

TRIPLE ZONE MASCARA BRUSH**BACKGROUND OF THE INVENTION**

The present invention relates generally to the field of mascara brushes, and in particular to mascara brushes having 5 more than one type of bristle.

The typical mascara brush of the prior art comprises a multiplicity of bristles mounted to a helically twisted wire, such that the free ends of the bristles are disposed in a spiral configuration. The shape of the brush is generally 10 cylindrical, having bristles of uniform length throughout the length of the brush, or conical, having progressively shorter bristles toward the brush tip. Bristle density varies, sometimes according to bristle diameter, but is generally known to be in the range of 10 to 60 bristles per turn. The 15 twisted wire axis is usually supplied with a handle at the end opposite the bristles. This handle also typically serves as the cap for the mascara container which houses the brush when it is not in use and carries the mascara supply.

The conventional mascara brush employs bristles of nylon 20 composition. These bristles are typically cylindrical in shape and have a generally circular cross-section, although many other shapes are taught in the art. The suppleness of the bristle material is essential for the purpose of picking up the mascara from the container and transporting it to the 25 eyelashes. However, this type of bristle often results in clumping during application, because, while the bristles are soft enough to properly transport the mascara, they are too soft to provide the combing effect necessary to achieve uniform distribution of mascara to the eyelashes. As a 30 result, a separate instrument has been required to comb the lashes during application with the conventional brush.

It has been suggested by the prior art to use two different types of bristles in the same brush, i.e., soft bristles for applying the mascara and stiff bristles for 35 combing the applied mascara through the lashes. For example, U.S. Patent No. 4,964,429 to Cole discloses a mascara applicator with alternating rows of flexible bristles and

stiff teeth. U.S. Patent No. 4,861,179 to Schrepf discloses a spiral mascara brush having soft and stiff bristles randomly intermingled throughout the length of the brush in specific proportion. However, the spiral configuration of
5 these brushes does not allow for a uniform distribution of the bristle tips, which has been found to be better for the purpose of picking up and transferring mascara, especially mascaras of high viscosity.

U.S. Patent Nos. 4,733,425 and 5,161,554 disclose the
10 use of certain bristle types which, when used with the conventional twisted wire axis, result in a non-spiral bristle configuration. U.S. Patent No. 4,733,425, for example, discloses the use of hollow bristle fibers which compress when gripped between the wire axis and flare
15 outwardly in a random arrangement. Similarly, U.S. Patent No. 5,161,554 discloses the use of bristles with varying diameter along the longitudinal axis of the bristle such that they produce a random configuration depending on where they are engaged with the wire axis. However, these patents do
20 not solve the previously addressed problem of clumping without the use of a separate combing implement.

Another proposed solution is disclosed in U.S. Patent No. 4,887,622 wherein a lesser bristle density is used in combination with a larger diameter and thus stiffer bristle
25 in an attempt to provide a brush which will both evenly apply the mascara and separate the lashes.

Thus, there is a need for an improved mascara brush which allows for optimal transfer of a high viscosity mascara product to the lashes in a single stroke application, by
30 providing maximum exposure of brush to the eyelashes and incorporating a combing implement to eliminate clumping.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a mascara brush which is capable of both applying mascara and combing the eyelashes so as to provide a uniform distribution
5 of mascara to the eyelashes.

It is another object of the invention to provide a mascara brush which maximizes the exposure of the lash to the mascara thereby providing for single stroke application.

It is a further object of the invention to provide a
10 mascara brush which may be effectively utilized with high viscosity mascara formulations.

It is a still further object of the invention to provide a mascara brush capable of effectively reaching the corners and roots of eyelashes for optimal application of product.

15 The present invention contemplates an improved mascara brush having three sections or zones of bristle configuration along the length of the brush portion. Each zone is defined by the diameter, length, stiffness and density of the bristles contained therein. Preferably, the effective
20 overall stiffness of the brush varies from zone to zone.

The middle cylindrical section is comprised of a combination of stiff and supple bristles intermingled throughout the section, and each of the end portions is comprised of one or more bristle types. In a preferred
25 embodiment, the end sections comprise a third bristle type. Alternatively, at least one end bristle type is the same as one of the bristle types utilized in the middle section.

