in contact with a liquid is compared to the weight of the given particle after having been placed in contact with the liquid for a period of time such that further contact with the liquid does not result in an appreciable amount of additional liquid being absorbed. The difference in the weight of the particle prior to contacting the liquid and the particle's weight after absorbing the liquid for a period of time represents the weight of the liquid absorbed.

[0008] As used herein, the term "fiber" means any generally elongate body (e.g., a bristle of a brush (e.g., a bristle of a mascara brush, nail varnish brush, paint brush, or blusher brush), a fiber in a flocking, a bristle in a paint brush, a fiber for applying a powder, fibers included in a filler for a product intended to be applied to the eyelashes (e.g., for lengthening the eyelashes)). The fibers may be relatively flexible, for example, elastically deformable, and the fibers may comprise a synthetic material.

[0009] As used herein, the term "liquid" means any liquid that is acceptable for use in either a cosmetic product and/or a care product, including, for example, but not limited to, water, an oil, an aqueous solution, an alcohol solution, or an oil solution that can be applied on the human body. Such liquid may be contained in the product to be applied. It is not necessary, however, that the liquid be contained in the product.

[0010] In yet another aspect, a device for applying a product may be provided including a plurality of fibers for applying the product. At least one of the fibers may include particles configured to be capable of at least one of absorbing at least one of a liquid and a compound in solution in a liquid, and dissolving in a liquid. The particles may lack clay, may lack silica, and may lack cotton.

[0011] In another aspect, a device for applying a product may be provided including a plurality of fibers for applying the product. At least one of the fibers may include particles configured to be capable of at least one of absorbing at least one of a liquid and a compound in solution in a liquid, and dissolving in a liquid. The at least one fiber may be substantially untapered and the particles may lack clay, may lack silica, and may lack cotton. In still a further aspect, at least one of the fibers may have a diameter ranging from about 0.5 μm to about 500 μm.

[0012] According to yet another aspect, a fiber for a device for applying a product may be provided including a synthetic material, and particles associated with the synthetic material. The particles may be configured to be capable of at least one of absorbing at least one of an amount of a liquid having a weight at least equal to a weight of the particles and a compound in solution in a liquid, and dissolving in a liquid. The particles may lack cotton.

[0013] In still another aspect, a fiber for a device for applying a product may be provided including a synthetic material and particles associated with the synthetic material. The particles may be configured to be capable of at least one of absorbing at least one of a liquid and a compound in solution in a liquid, and dissolving in a liquid. The particles may lack clay, may lack silica, and may lack cotton.

[0014] In a further aspect, a fiber for a device for applying a product may be provided including a synthetic material and particles associated with the synthetic material. The particles may be configured to be capable of at least one of absorbing at least one of a liquid and a compound in solution in a liquid, and dissolving in a liquid. The fiber may be substantially untapered and the particles may lack clay, may lack silica, and may lack cotton.

[0015] In an additional aspect, at least one of the fibers may have a cross-section that is substantially constant, and at least one of the fibers may be formed by one of extruding and co-extruding at least one of a thermoplastic material and an elastomeric material.

[0016] In one aspect, at least one of the particles may be at the surface of the at least one fiber. In a further aspect, at least a portion of at least one fiber may include particles only at the surface of the at least one fiber. In yet another aspect, at least one fiber may include particles dispersed throughout the at least one fiber. The fiber may be formed by co-extrusion of two materials (e.g., synthetic materials) with one of the materials being filled, for example, with the particles. The particles may be present, for example, at least at the surface of at least a portion of the fibers, at the surface only of the fibers, or dispersed throughout the material of the fibers.

[0017] In another aspect, the particles may include a material configured to increase in volume on contact with at least a portion of the product to be applied. For example, at least one of the fibers may include a material capable of swelling on contact with at least a portion of the product to be applied. The particles may be capable of swelling when coming in contact with a solvent (e.g., water) contained in the product to be applied. Such an increase in volume may serve to create surface irregularities at the surface of the fiber, which may form zones for retaining the product. Such surface irregularities may be desired, for example, when the fibers are used for application purposes and are dipped in a receptacle containing a supply of a cosmetic product and/or a care product.

[0018] The use of particles capable of absorbing liquid, and possibly of swelling in contact therewith, or of dissolving in contact with the liquid, may serve to create special zones for anchoring on the fiber the cosmetic product and/or care product to be applied, for example, by affinity of the particles for hydrophilic or lipophilic compounds contained in the product. The product may exhibit improved adherence to the fiber and the applicator may be capable of carrying a larger quantity of the product.

[0019] The presence of particles suitable for absorbing liquid and/or for swelling on contact with the liquid may also be useful in retarding the drying out of the cosmetic product and/or care product present on the surface of the fiber. The solvent (e.g., water) contained in the cosmetic product and/or care product may evaporate and the particles which have absorbed the liquid may then release the liquid back into the substance present around the fiber. Retarding the drying out of product present on the surface of an applicator fiber may be desired because it may serve not only to enable the applicator to be used for a greater length of time, but it may also retard the drying out when, for example, the applicator is not in contact with the product (e.g., while not being used (e.g., while being protected merely by a protective cap)).

[0020] The particles may be in a crystalline state when dry and may be capable of softening when placed in contact with the liquid contained in the product. This may render the fiber more flexible after absorption of the liquid. By selecting the nature of the particles and the amount introduced, for example, one may form fibers having a desired flexibility.

[0021] In yet another aspect, the particles may include, but are not limited to, at least one material chosen from polymers that swell in the presence of at least one of water and lipids, super-absorbent reticulated polyacrylates having a high swelling factor in water, polyvinyl alcohols, carboxyvinyl polymers, semi-synthetic derivatives of cellulose, starches, biogums, biosaccharides, scelro-glucanes, casein, phytocolloids, alginates, gelatins, gelanes, xanthans, laponites, silicas, and colloidal silica. These particles may, for example, increase their volume upon coming into contact with the product to be applied (e.g., upon coming into contact with water).

[0022] In another aspect, at least some of the particles may include one or more super-absorbent materials that may be capable of absorbing twice their weight, ten times their weight, fifty times their weight, one-hundred times their weight, or as much as five-hundred times their weight in liquid.

[0023] In a further aspect, the particles may have a grain size ranging from about 0.1 μm to about 300 μm prior to swelling. For example, the particles may have a grain size ranging from about 5 μm to about 200 μm, or from about 10 μm to about 150 μm. The grain size of the particles may be selected, for example, as a function of the degree of roughness of the fiber desired after swelling. The particles may be formed of a material that is capable of swelling when placed in contact with the product to be applied and which, for example, presents a relative increase in volume of about 15%.

[0024] In yet another aspect, the concentration by weight of the particles prior to swelling relative to the total weight of the at least one fiber may range from above about 0% to about 20%. For example, the concentration by weight of the particles prior to swelling relative to the total weight of the at least one fiber may range from above about 0% to about 6%.

[0025] In still another aspect, at least one of the fibers may include at least one plastic material chosen from polyamides, polyethylene terephthalates (PETs), acetates, polyethylenes (PEs), polypropylenes (PPs), polyvinylchlorides (PVCs), amide block polyesters, plasticized RILSAN (which is believed to be a form of polyamide), elastomers, polyester elastomers, PE elastomers, silicone elastomers, and nitril elastomers. The fibers may also include other materials.

[0026] According to another aspect, the particles may be configured to be capable of forming a gel at the surface of the at least one fiber, and/or may be configured to be capable of dissolving on contact with a liquid. For example, at least one of the particles may be one of hydrosoluble and liposoluble. The dissolution of such particles may result in surface roughness on the fiber and/or render the fiber substantially porous.

