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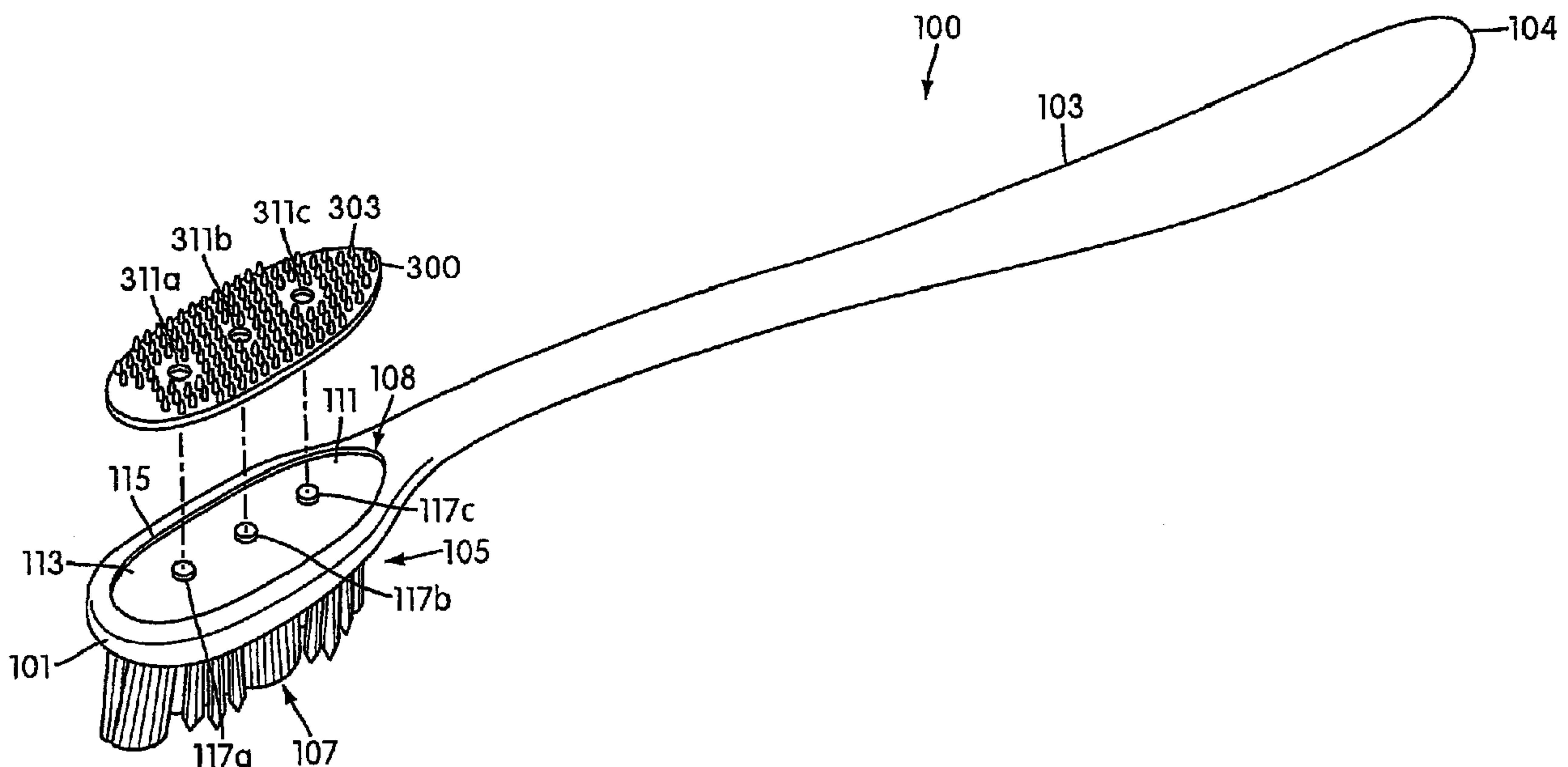
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(71) Demandeur/Applicant:
COLGATE-PALMOLIVE COMPANY, US

(72) Inventeur/Inventor:
HOHLBEIN, DOUGLAS J., US

(74) Agent: SMART & BIGGAR

(54) Titre : ELEMENT DE NETTOYAGE TISSULAIRE POUR BROUSSE A DENTS
(54) Title: TOOTHBRUSH TISSUE CLEANSER



(57) **Abrégé/Abstract:**

An oral care implement with a handle includes a head with a tissue cleanser. The tissue cleanser may be a pad composed of an elastomeric material. The pad is disposed on the head on a surface opposite the tooth cleaning elements. The tissue cleanser may include a plurality of nubs extending for cleaning between the papillae of the tongue. The tissue cleanser may include a plurality of conically shaped nubs. A tissue cleanser can be used to reduce oral epithelial cells.

Abstract

An oral care implement with a handle includes a head with a tissue cleanser. The tissue cleanser may be a pad composed of an elastomeric material. The pad is disposed on the head on a surface opposite the tooth cleaning elements. The tissue cleanser may include a plurality of nubs extending for cleaning between the papillae of the tongue. The tissue cleanser may include a plurality of conically shaped nubs. A tissue cleanser can be used to reduce oral epithelial cells.

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TOOTHBRUSH TISSUE CLEANSER

This is a divisional of Canadian National Phase Patent Application Serial No. 2,526,826, filed on June 18, 2004.

FIELD OF THE INVENTION

- [01] The present invention pertains to an oral care implement with a cleanser for cleaning soft tissue surfaces in the mouth.

BACKGROUND OF THE INVENTION

- [02] According to the American Dental Association, a major source of bad breath in healthy people is microbial deposits on the tongue, where a bacterial coating harbors organisms and debris that contribute to bad breath. The tongue is a haven for the growth of microorganisms since the papillary nature of the tongue surface creates a unique ecological site that provides an extremely large surface area, favoring the accumulation of oral bacteria. Anaerobic flora and bacteria residing on the tongue play an important role in the development of chronic bad breath commonly called halitosis. In general, the bacteria produce volatile sulfur compounds (VSC). If there is enough buildup of the sulfur compounds, the result can be lead bad breath or oral malodor.
- [03] While bladed tongue scrapers have been used in the past, these scrapers are inadequate in respect to their effectiveness on the soft tissue surface of the tongue. Broad flat scraping blades are limited in their ability to reach between the papillae where the bacteria and microdebris have collected. Moreover, notwithstanding the benefits to be gained by any ability to clean the tongue, some users avoid the use of such blades because of lack of comfort on the tongue surface.

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[04] Hence, there is a need for an oral care implement with a tongue cleanser that provides effective removal of the tongue bacteria and other debris while maintaining comfort to the user.