The diameter of the middle portion of the brush is preferably 0.325 inches or greater, larger than that of the
30 standard mascara brush. The bristles of the middle section are preferably comprised of a combination of stiff, irregularly-shaped synthetic "goat" fibers of about 0.004 to 0.006 inches in diameter and soft ultrafine fibers of about 0.001 to 0.002 inches in diameter. These fibers are inserted
35 between the legs of a wire axis which has been twisted in a helical formation and inserted into a rod which extends from the cap of the mascara container. By virtue of their

irregular shape, the stiff bristles are distributed throughout the middle section of the brush in a non-spiral arrangement.

Each of the end sections of the brush contains one or 5 more bristle types. The bristle composition of the tip end section may differ from that of the base end section. In a preferred embodiment, one of the bristle types used in the middle section of the brush is also used in either or both of the end sections of the brush. However, in this embodiment, 10 at least one of the bristle types used in the middle section will be absent from either or both of the tip or base end sections. The bristles contained in at least one of the end portions of the brush are preferably comprised of hollow synthetic fibers of about 0.004 to 0.006 inches in diameter, 15 most preferably of about 0.005 inches. These fibers are gripped between the wire core in the standard fashion, such that the bristles extend out from the wire in a spiral, or helical, configuration. Preferably, one or both of the end sections are tapered such that the bristle length 20 progressively decreases nearer the tip and/or base of the brush.

The density of the bristles in the end portions of the brush may differ from the density in the middle portion of the brush depending on the use intended. In one embodiment, 25 the bristle density of the end sections is less than the density in the middle section. In an alternative embodiment, one or both of the end sections exhibits greater bristle density than the middle section of the brush. In this embodiment, most preferably, the base end section exhibits 30 the greatest bristle density, followed by the tip end section and lastly by the middle section.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal side view of a mascara brush 35 according to the present invention;

FIG. 2 is an enlarged cross-sectional view of a non-circular bristle as utilized in the middle section of a

mascara brush according to an embodiment of the present invention;

FIG. 3 is an enlarged cross-sectional view of a circular ultrafine bristle as utilized in the middle section of a mascara brush according to an embodiment of the present invention;

FIG. 4 is an enlarged cross-sectional view of a hollow bristle as utilized in the end section of a mascara brush according to an embodiment of the present invention; and

FIG. 5 is a longitudinal side view of a second embodiment of a mascara brush according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

A mascara brush according to the present invention is shown in FIG. 1. The brush portion 10 is comprised of a plurality of bristles arranged in three distinct sections or zones 12, 14, 16 throughout the length of the brush -- a base end section 12, a middle section 14 and a tip end section 16. The sections are distinguished by the diameter, length, stiffness and density of the bristles found in each section, preferably resulting in a variation in overall effective stiffness from zone to zone. Overall effective stiffness is defined by the diameter, length, stiffness and density of the bristles used in each section such that, all other things being equal, a more densely packed zone will have greater overall effective stiffness than a less densely packed zone.

The bristles of all three sections of the brush are mounted to a metal wire 24 which is bent at its midpoint, forming the brush tip 26, and twisted about itself in a helical configuration as is known in the art. The pitch of the metal helix is preferably about 15.0 to 19.0 turns per inch. The wire 24 of the core has a diameter of about 0.0270 to 0.0290 inches. The bristles are gripped at their midpoints between the twisted wire and extend outwardly from the helical axis 24. Opposite the brush tip 26, the wire axis extends longitudinally beyond the last bristle at the

base 27 of the brush portion 10 and is fixedly housed in a hollow rod 28 projecting from a cylinder 30, which may function as the cap of the mascara container.

The middle section 14 of the brush 10 is generally 5 cylindrical in shape due to the fact that the bristles 22 of this section are of relatively uniform length. The diameter of the middle section 14 of the brush portion is preferably about 0.325 inches or greater, most preferably about 0.350 inches. This diameter is significantly greater than that of 10 the standard mascara brush, so as to facilitate use with high viscosity mascara formulations and provide maximum exposure of the brush to the lashes. Longer bristles, such as the ones used in the present invention, were formerly believed to be too flexible to provide the stiffness and control required 15 for mascara application. However, as is further shown below, the tri-sectional configuration and combination of bristle types utilized by the present invention allows for the use of such longer bristles while maintaining the stiffness required for optimal mascara application.