[0027] In another aspect, the particles may be configured to be capable of absorbing a liquid. For example, at least one of the fibers may include particles suitable for absorbing a liquid such as water with or without swelling. The use of such particles may be desired for enabling one or more compounds to be introduced into the fiber (e.g., for imparting biocidal and/or bactericidal properties to the fiber). In another aspect, the particles may be configured to be capable of absorbing preservatives in solution in a liquid, for example, in an aqueous solution.

[0028] In an additional aspect, the concentration by weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber may range from above about 0% to about 20%. For example, the concentration by

weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber may range from above about 0% to about 6%.

[0029] In still a further aspect, the cross-section of at least one of the fibers may have at least one shape chosen from circularly symmetrical shapes, circular shapes, solid square shapes, hollow square shapes, disk shapes, disk shapes having a groove, solid triangle shapes, hollow triangle shapes, solid star shapes, hollow star shapes, U-shaped, V-shaped, I-shaped, T-shaped, Z-shaped, dash-shaped, cross-shaped, kidney-shaped, shapes having three branches, and hollow shapes. The at least one fiber may have a cross-section shape that is twisted.

[0030] In one exemplary embodiment, the device may include a wiper member. The device may be configured to be loaded with the product and may be, for example, a mascara brush including a plurality of bristles. At least one of the bristles may include at least one of the fibers according to any of the previously mentioned aspects. The presence of particles configured to be capable of absorbing liquid and/or capable of swelling upon being placed in contact with a liquid or of dissolving in a liquid may render it possible to impart a degree of roughness and/or porosity to the bristles of a brush, thereby encouraging, for example, adherence of mascara to the bristles and thereby retarding drying out of the mascara. The particles (e.g., when they are suitable for generating films) may also deposit a film on the surface of the eyelashes, thereby improving, for example, the firmness and/or the appearance of the eyelashes, and/or encouraging sliding of the applicator on the eyelashes.

[0031] According to yet another aspect, the device may include a paintbrush including a plurality of bristles. At least one of the bristles may include at least one of the fibers according to any of the previously mentioned aspects. In an additional aspect, the device may include a flocking comprising a plurality of the fibers according to any of the previously mentioned aspects. The device may be configured so that the flocking covers at least a portion of one of teeth, bristles, a wiper, a foam member, a porous member, a film, a perforated film, an endpiece, a woven fabric, and a non-woven fabric.

[0032] The fibers may alternatively be included as at least a portion of a filler in a cosmetic product and/or a care product (e.g., a mascara in which the fibers may contribute to lengthening the eyelashes). Incorporating particles configured to be capable of absorbing a liquid and/or of swelling in contact therewith in the fibers may contribute to improving the retention of the fibers on the eyelashes.

[0033] In one aspect of the device, at least one of the fibers may include at least one of at least one magnetized particle and at least one magnetizable particle. The magnetized and/or magnetizable particles may be included in fibers that contain particles capable of absorbing a liquid, particles capable of swelling on contact with a liquid, and/or particles capable of dissolving in a liquid. The device may have at least some fibers including substantially only magnetic and/or magnetizable particles, and other fibers may include particles capable of absorbing a liquid, particles capable of swelling on contact with a liquid, and/or particles capable of dissolving in a liquid. The magnetic and/or magnetizable particles may be particles coated in a resin (e.g., cyanoacrylate), or they may be formed by depositing a magnetic material on a non-magnetic medium (e.g., a microbead of glass or a wood fiber). Fibers having magnetic properties may improve extraction of the product, may improve application of the product to a treated surface, and/or may create novel makeup effects. The magnetic properties may also encourage penetration of active agents by encouraging microcirculation. The fibers may be stationary or moving.

[0034] In an additional aspect, a method of manufacturing a device for applying a product may include extruding a fiber including a plastics material and particles. The particles may be configured to be capable of at least one of absorbing at least one of a liquid and a compound in solution in a liquid, and dissolving in a liquid. The method may further include placing the fiber and a liquid in contact with one another. The extruding may include co-extruding. The particles may swell on contact with the liquid. The particles may have a grain size selected such that a predefined degree of roughness is imparted to the fiber after the particles have swollen.

[0035] In another aspect, the method may include absorbing a preservative in solution in the liquid. The liquid may cool the fibers and at least a portion of the liquid may be at least one of a cosmetic product and a care product. Alternatively, the liquid may not be the product to be applied by the device or a portion of the product.

[0036] Aside from the structural and procedural arrangements set forth above, the invention could include a number of other arrangements, such as those explained hereinafter. It is to be understood, that both the foregoing description and the following description are exemplary.

[0037] The accompanying drawings are incorporated in and constitute a part of this specification. The drawings illustrate exemplary embodiments of the invention and, together with the description, serve to explain some principles of the invention. In the drawings,

[0038] **FIG. 1A** is a schematic axial cross-section view of an embodiment of a fiber;

[0039] **FIG. 1B** is a schematic axial cross-section view of the fiber of **FIG. 1A** after contacting liquid;

[0040] **FIG. 2A** is a schematic axial cross-section view of another embodiment of a fiber;

[0041] **FIG. 2B** is a schematic axial cross-section view of the fiber of **FIG. 2A** after contacting liquid;

[0042] **FIG. 3** is a schematic axial cross-section view of another embodiment of a fiber;

[0043] **FIG. 4** is a schematic axial cross-section view of another embodiment of a fiber;

[0044] **FIG. 5A** is a schematic axial cross-section view of another embodiment of a fiber;

[0045] **FIG. 5B** is a schematic axial cross-section view of the fiber of **FIG. 5A** after contacting liquid;

[0046] **FIG. 6A** is a schematic axial cross-section view of another embodiment of a fiber;

[0047] **FIG. 6B** is a schematic axial cross-section view of the fiber of **FIG. 6A** after contacting liquid;

[0048] **FIG. 7** is a schematic axial cross-section view of another embodiment of a fiber;

[0049] **FIG. 8A** is a schematic cross-section view of another embodiment of a fiber;

[0050] **FIG. 8B** is a schematic cross-section view of another embodiment of a fiber;

[0051] **FIG. 8C** is a schematic cross-section view of another embodiment of a fiber;

[0052] **FIG. 9A** is a schematic view of a cross-section of one embodiment of a fiber;

[0053] **FIG. 9B** is a schematic view of a cross-section of another embodiment of a fiber;

[0054] **FIG. 9C** is a schematic view of a cross-section of another embodiment of a fiber;

[0055] **FIG. 9D** is a schematic view of a cross-section of another embodiment of a fiber;

[0056] **FIG. 9E** is a schematic view of a cross-section of another embodiment of a fiber;

[0057] **FIG. 9F** is a schematic view of a cross-section of another embodiment of a fiber;

[0058] **FIG. 9G** is a schematic view of a cross-section of another embodiment of a fiber;

[0059] **FIG. 9H** is a schematic view of a cross-section of another embodiment of a fiber;

[0060] **FIG. 9I** is a schematic view of a cross-section of another embodiment of a fiber;

[0061] **FIG. 9J** is a schematic view of a cross-section of another embodiment of a fiber;

[0062] **FIG. 9K** is a schematic view of a cross-section of another embodiment of a fiber;

[0063] **FIG. 9L** is a schematic view of a cross-section of another embodiment of a fiber;