BRIEF SUMMARY OF THE INVENTION

5 **[04a]** According to one aspect of the present invention, there is provided an oral care implement comprising: a handle; a head coupled to the handle and having a plurality of protuberances extending therefrom, the protuberances each having a free end; a tissue cleanser having a plurality of apertures exposing the free ends of the protuberances, and a plurality of projections for cleaning soft tissue surfaces in the
10 mouth; and a first group of arcuate segment tooth cleaning elements and a second group of arcuate segment tooth cleaning elements extending from one side of the head, wherein the tissue cleanser is mounted to an opposite side of the head.

[04b] According to another aspect of the present invention, there is provided an oral care implement, comprising: a handle; a head coupled to the handle and the
15 head having a basin formed in one side thereof; the basin having a base surface and a peripheral sidewall extending from the base surface, the sidewall having an exposed top surface, and the basin comprising a plurality of protruding members extending from the base surface, wherein at least two of the protruding members have a top portion raised above the base surface; and an elastomeric tissue cleanser received in
20 the basin, the tissue cleanser having a top surface being generally flush with the top surface of the sidewall, the tissue cleanser having at least two complementary openings for receiving the at least two protruding members therein and exposing the top portions thereof, and the tissue cleanser comprising a plurality of conical shaped nubs for cleaning soft tissue surfaces in the mouth.

25 **[04c]** According to still another aspect of the present invention, there is provided an oral care implement comprising: a handle and a head, the head comprising a port, the head having a side comprising a cavity, a resilient tissue engaging region having a pad portion with a plurality of nubs extending therefrom and

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for removal of debris from an oral soft tissue surface, the pad portion and the port being disposed within the cavity; the head having an opposite side comprising a plurality of the tooth cleaning elements extending therefrom, one of the tooth cleaning elements being a bristle; and at least one of the tooth cleaning elements is unitary with the pad portion and the nubs, and extends through the port; wherein the unitary tooth cleaning element is adjacent to the bristle for cleaning teeth.

[04d] According to yet another aspect of the present invention, there is provided an oral care implement comprising a handle, a head, a plurality of elastomeric tooth cleaning elements and a bristle tooth cleaning element extending from one side of the head, and an elastomeric tissue cleanser disposed on an opposite side of the head in a basin having a sidewall portion, wherein said elastomeric tooth cleaning elements are formed as a unitary member with the tissue cleanser; wherein the head includes apertures in the basin; the elastomeric tooth cleaning elements are connected to the tissue cleanser through corresponding apertures, the tissue cleanser comprising a base having a plurality of projections extending from the base.

[04e] According to a further aspect of the present invention, there is provided an oral care implement, comprising: a head and a handle; a plurality of tooth cleaning elements disposed on a first side of the head and comprising a plurality of filament bristles; a means for engaging a surface of a tongue of a user, the means for engaging disposed on a second side of the head opposite the tooth cleaning elements, the means for engaging configured and adapted for cleansing soft tissue and having a different configuration than the bristles; the means for engaging comprising a soft tissue cleanser comprising conical nubs formed of an elastomeric material, the conical nubs disposed on the head in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nubs are in a staggered relationship, the conical nubs having a base portion, a tip portion and a substantially circular cross-section, the conical nubs having a height that is greater than a width of the conical nubs at the base portion, and wherein the base portion of each conical nub is spaced apart from

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the base portions of adjacent conical nubs; and a basin formed in the second side of the head, the soft tissue cleanser disposed within the basin.

[04f] According to yet a further aspect of the present invention, there is provided an oral care implement, comprising: a head and a handle; a plurality of tooth
5 cleaning elements disposed on a first side of the head and comprising a plurality of filament bristles; a soft tissue cleanser having a plurality of conical nubs formed of an elastomeric material and having a different configuration than the bristles, the conical nubs disposed on a second side of the head opposite the tooth cleaning elements in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical
10 nubs are in a staggered relationship, wherein each conical nub is spaced apart from adjacent conical nubs, the conical nubs having a cylindrical base portion of substantially constant cross-sectional area and a tapered tip portion, the conical nubs having a height that is greater than a width of the conical nubs at the base portion, and the conical nubs having a substantially circular cross-section; and a basin formed in
15 the second side of the head, the soft tissue cleanser injection molded into the basin.

[04g] According to still a further aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of tooth cleaning elements disposed on a first side of the head and comprising a plurality of filament bristles and arcuate elastomeric walls; a soft tissue cleanser having a plurality
20 of conical nubs formed of an elastomeric material and having a different configuration than the bristles, the conical nubs disposed on a second side of the head opposite the tooth cleaning elements in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nubs are in a staggered relationship, wherein each conical nub is spaced apart from adjacent conical nubs, the conical nubs having a cylindrical
25 base portion and a tapered tip portion, the conical nubs having a height that is greater than a width of the conical nubs at the base portion; and a basin formed in the second side of the head, the soft tissue cleanser disposed within the basin.

[04h] According to another aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of bristles

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disposed on a first side of the head; a basin formed into a second side of the head opposite the first side, the basin comprising a floor and a peripheral sidewall extending from the floor, the peripheral sidewall terminating at a surface of the second side of the head; an elastomeric soft tissue cleanser comprising a pad and a plurality of
5 projections extending from the pad; wherein the soft tissue cleanser is disposed within and injection molded into the basin; and wherein the pad comprises a bottom surface that is in contact with the floor of the basin and a top surface that is substantially flush with the surface of the second side of the head, the projections extending outwardly from the top surface of the soft tissue cleanser so as to extend beyond the surface of
10 the second side of the head.

[04i] According to yet another aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of tooth cleaning elements extending from a first face of the head; a receiving cavity formed into a second face of the head opposite the first face, the receiving cavity comprising a
15 lower base surface and a sidewall extending from the lower base surface, the sidewall terminating at the second face of the head; and a soft tissue cleanser formed of an elastomeric material that is injection molded into the receiving cavity, the soft tissue cleanser comprising a base surface that is substantially flush with the second face of the head and a plurality of projections extending from the base surface beyond the
20 second face of the head.

[04j] According to yet another aspect of the present invention, there is provided a method of cleaning a mouth comprising: brushing teeth of a user with tooth engaging elements mounted to an oral care implement; and moving an elastomeric tissue cleanser mounted to the oral care implement on a surface of a tongue of the
25 user, the elastomeric tissue cleanser comprising conical nubs formed of an elastomeric material, the conical nubs disposed on the head in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nubs are in a staggered relationship, the conical nubs having a base portion, a tip portion and a substantially circular cross-section, the conical nubs having a height that is greater

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than a width of the conical nubs at the base portion, and wherein the base portion of each conical nub is spaced apart from the base portions of adjacent conical nubs.

[04k] According to another aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of tooth cleaning
5 elements extending from a first face of the head; a receiving cavity formed into a second face of the head opposite the first face; a soft tissue cleanser formed of an elastomeric material that is injection molded into the receiving cavity, the soft tissue cleanser comprising a plurality of projections; and one or more peg members
10 extending from a lower base surface of the receiving cavity, the soft tissue cleanser comprising one or more complementary apertures that receive the one or more peg members and expose tops of the one or more peg members.