20 The bristles 22,23 utilized in the middle cylindrical section 14 of the brush are of at least two types: preferably, at least one soft bristle type 23 for applying the mascara and at least one stiff bristle type 22 for combing the mascara through the lashes. For purposes of this 25 application, "soft" bristles are defined as those bristles which have relatively low flexural strength, i.e., resistance to bending, whereas "stiff" bristles have substantially greater flexural strength. Bristle stiffness varies depending on the bristle material, the diameter of the 30 bristle and the bristle length. Thus, all other things being equal, a shorter bristle is more stiff than a longer bristle and a thicker bristle is stiffer than a thin bristle. Additionally, hollow bristles are generally more flexible than solid bristles of the same material and dimensions. As 35 used herein, solid synthetic bristles having a diameter less than 0.004 inches are considered "soft" whereas solid

synthetic bristles of 0.004 inches or greater diameter are considered "stiff."

The bristles utilized in the present invention may exhibit a variety of the cross-sections known in the art. As 5 shown in FIG. 2, the soft bristles are preferably of generally circular cross-section and may be formed of various synthetic fibers, such as polyamide, polyesters, polyolefin and the like. The diameter of the soft bristle fiber is preferably about 0.001 to 0.002 inches to provide the 10 requisite suppleness for applying the mascara. As shown in FIG. 3, the stiff bristles are preferably of irregular or non-circular cross section, similar to that of natural goat hairs. These fibers may be formed synthetically from any of the known materials listed above. The preferred stiff 15 bristle has a diameter of about 0.004 to 0.006 inches, most preferably about 0.005 inches.

The combination of stiff bristles 22 and soft bristles 23 comprising the middle section 14 of the brush are fed together through the legs of the twisted wire axis 24 and are 20 gripped at their midpoints therein. The bristles 22,23 of the middle section 14 may be more or less densely packed than the bristles 18,20 of either of the end sections 12,16. Preferably, the density of the stiff bristles 22 of the middle section 14 is about five to ten bristles per turn, and 25 the bristle density of the soft bristles 23 of the middle section 14 is about eighteen to thirty-two bristles per turn. In an alternative embodiment, the density of the stiff bristles 22 is about thirteen to twenty four bristles per turn and the density of the soft bristles 23 is about to 30 eighteen bristles per turn.

In a preferred embodiment, the stiff bristles 22 of the middle section 14 project from the wire axis 24 in a non-spiral arrangement. This non-spiral arrangement produces a fuller, more uniform bristle distribution throughout the 35 middle section 14 of the brush.

Each of the end sections 12,16 of the brush 10 is comprised of one or more bristle types. In a preferred

embodiment, the bristles of the end sections 12,16 are of a different bristles of the middle section 14. A preferred bristle type comprises tubular fibers of hollow circular cross-section, as shown in FIG. 4. These bristles 18,20 are known to be manufactured of various synthetic materials, such as polyamide, polyesters, and polyolefins, and are available in varying diameters. A preferred embodiment utilizes a hollow nylon fiber of about 0.004 to 0.006 inches in outer diameter, most preferably about 0.005 inches.

10 Alternatively, the diameter and stiffness of one of the bristle types used in one or both of the end sections 12,16 is the same as the diameter and stiffness of one of the bristle types used in the middle section 14 of the brush. However, in this embodiment, neither end section will contain
15 the same combination of bristle types as those contained in the middle section. For example, the middle section 14 may contain bristle A and bristle B and the end sections 12,16 may both contain bristle A but not bristle B. Alternatively, the tip end section 16 may contain bristle A and the base end
20 section 12 may contain bristle B, or vice versa.

In a preferred embodiment, the bristle composition of the base end section 12 varies from that of the tip end section 16, such that the diameter and stiffness of at least one of the bristle types contained in the base end section 12
25 is different than the diameter and stiffness of the bristles used in the tip end section 16. For example, the tip end section 16 may more advantageously serve as a combing implement and may require a stiffer bristle type than that used in the base end section 12.

30 The bristle density of the end sections 12,16 may vary from that of the middle section 14. Preferably, the tip end section 16 utilizes twenty to forty bristles per turn and the base end section 12 utilizes thirty to sixty bristles per turn. Most preferably, the tip end section 16 utilizes
35 twenty seven bristles per turn. In one embodiment, the middle section 14 will be less densely packed than one or both of the end sections 12,16. In an alternative

embodiment, the middle section 14 exhibits greater bristle density than one or both end sections 12,16.