[0064] **FIG. 9M** is a schematic view of a cross-section of another embodiment of a fiber;

[0065] **FIG. 9N** is a schematic view of a cross-section of another embodiment of a fiber;

[0066] **FIG. 9O** is a schematic view of a cross-section of another embodiment of a fiber;

[0067] **FIG. 9P** is a schematic view of a cross-section of another embodiment of a fiber;

[0068] **FIG. 9Q** is a schematic view of a cross-section of another embodiment of a fiber;

[0069] **FIG. 10** is a schematic side view of fibers being manufactured according to one embodiment;

[0070] **FIG. 11** is a schematic side view of fibers being manufactured according to another embodiment;

[0071] **FIG. 12** is a schematic, partial cross-section view of one embodiment of a device for applying a product to a surface;

[0072] **FIG. 13** is a schematic view of another embodiment of a device for applying a product to a surface;

[0073] **FIG. 14** is a schematic, partial cross-section view of another embodiment of a device for applying a product to a surface;

[0074] **FIG. 15** is a schematic, partial cross-section view of another embodiment of a device for applying a product to a surface;

[0075] **FIG. 16** is a schematic view of a further embodiment of a device for applying a product to a surface;

[0076] **FIG. 17** is a perspective view of another embodiment of a device for applying a product to a surface;

[0077] **FIG. 18A** is a schematic view of another embodiment of a device for applying a product being used according to one exemplary method;

[0078] **FIG. 18B** is a view of another embodiment of a device for applying a product to a surface;

[0079] **FIG. 19** is a view of another embodiment of a device for applying a product to a surface;

[0080] **FIG. 20** is a view of another embodiment of a device for applying a product to a surface;

[0081] **FIG. 21** is a side view of another embodiment of a device for applying a product to a surface;

[0082] **FIG. 22** is a perspective view of another embodiment of a device for applying a product to a surface;

[0083] **FIG. 23** is a view of another embodiment of a device for applying a product to a surface;

[0084] **FIG. 24** is a perspective view of another embodiment of a device for applying a product to a surface;

[0085] **FIG. 25** is a schematic cross-section view of another embodiment of a device for applying a product to a surface;

[0086] **FIG. 26** is a schematic cross-section view of another embodiment of a device for applying a product to a surface;

[0087] **FIG. 27** is a schematic side view of fibers according to one embodiment being influenced by magnetic field lines in an exemplary manner;

[0088] **FIG. 28A** is a schematic view of an embodiment of fibers influenced by magnetic interaction in one exemplary manner;

[0089] **FIG. 28B** is a schematic view of an embodiment of fibers influenced by magnetic interaction in another exemplary manner;

[0090] **FIG. 29A** is a schematic side view of an embodiment of fibers influenced by magnetic interaction in another exemplary manner;

[0091] **FIG. 29B** is a schematic side view of an embodiment of fibers influenced by magnetic interaction in another exemplary manner;

[0092] **FIG. 30** is a partial cross-section view of another embodiment of a device for applying a product to a surface;

[0093] **FIG. 31** is a schematic cross-section view of one embodiment of a particle; and

[0094] **FIG. 32** is a schematic cross-section view of another embodiment of a particle.

[0095] Reference will now be made in detail to some possible embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever

possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

[0096] **FIGS. 1A through 9Q** show numerous exemplary embodiments of fibers according certain aspects of the invention which are suitable for use in a device for applying a product (e.g., the devices shown in FIGS. **12** to **26**).

[0097] According to exemplary embodiments of a fiber, the fibers may be made by extruding a material **11** (e.g., a thermoplastic material) containing a filler of particles (e.g., particles that are capable of absorbing a liquid and/or a compound in solution in the liquid, and/or particles that are capable of dissolving in a liquid) along with optional filler particles (e.g., particles that have magnetic properties (e.g., particles that are magnetized and/or magnetizable)).

[0098] **FIG. 1A** is a schematic axial cross-section view of an embodiment of a fiber containing a filler of particles **30** of a compound (e.g., a compound that swells when placed in contact with a liquid) prior to the fiber being placed in contact with a liquid (e.g., water), and **FIG. 1B** shows the fiber of **FIG. 1A** after it has contacted the liquid. In the exemplary embodiment shown, the fiber **11** may be solid and may be circular in cross-section. As explained herein, however, the fiber **11** may have other cross-sections.

[0099] According to one exemplary aspect, the fiber **11** may be formed using an arrangement as shown in **FIG. 10**. Such an exemplary arrangement may comprise an extruder **20** and a bath **21** of liquid (e.g., a cooling liquid) into which the fibers **11** may be immersed upon leaving the extruder **20**.

[0100] The swelling of the particles **30** may serve to produce a relief effect on the surface of the fiber **11**. Such a relief may be useful, for example, for enabling the fiber **11** to pick up a greater quantity of a product (e.g., a cosmetic product and/or a care product) or for improving the ability of the fiber **11** to catch hold of eyelashes, for example, when the fiber **11** is being used as a bristle in a mascara brush. The particles **30** may also be useful for absorbing one or more substances within the fiber **11** (e.g., preservatives and/or agents that are cosmetically and/or dermatologically active). For example, referring to **FIGS. 10 and 11**, it may possible for the bath **21** used for cooling the fibers **11** upon leaving the extruder **20** to include one or more compounds that may be soluble in the liquid of the bath **21** (e.g., preservatives), and the compounds may be absorbed by the particles **30** when the fibers **11** are contacted with the liquid of bath **21**. In this manner, the fibers **11** leaving the bath **21** may be substantially filled with compounds which have been absorbed by the particles **30** contained in the fibers **11**. These compounds may be released progressively on contact with a product (e.g., a cosmetic product and/or a care product) in order to improve, for example, conservation of the product. The fibers **11** may optionally be dehydrated on leaving the bath **21**.

[0101] Alternatively, in addition to the particles **30**, the fibers **11** may contain particles **40** that are soluble in liquid (e.g., the bath **21** of the liquid (e.g., water) used for cooling the fibers **11** on leaving the extruder **20**). Particles **40** may comprise, for example, a salt, a sugar that is soluble in the liquid used, or a gelatin, when the liquid is water. **FIG. 2A** shows a fiber **11** containing particles **40** prior to being dissolved (e.g., immediately after leaving the extruder **20**), and **FIG. 2B** shows the fiber **11** of **FIG. 2A** after passing through the bath **21**. **FIG. 2B** illustrates one example in which the soluble particles **20** that were present at the surface of the fiber **11** have been dissolved by the liquid of the bath **21**, thereby creating roughness at the surface of the fiber **11**. In some embodiments, the roughness may result in the fiber **11** being porous. Such roughness or porosity may be used, for example, for increasing the amount of a product that the fiber **11** can pick up. The amount of roughness or porosity obtained may depend on the initial grain size of the particles **40**. Only a portion of the particles **40** may dissolve when the fiber **11** leaves the bath **21**. In such case, the particles **11** may continue to dissolve upon contacting a product (e.g., a cosmetic product and/or a care product) present on the surface of the fiber **11**. The particles **40** may comprise one or more substances having a cosmetic and/or a dermatological effect. Under such circumstances, the dissolution of the particles **40** upon contacting the product may be accompanied by the substances (i.e., the substances having a cosmetic and/or a dermatological effect) being released onto the treated surface. The fibers **11** may also be exposed to shocks causing and/or facilitating the removal of at least a portion of the particles **40** present at the surface of the fiber **11**.

