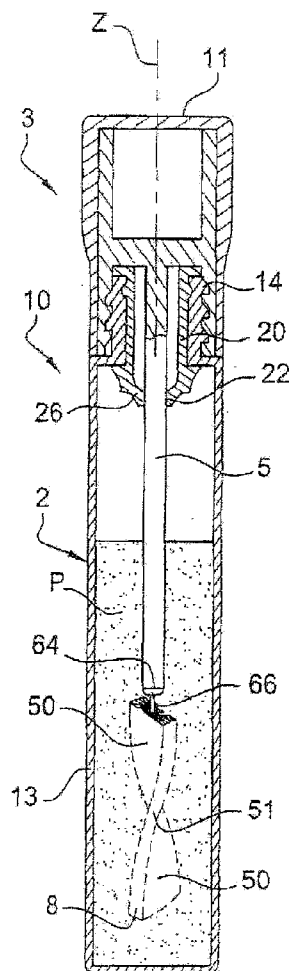
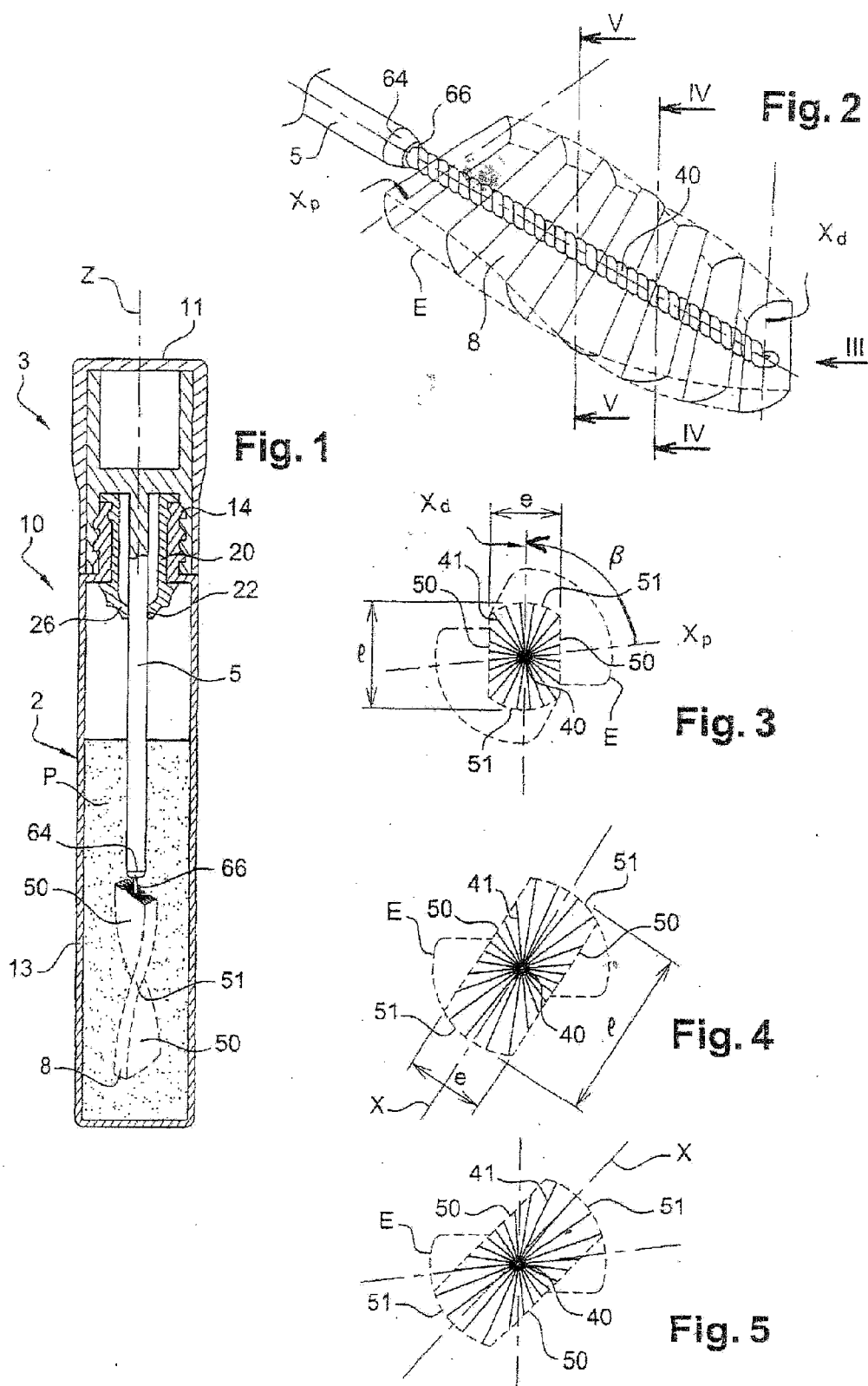


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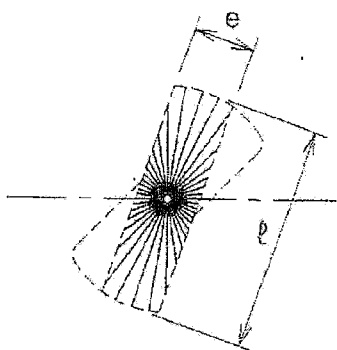