The fibers 18,20 utilized in the end sections 12,16 of the brush are gripped between the legs of the wire axis 24 at their midpoints. It is known that hollow fibers have a tendency to flare outwardly in a substantially V-shaped arrangement, thereby producing a random distribution of bristles at the face of the brush. However, it is preferred in the present invention that the end sections 12,16 of the brush maintain a spiral arrangement. Therefore, when using hollow bristles in the end sections 12,16 of the brush, the bristle density must be adjusted to assure a substantially spiral arrangement in these end sections.

As shown in Fig. 5, one or both of the end sections 12,16 of the brush are preferably designed to have a sharp taper such that the bristles 18 at either end of the brush are progressively shorter than those bristles 20 immediately adjacent to the middle section 14 of the brush portion 10. Unlike brushes which utilize an elliptical or football shape, the sharp taper of this preferred embodiment clearly distinguishes the end sections 12,16 of the brush from the middle section 14 of the brush. This sharp taper has several advantages. For example, the tip end section 16 is useful as a styling tool for reaching into corners and combing through the delicate lashes of the lower eyelid. On the other hand, the short, stiff bristles of the base end section 12 serve to keep the middle section 14 of the brush cleaner upon removal from a mascara container by dispensing of any excess mascara accumulated at the opening of the container before it reaches the longer, more flexible bristles 22,23 of the middle section 14. These functions are further advanced by the difference in overall effective stiffness from one zone to the next.

Therefore, while there have been described what are at present considered to be the preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made without

departing from the invention, and it is, therefore, aimed to cover all such changes and modifications that fall within the true spirit and scope of the invention.

5

10

15

20

25

30

35

**WHAT IS CLAIMED IS:**

1. A mascara brush, comprising:
a twisted wire core extending longitudinally; and
a plurality of bristles mounted to said twisted wire
5 core, said plurality of bristles comprising a middle
cylindrical section containing a plurality of at least first
and second different bristle types of relatively uniform
length intermingled throughout the length of said middle
section and two end sections containing a third type of
10 bristles.
2. A mascara brush according to claim 1 wherein said
plurality of bristle types comprises at least one relatively
soft bristle type and one relatively stiff bristle type.
15
3. A mascara brush according to claim 2 wherein the
diameter of said middle cylindrical section is at least about
0.325 inches.
- 20 4. A mascara brush according to claim 2 wherein at least
one of said end sections is tapered, said third type of
bristles progressively decreasing in length toward the end of
said at least one tapered section.
- 25 5. A mascara brush according to claim 4 wherein said middle
cylindrical section has greater bristle density than said end
sections.
6. A mascara brush according to claim 5, wherein said
30 bristle density in each said section is uniform throughout
each section.
7. A mascara brush according to claim 5 wherein said soft
bristles are comprised of fibers having a diameter of about
35 0.001 to 0.002 inches.



8. A mascara brush according to claim 5 wherein said stiff bristles are comprised of fibers of non-circular cross-section having a diameter of from about 0.004 to 0.006 inches.

5

9. A mascara brush according to claim 5 wherein said end section bristles are formed of hollow filaments of generally circular cross-section.

10 10. A mascara brush according to claim 9 wherein said end section bristles are comprised of filaments having an outer diameter of about 0.004 to 0.006 inches.

11. A mascara brush, comprising:

15 a tip section terminating at a tip, including first bristles having a first diameter and stiffness;

a middle section adjacent said tip section, said middle section including second bristles having a second diameter and stiffness and third bristles having a third diameter and
20 stiffness, wherein said second and third bristles are blended together in the middle section; and

a base section adjacent said middle section and opposite said tip section, said base section including said first bristles.

25

12. A mascara brush according to claim 11 wherein said tip section is tapered, with said first bristles of said tip section progressively decreasing in length toward said tip.

30 13. A mascara brush according to claim 12 wherein said base section is tapered, with said first bristles of said base section progressively decreasing in length toward a base opposite the middle section.

35 14. A mascara brush according to claim 13 wherein said second and third bristles have a length greater than a majority of said first bristles.