[0102] The particles **40** may alternatively comprise a material which is not soluble in the liquid (e.g., water) of the bath **21**, but which is soluble, for example, progressively, upon contacting a product to be applied (e.g., a cosmetic product and/or a care product).

[0103] According to another aspect, it may be possible to introduce particles **50** into the fiber **11** that are suitable for gelling upon contact with a liquid so as to form a layer of gel **51** on the surface of the fiber **11**, as shown in **FIG. 3**. Such a layer of gel **51** may modify the affinity of the fiber **11** to contact the product. The layer of gel **51** may also become deposited on the treated surface (e.g., the eyelashes) so as to improve the firmness and/or the appearance of the treated surface, and/or so as to improve the sliding of the applicator on the treated surface.

[0104] The use of particles capable of absorbing a liquid (e.g., water) may also be advantageous for retarding the drying of a product (e.g., a cosmetic product and/or a care product) on the surface of the fiber **11**, for example, when the liquid absorbed by the particles is capable of being released progressively in order to compensate for the evaporation of any solvent contained in the composition.

[0105] The use of particles **30**, **40**, and/or **50** may also serve to create privileged anchor zones on the surface of the fiber **11** for the product to be applied, for example, because of the particles' affinity for lipophilic and/or hydrophilic compounds contained in the product. The product may be a water/oil emulsion and the fibers **11** may absorb only water, or only oil, or more generally, they may absorb one of the components of the product in a selective manner.

[0106] According to one exemplary embodiment, the particles **30**, **40**, and/or **50** may be present solely on the surface of the fibers **11**, as shown in **FIG. 4**.

[0107] According to one aspect, the initial grain size of the particles **30**,**40**, and/or **50** may range from about 1 μm to about 300 μm, for example, from about 5 μm to about 200 μm, or from about 10 μm to about 150 μm. The concentration of particles **30**, **40**, and/or **50** may range from above

about 0% to about 20% by weight, for example, above about 0% to about 6% by weight when dry.

[0108] According to another aspect, the fibers **11** may include magnetic particles **12** (e.g., particles configured to generate a magnetic field) dispersed in a substantially uniform manner within the material of the fiber **11**. The magnetic particles **12** may alternatively be located solely at the surface of the fiber **11**, by a suitable technique (e.g., by coating as shown in **FIG. 8A**), or the magnetic particles **12** may be located inside the fiber **11**, as shown in **FIG. 8B**. It may also be possible to replace the magnetic particles **12** with a central core **14** having magnetic properties, as shown in **FIG. 8C**. The concentration by weight of magnetic particles **12** may range from, for example, about 0.2% to about 30%.

[0109] The magnetic material for the magnetic particles **12** may at least partially include at least one material chosen from soft magnetic materials, hard magnetic materials, ferrites, ferrites based on zinc, ferrites based on nickel, ferrites based on manganese, rare earth elements, barium sulfates, silicon iron alloys, cobalt irons, and cobalt irons filled with molybdenum. The magnetic particles **12** may be formed, for example, by fragmenting a magnetic substance or by depositing a magnetic substance M on a non-magnetic body C (e.g., a microbead or a wood fiber) as shown in **FIG. 31**. The particles **12** may also be configured in the form of magnetic cores M having non-magnetic outer coverings R (e.g., a layer of resin, for example, a layer of cyanoacrylate), as shown in **FIG. 32**.

[0110] **FIGS. 5A and 5B** show a fiber **11** which differs from that of **FIGS. 1A and 1B** at least by having magnetic particles **12** present within the fiber **11**. **FIGS. 6A and 6B** substantially correspond to a fiber **11** which differs from that of **FIGS. 2A and 2B** at least by the presence of magnetic particles **12**. **FIG. 7** shows substantially the fiber **11** of **FIG. 3** having magnetic particles **12** dispersed throughout fiber **11**.

[0111] As described below with reference to **FIGS. 9A through 9Q**, the fibers **11** may have a wide variety of cross-sections. The fibers **11** may be formed (e.g., by extrusion) to have a substantially flat cross-section as shown in **FIG. 9A, a** cross-shaped section as shown in **FIG. 9**B, or a three-branch star shape as shown in **FIG. 9C**. The cross-section of the fibers **11** may also be hollow as shown in **FIG. 9**D, or solid with a capillary groove as shown in **FIG. 9E**. The fibers **11** may also have a cross-section that is U-shaped, as shown in **FIG. 9F**; I-shaped, as shown in **FIG. 9H**; C-shaped, as shown in **FIG. 9I**; V-shaped, as shown in **FIG. 9J**; Z-shaped, as shown in **FIG. 9K**; or a combination of the these shapes (e.g., the combination shown in **FIG. 9G** which combines the shapes that correspond to **FIGS. 9B and 9C**). **FIG. 9L** shows an exemplary fiber having a hollow square cross-section; **FIG. 9M** shows an exemplary fiber having a solid square cross-section; **FIG. 9N** shows an exemplary fiber having a hollow star-shaped cross-section; **FIG. 9O** shows an exemplary fiber having a hollow triangular cross-section; **FIG. 9P** shows an exemplary fiber having a cross-section that forms peripheral grooves; and **FIG. 9Q** shows an exemplary fiber having a kidney-shaped cross-section.

[0112] The fibers **11** may be exposed to a magnetic field for magnetizing the fibers **11** upon leaving the bath **21** by means of, for example, a magnetizing apparatus **60**, as shown in **FIG. 11**, so as to magnetize the fibers **11** with a predefined polarity. According to an exemplary embodiment, the fibers **11** may also be magnetized after the fibers **11** have been incorporated into an applicator device by subjecting the device, or a batch of such devices, to a magnetizing field. By magnetizing the fibers **11** once they have been placed into an applicator device, it may be possible to limit any risk of the fibers **11** clumping together.

[0113] The fibers **11** may also be used in a variety of devices as described herein. For example, **FIG. 12** shows an applicator device **100** comprising a receptacle **101** for containing a product P for application (e.g., a mascara) and an applicator **102**. The receptacle **101** may be provided with a wiper member **106** which, in an exemplary embodiment not shown, may be provided with flocking. The applicator **102** may include a stem **103** provided at one end with a handle member **104** that may also constitute a cap for closing the receptacle **101**. A brush **105** may be provided at the opposite end of the applicator **102**. The brush **105** may include a core comprising twisted wire with bristles being held in the turns of the twisted wire core. The bristles may comprise fibers **11** configured to generate a magnetic field, for example. Alternatively, the bristles might lack any magnetic properties.

[0114] The magnetic poles of the brush **105** may be oriented either along the axis of the stem **103** or perpendicularly to the axis of the stem **103**, for example. The twisted core may be formed from a non-magnetic material (e.g., a non-magnetic stainless steel) or in another embodiment, the twisted wire core may be formed from a material having magnetic properties. The core may thus interact magnetically with the bristles. The bristles of the brush **105** may be magnetized such that the magnetization of a bristle of the brush **105** acts on adjacent bristles with the magnetic interactions between the bristles being used, for example, to orient the bristles in a desired manner. Depending on the orientation of the magnetic poles of the brush **105**, the effect on the orientation of the bristles may differ. For example, **FIGS. 28A and 28B** show one effect of the bristles of the brush **105** being deflected in the presence of a transverse magnetic field.

[0115] The magnetization of the bristles may also be used, during application of a product onto the eyelashes, for example, for the purpose of applying a magnetic field whose action is beneficial on the eyelashes or on some other part of the face (e.g., the eyelids). The magnetic field exerted by the bristles of the brush **105** may vary over time, for example, when the shape of the brush **105** is altered (e.g., while the applicator is being withdrawn from a receptacle or during application of the product).