Fig. 6

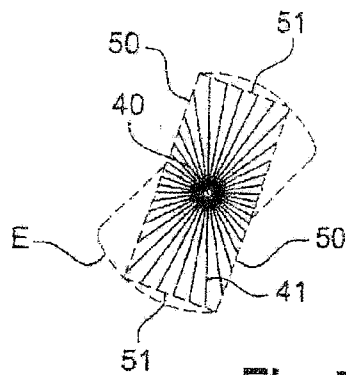


Fig. 7

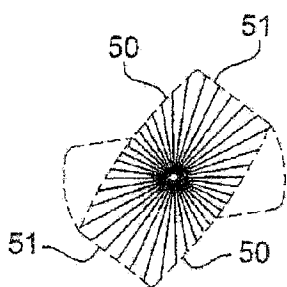


Fig. 8

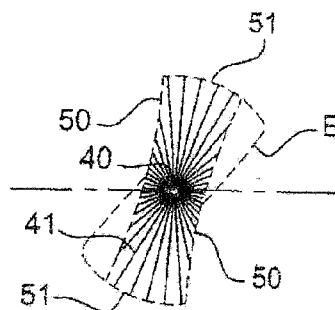


Fig. 9

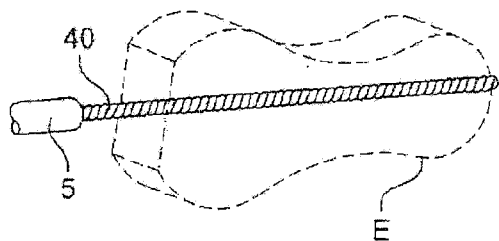


Fig. 10

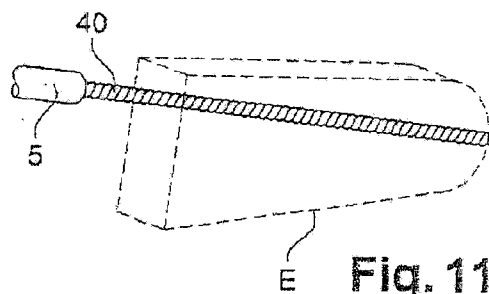


Fig. 11

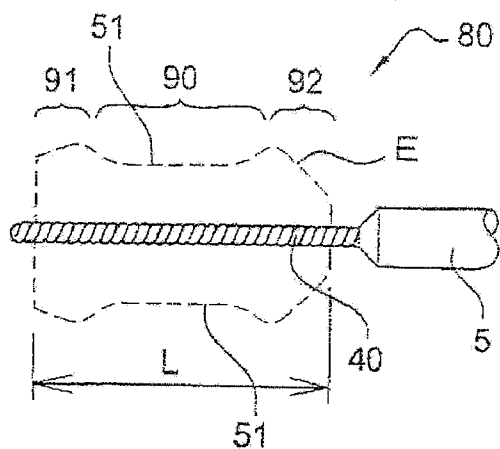


Fig. 12

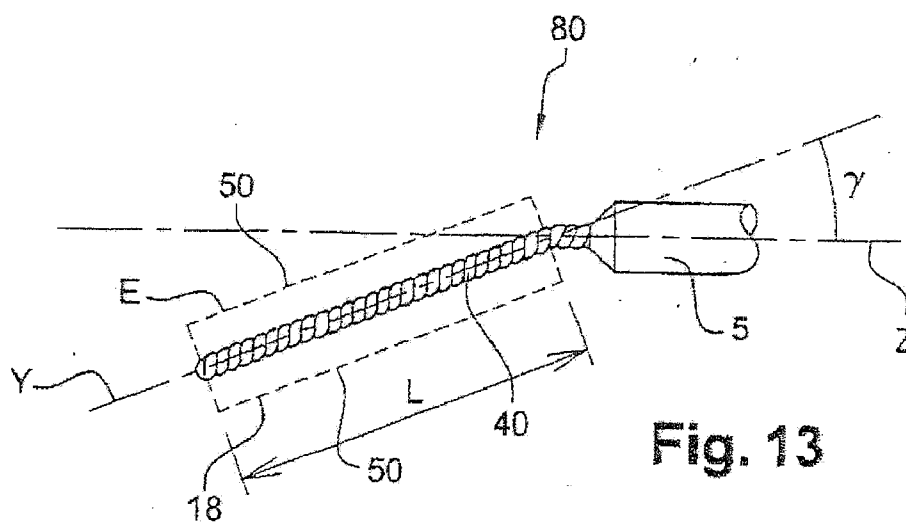


Fig. 13

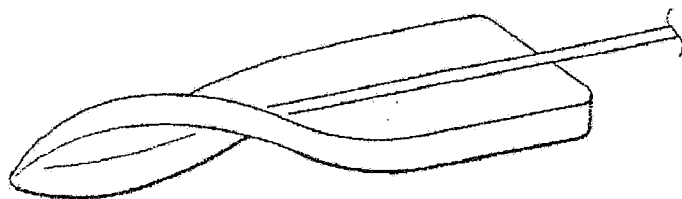


Fig. 18

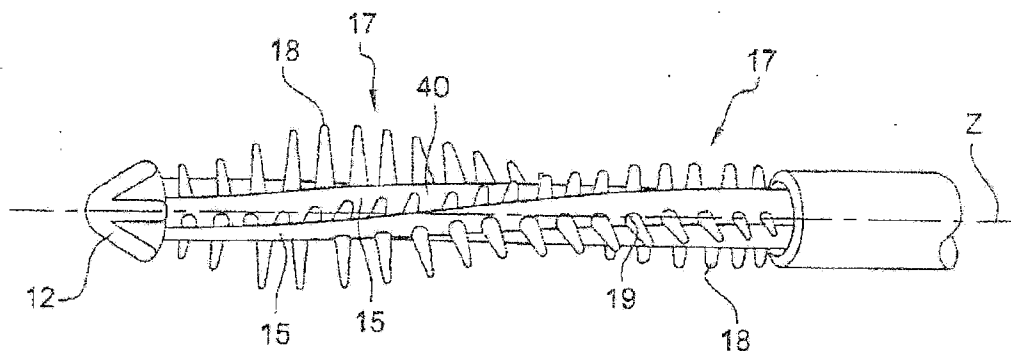


Fig. 14

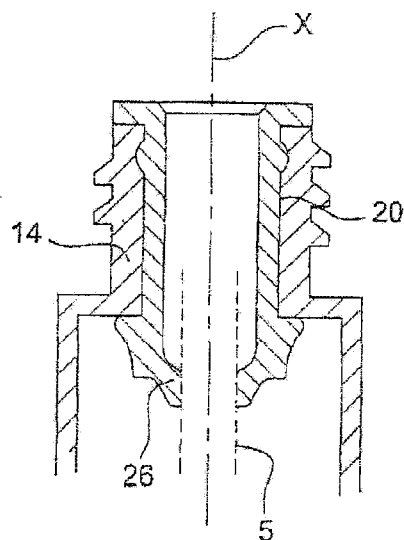


Fig. 15

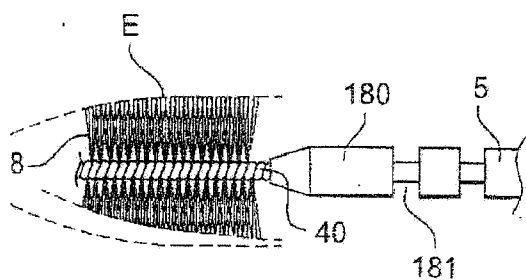


Fig. 16

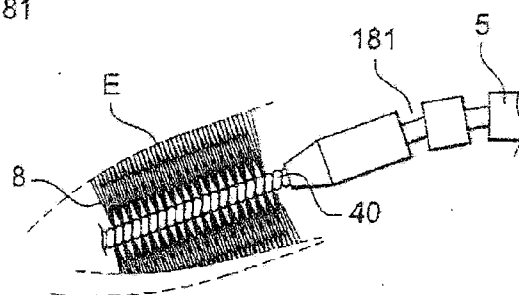


Fig. 17

**APPLICATOR FOR APPLYING A COSMETIC,
MAKEUP, OR CARE PRODUCT
COMPOSITION, AND A METHOD OF
MANUFACTURE**

[0001] This application claims benefit of U.S. Provisional Application No. 61/170,230, filed Apr. 17, 2009. This application also claims benefit of priority under 35 U.S.C. §119 to French Patent Application No. 0951794, filed Mar. 20, 2009.

[0002] The present invention relates to an applicator for applying a cosmetic, makeup, or care product composition, e.g. mascara, to the eyelashes and/or the eyebrows, and a packaging and applicator device including such an applicator.

[0003] The invention also relates to a method of manufacturing such an applicator.

[0004] In general, a brush mounted at the end of a stem is used to take mascara from a container that is provided with a wiper member for removing excess mascara present on the stem and on the brush. By way of example, the wiper member includes a lip that is made of an elastomer material and that defines a wiper orifice of circular section having a diameter that corresponds substantially to the diameter of the stem.

[0005] There exist flat brushes presenting a curving capability that is limited by straight edges. In addition, on passing through the wiper member, the composition is smoothed all along the brush in the same way, thereby giving a brush with faces that are impregnated with mascara in the same way, without any favored zones.

[0006] There also exist applicators having brushes with helical edges.

[0007] Application GB 2 170 996 describes a mascara brush including at least three rows of short bristles and three rows of long bristles, the rows being longitudinal or spiral.

[0008] In patent application FR 2 913 572, the bristles of the applicator are disposed in helical rows, the bristles being centered on the corresponding faces of a central core.