[04l] According to another aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of tooth cleaning elements extending from a first face of the head; a receiving cavity formed into a
15 second face of the head opposite the first face; and a soft tissue cleanser formed of an elastomeric material that is injection molded into the receiving cavity to bond the soft tissue cleanser to the head, the soft tissue cleanser comprising a plurality of projections extending beyond the second face of the head.

[04m] According to another aspect of the present invention, there is provided
20 an oral care implement comprising: a handle; a head having a longitudinal axis; a plurality of tooth cleaning elements extending from a first face of the head; a receiving cavity formed into a second face of the head opposite the first face, the receiving cavity comprising a peripheral sidewall extending away from a lower base surface; a soft tissue cleanser formed of an elastomeric material that is injection molded into the
25 receiving cavity to bond the soft tissue cleanser to the head, the soft tissue cleanser comprising a plurality of nubs that extend beyond the second face of the head; and at least one peg member aligned along the longitudinal axis and extending from the lower base surface of the receiving cavity, the soft tissue cleanser comprising at least one complementary aperture that exposes a top of the at least one peg member.

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[04n] According to another aspect of the present invention, there is provided an oral care implement comprising: a head and a handle; a plurality of tooth cleaning elements extending from a first face of the head; a soft tissue cleanser on the head opposite the first face, the soft tissue cleanser formed of an elastomeric material that is injection molded to the head to bond the soft tissue cleanser to the head, the soft tissue cleanser comprising a plurality of projections; and at least one peg member aligned along the longitudinal axis and extending from the head, the soft tissue cleanser comprising at least one complementary aperture that exposes a top of the at least one peg member.

10 **[05]** Some aspects of the invention pertain to an oral care implement with a tissue cleanser that provides improved cleaning and effective removal of bacteria and microdebris disposed on the oral tissue surfaces.

[06] In one aspect of the invention, the tissue cleanser includes a plurality of nubs for cleaning soft tissue surfaces in the mouth and particularly for cleaning between the papillae of the tongue. In a further preferred aspect of the invention, the tissue cleanser includes a plurality of conically shaped nubs.

[07] In another aspect of the invention, the tissue cleanser is constructed from an elastomeric material. In one preferred embodiment, the tissue cleanser is formed as an elastomeric pad mounted on the head of the oral care implement for improved cleaning, ease of manufacture, and user comfort.

[08] In another aspect of the invention, the oral care implement includes a seat to facilitate and ease molding of the tissue cleanser to the head. In one preferred construction, the head has one or more protuberances for anchoring the head during molding of the tissue cleanser. The head may also include a basin to further define the outline of the molded tissue cleanser.

[09] In another aspect of the invention, an oral care implement includes a tissue cleanser having means for reducing oral volatile sulfur compounds by 35% from a baseline measured two hours after use.

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- [10] In another aspect of the invention, an oral care implement is provided with tooth cleaning elements and a tissue cleanser for a thorough cleaning of the teeth, gums, tongue and oral surfaces of the cheeks and lips. In a preferred construction, the tooth cleaning elements and tissue cleanser are supported on opposite sides of a supporting head.
- [11] In one other aspect of the invention, an oral care implement which includes tooth cleaning elements and a tissue cleanser forms at least one of the tooth cleaning elements as a unitary member with the tissue cleanser.

BRIEF DESCRIPTION OF THE DRAWINGS

- [12] A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description in consideration of the accompanying drawings, in which like reference numbers indicate like features, and wherein:
- [13] Figure 1 is an exploded assembly perspective view of an oral care implement according to one or more aspects of an illustrative embodiment;
- [14] Figure 2 is an enlarged perspective view of a head of an oral care implement of FIG. 1;
- [15] Figure 3 is a plan view of the oral care implement of FIG. 1 illustrating a tongue cleaning feature;
- [16] Figure 4 is a partial section view of a head of the oral care implement of FIG. 1 taken along line 4-4 of FIG. 3;
- [17] Figure 5 is a plan view of the oral care implement of FIG. 1 illustrating at least one tooth cleaning configuration;

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- [18] Figure 6 is a perspective of the view of the oral care implement illustrating example tooth cleaning elements; and
- [19] Figure 7 is a section view of an alternative construction of the head of an oral care implement.

DETAILED DESCRIPTION OF THE INVENTION

- [20] In the following description, the invention is discussed in terms of a toothbrush, but could be in the form of other oral care implements including simply a tissue cleansing implement. Further, it is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope of the present invention.
- [21] Figures 1-7 illustrate an oral care implement, such as a toothbrush 100, having a handle 103 and a head 105 which may be used for cleaning the teeth and soft tissue in the mouth, such as the tongue, interior surfaces of the cheeks, lips or the gums. Handle 103 is provided for the user to readily grip and manipulate the toothbrush, and may be formed of many different shapes and constructions. While the head is normally widened relative to the neck of the handle, it could in some constructions simply be a continuous extension or narrowing of the handle. In the preferred construction, head 105 has a first face 106 that supports tooth cleaning elements 107 (FIGS. 5 and 6) and a second face 108 that supports a tissue cleanser 300 (FIGS. 2 and 3). The first and second faces 106, 108 are preferably on opposite sides of head 105. Nevertheless, tissue cleanser 300 may be mounted elsewhere, such as the proximal end 104 of handle 103. The tissue cleanser 300 or portions of it may also be located on the peripheral sidewall surface 101 of head 105 or extend farther towards the proximate end 104 of handle 103 than illustrated.

- [22] The elastomeric material of tissue cleanser 300 may be any biocompatible resilient material suitable for uses in an oral hygiene apparatus. To provide optimum comfort as well as cleaning benefits, the elastomeric material preferably has a hardness property in the range of A8 to A25 Shore hardness. As an example, one preferred elastomeric material is styrene-ethylene/butylene-styrene block copolymer (SEBS) manufactured by GLS Corporation. Nevertheless, SEBS material from other manufacturers or other materials within and outside the noted hardness range could be used.
- [23] Tissue cleanser 300 is preferably configured with a multiplicity of tissue engaging elements 303 (FIGS. 1-4), which in the preferred construction are formed as nubs. As used herein a "nub" is generally meant to include a column-like protrusion (without limitation to the cross-sectional shape of the protrusion) which is upstanding from a base surface. In a general sense, the nub, in the preferred construction, has a height that is greater than the width at the base of the nub (as measured in the longest direction). Nevertheless, nubs could include projections wherein the widths and heights are roughly the same or wherein the heights are somewhat smaller than the base widths. Moreover, in some circumstances (e.g., where the nub tapers to a tip or includes a base portion that narrows to a smaller projection), the base width can be substantially larger than the height.
- [24] Such tissue engaging elements 303 are designed to significantly reduce a major source of bad breath in people and improve hygiene. Nubs 303 enable removal of microflora and other debris from the tongue and other soft tissue surfaces within the mouth. The tongue, in particular, is prone to develop bacterial coatings that are known to harbor organisms and debris that can contribute to bad breath. This microflora can be found in the recesses between the papillae on most of the tongue's upper surface as well as

along other soft tissue surfaces in the mouth. When engaged or otherwise pulled against a tongue surface, for example, nubs 303 of elastomeric tissue cleanser 300 provide for gentle engagement with the soft tissue while reaching downward into the recesses of adjacent papillae of the tongue. The elastomeric construction of tissue cleanser 300 also enables the base surface 301 to follow the natural contours of the oral tissue surfaces, such as the tongue, cheeks, lips, and gums of a user. Moreover, the soft nubs 303 are able to flex as needed to traverse and clean the soft tissue surfaces in the mouth along which it is moved.