[0116] The product P may present magnetic properties (e.g., the product P may contain particles that are magnetized and/or that are magnetizeable). When the product P presents magnetic properties, a brush having bristles which may be configured to generate a magnetic field may encourage loading of the brush with the product P (i.e., by the product P being attracted to the bristles of the brush). The product P may also contain fibers or flakes having magnetic properties and the applicator may interact magnetically with the flakes, for example, to put them into a particular orientation at the time of application (e.g., to encourage sliding of the applicator during application).

[0117] **FIG. 13** shows an exemplary embodiment of a device **110** for applying a product (e.g., nail varnish). The

device **110** may comprise a receptacle **111** and an applicator **112** comprising a stem **113** provided at one end with a handle member **114** that may also constitute a cap for closing the receptacle **111**. The other end of the applicator **112** may be provided with a bristle tuft **115** (e.g., in the form of a paint brush) comprising a bundle of bristles placed close together. The bristles may be formed from fibers presenting magnetic properties, which may be useful for bringing the bristles of the tuft **115** into a predefined orientation so as to make it easier to load product onto the tuft **115** and/or so as to exert an action on the treated surface. Magnetic interactions between the bristles of the tuft **115**, depending on the polarity of the magnetic field of each bristle, may contribute either to bunching the bristles together or to splaying them apart. For example, **FIGS. 29A and 29B** are schematic representations of one possible effect (i.e., the effect of the bristles being splayed apart due to magnetic interactions between the bristles). The product P may also present magnetic properties.

[**0118**] **FIG. 14** shows an exemplary embodiment of an applicator device **120** which may comprise a receptacle **121** containing a product P (e.g., a liquid lipstick) and an applicator **122** comprising a stem **123** provided at one end with a cap **124** for closing the receptacle **121** which may also serve as a handle, and at its other end with an applicator endpiece **124** covered in flocking comprising fibers that are configured to generate a magnetic field. The device **120** may also include a wiper comprising a block of foam **125**. The block of foam **125** may present magnetic properties. For example, the block of foam **125** may be magnetized in a certain direction by incorporating magnetized and/or magnetizable particles within the block of foam **125**. Magnetizing the wiper may be used, for example, to magnetize the flocking on the endpiece **124** while the applicator **122** is being withdrawn from the receptacle **121**.

[**0119**] **FIG. 15** shows another exemplary embodiment of an applicator device **130** for a product P (e.g., a liquid lipstick) that may include an endpiece **131** covered by flocking **132** comprising fibers presenting magnetic properties.

[**0120**] **FIG. 16** shows an exemplary embodiment of a brush **140** for applying a powder, for example, with bristles of the brush being formed using fibers that present magnetic properties.

[**0121**] **FIG. 17** shows an exemplary embodiment of an applicator **150** comprising a foam member **151** covered on its surface by flocking **152** comprising fibers that present magnetic properties. Such an applicator may be used, for example, to apply blush to the skin.

[**0122**] **FIG. 18A** shows an exemplary embodiment of a liquid lipstick applicator **160** including an endpiece **161** of material (e.g., an elastomer) provided with flocking, and **FIG. 18B** shows an exemplary embodiment of an eyeliner **160'** including an endpiece **161'** of material (e.g., an elastomer) provided with flocking. The flocking may comprise fibers presenting magnetic properties.

[**0123**] The fibers may also be used for flocking on an embodiment of a powder puff **170**, as shown in **FIG. 19**, or for flocking on an exemplary embodiment of a make-up removal sponge **180**, as shown in **FIG. 20**. The flocking may also extend on a film **191** fixed on a block of foam **192** of an exemplary embodiment of an applicator **190**, as shown in **FIG. 21**.

[**0124**] It may also be possible to use fibers that present magnetic properties in a disk or wiper **200** comprising at least one layer **201** of a woven or non-woven fabric incorporating such fibers, as shown in **FIG. 22**.

[**0125**] **FIG. 23** shows an exemplary embodiment of a comb **210** for applying a product to the eyelashes. The comb may include teeth **211** provided with flocking. The flocking may be formed using fibers having magnetic properties.

[**0126**] According to an exemplary embodiment, an applicator may include one or more one-piece magnets in addition to fibers having magnetic properties. For example, **FIG. 24** shows an applicator **220** comprising a handle **221** with a magnet **222** fixed thereto. The magnet **222** may be covered by a block of foam **223**. The block of foam **223** may be provided with flocking **224** comprising fibers presenting magnetic properties. The presence of the magnet **222** may subject the flocking **224** to a magnetic field. For example, the flocking having fibers that extend substantially perpendicularly to the underlying support may become oriented along magnetic field lines M, as shown in **FIG. 27**. The fibers may tend to stand up on the surface of the applicator **220** or may tend to take on other orientations depending on their position relative to the magnet **222**. This may make it possible, for example, to load more product onto the applicator **220**, which may result in making application of the product softer. In addition, when the product is a powder that is brought into contact with the applicator **220**, and when the applicator **220** has magnetic properties, the particles of powder may tend to become deposited on the applicator **220** (e.g., on its fibers), thereby reducing the risk of the powder being blown about, which may induce sneezing.

[**0127**] **FIG. 25** shows an exemplary embodiment of a device **230** in which the product may be contained in a flexible bag **231** associated with a pump **232** mounted thereon. The applicator may include a foam element **234** coated on a surface with flocking **235** and secured to a cap **236**. A magnet **237** may be received in the foam element **234** and may be carried by the cap **236**. The flocking **235** may present magnetic properties and may be subjected to the magnetic field of the magnet **237**, as described previously herein.

[**0128**] **FIG. 30** shows a portion of an exemplary applicator **280** comprising flocking on an endpiece **282**, which may be received in a cap **281** when not in use. By using fibers that contain particles which absorb water or which swell in water, it may be possible to maintain moist conditions within the cap **281**, such that the endpiece **282** dries out more slowly. In another aspect, the endpiece **282** could be replaced by some other applicator element (e.g., a brush).

[**0129**] Naturally, the invention is not limited to the embodiments described above. For example, it may be possible to provide a screen **240** between an applicator and a product contained in a receptacle, as shown in **FIG. 26**. Under such circumstances, the product P may contain magnetic particles **241** and the applicator may present magnetic properties (e.g., because it comprises an endpiece provided with flocking comprising magnetized and/or magnetizable fibers). The endpiece **242** may be capable of attracting the magnetic particles **241** contained in the product. By selecting a proper mesh size for the screen **240**, it may be possible to ensure that the magnetic particles **241** attracted by the endpiece **242** are substantially prevented from passing through the screen **240**, while still serving to move the product P towards the endpiece **242**, thereby improving loading of the endpiece **242** with product. In another aspect,

the product P may itself present magnetic properties (e.g., containing coated magnetic particles) and may pass through the mesh of the screen **240**.

[**0130**] In addition, the fibers may be magnetized over only a fraction of their length. The applicator devices described above may include fibers having magnetic properties mixed with fibers that do not have magnetic properties (e.g., fibers that are filled with particles of a material for absorbing liquid (e.g., water), and/or particles suitable for swelling on contact with a liquid, and/or particles capable of dissolving on contact with the liquid).

[**0131**] The device and system according to some exemplary embodiments of the invention may be used to apply any cosmetic or care products, such as make-up, dermatological, or pharmaceutical compositions used for treating and/or changing the appearance of eyelashes, hair, skin, lips, or nails. However, in its broadest aspects, the present invention could be used to apply many other substances.