[0009] Application WO 2001/41599 describes a brush blank that is machined so as to create helical channels.

[0010] U.S. Pat. No. 5,551,456 discloses a method of manufacturing a helical brush having a cross-section that turns through an angle lying in the range 90° to 360°.

[0011] U.S. Pat. No. 5,335,465 also discloses a corkscrewed applicator having an angular offset between its cross-sections that lies in the range one fourth of a turn to one complete turn.

[0012] U.S. Pat. No. 5,595,198 discloses a mascara applicator that presents an angular offset lying in the range 180° to 400°.

[0013] There exists a need to improve still further applicators for applying a composition to keratinous fibers, in particular so as to impart to the applicator member a capability to curve progressively, and so as to favor the creation of zones that are loaded with more composition.

[0014] The invention seeks in particular to satisfy that need.

[0015] Exemplary embodiments of the invention provide an applicator comprising a stem and an applicator member at the end of the stem, the applicator member comprising projecting elements extending from a core, the applicator member including a corkscrewed portion having a cross-section that is flat, and having a greatest transverse dimension that preferably lies in the range 8 millimeters (mm) to 16 mm.

[0016] In particular, the greatest transverse dimension may be greater than 9 mm, and the thickness of the corkscrewed portion of the brush may lie in the range 2 mm to 6.5 mm.

[0017] The greatest transverse dimension may be found at a distance from the proximal and/or distal ends that is greater than one fourth of the total length of the portion of the applicator member that is used for application, e.g. for a twisted-core brush, the portion that carries bristles.

[0018] The long axes of the proximal and distal cross-sections of the corkscrewed portion may be angularly offset, preferably by less than one fourth of a turn.

[0019] The container containing the composition for application may include a wiper member that defines a wiper orifice through which the applicator member passes while said applicator member is being removed from the container, the diameter of the wiper orifice preferably lying in the range 2.5 mm to 5.5 mm.