- [25] As seen in Figure 2 and 4, in one preferred arrangement of tissue cleanser 300, nubs 303 are preferably conically shaped. As used herein, "conically shaped" or "conical" is meant to include true cones, frusto-conically shaped elements, and other shapes that taper to a narrow end and thereby resemble a cone irrespective of whether they are uniform, continuous in their taper, or have rounded cross-sections. With reference to Figure 4, the base portion 305 of each conically shaped tissue engaging element 303 is larger than the corresponding tip portion 307. In this conically shaped configuration, the base portion 305 has a wider cross-sectional area to provide effective shear strength to withstand the lateral movement of the tissue cleanser 300 along the surface of the tongue or other soft tissue surface. The smaller width or diameter of the tip portion 307 in conjunction with the length of the conically shaped nub 303 enable the nubs to sweep into the recesses of the tongue and other surfaces to clean the microbial deposits and other debris from the soft tissue surfaces. In the preferred construction, nubs 303 are able to flex and bend from their respective vertical axes as lateral pressure is applied during use. This flexing enhances the comfort and cleaning of the soft tissue surfaces. In a preferred construction, the thickness or width of the base of the nub is 0.64 mm, and preferably within the range

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from about 0.51 mm to about 2.00 mm. Tip 307 of the nubs is 0.127 mm and preferably within a range from about 0.10 mm to about 0.75 mm for optimal penetration between the recesses of papillae of a user's tongue. The length or height of nubs 303, as measured from base surface 301 to tip 307, is preferably 0.91 mm and preferably within range from about 0.5 mm to about 2.5 mm, and most preferably range between 0.75 mm to 1.5 mm. Nevertheless, nubs of other sizes and shapes outside the given ranges can be used.

[26] Alternatively, the tissue cleaning elements 303 may have other shapes. As one example, the tissue cleanser may have a grated form such as described in co-pending U.S. Patent Application Publication No. 2004/0255416.

[27] In a preferred construction, nubs 303 are disposed on the base surface 301 of tissue cleanser 300 in a high density pattern. Each nub 303 is preferably spaced apart from adjacent nubs 303 between a range of about 0.5 mm to about 3 mm; more preferably the spacing ranges between 0.7 mm to 2.5 mm, and most preferably between 1 mm to 2 mm. Nevertheless, other spacing ranges are possible. The surface density of the nubs 303 on base surface 301 ranges preferably from about 100 to about 600 nubs per square inch. In a more preferred construction of the tissue cleanser, the surface density may range from 200 to 500 nubs per square inch, and most preferably between 300 to 450 nubs per square inch. In one preferred example, tissue cleanser 300 includes about 400 nubs per square inch of surface area. The surface density features in conjunction with the height of the nubs 303 enables the tissue cleanser to provide enhanced cleaning of the soft tissue surfaces with improved comfort. Nonetheless, other surface densities are possible.

[28] As seen in Figure 3, nubs 303 are preferably disposed in longitudinal rows in a direction generally parallel to the longitudinal axis a-a. Further, nubs 303 are

disposed in transverse rows R1, R2 on an axis parallel to base surface 301 and generally perpendicular to the longitudinal axis a-a. In one preferred construction, adjacent nubs 303 are provided on the base surface 301 in a staggered arrangement. For example, adjacent transverse rows of nubs R1 and R2 have nubs 303 that are not directly behind each other. A first nub is said herein to be "directly behind" second nub when it is located within the lateral bounds of the second nub extending in a longitudinal direction. This configuration enables improved cleaning of the soft tissue surfaces by facilitating the removal of microflora and other debris, and especially from the recesses of adjacent papillae of the tongue. Nonetheless, the nubs could be arranged randomly or in a myriad of different patterns.

[29] Tongue cleanser 300 is preferably formed by being molded to head 105, although other manufacturing processes could be used. With reference to Figures 1 and 4, tissue cleanser 300 is preferably molded within a basin or a receiving cavity 111 in face 108 of head 105. The receiving cavity 111 has a lower base surface 113 and a peripheral sidewall 115 extending away from the lower base surface 113. In one mounting arrangement, nubs 303 of the tissue cleanser 300 are exposed for use with the base surface of the tissue cleanser 300 being flush or recessed relative to the surface 114 of the head. Nevertheless, other orientations are possible. Also, base surface 301 of the tissue cleanser could be embedded in head 105 or covered by another layer with nubs 303 projecting through appropriate openings.

[30] As can be seen in Figures 1 and 4, face 108 also preferably includes one or more peg members 117a-c disposed within basin 111. Peg members 117 form anchor points against the opposing mold to prevent the head from moving under the pressure of the injection molding. As a result, tissue cleanser 300 preferably includes one or more complementary apertures 311a-c which exposes the tops of peg members 117a-c.

Although, the pegs are illustrated in alignment along the centerline of the head (e.g. longitudinal axis a-a), the pegs could have many different positions. Further, the pegs and basin are preferably both included with head 105, but either could be used without the other.

- [31] Alternatively, basin 111 and peg members 117a-c may be provided to position and hold a previously molded tissue cleanser, although these constructions are not necessary to use such a previously molded tissue cleanser.
- [32] Peg members 117a-c may take on a variety of shapes and lengths. With continued reference to the Figures 1 and 4, head 105 includes peg members 117a-c extending away from the lower base surface 113 of basin 111 to the height of the peripheral sidewall 115. The peg members 117a-c are shaped in the form of a cylinder, but other shapes and lengths of the peg members 117a-c are possible. While the molding process would preferably bond the tissue cleanser to the head, the tissue cleanser could be performed and attached by adhesive or other known means.
- [33] As shown in Figures 1-4, tissue cleanser 300 is preferably formed as a pad composed of a soft and pliable elastomeric material for comfortable cleaning and effective removal of bacteria and debris disposed on the surface of the tongue, other soft tissue in the mouth and even along the lips. The tissue cleanser 300 also provides effective massaging, stimulation and removal of bacteria, debris and epithelial cells from the surfaces of the tongue, cheeks, gums or lips.
- [34] In the preferred construction (FIGS. 1-6), tissue cleansers 300 may rub against the inside surfaces of the cheeks or lips, and on the sides of the tongue while the user brushes his or her teeth, and thus provide a desired massaging, stimulation and cleaning of various soft tissue surfaces within the mouth. For example, during

brushing of the facial tooth surfaces, tissue cleanser 300 is disposed on the outer face 108 of head 105 to naturally rub against the oral surfaces of the cheek. As a result, enhanced cleaning is attained without additional cleaning steps. Further, some users may sense a stimulating tingle on the cheek surfaces that leads to a positive user reaction, and even enjoyment of the comfortable feel of the tissue cleanser along the soft tissues surfaces in the mouth. Tissue cleanser 300 may also be additionally rubbed on the cheeks, tongue, etc. as desired for further cleaning aside from the contact that may occur while brushing the teeth.