15. A mascara brush according to claim 14 wherein the diameter of said middle section is at least about 0.325 inches.
- 5 16. A mascara brush according to claim 15 wherein said middle section has greater bristle density than said tip and base sections.
17. A mascara brush according to claim 16 wherein said
10 second bristles are comprised of synthetic fibers having a diameter of about 0.001 to 0.002 inches.
18. A mascara brush according to claim 17 wherein said third
15 bristles are comprised of synthetic fibers of non-circular cross-section.
19. A mascara brush according to claim 18 wherein said third bristles are comprised of synthetic fibers having a diameter of from about 0.004 to 0.006 inches.
- 20
20. A mascara brush according to claim 16 wherein said first bristles are formed of hollow filaments of generally circular cross section.
- 25 21. A mascara brush according to claim 20 wherein said first bristles are comprised of synthetic filaments having an outer diameter of about 0.004 to 0.006 inches.
22. A mascara brush, comprising:
30 a twisted wire core extending longitudinally; and
a plurality of bristles mounted to said twisted wire core, said plurality of bristles comprising:
a middle cylindrical section containing a plurality of
at least first and second different bristle types of
35 relatively uniform length intermingled throughout the length of said middle section; and



two end sections containing a plurality of bristles comprising one of said first or second bristle types.

23. A mascara brush according to claim 22 wherein said
5 plurality of bristle types comprises at least one relatively soft bristle type and one relatively stiff bristle type.

24. A mascara brush according to claim 23 wherein said
middle section is less densely packed than at least one of
10 said end sections.

25. A mascara brush according to claim 24 wherein the
diameter of said middle cylindrical section is at least about
0.325 inches.

15

26. A mascara brush according to claim 25, wherein said
bristle density in each said section is uniform within each
section.

20 27. A mascara brush according to claim 26 wherein at least one of said end sections is tapered, said bristles of said end section progressively decreasing in length toward the end of said at least one tapered section.

25 28. A mascara brush according to claim 26 wherein said soft bristles are comprised of fibers having a diameter of about 0.001 to 0.002 inches.

29. A mascara brush according to claim 26 wherein said stiff
30 bristles are comprised of fibers of non-circular cross-section having a diameter of from about 0.004 to 0.006 inches.

30. A mascara brush, comprising:
35 a tip section terminating at a tip, said tip section comprising at least first tip bristles having diameter and stiffness;



a middle section adjacent said tip section, said middle section comprising at least first middle bristle types having first diameter and stiffness and second middle bristle types having second diameter and stiffness, wherein said first and
5 second middle bristle types are blended together in the middle section; and

a base section adjacent said middle section and opposite said tip section, said base section comprising at least first base bristles having diameter and stiffness

10 wherein said tip bristles have first diameter and stiffness and said base bristles have second diameter and stiffness.

31. A mascara brush according to claim 30 wherein said
15 plurality of bristle types comprises at least one relatively soft bristle type and one relatively stiff bristle type.

32. A mascara brush according to claim 31 wherein said middle section is less densely packed than at least one of
20 said end sections.

33. A mascara brush according to claim 32 wherein the diameter of said middle cylindrical section is at least about 0.325 inches.

25

34. A mascara brush according to claim 33, wherein said bristle density in each said section is uniform within each section.

30 35. A mascara brush according to claim 34 wherein at least one of said end sections is tapered, said bristles of said end section progressively decreasing in length toward the end of said at least one tapered section.

35 36. A mascara brush according to claim 34 wherein said soft bristles are comprised of fibers having a diameter of about 0.001 to 0.002 inches.



37. A mascara brush according to claim 34 wherein said stiff bristles are comprised of fibers of non-circular cross-section having a diameter of from about 0.004 to 0.006 inches.

5

38. A mascara brush according to claim 30 wherein said tip section is tapered, with said tip bristles of said tip section progressively decreasing in length toward said tip.

10 39. A mascara brush according to claim 30 wherein said base section is tapered, with said first bristles of said base section progressively decreasing in length toward a base opposite the middle section.

15 40. A mascara brush according to claim 39 wherein the diameter of said middle section is at least about 0.325 inches.

41. A mascara brush, comprising:

20 a tip section terminating at a tip, said tip section comprising at least first bristles having a first diameter and stiffness;

a middle section adjacent said tip section, said middle section comprising at least second bristles having a second
25 diameter and stiffness and third bristles having a third diameter and stiffness, wherein said second and third bristles are blended together in the middle section; and

a base section adjacent said middle section and opposite said tip section, said base section comprising at least
30 fourth bristles having a fourth diameter and stiffness.

35