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(54) **COSMETIC APPLICATOR**

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(57) **ABSTRACT**

To provide a user-friendly and easy-to-use cosmetic applicator equipped with a brush section having thin, tapered, plastic brush fibers each having a round cross section and a rounded tip, yet the brush as a whole having adequate stiffness, not too stiff nor too soft for applying a cosmetic without hurting facial skin. A cosmetic applicator has an applicator shaft **30** made of a first plastic resin, a brush section **40** made of a second plastic resin softer than the first plastic resin and securely fixed to the leading end of the applicator shaft **30**. The brush section has a base **42** securely fixed to the leading end of the applicator shaft **30** and a brush **44** consisting of a multiplicity of tapered thin brush fibers that are integrally molded with the base **42** to extend forward from the base **42**. Each brush fiber has a round cross section and a rounded tip. The brush includes thick stiff fibers **44***a* mixed with thin soft fibers **44***b*. The stiffness and softness of the brush fibers are optimized so as not to be too stiff nor too soft so that the applicator is handleable but not hurtful to lips and facial skin.

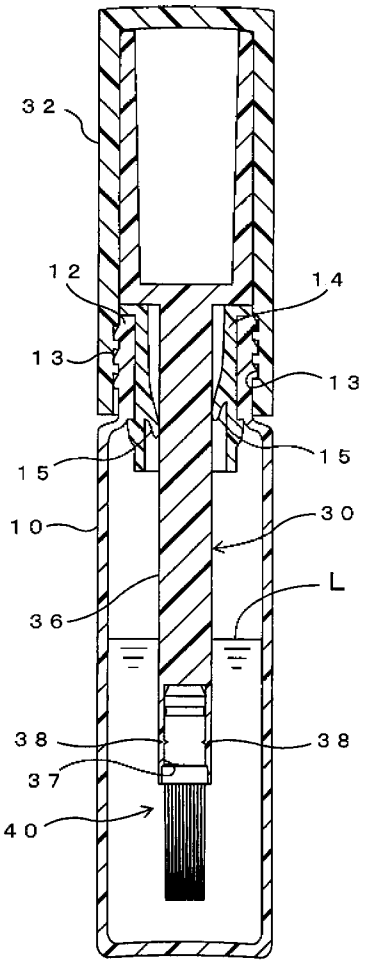


FIG. 1

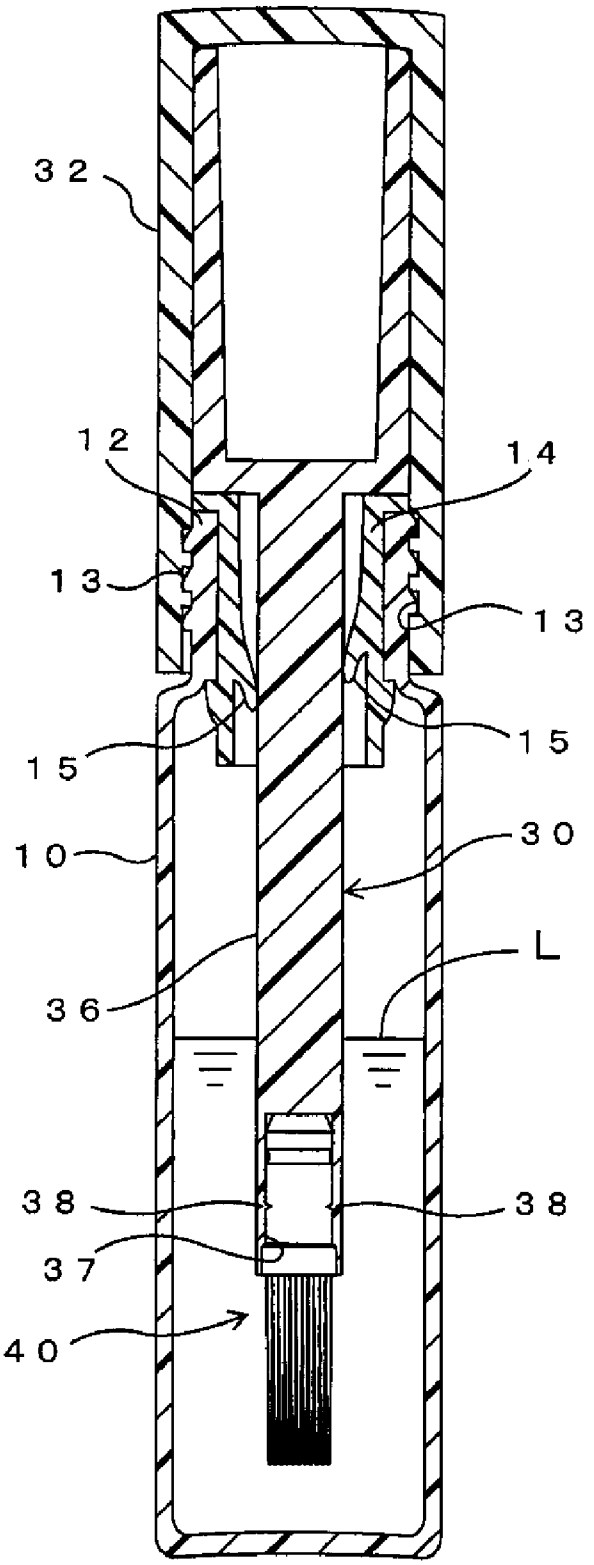
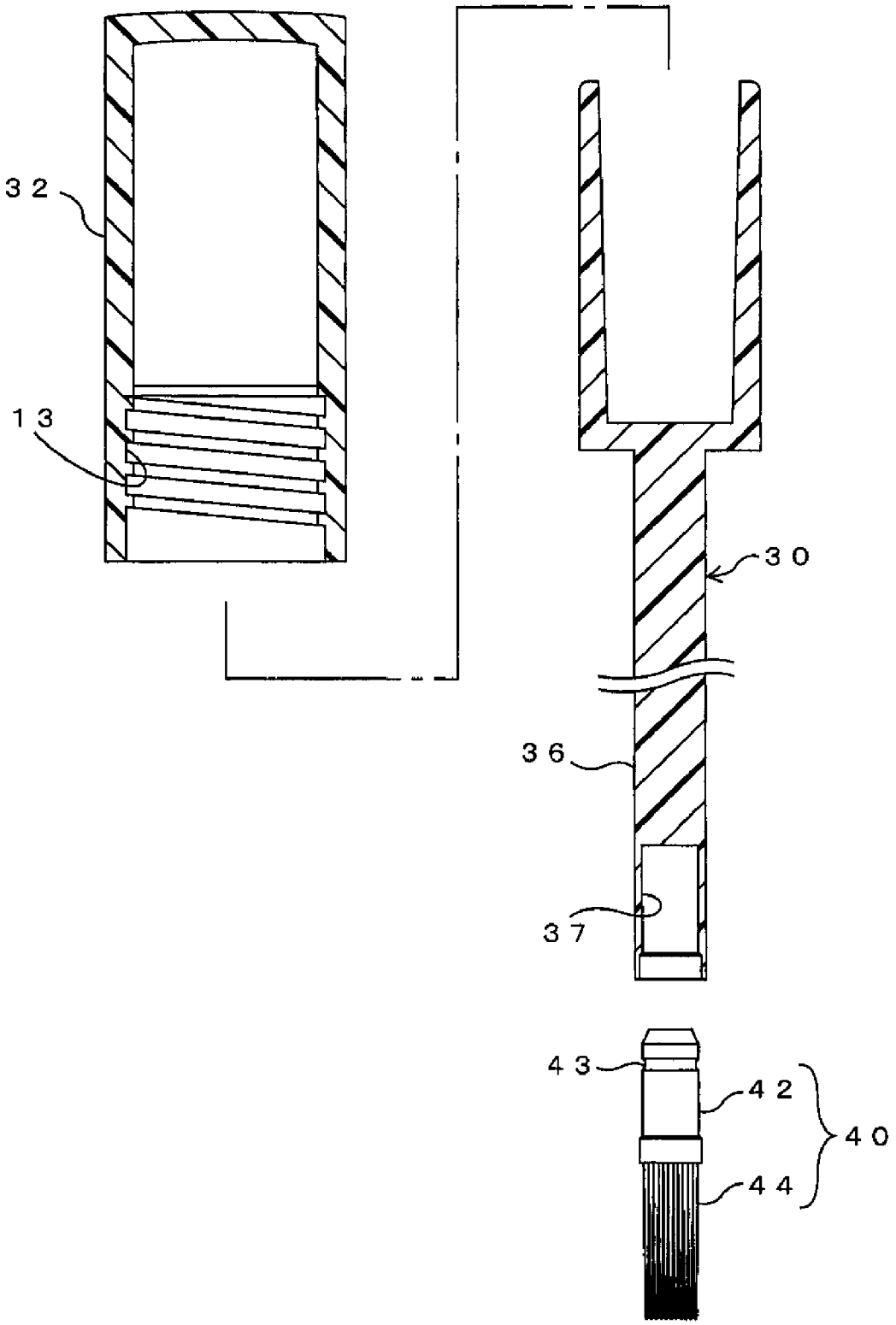