- [35] Referring to Figures 5 and 6, the tooth cleaning elements 107 of head 105 may include a variety of tooth cleaning elements which can be used for wiping, cleaning and massaging the user's teeth and gums. Any suitable form of tooth cleaning elements may be used. The term "tooth cleaning elements" is used in a generic sense which refers to filament bristles or elastomeric fingers or walls that have any desirable shape. In the illustrated example of Figure 5, tooth cleaning elements 107 include distal tooth cleaning elements 203a-b disposed at a distal tip 121 of head 105, peripheral tooth cleaning elements 205a-l, longitudinal tooth cleaning elements 207a-c disposed along longitudinal axis a-a, arcuate tooth cleaning elements 209a-d and 211a-b, and proximal cleaning elements 213a,b. Tooth cleaning elements 205, 207, 211 and 213 are preferably provided as tufts of bristles whereas tooth cleaning elements 209 are preferably formed as elastomeric walls. Nevertheless, other forms and types of tooth cleaning elements may be used.

- [36] Figure 7 illustrates a sectional view of an alternative arrangement of a head 400 of a toothbrush. Head 400 is similar in construction to head 105, except that tooth cleaning elements 209a-d are integrally formed with tissue cleanser 300. To accomplish the alternative construction, head 400 has appropriately sized ports or

openings 401 to allow the elastomeric material to flow through the head during an injection molding process. In this construction, tooth cleaning elements 209a-d and tissue cleaner 300 are formed with the same elastomeric material. Thus, head 400 may include at least one elastomeric tooth cleaning element formed as a unitary member with tissue cleanser 300.

[37] As various changes could be made in the above methods, compositions and structures without departing from the scope of the invention, it is intended that all matter contained in this application, including all mechanisms and/or modes of interaction described above, shall be interpreted as illustrative only and not limiting in any way the scope of the appended claims.

[38] The following examples are set forth as representative of the improved operation of the present invention. These examples are not to be construed as limiting the scope of the invention.

EXAMPLE 1

[39] The performance nature of a toothbrush can be measured using known oral malodor assessment methods. A study was conducted to evaluate the performance of a toothbrush provided with an elastomeric tissue cleanser having conically shaped nubs, such as the preferred construction of toothbrush 100 discussed above. Human test subjects participated in the study. There was a washout or normalization period prior to testing of about 7 days in which the test subjects brushed twice a day with a fluoride dental cream (see Table 1). After the washout period, the test subjects were asked to refrain from any oral hygiene (brushing, rinsing, and flossing), eating and drinking prior to oral testing. A baseline volatile sulfur compound (VSC) sample was taken from each of the test subjects. In the study for overnight odor control, the

test subjects brushed their teeth for one minute with a fluoride dental cream (see Table 1) using toothbrush 100 provided with the above noted tissue cleanser 300. Subsequently, the subjects cleaned their tongue surface with the tissue engaging elements of the toothbrush for ten seconds. The test subjects slept overnight and returned for post treatment. VSC samples were taken at the ten-hour time point from the previous day cleaning. In the illustrative example, use of the toothbrush reduced oral VSC about 60% verses brushing the teeth alone as measured from a baseline ten hours after use. The VSC readings were obtained by gas chromatography.

EXAMPLE 2

[40] In another study of the above-noted toothbrush 100, there was a washout or normalization period prior to testing of about 7 days which the test subjects brushed twice a day with a fluoride dental cream (see Table 1). The test subjects were asked to refrain from any oral hygiene (brushing, rinsing, and flossing), eating and drinking before testing. After the washout period, the test subjects provided a baseline tongue bacteria sample by swabbing a side of the back of the tongue with a sterile cotton swab. The test subjects brushed their teeth with a fluoride dental cream (see Table 1) for one minute with the toothbrush having the above-noted tissue cleanser. Subsequently, the test subjects cleaned their tongue surface with a preferred construction of the tissue engaging elements 300 of the toothbrush 100 for ten seconds. Two hours after the cleaning of the tongue surface, a tongue bacteria sample was taken from a side of the back of the tongue with a cotton swab. In the illustrative example, use of the tissue engaging elements controlled more odor causing tongue bacteria than simply brushing the teeth alone. Use of the tissue cleanser 300 demonstrated a tongue bacteria log reduction of over 0.8 Log colony forming units/ml two hours after use on the tongue.

EXAMPLE 3

- [41] In another study of the above-noted toothbrush, a MTT assay was used to examine the viability of the epithelial cells collected from the oral cavity prior to and after the use of the toothbrush with the noted tissue cleanser. The MTT Assay was based on the enzymatic reduction of the tetrazolium salt MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-tetrazoliumbromide ++ +] in living, metabolically active cells. The reaction was carried out *in situ* in test tubes, and the reaction product, a purple-colored formazan soluble in dimethylsulfoxide, was measured colormetrically using a multiwell plate reader. Advantageously, the MTT Assay offers a high degree of precision, ease of use, and suitability for the purpose for large scale chemosensitivity testing.
- [42] Following a 7-day washout period, the test subjects reported to a test site without prior eating, drinking, or performing oral hygiene. The test subjects provided salivary rinse samples by rinsing their oral cavity with 9 ml of sterile water for 10 seconds and then discharging the water from the rinse into a tube containing 10x sterile phosphate buffered saline(PBS) solution. The samples were refrigerated for approximately 30 minutes before the MTT Assay was run. The test subjects brushed their teeth under supervision for one minute using a fluoride dental cream (see Table 1) followed by 10 seconds of tongue cleaning with the tongue cleanser 300 of the preferred construction. Approximately 30 minutes after brushing and tongue cleaning, the test subjects provided a rinse sample in the manner described previously.
- [43] The pre-rinse samples and post-rinse samples were centrifuged for 15 minutes at about 3000 RPM. The supernatant, e.g., clear liquid, was removed and the pellet was resuspended in 2.5 mL of PBS. The samples were vortexed for 5 seconds, then 2.5 ml of MTT Solution was added. The samples were subsequently incubated in a gently

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shaking waterbath set at 37 °C for 2 hours. Following the 2 hour incubation period, the samples were centrifuged for 15 minutes at about 3000 RPM. The supernatant was siphoned out and 3 mL of detergent (0.04 N Acid Isopropanol) was added to dissolve purple crystals. An increase or decrease in MTT conversion was spectrophotometrically quantified. From each sample, 200 µl of each was added to 96 well plates and the optical density was measured at 570 nm and compared to a negative buffer control. In the illustrative example, one minute of brushing followed by 10 seconds of use of the tissue cleanser reduced oral epithelial cells about 72% as determined by a MTT assay protocol.