[0020] The applicator member of the invention makes it possible to obtain a makeup effect that is satisfactory, as a result of said member presenting a profile that varies as it is being turned about the longitudinal axis of the stem.

[0021] The corkscrewed portion presents an angular offset between its distal and proximal ends that may be relatively small. The term “angular offset” means the angle through which the long axis of the cross-section turns between said ends. The angular offset may be more or less equal to the angle through which the user turns the applicator about its own axis while applying makeup. By means of this small offset and by pivoting the hand a little, the applicator member may lift the set of eyelashes progressively, in natural manner.

[0022] The angular offset between the distal end and the proximal end of the corkscrewed portion may lie in the range 20° to 80°, better it may be less than 35°, better still it may lie in the range 25° to 35°, or it may even be equal to about 30°.

[0023] The corkscrewed portion may extend over at least half the length of the applicator member, better at least three fourths, preferably over substantially all of its length. The corkscrewed portion may thus extend over a length that lies in the range 20 mm to 35 mm, for example. The length of the applicator member is here defined as being the length of the fraction of the core that carries projecting elements that are used for application, e.g. bristles or teeth.

[0024] The applicator member may be corkscrewed along only part of its length.

[0025] The applicator member may be corkscrewed along only a distal part, e.g. its distal half.

[0026] At points along the longitudinal axis of the core, the angle of the long axis of the cross-section of the applicator member relative to a reference direction may vary continuously along the longitudinal axis of the core. An end of said long axis may describe a helix of regular pitch around the longitudinal axis of the core. In a variant, the angle may vary in non-continuous manner. An end of said long axis may form a helix of varying pitch around the longitudinal axis of the core, e.g. the pitch may possibly increase towards a distal end of the applicator or decrease towards the distal end, or it may even increase and then decrease, or decrease and then increase. The reference direction may be parallel to the long axis of the proximal cross-section of the corkscrewed portion.

[0027] The corkscrewed portion may be corkscrewed clockwise or counterclockwise.

[0028] In cross-section, the corkscrewed portion may be at least 30% wider than it is thick. In other words, the greatest width of the cross-section of the applicator member may be at

least 1.3 times the thickness of said applicator member. The corkscrewed portion of the applicator member may be 30% to 100% wider than it is thick, better 35% to 55% wider than it is thick. By way of example, the cross-section of the applicator member may be rectangular, oval, oblong, lozenge-shaped, or kidney-shaped.

[0029] The width of the corkscrewed portion is defined as the greatest width of a cross-section of the corkscrewed portion. The thickness of the corkscrewed portion is measured in a section plane that is perpendicular to the longitudinal axis of the core in a direction that is perpendicular to the greatest width.

[0030] The greatest transverse dimension of the corkscrewed portion may lie in the range 6 mm to 14 mm, or better, as indicated above, in the range 8 mm to 16 mm. The width of the corkscrewed portion may be at least 3 mm greater than its thickness. The thickness of the corkscrewed portion may lie in the range 3 mm to 7 mm, better in the range 3 mm to 6 mm.

[0031] The applicator member may present two opposite main faces, with the spacing between them defining the thickness of the applicator member. The main faces may be parallel to each other.

[0032] The applicator member may present two side faces e.g. that are outwardly convex in cross-section.

[0033] The core may be centered or off-center, and it may optionally be rectilinear. The longitudinal axis of the core may coincide with the longitudinal axis of the stem. Alternatively, the longitudinal axis of the core need not be in alignment with the longitudinal axis of the stem. The core may be curved.

[0034] The core may be a twisted core, e.g. comprising two branches of a wire that are twisted together, thus being other than a core made of thermoplastic material.

[0035] In the meaning of the present invention, the term “bristle” should be understood to mean any individual projecting element carried by the core. The terms “bristle” or “projecting element” or “tooth” are interchangeable, even if the term “bristle” is normally used to designate projecting elements fitted on a core, e.g. as for a twisted-core brush, and the term “tooth” is often used to designate applicator elements of an applicator member made by molding.

[0036] The envelope surface is defined as being the surface that bears on the free ends of the projecting elements.

[0037] The applicator member may be used to apply a composition contained in a container including a wiper member.

[0038] Because of its corkscrew shape and flat cross-section the applicator member is capable of passing through the wiper member without its projecting elements being compressed excessively over any of its periphery, and the applicator member may present relatively little resistance on passing through the wiper member.

[0039] In addition, the piston phenomenon associated with the suction created by extracting the stem may be of limited effect because of the intake of air made possible by the shape of the applicator member.

[0040] The applicator member makes it possible to obtain wiping that is not uniform, leading to zones that are loaded unequally with composition.

[0041] The longest projecting elements of the applicator member may be wiped thoroughly. The shortest projecting elements may be more loaded relative thereto.

[0042] Thus, the user may have a greater quantity of composition available on the applicator member, making it pos-

sible to add composition locally to the eyelashes if that turns out to be necessary while making up, without any need to put the applicator member back into the container. In addition, the user has projecting elements available that are loaded with less composition, advantageously being suitable for separating the eyelashes, in particular the small eyelashes at the ends of the eyelid.

[0043] The stem may include a distal portion that is elastically deformable. By way of example, the distal portion is formed by an endpiece that is fitted on the remainder of the stem that may be made of a material that is more rigid. The endpiece may include one or more annular grooves, imparting more flexibility thereto.

[0044] At a second end opposite from the first, the stem may include a handle of the applicator, said handle possibly constituting a closure cap for closing the container in leak-tight manner.

[0045] The applicator member may present an envelope surface of cross-section that decreases on going towards the proximal and distal ends of the applicator member. For example, the envelope surface is frustoconical at the proximal and distal ends.