[**0132**] Furthermore, sizes of various structural parts and materials used to make the above-mentioned parts are illustrative and exemplary only, and one of ordinary skill in the art would recognize that these sizes and materials can be changed as necessary to produce different effects or desired characteristics.

[**0133**] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure and methodology of the present invention. Thus, it should be understood that the invention is not limited to the examples discussed in the specification. Rather, the present invention is intended to cover modifications and variations.

What is claimed is:

1. A device for applying a product, the device comprising:

a plurality of fibers for applying the product,

wherein at least one of the fibers comprises particles configured to be capable of at least one of

absorbing at least one of

an amount of a liquid having a weight at least equal to a weight of the particles, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the particles lack cotton.

2. The device of claim 1, wherein at least one of the fibers comprises a synthetic material.

3. The device of claim 1, wherein at least one of the fibers has a cross-section that is substantially constant.

4. The device of claim 2, wherein at least one of said fibers is formed by one of extruding and co-extruding at least one of a thermoplastic material and an elastomeric material.

5. The device of claim 1, wherein at least one of the particles is at the surface of the at least one fiber.

6. The device of claim 1, wherein at least a portion of the at least one fiber comprises the particles only at the surface of the at least one fiber.

7. The device of claim 1, wherein the at least one fiber comprises particles dispersed throughout the at least one fiber.

8. The device of claim 1, wherein the particles comprise a material configured to increase in volume on contact with at least a portion of the product to be applied.

9. The device of claim 8, wherein the particles comprise at least one material chosen from polymers that swell in the presence of at least one of water and lipids, super-absorbent reticulated polyacrylates having a high swelling factor in water, polyvinyl alcohols, carboxyvinyl polymers, semi-synthetic derivatives of cellulose, starches, biogums, biosaccharides, scelro-glucanes, casein, phytocolloids, alginates, gelatins, gelanes, xanthans, laponites, silicas, and colloidal silica.

10. The device of claim 8, wherein the particles have a grain size ranging from about 0.1 μm to about 300 μm prior to swelling.

11. The device of claim 8, wherein the concentration by weight of said particles prior to swelling relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

12. The device of claim 1, wherein at least one of the fibers comprises a material capable of swelling on contact with at least a portion of the product to be applied.

13. The device of claim 1, wherein the particles are configured to be capable of dissolving on contact with a liquid.

14. The device of claim 13, wherein at least one of the particles is one of hydrosoluble and liposoluble.

15. The device of claim 13, wherein the concentration by weight of the particles configured to be capable of dissolving relative to the total weight of the at least one fiber prior to dissolution ranges from above about 0% to about 20%.

16. The device of claim 13, wherein the grain size of the particles ranges from about 0.1 μm to about 300 μm.

17. The device of claim 1, wherein the particles are configured to be capable of forming a gel at the surface of the at least one fiber.

18. The device of claim 1, wherein the particles are configured to be capable of absorbing a liquid.

19. The device of claim 18, wherein the particles are configured to be capable of absorbing preservatives in solution in a liquid.

20. The device of claim 18, wherein the concentration by weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

21. The device of claim 1, wherein at least one of the fibers comprises at least one plastic material chosen from polyamides, PETs, acetates, PEs, PPs, PVCs, amide block polyesters, plasticized RILSAN, elastomers, polyester elastomers, PE elastomers, silicone elastomers, and nitril elastomers.

22. The device of claim 1, wherein the cross-section of at least one of the fibers has at least one shape chosen from circularly symmetrical shapes, circular shapes, solid square shapes, hollow square shapes, disk shapes, disk shapes having a groove, solid triangle shapes, hollow triangle shapes, solid star shapes, hollow star shapes, U-shaped, V-shaped, I-shaped, T-shaped, Z-shaped, dash-shaped, cross-shaped, kidney-shaped, shapes having three branches, and hollow shapes.

23. The device of claim 22, wherein the at least one fiber having the cross-section shape is twisted.

24. The device of claim 1, further comprising a wiper member.

25. The device of claim 1, wherein the device is configured to be loaded with the product.

26. The device of claim 25, wherein the device is a mascara brush comprising a plurality of bristles, and wherein at least one of the bristles comprises at least one of the fibers.

27. The device of claim 25, wherein the device comprises a paintbrush comprising a plurality of bristles, and wherein at least one of the bristles comprises at least one of the fibers.

28. The device of claim 1, wherein the device comprises a flocking comprising the plurality of fibers.

29. The device of claim 28, wherein the device is configured so that the flocking covers at least a portion of one of teeth, bristles, a wiper, a foam member, a porous member, a film, a perforated film, an endpiece, a woven fabric, and a non-woven fabric.

30. The device of claim 1, wherein at least one of the fibers has a diameter ranging from about 0.5 μm to about 500 μm.

31. The device of claim 1, wherein at least one of the fibers has a length ranging from about 0.5 mm to about 50 mm.

32. The device of claim 1, wherein at least one of the fibers comprises at least one of at least one magnetized particle and at least one magnetizable particle.

33. The device of claim 1, wherein at least one of the fibers comprises at least one of at least one magnetized particle and at least one magnetizable particle ranging from about 0.2% to about 30% by weight of the at least one fiber.

34. A method of manufacturing the device of claim 1, the method comprising:

extruding a fiber comprising a plastics material and particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid; and

placing the fiber and a liquid in contact with one another.

35. The method of claim 34, wherein the extruding comprises co-extruding.

36. The method of claim 34, wherein the particles swell on contact with the liquid, and wherein the particles have a grain size selected such that a predefined degree of roughness is imparted to the fiber after the particles have swollen.

37. The method of claim 34, further comprising absorbing a preservative in solution in the liquid.

38. The method of claim 34, wherein the liquid cools the fibers.

39. The method of claim 34, wherein at least a portion of the liquid is at least one of a cosmetic product and a care product.

40. The method of claim 34, wherein the liquid is not the product to be applied by the device or a portion of the product.

41. A fiber for a device for applying a product, the fiber comprising:

a synthetic material; and

particles associated with the synthetic material, the particles being configured to be capable of at least one of

absorbing at least one of

an amount of a liquid having a weight at least equal to a weight of the particles, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the particles lack cotton.

42. The fiber of claim 41, wherein the fiber has a cross-section that is substantially constant.

43. The fiber of claim 41, wherein the fiber is formed by one of extruding and co-extruding at least one of a thermoplastic material and an elastomeric material.

44. The fiber of claim 41, wherein at least one of the particles is at the surface of the fiber.

45. The fiber of claim 41, wherein at least a portion of the fiber comprises the particles only at the surface of the fiber.

46. The fiber of claim 41, wherein the at least one fiber comprises particles dispersed throughout the fiber.

47. The fiber of claim 41, wherein the particles comprise a material configured to increase in volume on contact with at least a portion of the product to be applied.

48. The fiber of claim 47, wherein the particles comprise at least one material chosen from polymers that swell in the presence of at least one of water and lipids, super-absorbent reticulated polyacrylates having a high swelling factor in water, polyvinyl alcohols, carboxyvinyl polymers, semi-synthetic derivatives of cellulose, starches, biogums, biosaccharides, scelro-glucanes, casein, phytocolloids, alginates, gelatins, gelanes, xanthans, laponites, silicas, and colloidal silica.

49. The fiber of claim 47, wherein the particles have a grain size ranging from about 0.1 μm to about 300 μm prior to swelling.