EXAMPLE 4

- [44] In another study, human test subjects provided baseline VSC samples via a Halimeter™ (i.e., a sulfide meter). A Halimeter™ uses an electrochemical, voltammetric sensor which generates a signal when it is exposed to VSC such as, sulfide and mercaptan gases and measures the concentration of hydrogen sulfide gas in parts per billion. The test subjects brushed their teeth under supervision for one minute with the preferred construction of a toothbrush having the above noted tissue cleanser. Then, the test subjects used the noted toothbrush to provide six strokes on the tongue surface. A subsequent VSC sample was taken from the test subjects two hours after the brushing stage. In this illustrative example, use of a toothbrush with the tissue cleanser reduced the measured VSC in the mouth odor over 35% from a baseline measured two hours after use.

EXAMPLE 5

- [45] In one other study, after a washout period, human test subjects rinsed their mouths with sterile water to provide a baseline sample for viable epithelial cell analysis with

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the MTT assay. The subjects brushed their teeth under supervision for one minute with the preferred construction of the toothbrush having the above-noted tissue cleanser. Then, the test subjects used the tissue cleanser to provide six strokes on the tongue surface. The test subjects provided a post rinse sample for analysis. The samples were tested and analyzed in the manner as discussed with respect to Example 3. In this example, use of the toothbrush reduced oral epithelial cells by about 92% from a baseline as determined by MTT assay protocol.

[46] In the above noted examples, the subjects brushed their teeth using a fluoride dental cream with the formulation in Table 1.

% wt.	Ingredient
48.76%	Dicalcium Phosphate Dihydrate
22.0063%	Water
22.00%	Glycerin
4.138%	SO3 Sodium Lauryl Sulfate base – 29%
1.000%	Sodium CMC – 7MF – Food Grade
0.89%	105 Dental Cream Flavor
.76%	Sodium Monofluorophosphate
.25%	Tetrasodium Pyrophosphate
.20%	Sodium Saccharin

Table 1

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CLAIMS:

1. An oral care implement comprising:

a handle and a head, the head comprising a port, the head having a side comprising a cavity, a resilient tissue engaging region having a pad portion with a plurality of
5 nubs extending therefrom and for removal of debris from an oral soft tissue surface, the pad portion and the port being disposed within the cavity;

the head having an opposite side comprising a plurality of the tooth cleaning elements extending therefrom, one of the tooth cleaning elements being a bristle; and at least one of the tooth cleaning elements is unitary with the pad portion and the nubs, and extends
10 through the port;

wherein the unitary tooth cleaning element is adjacent to the bristle for cleaning teeth.

2. The oral care implement according to claim 1, in which the nubs are conically shaped.

15 3. The oral care implement according to claim 2, in which the pad portion, the unitary tooth cleaning element and nubs are composed of an elastomeric material.

4. The oral care implement according to claim 1, in which the pad portion, the unitary tooth cleaning element and nubs comprise the same elastomeric material.

5. The oral care implement according to claim 1, wherein the port further
20 comprises a plurality of ports and wherein unitary tooth cleaning elements extend through respective ports.

6. The oral care implement according to claim 1, wherein the unitary tooth cleaning element has a generally concave surface facing the bristle.

7. The oral care implement according to claim 1, wherein the port further
25 comprises a plurality of ports disposed in the cavity and wherein unitary tooth cleaning

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elements extend through corresponding ports; wherein the unitary tooth cleaning elements generally surround the bristle.

8. The oral care implement according to claim 7, wherein at least one of the unitary tooth cleaning elements has a concave configuration with respect to the bristle.

5 9. The oral care implement according to claim 7, wherein the pad portion, nubs and unitary tooth cleaning elements comprise the same elastomeric material.

10. The oral care implement according to claim 1, wherein the tissue engaging region has a hardness within the range of about 8-25 Shore A.

11. The oral care implement according to claim 1, in which the nubs are disposed
10 in longitudinal rows and transverse rows on the surface area of the tissue engaging region.

12. The oral care implement according to claim 11, in which adjacent transverse rows of nubs are in a staggered relationship.

13. The oral care implement according to claim 1, wherein the port further
comprise a plurality of ports and wherein unitary tooth cleaning elements extend through
15 corresponding ports; wherein the unitary tooth cleaning elements are disposed on opposing
sides of a longitudinal axis of the head.

14. An oral care implement comprising a handle, a head, a plurality of elastomeric
tooth cleaning elements and a bristle tooth cleaning element extending from one side of the
head, and an elastomeric tissue cleanser disposed on an opposite side of the head in a basin
20 having a sidewall portion, wherein said elastomeric tooth cleaning elements are formed as a
unitary member with the tissue cleanser; wherein the head includes apertures in the basin; the
elastomeric tooth cleaning elements are connected to the tissue cleanser through
corresponding apertures, the tissue cleanser comprising a base having a plurality of
projections extending from the base.

25 15. An oral care implement according to claim 14, wherein the projections are
conical.

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16. An oral care implement according to claim 14, wherein the tissue cleanser has a hardness of about 8-25 Shore A.

17. The oral care implement according to claim 14, wherein the tissue cleanser is composed of styrene-ethylene/butylene-styrene block copolymer (SEBS).

5 18. The oral care implement according to claim 14, wherein the tissue cleanser has about 100-600 projections per square inch.

19. The oral care implement according to claim 14, in which the projections are disposed in longitudinal rows or transverse rows on the base.

20. The oral care implement according to claim 14, wherein the elastomeric tooth
10 cleaning elements are disposed on opposing sides of a longitudinal axis of the head.

21. The oral care implement according to claim 14, wherein the projections of the tissue cleanser are configured for removing oral epithelial cells.

22. An oral care implement, comprising:

a head and a handle;

15 a plurality of tooth cleaning elements disposed on a first side of the head and comprising a plurality of filament bristles;

a means for engaging a surface of a tongue of a user, the means for engaging disposed on a second side of the head opposite the tooth cleaning elements, the means for engaging configured and adapted for cleansing soft tissue and having a different configuration
20 than the bristles;

the means for engaging comprising a soft tissue cleanser comprising conical nubs formed of an elastomeric material, the conical nubs disposed on the head in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nubs are in a staggered relationship, the conical nubs having a base portion, a tip portion and a substantially circular
25 cross-section, the conical nubs having a height that is greater than a width of the conical nubs

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at the base portion, and wherein the base portion of each conical nub is spaced apart from the base portions of adjacent conical nubs; and

a basin formed in the second side of the head, the soft tissue cleanser disposed within the basin.