FIG. 2



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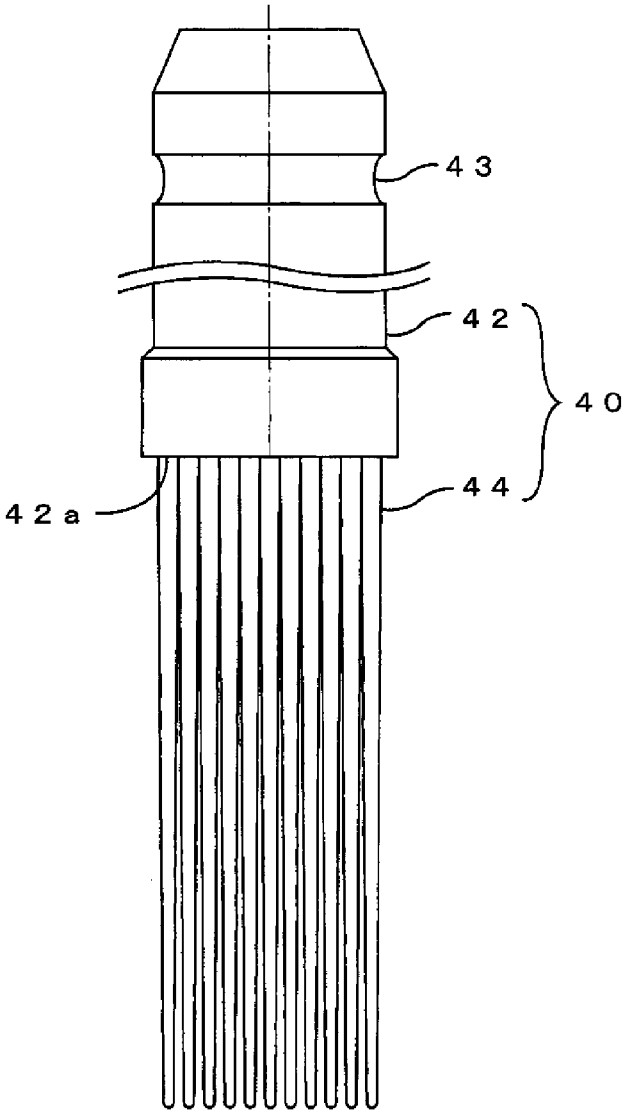