[0046] Other exemplary embodiments of the invention also provide an applicator comprising a stem and an applicator member at the end of the stem, the applicator member comprising projecting elements that extend from a core, the applicator member including a corkscrewed portion of cross-section that is flat, the long axes of the proximal and distal cross-sections of the corkscrewed portion being angularly offset around the longitudinal axis of the core by less than one fourth of a turn, i.e. by less than 90°.

[0047] Twisted-core brushes

[0048] The core may be a twisted core.

[0049] The core may have a left-hand twist or a right-hand twist, in particular a left-hand twist as described in French patent application FR-A-2 701 198. In a brush having a left-hand twist, the branches of the core are twisted to the left so as to form turns that, viewed along the axis of the core from the end fastened in the stem, turn in the clockwise direction on going from the stem towards the free end of the brush. The angle between the proximal and distal sections of the corkscrewed portion may be in the same direction as the pitch of the core, e.g. an angle in the clockwise direction with a left-hand pitch.

[0050] When the projecting elements are bristles held by a twisted core, the bristles may be natural or synthetic, and their ends may be subjected to any kind of known treatment, e.g. so as to form rounded heads or forks. The applicator member may include a mixture of bristles. The bristles used may be of any kind, in particular they may be bristles having a solid circular section, or they may be flat or corkscrewed hollow bristles having a capillary channel, or they may even have a zone of preferred deformation.

[0051] The angle between the proximal and distal sections of the corkscrewed portion may be oriented in the direction opposite to the pitch of the core, e.g. an angle in the counter-clockwise direction with a left-hand pitch, or an angle in the clockwise direction with a right-hand pitch.

[0052] In particular exemplary embodiments, the brush is made from a blank having a rectilinear twisted core and having an envelope surface that is circularly cylindrical. A brush of the invention may be obtained by applying a corkscrew twist after it has been cut flat. The blank is machined so

as to give the envelope surface a flat shape, and then the core is corkscrewed so as to give the brush a helical shape.

[0053] The blank may be a flat brush having a width lying in the range 6 mm to 14 mm, a thickness lying in the range 3 mm to 7 mm, and a length lying in the range 22 mm to 35 mm.

[0054] The core may be made by twisting a wire of diameter lying in the range 0.40 mm to 1 mm.

[0055] Starting from a twisted brush of the invention, it is possible, for the purpose of observation, to return to the blank of flat cross-section with two plane and parallel faces by corkscrewing it in the opposite direction until the angle between the long axes of the cross-sections at the distal and proximal ends of the corkscrewed portion has been reduced to zero.

[0056] The invention also provides a method of manufacturing a brush, the method comprising the following steps:

[0057] a) making a twisted-core brush, preferably of envelope surface that is cylindrical, in particular circularly cylindrical;

[0058] b) machining the brush over at least a portion of its length, so as to obtain a blank of cross-section that is flat; and

[0059] c) corkscrewing the core of said portion through an angle (β) that is strictly less than 90° .

[0060] The diameter of the cylindrical brush at step a) may lie in the range 8 mm to 16 mm. The starting brush may be bigger than the final brush.

[0061] The cross-section of the blank obtained at step b) may be at least 30% wider than it is thick.

[0062] The angle (β) may lie in the range 20° to 85° , better it may be less than 45° , better still it may lie in the range 25° to 35° , or it may even be equal to 30° . The blank may be 30% to 100% wider than it is thick, better 35% to 55% wider than it is thick. By way of example, the cross-section of the blank may be rectangular, oval, oblong, lozenge-shaped, or kidney-shaped.

[0063] The longitudinal axis of the core may be rectilinear.

[0064] At least one facet or notch may be made on or in the blank at step b) above, before corkscrewing the core.

[0065] The brush made at step a) may have a left-hand twist or a right-hand twist.

[0066] In another variant, a brush of the invention may be obtained by cutting using a cutter for example, by imparting relative rotation to the cutter or to the brush either in one pass or in two passes. The manufacturing steps may thus be:

[0067] a) making a twisted-core brush of envelope surface that is cylindrical; and

[0068] b) machining the blank, so as to obtain a brush that includes a portion of cross-section that is flat along a long axis (X), over at least a fraction of its length, with the long axes (X_p) and (X_d) of the proximal and distal cross-sections of the flat portion defining an angle (β) between them that is strictly less than one fourth of a turn.

[0069] Combs

[0070] The applicator may include a molded applicator member comprising a core and rows of molded teeth, also known as a "comb" or an "injection-molded brush".

[0071] The corkscrew configuration of the applicator member may be obtained by the shape of the mold used for molding, or, in a variant, the core may be deformed while unmolding, by exerting torsion on said core, in particular while the material is still hot.

[0072] The angular offset may be measured between the long directions of the end teeth of a helical row.

[0073] The core of the applicator may be of cross-section that is polygonal, e.g. in the shape of an optionally-regular polygon, e.g. triangular, square, rectangular, pentagonal, hexagonal, heptagonal, or octagonal. The faces of the core may be plane or slightly concave or slightly convex.

[0074] The core may have 3 to 8 longitudinal faces, or even 3 to 6 longitudinal faces.

[0075] The longitudinal faces of the core may be separated by sharp edges. One or more of the sharp edges, or even all of the sharp edges, may be corkscrew-shaped.

[0076] The cross-section of the applicator member is flat, at least over its corkscrewed portion. The teeth may be of any shape.

[0077] Devices

[0078] The invention also provides a packaging and applicator device comprising a container containing the composition for application to the eyelashes or the eyebrows, and an applicator as defined above, i.e. a brush or a comb.