- 5 23. The oral care implement according to claim 22, wherein the height of the conical nubs is in a range between 0.75 mm to 1.5 mm and adjacent conical nubs are spaced apart by a distance between 1 mm to 2 mm.
24. The oral care implement according to claim 22, wherein the width of the base portions of the conical nubs is within a range between 0.51 mm to about 2.00 mm.
- 10 25. The oral care implement according to claim 22, wherein the head includes a plurality of elastomeric tooth cleaning elements opposing the means for engaging.
26. The oral care implement according to claim 22, wherein the means for engaging has a hardness of about 8-25 Shore A hardness.
27. The oral care implement according to claim 22, wherein the means for
15 engaging has a nub density from about 100 to about 600 nubs per square inch.
28. The oral care implement according to claim 22, the head further comprising a first group of arcuate segment tooth cleaning elements and a second group of arcuate segment tooth cleaning elements extending from the first side of the head.
29. The oral care implement according to claim 28, wherein at least one group of
20 the arcuate segment tooth cleaning elements comprises at least one bristle tuft.
30. The oral care implement according to claim 28, wherein at least one group of the arcuate segment tooth cleaning elements comprises at least one elastomeric member.
31. The oral care implement according to claim 29, wherein the groups of arcuate
25 segment tooth cleaning elements comprise elastomeric walls and a cleaning element is disposed within each of the arcuate segment groups of cleaning elements.

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32. The oral care implement according to claim 22, wherein the height of the conical nubs is in a range between 0.75 mm to 1.5 mm, wherein adjacent conical nubs are spaced apart by a distance between 1 mm to 2mm, wherein the width of the base portions of the conical nubs is within a range between 0.51 mm to about 2.00 mm, wherein the means for
5 engaging has a hardness of about 8-25 Shore A hardness.

33. The oral care implement according to claim 32, wherein the means for engaging is constructed of a styrene-ethylene/butylene-styrene block copolymer.

34. The oral care implement according to claim 22, wherein the conical nubs are tapered to a tip.

10 35. the oral care implement according to claim 22, wherein the basin comprises a floor and a peripheral sidewall extending from the floor, the peripheral sidewall terminating at a surface of the second side of the head.

36. The oral care implement according to claim 35, wherein the soft tissue cleanser is a substantially flat elastomeric pad comprising a bottom surface that is in contact with the
15 floor of the basin and a top surface that is substantially flush with the surface of the second side of the head.

37. The oral care implement according to claim 36, wherein the conical nubs extend outwardly from the top surface of the soft tissue cleanser so that the tip portions of the conical nubs extend beyond the surface of the second side of the head.

20 38. The oral care implement according to claim 22, wherein the soft tissue cleanser is injection molded into the base.

39. An oral care implement, comprising:

a head and a handle;

a plurality of tooth cleaning elements disposed on a first side of the head and
25 comprising a plurality of filament bristles;

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a soft tissue cleanser having a plurality of conical nubs formed of an elastomeric material and having a different configuration than the bristles, the conical nubs disposed on a second side of the head opposite the tooth cleaning elements in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nubs are in a staggered relationship, wherein each conical nub is spaced apart from adjacent conical nubs, the conical nubs having a cylindrical base portion of substantially constant cross-sectional area and a tapered tip portion, the conical nubs having a height that is greater than a width of the conical nubs at the base portion, and the conical nubs having a substantially circular cross-section; and

a basin formed in the second side of the head, the soft tissue cleanser injection molded into the basin.

40. An oral care implement comprising:

a head and a handle;

a plurality of tooth cleaning elements disposed on a first side of the head and comprising a plurality of filament bristles and arcuate elastomeric walls;

a soft tissue cleanser having a plurality of conical nubs formed of an elastomeric material and having a different configuration than the bristles, the conical nubs disposed on a second side of the head opposite the tooth cleaning elements in longitudinal rows and transverse rows, wherein adjacent transverse rows of conical nub are in a staggered relationship, wherein each conical nub is spaced apart from adjacent conical nubs, the conical nubs having a cylindrical base portion and a tapered tip portion, the conical nubs having a height that is greater than a width of the conical nubs at the base portion; and

a basin formed in the second side of the head, the soft tissue cleanser disposed within the basin.

41. The oral care implement according to claim 40, wherein the conical nubs have a tip portion with a width in a range from about 0.10 mm to about 0.75 mm for optimal penetration between recesses of papillae of a user's tongue.

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42. An oral care implement comprising:

a head and a handle;

a plurality of bristles disposed on a first side of the head;

5 a basin formed into a second side of the head opposite the first side, the basin comprising a floor and a peripheral sidewall extending from the floor, the peripheral sidewall terminating at a surface of the second side of the head;

an elastomeric soft tissue cleanser comprising a pad and a plurality of projections extending from the pad;

10 wherein the soft tissue cleanser is disposed within and injection molded into the basin; and

wherein the pad comprises a bottom surface that is in contact with the floor of the basin and a top surface that is substantially flush with the surface of the second side of the head, the projections extending outwardly from the top surface of the soft tissue cleanser so as to extend beyond the surface of the second side of the head.

15 43. The oral care implement of claim 42 wherein the plurality of projections comprise a plurality of nubs.

44. The oral care implement of claim 42 wherein the peripheral sidewall of the basin forms a closed geometry.

20 45. The oral care implement of claim 42 wherein the elastomeric soft tissue cleanser has a Shore A hardness of A8 to A25.

46. The oral care implement of claim 42 further comprising one or more protuberances disposed within the basin and extending from the floor of the basin, the elastomeric soft tissue cleanser comprising one or more complementary apertures that receive the one or more protuberances and expose tops of the one or more protuberances.

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47. The oral care implement of claim 46 wherein the one or more protuberances are aligned along a longitudinal axis of the head.

48. The oral care implement of claim 47 wherein the one or more protuberances extend from the floor to the height of the peripheral sidewall.

5 49. The oral care implement of claim 42 wherein the basin has a generally oval shape that corresponds to a shape of the head.

50. The oral care implement of claim 42 further comprising:

one or more protuberances disposed within the basin and extending from the floor of the basin, the elastomeric soft tissue cleanser comprising one or more complementary
10 apertures that receive the one or more protuberances and expose tops of the one or more protuberances;

wherein the one or more protuberances are aligned along a longitudinal axis of the head;

15 wherein the one or more protuberances extend from the floor to the height of the peripheral sidewall;

wherein the plurality of projections comprise a plurality of nubs; and

wherein the basin has a generally oval shape that corresponds to a shape of the head.

51. The oral care implement of claim 42 wherein the pad is substantially flat.

20 52. An oral care implement comprising:

a head and a handle;

a plurality of tooth cleaning elements extending from a first face of the head;

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a receiving cavity formed into a second face of the head opposite the first face, the receiving cavity comprising a lower base surface and a sidewall extending from the lower base surface, the sidewall terminating at the second face of the head; and

5 a soft tissue cleanser formed of an elastomeric material that is injection molded into the receiving cavity, the soft tissue cleanser comprising a base surface that is substantially flush with the second face of the head and a plurality of projections extending from the base surface beyond the second face of the head.