FIG. 4

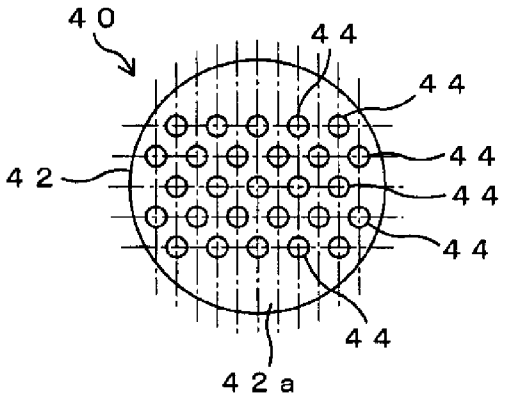


FIG. 5

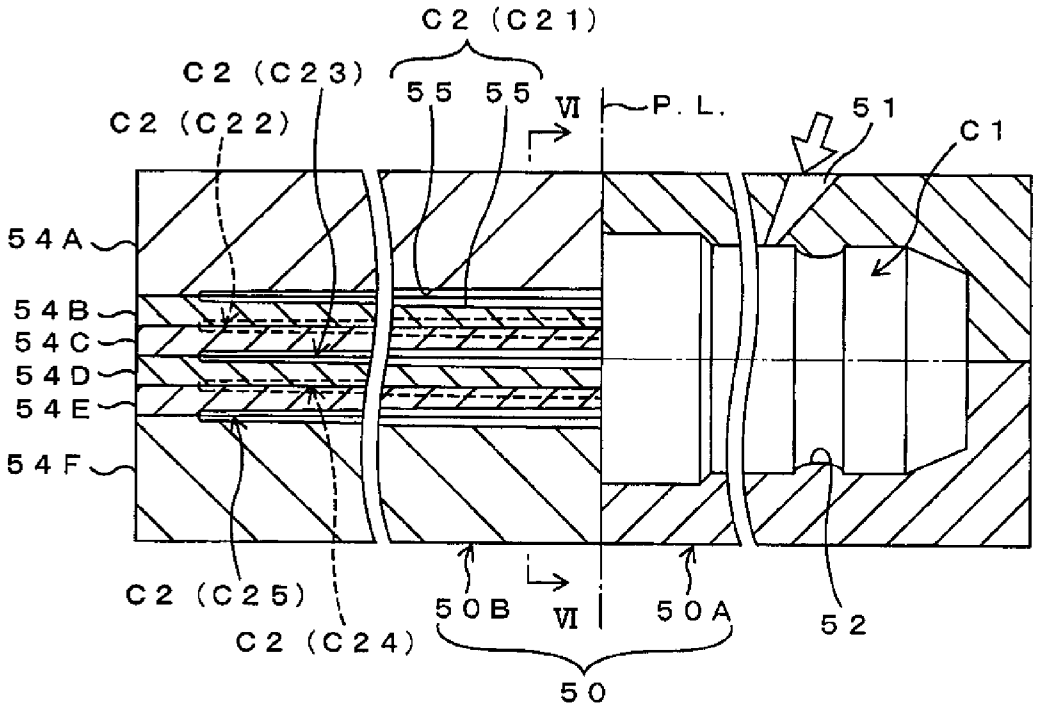

C2 (C21)
C2 (C23)
55 55
VI
P. L.
51
C1
C2 (C22)
54A
54B
54C
54D
54E
54F
C2 (C25)
C2 (C24)
50B
VI
50A
52
50

FIG. 6

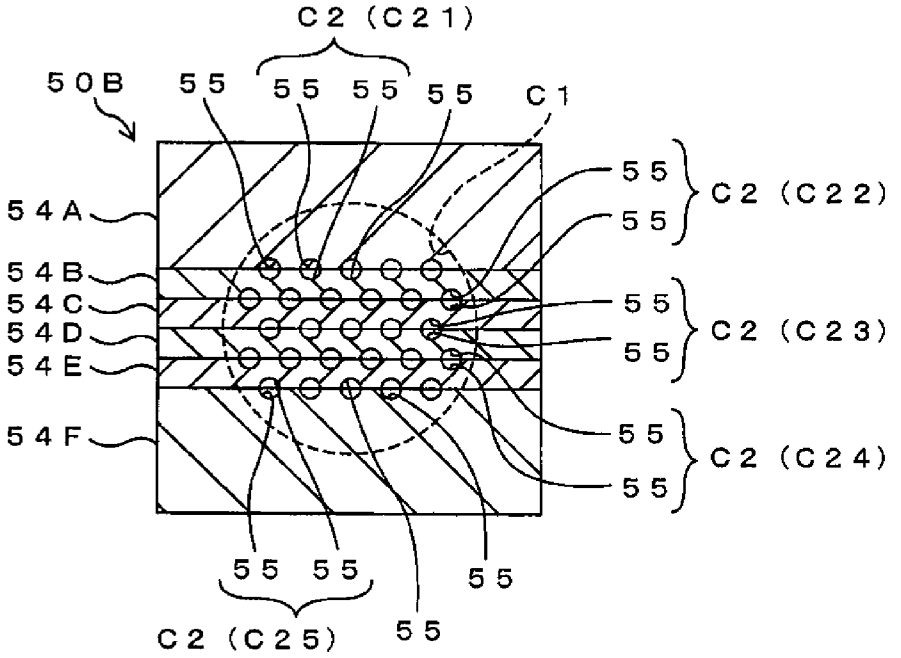

C2 (C21)
50B
55
55 55 55
C1
55
55
C2 (C22)
54A
54B
54C
54D
54E
55
55
C2 (C23)
54F
55
55
C2 (C24)
55 55
55
C2 (C25)
55

FIG. 7

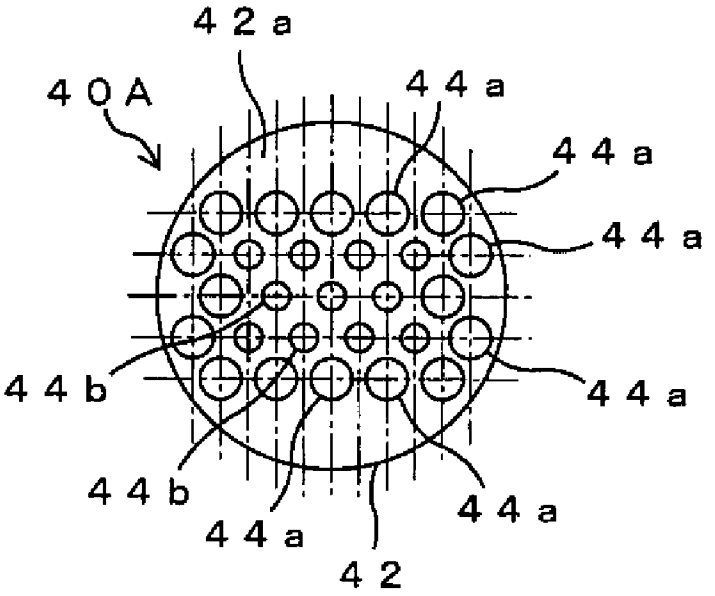

42a
40A
44a
44a
44a
44b
44a
44b
44a
44a
42

FIG. 8

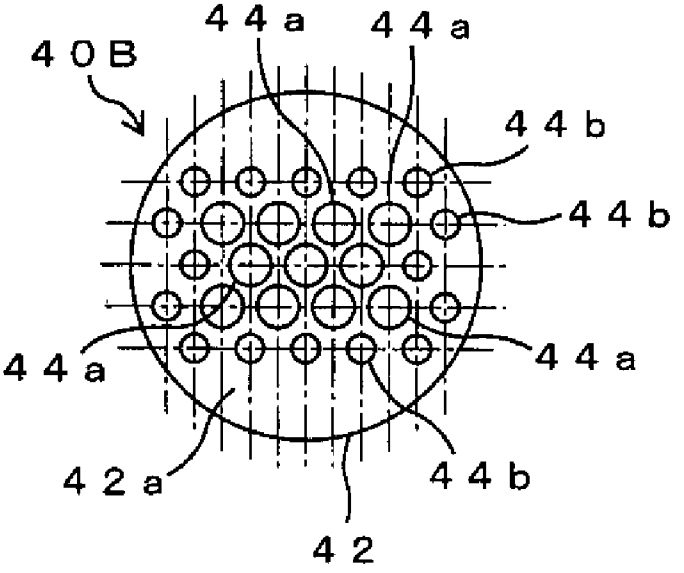

44a
44a
40B
44b
44b
44a
44a
42a
44b
42

FIG. 9

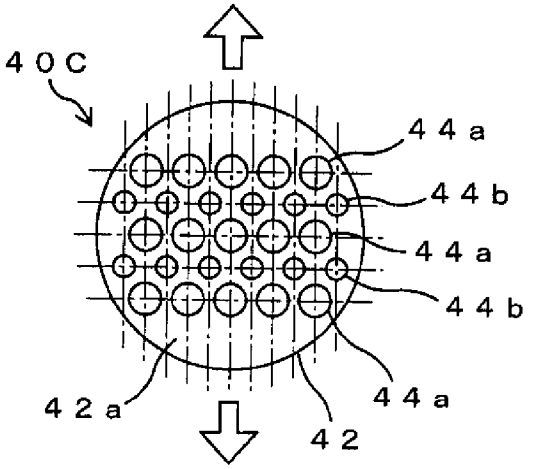


FIG. 10

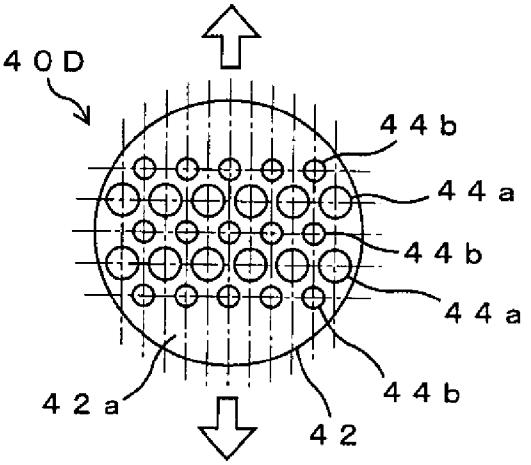


FIG. 11

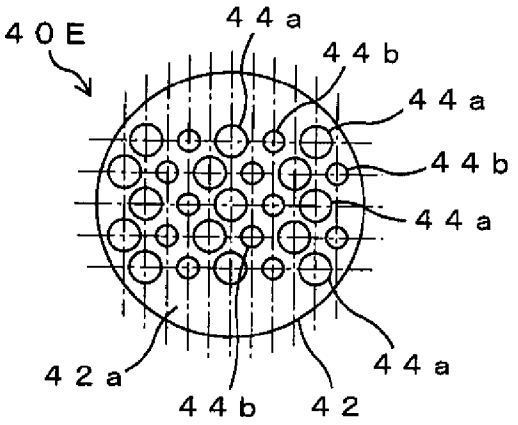


FIG. 12

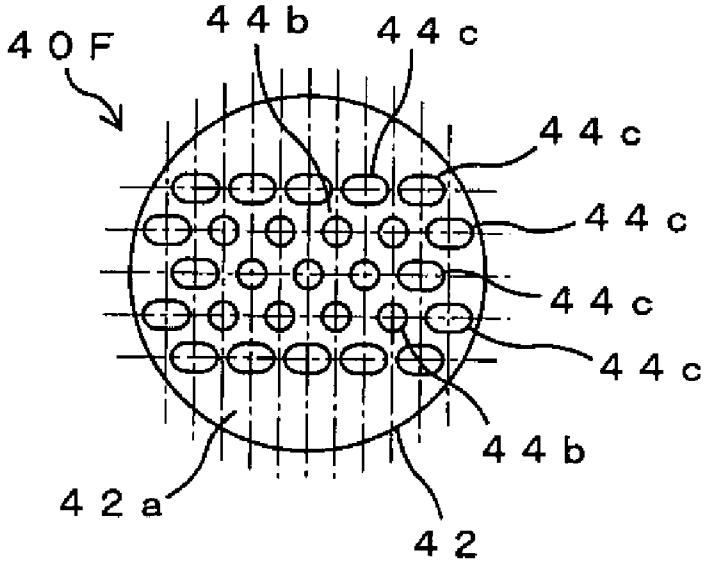
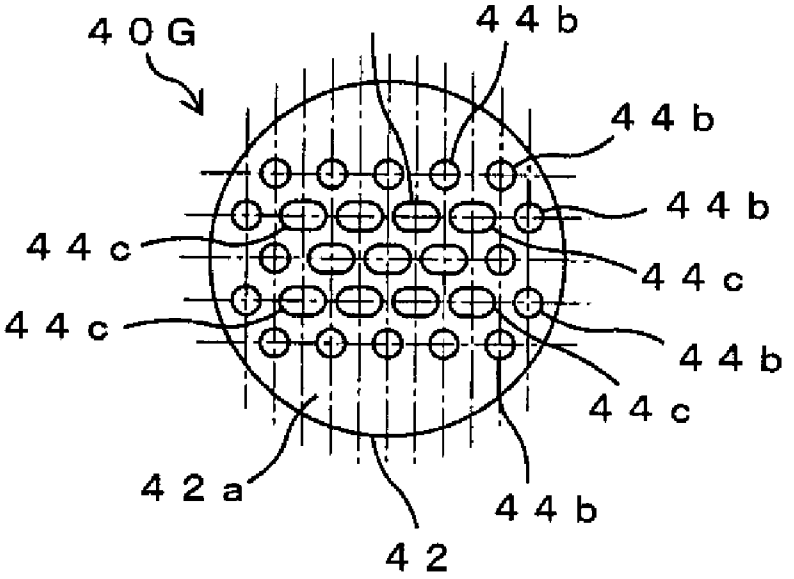

40F
44b
44c
44c
44c
44c
44c
44b
42a
42

FIG. 13


40G
44b
44b
44b
44c
44c
44c
44b
44c
42a
44b
42

COSMETIC APPLICATOR

TECHNICAL FIELD

[0001] This invention relates to a cosmetic applicator suitable for applying such liquid cosmetics as lip gloss, liquid rouge, eye liner, and enamel. More particularly, the invention relates to a cosmetic applicator equipped with a brush section which is integrally formed at the leading end of the shaft of the applicator and has a multiplicity of integrally molded plastic fibers.

BACKGROUND ART

[0002] Patent Document 1 listed below discloses a lip gloss applicator equipped with a brush section having very thin plastic fibers called bristles which are integrally bundled together and then securely swaged to the applicator shaft by means of a metal piece.