[0079] The device may include a wiper member for wiping the applicator member while it is being taken out of the container, said wiper member being disposed on a neck of the container, for example. The wiper member may be of any suitable type, being flexible or rigid, and having one or two stages.

[0080] The wiper member may have an inlet diameter that is less than or equal to the greatest transverse dimension of the applicator member. The inlet diameter is the diameter through which the wiper member opens out to the outside of the container. The diameter of the wiper orifice may lie in the range 2.5 mm to 5.5 mm, better in the range 2.5 mm to 4.5 mm. The term "diameter of the wiper orifice" should be understood to mean the diameter of the greatest circle that can be inscribed in the wiper orifice. The wiper orifice may optionally be circular.

[0081] The handle of the applicator may serve as a closure cap for closing the container. The container and the closure cap may be configured in such a manner as to close the container in leaktight manner. By way of example, they may co-operate by screw-fastening.

[0082] Other exemplary embodiments of the invention also provide a method of applying makeup to the eyelashes or the eyebrows, said method comprising the step consisting in applying a composition to the eyelashes or the eyebrows by means of an applicator as defined above.

[0083] By way of example, the composition contained in the container is a composition that tends not to load onto the eyelashes, for which it may be advantageous to brush the eyelashes as little as possible so as to avoid removing the already-deposited composition. By means of the large contact areas associated with the main faces of the brush, the brush makes it possible to make up the eyelashes while decreasing the risk of removing composition.

[0084] The invention can be better understood on reading the following detailed description of non-limiting embodiments thereof, and on examining the accompanying drawings, in which:

[0085] FIG. 1 is a diagrammatic longitudinal section showing an example of a packaging and applicator device made in accordance with the invention;

[0086] FIG. 2 is a diagrammatic and fragmentary perspective view of an embodiment of an applicator member of the invention;

[0087] FIG. 3 is an end view of the FIG. 2 applicator member, as seen looking along arrow III;

[0088] FIG. 4 is a cross-section view on IV-IV in FIG. 2;

[0089] FIG. 5 is a cross-section view on V-V in FIG. 2;

[0090] FIGS. 6 to 9 are views similar to FIG. 4, showing variant embodiments;

[0091] FIGS. 10 and 11 are perspective diagrams showing the envelope surfaces of examples of brush blanks made in accordance with the invention;

[0092] FIG. 12 is a side view of a variant embodiment of a brush blank;

[0093] FIG. 13 is a side view of a variant embodiment of a brush blank;

[0094] FIG. 14 is a perspective view of an embodiment of an applicator member of the invention;

[0095] FIG. 15 shows a detail of the FIG. 1 container with the applicator removed;

[0096] FIGS. 16 and 17 show the possibility of making the stem with a distal portion that is flexible; and

[0097] FIG. 18 is a perspective view showing another example of a brush of the invention.

[0098] The packaging and applicator device 10 shown in FIG. 1 comprises: a container 2 containing a composition P for application to the eyelashes or the eyebrows; and an applicator 3 that, in the embodiment under consideration, is suitable for being fastened in removable manner on the container 2.

[0099] The applicator 3 comprises a stem 5 of longitudinal axis Z, provided at one end with an applicator member 8 and at the other end with a handle 11 that also constitutes a closure cap for closing the container 2 in leaktight manner. The container comprises a body 13 that is provided at its top end with a threaded neck 14 on which the handle 11 may be screw-fastened so as to close the container 2. In a variant, the applicator may be fastened on the container in some other way.

[0100] As shown, the neck 14 may receive a wiper member 20 that is fitted on the container, for example.

[0101] As shown, the wiper member 20 may include a lip 26 that defines a wiper orifice 22 of diameter that is adapted to the diameter of the stem 5.

[0102] The applicator member 8 may be fastened to the stem 5 using any suitable means, e.g. it may be received in a housing that is provided at the distal end of the stem.

[0103] In the embodiment under consideration, the applicator member 8 includes a twisted metal core 40.

[0104] As shown, the diameter of the stem 5 may taper over a distal portion 64 of the stem 5, adjacent to its distal end 66, and may remain substantially constant over the greater portion of the stem, up to the handle 3.

[0105] Where appropriate, in its portion that comes to be positioned facing the wiper orifice when the applicator is in place on the container, the stem 5 may present an annular constriction so as to avoid stressing the wiper lip 26 during storage.

[0106] The core 40 carries bristles 41 that may be natural or synthetic, optionally in a mixture, and optionally flocked.

[0107] In the embodiment under consideration, the core 40 is formed by two branches of a wire that has been folded into a U-shape and then twisted, with bristles 41 being held between the turns of the core. The diameter of the wire lies in the range 0.1 mm to 1 mm, for example. The diameter of the bristles lies in the range 0.06 mm to 0.35 mm, for example.

[0108] The envelope surface E defined by the free ends of the bristles 41 presents two opposite main faces 50.

[0109] In the embodiment described, the core 40 is rectilinear, e.g. of longitudinal axis that coincides with the longitudinal axis of the stem 5. The main faces 50 are interconnected via two side faces 51 that are outwardly convex for example, as shown.

[0110] A few possible cross-sections for the applicator member are shown by way of example in FIGS. 6 to 9.

[0111] As shown in these figures, the ratio of width ℓ over thickness e (ℓ/e) may vary in relatively substantial manner depending on the applicator member.

[0112] The applicator member may have a cross-section that is rectangular and side faces 51 that are parallel, as shown in FIG. 7.

[0113] The main faces 50 may be parallel, as shown in FIGS. 2 to 7, or outwardly convex, as shown in FIG. 8.

[0114] When the main faces 50 are outwardly convex, the side faces 51 may be parallel, as shown in FIG. 8, or, in a variant that is not shown, they may be outwardly convex, e.g. with a radius of curvature that is smaller than the radius of curvature of the main faces.