50. The fiber of claim 47, wherein the concentration by weight of said particles prior to swelling relative to the total weight of the fiber ranges from above about 0% to about 6%.

51. The fiber of claim 41, wherein the fiber comprises a material capable of swelling on contact with at least a portion of the product to be applied.

52. The fiber of claim 41, wherein the particles are configured to be capable of dissolving on contact with a liquid.

53. The fiber of claim 52, wherein at least one of the particles is one of hydrosoluble and liposoluble.

54. The fiber of claim 52, wherein the concentration by weight of the particles configured to be capable of dissolving relative to the total weight of the at least one fiber prior to dissolution ranges from above about 0% to about 20%.

55. The fiber of claim 52, wherein the grain size of the particles ranges from about 0.1 μm to about 300 μm.

56. The fiber of claim 41, wherein the particles are configured to be capable of forming a gel at the surface of the at least one fiber.

57. The fiber of claim 41, wherein the particles are configured to be capable of absorbing a liquid.

58. The fiber of claim 57, wherein the particles are configured to be capable of absorbing preservatives in solution in a liquid.

59. The fiber of claim 57, wherein the concentration by weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

60. The fiber of claim 41, wherein the fiber comprises at least one plastic material chosen from polyamides, PETs, acetates, PEs, PPs, PVCs, amide block polyesters, plasti-

cized RILSAN, elastomers, polyester elastomers, PE elastomers, silicone elastomers, and nitril elastomers.

61. The fiber of claim 41, wherein the cross-section of the fiber has at least one shape chosen from circularly symmetrical shapes, circular shapes, solid square shapes, hollow square shapes, disk shapes, disk shapes having a groove, solid triangle shapes, hollow triangle shapes, solid star shapes, hollow star shapes, U-shaped, V-shaped, I-shaped, T-shaped, Z-shaped, dash-shaped, cross-shaped, kidney-shaped, shapes having three branches, and hollow shapes.

62. The fiber of claim 61, wherein the fiber having the cross-section shape is twisted.

63. The fiber of claim 41, wherein the fiber is configured to be loaded with the product.

64. The fiber of claim 41, wherein the fiber has a diameter ranging from about 0.5 μm to about 500 μm.

65. The fiber of claim 41, wherein the fiber has a length ranging from about 0.5 mm to about 50 mm.

66. The fiber of claim 41, wherein the fiber comprises at least one of at least one magnetized particle and at least one magnetizable particle.

67. The fiber of claim 41, wherein the fiber comprises at least one of at least one magnetized particle and at least one magnetizable particle ranging from about 0.2% to about 30% by weight of the fiber.

68. A method of manufacturing the fiber of claim 41, the method comprising:

extruding a fiber comprising a plastics material and particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid; and

placing the fiber and a liquid in contact with one another.

69. The method of claim 68, wherein the extruding comprises co-extruding.

70. The method of claim 68, wherein the particles swell on contact with the liquid, and wherein the particles have a grain size selected such that a predefined degree of roughness is imparted to the fiber after the particles have swollen.

71. The method of claim 68, further comprising absorbing a preservative in solution in the liquid.

72. The method of claim 68, wherein the liquid cools the fibers.

73. The method of claim 68, wherein at least a portion of the liquid is at least one of a cosmetic product and a care product.

74. The method of claim 68, wherein the liquid is not the product to be applied by the device or a portion of the product.

75. A device for applying a product, the device comprising:

a plurality of fibers for applying the product,

wherein at least one of the fibers comprises particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the particles lack clay, lack silica, and lack cotton.

76. The device of claim 75, wherein at least one of the fibers comprises a synthetic material.

77. The device of claim 75, wherein at least one of the fibers has a cross-section that is substantially constant.

78. The device of claim 76, wherein at least one of said fibers is formed by one of extruding and co-extruding at least one of a thermoplastic material and an elastomeric material.

79. The device of claim 75, wherein at least one of the particles is at the surface of the at least one fiber.

80. The device of claim 75, wherein at least a portion of the at least one fiber comprises the particles only at the surface of the at least one fiber.

81. The device of claim 75, wherein the at least one fiber comprises particles dispersed throughout the at least one fiber.

82. The device of claim 75, wherein the particles comprise a material configured to increase in volume on contact with at least a portion of the product to be applied.

83. The device of claim 82, wherein the particles comprise at least one material chosen from polymers that swell in the presence of at least one of water and lipids, super-absorbent reticulated polyacrylates having a high swelling factor in water, polyvinyl alcohols, carboxyvinyl polymers, semi-synthetic derivatives of cellulose, starches, biogums, bio-saccharides, scelro-glucanes, casein, phytocolloids, alginates, gelatins, gelanes, xanthans, and laponites.

84. The device of claim 82, wherein the particles have a grain size ranging from about 0.1 μm to about 300 μm prior to swelling.

85. The device of claim 82, wherein the concentration by weight of said particles prior to swelling relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

86. The device of claim 75, wherein at least one of the fibers comprises a material capable of swelling on contact with at least a portion of the product to be applied.

87. The device of claim 75, wherein the particles are configured to be capable of dissolving on contact a the liquid.

88. The device of claim 87, wherein at least one of the particles is one of hydrosoluble and liposoluble.

89. The device of claim 87, wherein the concentration by weight of the particles configured to be capable of dissolving relative to the total weight of the at least one fiber prior to dissolution ranges from above about 0% to about 20%.

90. The device of claim 87, wherein the grain size of the particles ranges from about 0.1 μm to about 300 μm.

91. The device of claim 75, wherein the particles are configured to be capable of forming a gel at the surface of the at least one fiber.

92. The device of claim 75, wherein the particles are configured to be capable of absorbing a liquid.

93. The device of claim 92, wherein the particles are configured to be capable of absorbing preservatives in solution in a liquid.

94. The device of claim 92, wherein the concentration by weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

95. The device of claim 75, wherein at least one of the fibers comprises at least one plastic material chosen from

polyamides, PETs, acetates, PEs, PPs, PVCs, amide block polyesters, plasticized RILSAN, elastomers, polyester elastomers, PE elastomers, silicone elastomers, and nitril elastomers.

96. The device of claim 75, wherein the cross-section of at least one of the fibers has at least one shape chosen from circularly symmetrical shapes, circular shapes, solid square shapes, hollow square shapes, disk shapes, disk shapes having a groove, solid triangle shapes, hollow triangle shapes, solid star shapes, hollow star shapes, U-shaped, V-shaped, I-shaped, T-shaped, Z-shaped, dash-shaped, cross-shaped, kidney-shaped, shapes having three branches, and hollow shapes.

97. The device of claim 96, wherein the at least one fiber having the cross-section shape is twisted.

98. The device of claim 75, further comprising a wiper member.

99. The device of claim 75, wherein the device is configured to be loaded with the product.

100. The device of claim 99, wherein the device is a mascara brush comprising a plurality of bristles, and wherein at least one of the bristles comprises at least one of the fibers.

101. The device of claim 99, wherein the device comprises a paintbrush comprising a plurality of bristles, and wherein at least one of the bristles comprises at least one of the fibers.

102. The device of claim 75, wherein the device comprises a flocking comprising the plurality of fibers.

103. The device of claim 102, wherein the device is configured so that the flocking covers at least a portion of one of teeth, bristles, a wiper, a foam member, a porous member, a film, a perforated film, an endpiece, a woven fabric, and a non-woven fabric.

104. The device of claim 75, wherein at least one of the fibers has a diameter ranging from about 0.5 μm to about 500 μm.