[0003] Patent Documents 2 and 3 disclose cosmetic applicators for applying liquid cosmetic such as enamel, which has a multiplicity of integrally molded plastic brush fibers at the leading end of the applicator shaft.

PRIOR ART DOCUMENTS

[0004] PATENT DOCUMENT 1: JPA LAID OPEN 2003-169713

[0005] PATENT DOCUMENT 2: JUM LAID OPEN H6-13714

[0006] PATENT DOCUMENT 3: JPA LAID OPEN 2004-196371

Problems to be Solved by the Invention

[0007] The cosmetic applicator of Patent Document 1 has a problem (referred to as first problem), however, in that it is costly due to the fact that it requires multiple steps for fabricating brush fibers and integrating them to a bundle.

[0008] The brush sections disclosed in Patent Documents 2 and 3 can be advantageously molded integral with the applicator shafts from cheap materials in fewer steps. The prior art, however, concerns cosmetic applicators for applying enamel to nails, so that their brush fibers require certain stiffness and must be made of a relatively hard plastic resin. Thus, the brush fibers of these applicators are too stiff and thick for use with lip gloss, and unfortunately they have rectangular or triangular transverse cross sections and angulated tips. As a consequence, they may hurt lips when used to apply lip gloss. This is a second problem pertinent to the prior art applicators.