[0115] The main faces 50 may also be outwardly concave, as shown in FIG. 9, e.g. with the concave shape being defined by a portion of circle or by plane faces that form a re-entrant angle between each other.

[0116] In a variant not shown, the cross-section of the applicator member may present a shape that is asymmetrical, e.g. with two main faces having shapes that are different.

[0117] The angular offset 13 between the long axes X_p and X_d of the cross-sections at the proximal and distal ends of the corkscrewed portion of the applicator member may take various values depending on the embodiment, as mentioned above.

[0118] FIG. 10 shows a variant of a blank of the applicator member before the core 40 has been corkscrewed, said blank having side faces 51 that are undulating and that pass, for example, through a minimum width that is substantially midway along the portion of the core 40 carrying the bristles.

[0119] Alternatively, the core 40 of the applicator member may be off-center in cross-section, as shown in FIG. 11.

[0120] When observed perpendicularly to the main faces, the blank 80 that is used to fabricate the applicator member 8 may present side faces 51 that are not parallel and that are not rectilinear for at least a fraction of the length of the applicator member, as can be seen in FIG. 12. For example, the side faces 51 are outwardly concave over a portion 90 of the blank that extends between distal and proximal portions 92, for example, each of which portions 92 is of width that decreases towards the adjacent end of the applicator member.

[0121] FIG. 13 shows the possibility of having a core that is rectilinear over its portion carrying the bristles and that forms an angle γ with the longitudinal axis Z of the stem, e.g. with the core being bent about an axis that is, for example, parallel to the plane of the main faces 50.

[0122] The core 40 may be twisted in one direction then in the other, e.g. with a left-hand twist over half of its length then with a right-hand twist over the remaining half.

[0123] In FIG. 14, the applicator member 8 includes a core 40 that is molded with teeth.

[0124] By way of example, over the majority of its length, the core 40 presents a cross-section that is polygonal, having sides that define longitudinal faces 15.

[0125] By way of example, the longitudinal faces 15 are four in number, the cross-section of the core being substantially square for example, as shown.

[0126] In the embodiment shown, a single row 17 of teeth 18 is connected to each of the longitudinal faces 15, which teeth have bases 19 that are in alignment, for example.

[0127] In addition, the teeth 18 of each row 17 extend along a longitudinal axis of the row that is corkscrewed, as can be seen in FIG. 14, the faces 15 of the core 40 themselves being corkscrewed.

[0128] As in the embodiment under consideration, the core 40 may be extended at its proximal end by a cylindrical endpiece that enables it to be fastened to the stem 5. In particular, fastening may be achieved by force-fitting, snap-fastening, adhesive bonding, heat sealing, or crimping in a housing provided at the end of the stem. In a variant, the stem may be inserted in a housing provided in the core.

[0129] The core 40 may alternatively be molded integrally with the stem 5 or with a housing into which the stem 5 is inserted.

[0130] The core 40 may be deformed while it is being unmolded, or, in a variant, it may be molded in its final shape.

[0131] In the embodiment under consideration, the teeth 18 are made integrally with the core 40 by molding thermoplastic material.

[0132] In order to mold the applicator member 8, it is possible to use a thermoplastic material that is optionally relatively rigid, e.g. styrene-ethylene-butylene-styrene (SEBS); polyurethane (PU); a silicone rubber; latex rubber; butyl rubber; ethylene-propylene-terpolymer rubber (EPDM); a nitrile rubber; nitrile butyl rubber; an acetate-based polymer; a styrene-isoprene-styrene (SIS) based polymer; a thermoplastic elastomer; a polyester, polyamide, polyethylene, or vinyl elastomer; a polyolefin such as polyethylene (PE) or polypropylene (PP); polyvinyl chloride (PVC); ethyl vinyl acetate (EVA); polystyrene (PS); polyethylene terephthalate (PET); polyoxymethylene (POM); polyamide (PA); polymethyl methacrylate (PMMA); or a PA elastomer. In particular, it is possible to use materials known under the trade names Hytrel®, Cariflex®, Alixine®, Santoprene®, Pebax®, this list not being limiting.

[0133] Where appropriate, the applicator member 8 may also be made by molding, by stamping, or by machining a metal.

[0134] The teeth and the core may be made out of different materials, where appropriate.

[0135] At its distal end 12, the applicator member 8 may include a head that tapers forwards so as to make it easier to put the applicator 3 back into the container 2. The height of the teeth 18 may decrease on going towards the head 12, along a distal portion, as shown in FIG. 14.

[0136] The height of the teeth 18 may also decrease along a proximal transition portion on going towards the stem 5, so as to make it easier for the applicator member 20 to pass through the wiper member 8 while the applicator 3 is being removed.

[0137] In general, the core may include any number of longitudinal faces, with it being possible for any of the above-described characteristics to apply regardless of the number of longitudinal faces.

[0138] The wiper member may have a portion of constant inside diameter, as shown in FIG. 15.

[0139] Movement of the corkscrewed portion of the applicator member in contact with the cylindrical inside surface of the wiper member may encourage mixing of the composition.