105. The device of claim 75, wherein at least one of the fibers has a length ranging from about 0.5 mm to about 50 mm.

106. The device of claim 75, wherein at least one of the fibers comprises at least one of at least one magnetized particle and at least one magnetizable particle.

107. The device of claim 75, wherein at least one of the fibers comprises at least one of at least one magnetized particle and at least one magnetizable particle ranging from about 0.2% to about 30% by weight of the at least one fiber.

108. A method of manufacturing the device of claim 75, the method comprising:

extruding a fiber comprising a plastics material and particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid; and

placing the fiber and a liquid in contact with one another.

109. The method of claim 108, wherein the extruding comprises co-extruding.

110. The method of claim 108, wherein the particles swell on contact with the liquid, and wherein the particles have a grain size selected such that a predefined degree of roughness is imparted to the fiber after the particles have swollen.

111. The method of claim 108, further comprising absorbing a preservative in solution in the liquid.

112. The method of claim 108, wherein the liquid cools the fibers.

113. The method of claim 108, wherein at least a portion of the liquid is at least one of a cosmetic product and a care product.

114. The method of claim 108, wherein the liquid is not the product to be applied by the device or a portion of the product.

115. A fiber for a device for applying a product, the fiber comprising:

a synthetic material; and

particles associated with the synthetic material, the particles being configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the particles lack clay, lack silica, and lack cotton.

116. The fiber of claim 115, wherein the fiber has a cross-section that is substantially constant.

117. The fiber of claim 115, wherein the fiber is formed by one of extruding and co-extruding at least one of a thermoplastic material and an elastomeric material.

118. The fiber of claim 115, wherein at least one of the particles is at the surface of the fiber.

119. The fiber of claim 115, wherein at least a portion of the fiber comprises the particles only at the surface of the fiber.

120. The fiber of claim 115, wherein the at least one fiber comprises particles dispersed throughout the fiber.

121. The fiber of claim 115, wherein the particles comprise a material configured to increase in volume on contact with at least a portion of the product to be applied.

122. The fiber of claim 121, wherein the particles comprise at least one material chosen from polymers that swell in the presence of at least one of water and lipids, superabsorbent reticulated polyacrylates having a high swelling factor in water, polyvinyl alcohols, carboxyvinyl polymers, semi-synthetic derivatives of cellulose, starches, biogums, biosaccharides, scelro-glucanes, casein, phytocolloids, alginates, gelatins, gelanes, xanthans, and laponites.

123. The fiber of claim 121, wherein the particles have a grain size ranging from about 0.1 μm to about 300 μm prior to swelling.

124. The fiber of claim 121, wherein the concentration by weight of said particles prior to swelling relative to the total weight of the fiber ranges from above about 0% to about 6%.

125. The fiber of claim 115, wherein the fiber comprises a material capable of swelling on contact with at least a portion of the product to be applied.

126. The fiber of claim 115, wherein the particles are configured to be capable of dissolving on contact with a liquid.

127. The fiber of claim 126, wherein at least one of the particles is one of hydrosoluble and liposoluble.

128. The fiber of claim 126, wherein the concentration by weight of the particles configured to be capable of dissolving relative to the total weight of the at least one fiber prior to dissolution ranges from above about 0% to about 20%.

129. The fiber of claim 126, wherein the grain size of the particles ranges from about 0.1 μm to about 300 μm.

130. The fiber of claim 115, wherein the particles are configured to be capable of forming a gel at the surface of the at least one fiber.

131. The fiber of claim 115, wherein the particles are configured to be capable of absorbing a liquid.

132. The fiber of claim 131, wherein the particles are configured to be capable of absorbing preservatives in solution in a liquid.

133. The fiber of claim 131, wherein the concentration by weight of the particles prior to contact with a liquid relative to the total weight of the at least one fiber ranges from above about 0% to about 6%.

134. The fiber of claim 115, wherein the fiber comprises at least one plastic material chosen from polyamides, PETs, acetates, PEs, PPs, PVCs, amide block polyesters, plasticized RILSAN, elastomers, polyester elastomers, PE elastomers, silicone elastomers, and nitril elastomers.

135. The fiber of claim 115, wherein the cross-section of the fiber has at least one shape chosen from circularly symmetrical shapes, circular shapes, solid square shapes, hollow square shapes, disk shapes, disk shapes having a groove, solid triangle shapes, hollow triangle shapes, solid star shapes, hollow star shapes, U-shaped, V-shaped, I-shaped, T-shaped, Z-shaped, dash-shaped, cross-shaped, kidney-shaped, shapes having three branches, and hollow shapes.

136. The fiber of claim 135, wherein the fiber having the cross-section shape is twisted.

137. The fiber of claim 115, wherein the fiber is configured to be loaded with the product.

138. The fiber of claim 115, wherein the fiber has a diameter ranging from about 0.5 μm to about 500 μm.

139. The fiber of claim 115, wherein the fiber has a length ranging from about 0.5 mm to about 50 mm.

140. The fiber of claim 115, wherein the fiber comprises at least one of at least one magnetized particle and at least one magnetizable particle.

141. The fiber of claim 115, wherein the fiber comprises at least one of at least one magnetized particle and at least one magnetizable particle ranging from about 0.2% to about 30% by weight of the fiber.

142. A method of manufacturing the fiber of claim 115, the method comprising:

extruding a fiber comprising a plastics material and particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid; and

placing the fiber and a liquid in contact with one another.

143. The method of claim 142, wherein the extruding comprises co-extruding.

144. The method of claim 142, wherein the particles swell on contact with the liquid, and wherein the particles have a grain size selected such that a predefined degree of roughness is imparted to the fiber after the particles have swollen.

145. The method of claim 142, further comprising absorbing a preservative in solution in the liquid.

146. The method of claim 142, wherein the liquid cools the fibers.

147. The method of claim 142, wherein at least a portion of the liquid is at least one of a cosmetic product and a care product.

148. The method of claim 142, wherein the liquid is not the product to be applied by the device or a portion of the product.

149. A device for applying a product, the device comprising:

a plurality of fibers for applying the product,

wherein at least one of the fibers comprises particles configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the at least one fiber is substantially untapered and the particles lack clay, lack silica, and lack cotton.

150. A fiber for a device for applying a product, the fiber comprising:

a synthetic material; and

particles associated with the synthetic material, the particles being configured to be capable of at least one of

absorbing at least one of

a liquid, and

a compound in solution in a liquid, and

dissolving in a liquid,

wherein the fiber is substantially untapered and the particles lack clay, lack silica, and lack cotton.

151. The device of claim 1, wherein at least some of the particles comprise a super-absorbent material configured to be capable of absorbing an amount of a liquid having a weight at least equal to twice the weight of said at least some of the particles.

152. The device of claim 151, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to fifty times the weight of said at least some of the particles.

153. The device of claim 152, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to one hundred times the weight of said at least some of the particles.

154. The device of claim 153, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to five hundred times the weight of said at least some of the particles.

155. The fiber of claim 41, wherein at least some of the particles comprise a super-absorbent material configured to

be capable of absorbing an amount of a liquid having a weight at least equal to twice the weight of said at least some of the particles.

156. The fiber of claim 155, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to fifty times the weight of said at least some of the particles.

157. The fiber of claim 156, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to one hundred times the weight of said at least some of the particles.

158. The fiber of claim 157, wherein the super-absorbent material is configured to be capable of absorbing an amount of a liquid having a weight at least equal to five hundred times the weight of said at least some of the particles.

* * * * *