[0009] To overcome these prior art problems, the inventors of the present invention are motivated to provide a cosmetic applicator having a brush section that can be manufactured from a relatively cheap soft plastic resin in a fewer steps, and can be securely fixed to the leading end of a relatively hard resin applicator shaft, thereby providing a handleable yet tender cosmetic applicator, non-hurtful to lips. Thus, this applicator can solve the first problem. The brush of the inventive cosmetic applicator can be made of a much thinner tapered plastic resin fibers than those of the Patent Documents 2 and 3, with their transverse cross sections and tips rounded to prevent lip injury (second problem).

[0010] The inventors of the present invention made trial products and has verified in repeated tests that the inventive cosmetic applicator has overcome the first and second problems mentioned above.

[0011] In the process of developing a new type of cosmetic applicators (especially brush sections) the inventors encountered a new problem though, as described below. That is, the applicator has a certain disadvantage in a case where the brush fibers of the brush have the same thickness even if they are relatively soft. If the brush fibers are too thick, the brush section as a whole becomes too stiff, which is convenient for lip gloss application, but can hurt lips. On the other hand, if the brush fibers are too thin, the brush section as a whole becomes too soft, which can prevent lip injury but creates a third problem that the applicator is difficult to use as a lip gloss applicator.

[0012] The inventors then came up with an idea that this third problem may be solved by a brush that consists of thin brush fibers and thick brush fibers mixed in such a way that it is soft enough to protect lips and hard enough as a lip gloss applicator.

[0013] The inventors made trial products and has verified through tests that in fact this configuration can overcome the third problem.

[0014] In view of the prior art problems mentioned above and our new findings, it is an object of the present invention to provide a cosmetic applicator having a brush section connected to the leading end of the applicator shaft, the brush section having plastic brush fibers each having a round cross section and a rounded tip, so that the brush will not hurt the facial skin of a user.

[0015] It is another object of the invention to provide a convenient cosmetic applicator for applying a liquid cosmetic, the applicator having a brush consisting of thick brush fibers mixed with thin brush fibers such that the brush has a sufficient stiffness needed for a liquid cosmetic applicator but has a sufficient softness not to hurt facial skin.

Means for Solving the Problems

[0016] To achieve the objects stated above, there is provided in accordance with the invention a cosmetic applicator, as defined in claim **1**, having:

[0017] an applicator shaft made of a first plastic resin;

[0018] a brush section made of a second plastic resin softer than the first plastic resin and securely fixed to the leading end of the applicator shaft coaxially with the shaft, the brush section has a base to be securely fixed to the leading end of the applicator shaft and a multiplicity of tapered plastic brush fibers that are integrally molded with the base to extend forward therefrom (the brush fibers collectively referred to as brush), with each fiber having a round cross section and a rounded tip, the applicator characterized in that:

[0019] the brush fibers are molded by a mold that comprises a fixed mold for molding the base and a multiplicity of stacking molds moveable in the axial direction of the shaft to and away from the fixed mold;

[0020] the brush fibers are disposed in horizontal rows which are horizontally separated at equal spaces such that the brush fibers are spaced apart at equal pitches in the respective rows but offset in the horizontal direction with respect to the neighboring brush fibers in the neighboring rows by a half pitch so that any two neighboring brush fibers are separated at equal spaces;

[0021] the brush fibers are molded by stacking molds which are each provided in the upper and/or lower stacking faces thereof with longitudinal narrow grooves

adapted to form narrow cavities between the respective stacking split molds when the stacking molds are stacked together.

[0022] (Function) This form of brush section having such base and brush fibers can be easily molded from a cheap material. The step of mounting the brush section to the shaft is simple. Thus, the applicator can be manufactured at low cost. Hence, the first of the prior art problems mentioned above is solved.

[0023] As stated above, the applicator shaft is preferably made of a fairly hard plastic resin from the point of handleability of the applicator. On the other hand, the fibers of the brush for applying a cosmetic to facial skin (including lips) are preferably made of a relatively soft plastic resin not to hurt the facial skin of the user. From this point, the applicator shaft is preferably selected from a first group of relatively hard plastic resins including, for example, polypropylene, PBT, POM, or a little harder PA (nylon), while the brush fibers are preferably selected from a second group of relatively softer plastic resins including, for example, polyethylene, a little softer PA, PET, and elastomers.

[0024] Further, each of the soft brush fibers is preferably thin and tapered and has a round cross section and a rounded tip, so that the brush will not hurt the lips or facial skin of the user. Thus, the second of the prior art problems is solved by the present invention. It should be noted that although the brush fibers are made of a relatively soft plastic resin, the handleability of the applicator is not lost due to the fact that the applicator shaft is made of a rather hard plastic resin.

[0025] To achieve the second object, the brush of claim **1** may include thick brush fibers and thin brush fibers mixed together, as defined in claim **2**.

[0026] (Function) Thin brush fibers have poor handleability for cosmetic application in that they are too soft to draw in outline. But they will not hurt lips nor facial skin. On the other hand, thick fibers are stiff and convenient to draw in outline with cosmetic, though they can hurt lips and facial skin. However, by mixing thick brush fibers with thin brush fibers in an appropriate proportion in the brush, the stiffness of the brush as a whole can be varied. Thus, by adjusting the proportion of thick brush fibers to thin brush fibers, the stiffness of the entire brush can be optimized for desired handleability and softness of applicator not to hurt lips and facial skin. In this way the third problem is solved.

[0027] The applicator of claim **2** may be configured such that the thick and thin brush fibers are distributed at a substantially uniform density, as defined in claim **3**.

[0028] (Function) Since the soft thin brush fibers and stiff thick brush fibers are distributed substantially uniformly, the stiffness of the brush becomes adequate for the applicator in that it is not too stiff nor too soft.

[0029] Alternatively, the applicator of claim **2** may be configured such that thin brush fibers are arranged in an inner area of the brush and the thick brush fibers in an outer area surrounding the thinner fibers, as defined in claim **4**.

[0030] (Function) Since the outer portion of the brush consists of stiff (or thick) fibers, the brush will not be deformed more than needed if it is pressed onto a face to apply a cosmetic.

[0031] Further alternatively, the cosmetic applicator of claim **2** may be configured such that the thick brush fibers are arranged in an inner area of the brush and the thin brush fibers in an outer area surrounding the thinner fibers, as defined in claim **5**.

[0032] (Function) Since the outer portion of the brush consists of soft (or thinner) fibers, mainly soft outer portion of the brush touches lips and facial skin while applying a cosmetic.

Results of the Invention

[0033] As is understood from the foregoing description, the brush of a cosmetic applicator in accordance with claim **1** of the invention can be manufactured from a cheap material in a simple process.

[0034] Since the brush fibers are not only made thin and tapered but also made to have a round cross section and a rounded tip, the brush will not hurt lips nor facial skin of a user. At the same time, by providing the applicator with a shaft made of a relatively hard plastic resin, the applicator is made handleable for smooth application of a cosmetic.