[0140] At its end, and as shown in FIG. 16, the stem 5 may be provided with an elastically-deformable endpiece 180 that serves as a support to the core of the brush and that leaves a

certain amount of angular clearance while the brush is being removed from the container or during application, as shown in FIG. 17. The endpiece includes a groove 181, for example. By way of example, the endpiece is as described in EP 1 917 883 A2 and may be made, at least in part, of a material from the following list: elastomer material; thermoplastic; thermoplastic elastomer; low-density polyethylene (LDPE); polyvinyl chloride (PVC); polyurethane (PU); thermoplastic elastomer polyesters, in particular copolymers of propylene-diene terpolymer (EPDM); propylene-diene terpolymer (PDM); ethyl vinyl acetate (EVA); styrene-isoprene-styrene (SIS); styrene-ethylene-butylene-styrene (SEBS); styrene-butadiene-styrene (SBS); latex; silicone rubber; nitrile rubber; butyl rubber; polyurethane; polyether block amide; polyester; this list not being limiting. The endpiece may be made of a material having hardness that lies in the range 25 on the Shore A scale (ShA) to 80 on the Shore D scale (ShD), for example, or even in the range 40 ShA to 70 ShD. The rigid portions of the stem may be made of a thermoplastic material, in particular one of the materials selected from the following list: high-density polyethylene (HDPE); LDPE; linear polyethylene (PE); polycrystalline (PT); polypropylene (PP); polyoxymethylene (POM); polyamide (PA); polyethylene terephthalate (PET); and polybutyl terephthalate (PBT); this list not being exhaustive.

[0141] The bristles may be natural or synthetic, and may, for example, be fabricated out of a material selected from: PE; PA, in particular PA6, PA6/6, PA6/10, or PA6/12; Hytrel® Pebax®; silicone rubber; PU; this list not being limiting. The brush may include bristles that present resilient properties, in particular bristles made of elastomer. Bristles that present magnetic properties may be used. The brush may be flocked. The bristles may be treated in such a manner as to present forks, beads, or hooks at their ends. The bristles may be treated so as to be slippery.

[0142] The bristles may present a solid circular section, a hollow circular section, a hollow polygonal section, e.g. a hollow triangular section. The bristles may also present a hollow star-shaped section, a multi-lobed section that may be solid, a flat section, an oval section, a right-angled triangle section, an H-shaped section, a dumbbell-shaped section, a solid triangular-shaped polygonal section, a square section, a pentagonal section, a semi-circular section, a trapezoidal section, or even a U-shaped section. The bristles may present at least one capillary channel.

[0143] The brush may be caused to vibrate either by a generator that is mounted in the applicator, in particular on the handle, in optionally-removable manner, or by an external vibrator element that is mounted on a finger of the user, for example.

[0144] A vibration generator is described in French patent application FR 2 882 506.

[0145] In a variant, in order to make the core, it is possible to use a double wire that is itself twisted so as to trap the bristles, thereby making it possible to make the distribution of the free ends of the bristles more random. The brush may also be formed by twisting together two twisted cores, each carrying bristles.

[0146] A wiper member having a wiper orifice that is defined by an undulating lip may be used.

[0147] The brush may be corkscrewed along only its distal half, as shown in FIG. 18.

[0148] Once it has been given a corkscrew shape, the core of the brush may be curved around at least one axis, e.g. an axis that is perpendicular to the core.

[0149] The wiper member may be rigid, e.g. made in a non elastomer thermoplastic material. In some embodiments, the wiper member may be flexible, e.g. made in elastomer.

[0150] The expression “comprising a” should be understood as being synonymous with “comprising at least one”.

What is claimed is:

1. An applicator comprising a stem and an applicator member at an end of the stem, the applicator member comprising: a core; and

projecting elements that extend from the core, the applicator member including a corkscrew portion having an envelope surface of cross-section that is flat, and having a greatest transverse dimension that lies in the range 8 mm to 16 mm.

2. An applicator according to claim 1, wherein long axes of proximal and distal cross-sections of the corkscrew portion are angularly offset around a longitudinal axis of the core by less than 90°.

3. An applicator according to claim 1, wherein the thickness of the corkscrew portion lies in the range 2 mm to 6.5 mm.

4. An applicator according to claim 1, wherein the corkscrew portion extends over at least half the length of the applicator member.

5. An applicator according to claim 4, wherein the corkscrew portion extends over at least three fourths of the length of the applicator member.

6. An applicator according to claim 4, wherein the corkscrew portion extends over the entire length of the applicator member.

7. An applicator according to claim 1, wherein the long axes of proximal and distal cross-sections of the corkscrew portion are angularly offset by an angle β that lies in the range 20° to 80°.

8. An applicator according to claim 7, wherein the angle β lies in the range 25° to 35°.

9. An applicator according to claim 1, wherein the cross-section of the corkscrew portion is at least 30% wider than it is thick.

10. An applicator according to claim 1, wherein the longitudinal axis of the core is rectilinear.

11. An applicator according to claim 1, wherein the width of the corkscrew portion is at least 3 mm greater than a thickness of the corkscrew portion.

12. An applicator according to claim 1, wherein the corkscrew portion presents two opposite main faces that are parallel to each other.

13. An applicator according to claim 1, wherein the corkscrew portion is at constant pitch.

14. An applicator according to claim 1, wherein the core is twisted.

15. An applicator according to claim 1, wherein the applicator member and the projecting elements are molded.

16. A method of manufacturing a brush according to claim 1, comprising :

a) making a blank of a twisted-core brush of envelope surface that is circularly cylindrical, and of diameter lying in the range 8 mm to 16 mm;

b) machining the brush over at least a portion of its length, so as to obtain a blank of cross-section that is flat; and

c1) corkscrewing the core, preferably through an angle β that is strictly less than 90°; or

c2) machining the blank, while turning the brush relative to the machining tool, so as to obtain a brush that presents a portion of cross-section that is flat over at least a fraction of its length, the long axes of the proximal and distal cross-sections of the machined portion defining an angle β that is preferably strictly less than 90°.

17. A method according to claim 16, wherein the angle β is strictly less than 90°.

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