[0035] According to claim **2**, the proportion of the thick brush fibers to thin brush fibers can be altered to vary the stiffness of the brush so that the applicator has both preferred stiffness and softness that meets varied needs of cosmetics users.

[0036] According to claim **3**, the stiffness and softness of the brush can be optimized to obtain a handleable and tender applicator.

[0037] According to claim **4**, the brush can properly deform to follow the facial configuration without bending excessively, so that the applicator is easy to draw in outline with a cosmetic.

[0038] When an applicator of claim **5** is used, mainly the outer soft part of the brush touches a facial section, and hence the brush will not hurt lips nor facial skin.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] FIG. **1** is a longitudinal cross sectional view of a cosmetic applicator, in particular a lip gloss applicator, in accordance with a first embodiment of the invention.

[0040] FIG. **2** is an exploded cross sectional view of a main portion of the lip gloss applicator.

[0041] FIG. **3** is a side view of a main section of the lip gloss applicator, in particular the brush section.

[0042] FIG. **4** is an enlarged bottom view of the brush section of the lip gloss applicator (viewed from the tip end of the brush).

[0043] FIG. **5** is a longitudinal cross sectional view of a mold for injection molding the brush section.

[0044] FIG. **6** is a cross sectional view of a split type mold (moveable mold) for molding the brush fibers of a brush section, taken along Line VI-VI of FIG. **5**.

[0045] FIG. **7** is an enlarged bottom view of a main section of a lip gloss applicator, in particular the brush section, in accordance with a second embodiment of the invention (viewed from the tip end of the brush).

[0046] FIG. **8** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a third embodiment of the invention (viewed from the tip end of the brush).

[0047] FIG. **9** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a fourth embodiment of the invention (viewed from the tip end of the brush).

[0048] FIG. **10** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a fifth embodiment of the invention (viewed from the tip end of the brush).

[0049] FIG. **11** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a sixth embodiment of the invention (viewed from the tip end of the brush).

[0050] FIG. **12** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a seventh embodiment of the invention (viewed from the tip end of the brush).

[0051] FIG. **13** is an enlarged bottom view of a main section, in particular the brush section, of a lip gloss applicator in accordance with a eighth embodiment of the invention (viewed from the tip end of the brush).

NOTATIONS

[0052] **30** applicator shaft;

[0053] **40**, **40**A, **40**B, **40**C, **40**D, **40**E, **40**F, and **40**G brush sections;

[0054] **42** base;

[0055] **44** brush;

[0056] **44***a* thick brush fibers;

[0057] **44***b* thin brush fibers;

[0058] **44***c* thick brush fibers having an elliptic cross section;

[0059] **50** mold for injection molding a brush section

[0060] **50**A fixed mold for molding the base of a brush section

[0061] **50**B moveable mold for molding the brush fibers of a brush section

BEST MODE FOR CARRYING OUT THE INVENTION

[0062] The invention will now be described in detail by way of example with reference to the accompanying drawings.

[0063] FIGS. **1** through **6** shows a first embodiment of the invention. More particularly, FIG. **1** is a longitudinal cross sectional view of a cosmetic applicator, in particular a lip gloss applicator, in accordance with a first embodiment of the invention; FIG. **2** is an exploded cross sectional view of a main portion of the lip gloss applicator; FIG. **3** is a side view of a main section of the lip gloss applicator, in particular the brush section; FIG. **4** is an enlarged bottom view of the brush section of the lip gloss applicator (viewed from the tip end of the brush); FIG. **5** is a longitudinal cross sectional view of a mold for injection molding the brush section; and FIG. **6** is a cross sectional view of a split type mold (moveable mold) for molding the brush fibers of the brush section, taken along Line VI-VI of FIG. **5**.

[0064] In these figures, particularly FIGS. **1** through **2**, reference numeral **10** indicates an elongate cylindrical container for containing therein liquid lip gloss L. Provided in the upper section of the container **10** is a mouth piece **12** for receiving

therein an applicator shaft having an outer diameter smaller than the inner diameter of the container **10**. A male thread **13** is formed on the outer periphery of the mouth piece **12** for engagement with the female thread **33** formed in the rear end of the shaft **30**.

[0065] The shaft **30** is made of polypropylene. The stem portion **36** of the shaft **30** is provided at the leading end thereof with a bore **37** which is open in the forward direction. A brush section **40** made of polyethylene is integrally fitted in this hole **37**.

[0066] The brush section **40** is injection molded to form a substantially cylindrical base **42** and a multiplicity of parallel thin brush fibers **44** (the brush fibers collectively referred to as brush) which are integral with the base **42** and extend forward from the front end **42***a* of the base **42**. After inserting the base **42** of the brush section **40** into the bore **37** formed at the leading end of the stem portion **36**, the stem portion **36** of the shaft **30** is swaged with dowels **38** at multiple circumferential positions near the leading end of the stem **36** so as to securely fix the base **42** to the shaft **30**.

[0067] In this way, in order to make the applicator handleable, the helve or the shaft **30** of the applicator is made of a fairly hard plastic resin (polypropylene for example), while the brush **44** of the brush section **40** is made of a fairly soft plastic resin (polyethylene for example) so as not to hurt lips.

[0068] Incidentally, reference numeral **43** indicates an annular recess formed in the outer circumference of the base **42**, which is designed to engage with the annular protrusion **52** formed on the inner circumferential surface of the cavity C**1** of the mold **50**A for forming the brush section, as will be described in detail later. The annular recess **43** keeps the base **42** of the brush section **40** in the cavity C**1**, thereby facilitating removal of the brush **44** from (the cavity C**2** of) the moveable mold **50**B after injection molding is completed.

[0069] Reference numeral **14** indicates a cylindrical middle inner plug made of a resilient plastic resin and securely fitted to the open end **12** of the container **10**. Formed near the lower end of the middle inner plug **14** is a wiper **15** that protrudes from the inner surface of the middle inner plug **14** for scraping off superfluous liquid gloss adhering to the stem portion **36** of the shaft **30** or brush **44** as the shaft **30** is withdrawn from the container **10**.

[0070] As shown in FIGS. **3** and **4**, the brush **44** of the brush section **40** consists of 27 brush fibers (11 mm in length) spaced apart at substantially equal distance, each brush fiber having a circular transverse cross section and rounded tip, and being tapered (with the outer diameter being 0.4 mm at the root thereof, 0.2 mm at the tip).

[0071] Each of the brush fibers extending from the forefront face **42***a* of the base **42** has a total length of 9 mm and outer diameter of 3.4 mm. They are arranged in five rows on the face **42***a* and spaced apart at equal intervals in the vertical direction (with the pitch of 0.5 mm for example) and in the horizontal direction (with the pitch of 0.7 mm for example), as shown in FIGS. **3** and **4**. The second and fourth rows of six brush fibers are offset from the first, third, and fifth horizontal rows of five brush fibers in the horizontal direction by a half pitch (0.35 mm).

[0072] Furthermore, since the brush fibers of the brush **44** are not only made of thin fibers but also tapered and have round cross sections and rounded tips, that they will not hurt the lips or facial skin of the user.

[0073] It is noted that to circumvent the difficulty of accurately drilling very fine injection holes in a mold, a split-type mold is provided for molding the brush **44** as shown in FIGS. **5** and **6**.

[0074] Referring to FIGS. **5** and **6** there is shown a mold for injection molding the brush section **40**, which comprises a fixed mold **50**A and a moveable mold **50**B that can be slid in one linear direction (left-right direction for example) with respect to the fixed mold **50**A. The fixed mold **50**A is provided with one cylindrical cavity C**1** for molding the base **42** of the brush section **40**, while the moveable mold **50**B is provided with 27 elongate cavities C**2** for injection molding the brush

44. These cavities are spaced apart at substantially equal distances and communicates with the cavity C**1**. The fixed mold **50**A is provided with a resin injection port **51** for receiving a melt resin. In molding the brush, the fixed mold **50**A and moveable mold **50**B are clamped together when the melt resin is injected into the port **51** as shown in FIG. **4** by an arrow, until the melt resin fills up in the cavities C**1** and C**2**.

[0075] Reference symbol PL shown in FIG. **5** indicates the parting line of the molds **50**A and **50**B. After the injection molded brush section **40** has cooled in the mold **50**, the moveable mold **50**B is separated from the fixed mold **50**A and the brush **44** is separated from the cavity C**2** of the moveable mold **50**B. Since the annular recess **43** of the base **42** thus molded is securely held in engagement with the annular protrusion **52** formed in the inner circumferential surface of the cavity C**1**, the base **42** of the brush **44** is firmly held in the fixed mold **50**A when the molds are separated, thereby infallibly separating the molded brush **44** from the moveable mold **50**B (cavity C**2**). Then, the base **42** of the brush section **40** is separated from the fixed mold **50**A by forcing push pins (not shown) provided on the fixed mold **50**A towards the open end of the fixed mold **50**A (to the left in FIG. **5**).

[0076] It is noted that the moveable mold **50**B comprises six stacking split molds **54**A-**54**F, as shown in FIGS. **5** and **6**. Formed in the upper and/or lower faces of the split mold **54**A-**54**F are longitudinal narrow grooves **55** that can be aligned and mated to form narrow cavities C**2** between the stacked split molds **54**A-**54**F. More specifically, as shown in FIG. **4**, the split molds **54**A and **54**B together form the uppermost first row of five cavities C**21** for molding five brush fibers of the brush **44**, the split molds **54**B and **54**C together form the second row of six cavities C**22** for six brush fibers, the split molds **54**C and **54**D the third row of five cavities C**23** for five brush fibers, the split molds **54**D and **54**E the fourth row of six cavities C**24** for six brush fibers, and the split molds **54**E and **54**F the fifth row of five cavities C**25** for five brush fibers.

[0077] Referring to FIGS. **7** through **13**, there is shown a second through sixth embodiments of the invention, in which thick brush fibers and thin brush fibers coexist in the brush.

[0078] Referring first to FIG. **7**, there is shown in enlarged bottom view (as seen from the tip end of the brush) a main portion of a lip gloss applicator in accordance with a third embodiment of the invention defined in claim **4**.

[0079] In this embodiment, the brush of the brush section **40**A has thin brush fibers **44***b* in an inner region of the brush, surrounded by thick brush fibers **44***a* in the outer region of the brush.

[0080] Like the brush **44** of the first embodiment, each of the thin brush fibers **44***b* has a round cross section and a rounded tip, and is tapered (with the outer diameter being 0.4 mm at the root thereof and 0.2 mm at the tip end, which is 11 mm from the root).

[0081] Each of the thick brush fibers **44***a* also has a round cross section and a rounded tip, and is tapered (with its outer diameter being 0.5 mm at the root thereof, 0.3 mm at the tip end, which is 11 mm from the root).

[0082] Other features of the second embodiment are the same as in the first embodiment, and further description will be omitted by identifying like components by like reference numerals in both embodiments.

[0083] In the second embodiment, the brush **44** of the brush section **40**A consists of stiff thick brush fibers **44***a* arranged in the outer area of the brush to provide adequate flexibility and prevent excessive deformation of the brush in applying lip gloss when the brush is pressed onto a facial section. Thus, the brush is convenient for drawing in outline with lip gloss.

[0084] Referring to FIG. **8**, there is shown in enlarged bottom view (as seen from the tip ends of the brush) a main section of a lip gloss applicator in accordance with a third embodiment of the invention as defined in claim **5**.

[0085] In this applicator, the brush of the brush section **40**B has outer thin brush fibers **44***b* surrounding inner thick brush fibers **44***a*. The rest of the features of the third embodiment are the same as in the first embodiment, and further description will be omitted by identifying like components by like reference numerals in both embodiments.

[0086] Since in this third embodiment the outer portion of the brush is made of soft thin fibers **44***b*, mainly the outer soft brush fibers **44***b* touch lips without hurting them.

[0087] Referring to FIGS. **9** and **10**, there is shown in enlarged bottom view (as seen from the tip ends of the brush) a maim portion of a lip gloss applicator in accordance with a fourth and a fifth embodiment of the invention.

[0088] As seen in FIGS. **9** and **10**, the brush sections comprise vertically arranged 5 rows of horizontal arrays of brush fibers. In the fourth embodiment shown in FIG. **9**, thick brush fibers **44***a* are disposed in the first, third, and fifth rows (ordered from above), while thin brush fibers **44***b* are disposed in the second and fourth rows, that is, in the rows interlacing the rows of thick brush fibers **44***a*.

[0089] The rest of the features of the fourth embodiment are the same as in the first embodiment, and further description will be omitted by identifying like components by like reference numerals in both embodiments.

[0090] In the fourth embodiment, stiff thick brush fibers **44***a* are disposed along the longer sides (or uppermost and lowermost rows) of the brush. As a consequence, when the shaft **30** of the lip gloss applicator is moved in the directions indicated by the arrows shown in FIG. **9** to apply lip gloss, the leading end of the brush section **40**C is properly deformed in harmony with the facial configuration, but not excessively deformed. Thus, drawing in outline is easy, and lip gloss can be applied smoothly.

[0091] On the other hand, in the fifth embodiment as shown in FIG. **10**, thin brush fibers are disposed in the first, third, and fifth rows, while thick brush fibers are disposed in the second and fourth rows, that is, between the rows of thin brush fibers.

[0092] The rest of the features of the fifth embodiment are the same as in the first embodiment, and further description will be omitted by identifying like components by like reference numerals in both embodiments.

[0093] In the fifth embodiment, soft thin brush fibers **44***b* are disposed along the longer sides (or uppermost and lowermost rows) of the brush. As a consequence, when the shaft of the lip gloss applicator is moved in the direction indicated by the arrows shown in FIG. **10** to apply lip gloss, mainly the outer soft fibers **44***b* touch a lip without hurting it.

[0094] It is noted that since the thick brush fibers **44***a* are arranged between the second and fourth rows of soft brush fibers, they prevent the leading end of the brush section **40**D from being deformed excessively, and facilitates easy drawing of an outline and smooth application of lip gloss.

[0095] Referring to FIG. **11**, there is shown in enlarged bottom view (as seen from the tip end of the brush section) a lip gloss applicator in accordance with a sixth embodiment of the invention as defined in claim **3**.

[0096] In this embodiment, the applicator has a brush consisting of twenty seven brush fibers disposed in vertically arranged five rows. The brush includes fifteen thick brush

fibers **44***a* and twelve thin brush fibers **44***b* in alternating order in each row as shown in FIG. **11**. Thus, stiff brush fibers **44***a* and soft brush fibers **44***b* are distributed at a substantially uniform density. As a result, the brush of the brush section **40**E has an optimum stiffness and softness of a lip gloss applicator, not too soft to handle the applicator and not too stiff for lips.

[0097] The rest of the features of the sixth embodiment are the same as in the first embodiment, and further description will be omitted by identifying like components by like reference numerals in both embodiments.

[0098] Referring to FIGS. **12** and **13**, there are shown in enlarged bottom view (as seen from the tip ends of the respective brush sections) main portions of a seventh and an eighth lip gloss applicator in accordance with a seventh and eighth embodiments of the invention.

[0099] The brush section **40**F of the seventh embodiment shown in FIG. **12** differs from the brush section **40**A of the second embodiment shown in FIG. **6** in that thick brush fibers **44***c* of the seventh embodiment have an elliptic transverse cross section, in contrast to the thick brush fibers **44***a* of the second embodiment having a round cross section. Similarly, the brush section **40**G of the eighth embodiment shown in FIG. **13** differs from the brush section **40**C of the third embodiment shown in FIG. **7** in that thick brush fibers **44***a* of the eighth embodiment have an elliptic transverse cross section in contrast to the thick brush fibers **44***c* of the third embodiment having a round cross section. The rest of the features are the same as in the second and third embodiments, and further description will be omitted by identifying like components by like reference numerals in all of these embodiments.

[0100] The applicators of the second and third embodiments have the same flexibility in all directions due to the fact that their thick brush fibers **44***a* have a round transverse cross section as shown in FIGS. **7** and **8**. As a consequence, the brushes of the brush sections **40**A and **40**B shown in FIGS. **7** and **8** have substantially the same stiffness in all directions. However, since the brush fibers of the brush sections **40**F and **40**G of the seventh and eighth embodiments, respectively, have elliptic cross sections, their flexibility depend on the direction in which they are moved.

[0101] In the seventh and eighth embodiments, the brush fibers having elliptic cross sections have a larger flexibility (or less stiffness) in the vertical direction (perpendicular to the longer sides of the brush) in FIGS. **12** and **13** than any other direction, and so are the brush sections **40**F and **40**G. Accordingly, the brush sections **40**F and **40**G may be conveniently used in accordance with the intended use. For example, the they can be moved in the horizontal direction (as seen in FIGS. **12** and **13**) to draw in outline, and moved in the vertical direction to apply cosmetic uniformly over a wide area.

[0102] Moreover, the seventh embodiment shown in FIG. **12** has the same handleability as the second embodiment, that is, it can easily draw in outline and smoothly apply lip gloss, since the brush section can be deformed only moderately along the facial configuration but not excessively. This is due to the fact that the brush section has thin brush fibers **44***b* surrounded by thick brush fibers **44***c* having an elliptic cross section.

[0103] Similarly, in the eighth embodiment shown in FIG. **13** thin brush fibers **44***b* are arranged in an outer area of the brush surrounding thick brush fibers **44***c* having an elliptic cross section. As a consequence, mainly the soft brush fibers **44***b* touch lips without hurting them, as in the third embodiment shown in FIG. **8**.

[0104] Although it has been described in the foregoing embodiments that the shaft **30** is made of polypropylene and the brush section **40** is made of polyethylene, the shaft may be made of another plastic resin having a certain hardness (such as PBT, POM, and a relatively hard PA), and the brush section **40** may be made of another plastic resin having a certain softness (for example PET, fairly soft PA, and elastomers).

[0105] In the foregoing examples, the base **42** of a brush section **40** is swaged near the leading end of the shaft **30** with dowels. However, the base **42** can be secured using solder, glue, or any other known means.

[0106] Although the invention has been described with a particular reference to a lip gloss applicator, the invention is not limited to the example shown herein, but rather the invention should be understood to encompass those cosmetic applicators for use with other liquid cosmetics including lip rouge, eye liner, and enamel.

INDUSTRIAL APPLICABILITY

[0107] The invention can be applied to a wide range of cosmetic applicators for safely applying a liquid cosmetic such as lip gloss, lip rouge, eye liner and enamel to a vulnerable facial skin including lips.

1. A cosmetic applicator having:
an applicator shaft made of a first plastic resin;
a brush section made of a second plastic resin softer than the first plastic resin and securely fixed to the leading end of the applicator shaft coaxially with the shaft, the brush section having a base securely and integrally connected to the leading end of the applicator shaft and a brush consisting of a multiplicity of tapered thin brush fibers that are integrally molded with the base to extend forward from the base, each brush fiber having a round cross section and a rounded tip, the applicator characterized in that:
the brush fibers are molded by a mold that comprises a fixed mold for molding the base and a multiplicity of stacking molds moveable in the axial direction of the shaft to and away from the fixed mold;
the brush fibers are disposed in horizontal rows which are horizontally separated at equal spaces such that the brush fibers are spaced apart at equal pitches in the respective rows but offset in the horizontal direction with respect to the neighboring brush fibers in the neighboring rows by a half pitch so that any two neighboring brush fibers are separated at equal spaces;
the brush fibers are molded by stacking molds which are each provided in the upper and/or lower stacking faces thereof with longitudinal narrow grooves adapted to form narrow cavities between the respective stacking split molds when the stacking molds are stacked together.

2. The cosmetic applicator according to claim **1**, wherein the brush of the brush section includes thick brush fibers and thin brush fibers mixed together.

3. The cosmetic applicator according to claim **2**, wherein the thick brush fibers and thin brush fibers are distributed at a substantially uniform density.

4. The cosmetic applicator according to claim **2**, wherein the thick brush fibers are arranged in an outer area of the brush surrounding the thin fibers arranged in an inner area of the brush.

5. The cosmetic applicator according to claim **2**, wherein the thick brush fibers are arranged in an outer area of the brush surrounding the thick brush fibers arranged in an inner area of the brush.

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