53. The oral care implement of claim 52 wherein the plurality of projections comprise a plurality of nubs.

10 54. The oral care implement of claim 52 wherein the sidewall of the receiving cavity forms a closed geometry.

55. The oral care implement of claim 52 wherein the soft tissue cleanser has a Shore A hardness of A8 to A25.

56. The oral care implement of claim 52 further comprising one or more
15 protuberances disposed within the receiving cavity and extending from the lower base surface of the receiving cavity, the elastomeric soft tissue cleanser comprising one or more complementary apertures that receive the one or more protuberances and expose tops of the one or more protuberances.

57. The oral care implement of claim 56 wherein the one or more protuberances
20 are aligned along a longitudinal axis of the head.

58. The oral care implement of claim 57 wherein the one or more protuberances extend from the lower base surface of the receiving cavity to the height of the sidewall.

59. The oral care implement of claim 52 wherein the receiving cavity has a generally oval shape that corresponds to a shape of the head.

25 60. The oral care implement of claim 52 further comprising:

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one or more protuberances disposed within the receiving cavity and extending from the lower base surface of the receiving cavity, the elastomeric soft tissue cleanser comprising one or more complementary apertures that receive the one or more protuberances and expose tops of the one or more protuberances;

5 wherein the one or more protuberances are aligned along a longitudinal axis of the head;

wherein the one or more protuberances extend from the lower base surface of the receiving cavity to the height of the sidewall;

wherein the plurality of projections comprise a plurality of nubs; and

10 wherein the receiving cavity has a generally oval shape that corresponds to a shape of the head.

61. The oral care implement of claim 52 further comprising at least one opening in the lower base surface of the receiving cavity that allows the elastomeric material to flow through the opening during the injection molding, the elastomeric material forming one or
15 more of the tooth cleaning elements as a unitary member with the soft tissue cleanser.

62. The oral care implement of claim 61 wherein the tooth cleaning elements further comprise bristles.

63. The oral care implement of claim 61 wherein the receiving cavity has a generally oval shape that corresponds to a shape of the head.

20 64. An oral care implement comprising:

a head and a handle;

a plurality of tooth cleaning elements extending from a first face of the head; a receiving cavity formed into a second face of the head opposite the first face; and a soft tissue cleanser formed of an elastomeric material that is injection molded into the receiving cavity to

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bond the soft tissue cleanser to the head, the soft tissue cleanser comprising a plurality of projections extending beyond the second face of the head.

65. The oral care implement of claim 64 wherein the plurality of projections comprise a plurality of nubs.

5 66. The oral care implement of claim 65 wherein the plurality of nubs are conically shaped.

67. The oral care implement of claim 64 wherein the tooth cleaning elements comprise bristles.

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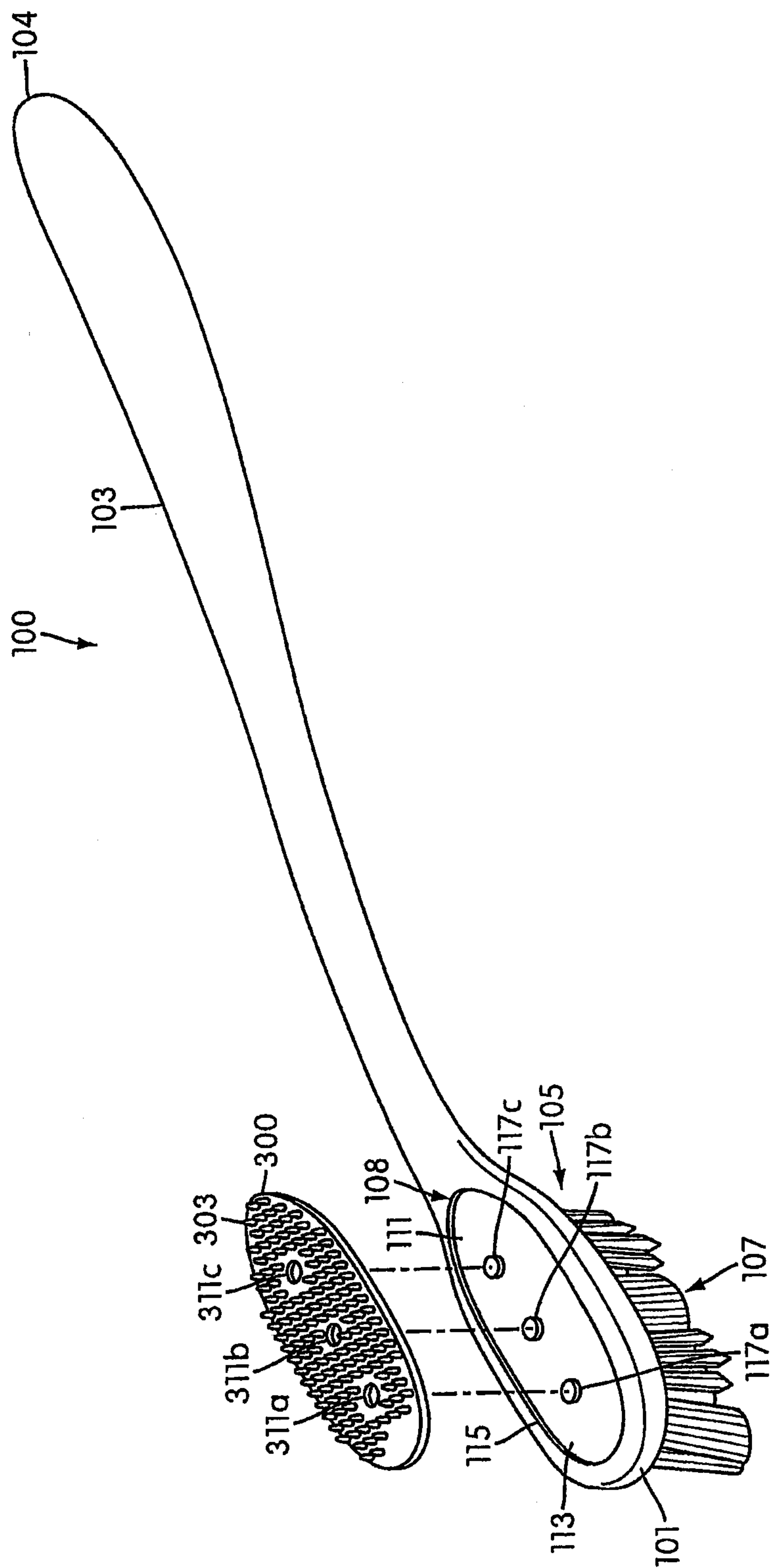


FIG. 1

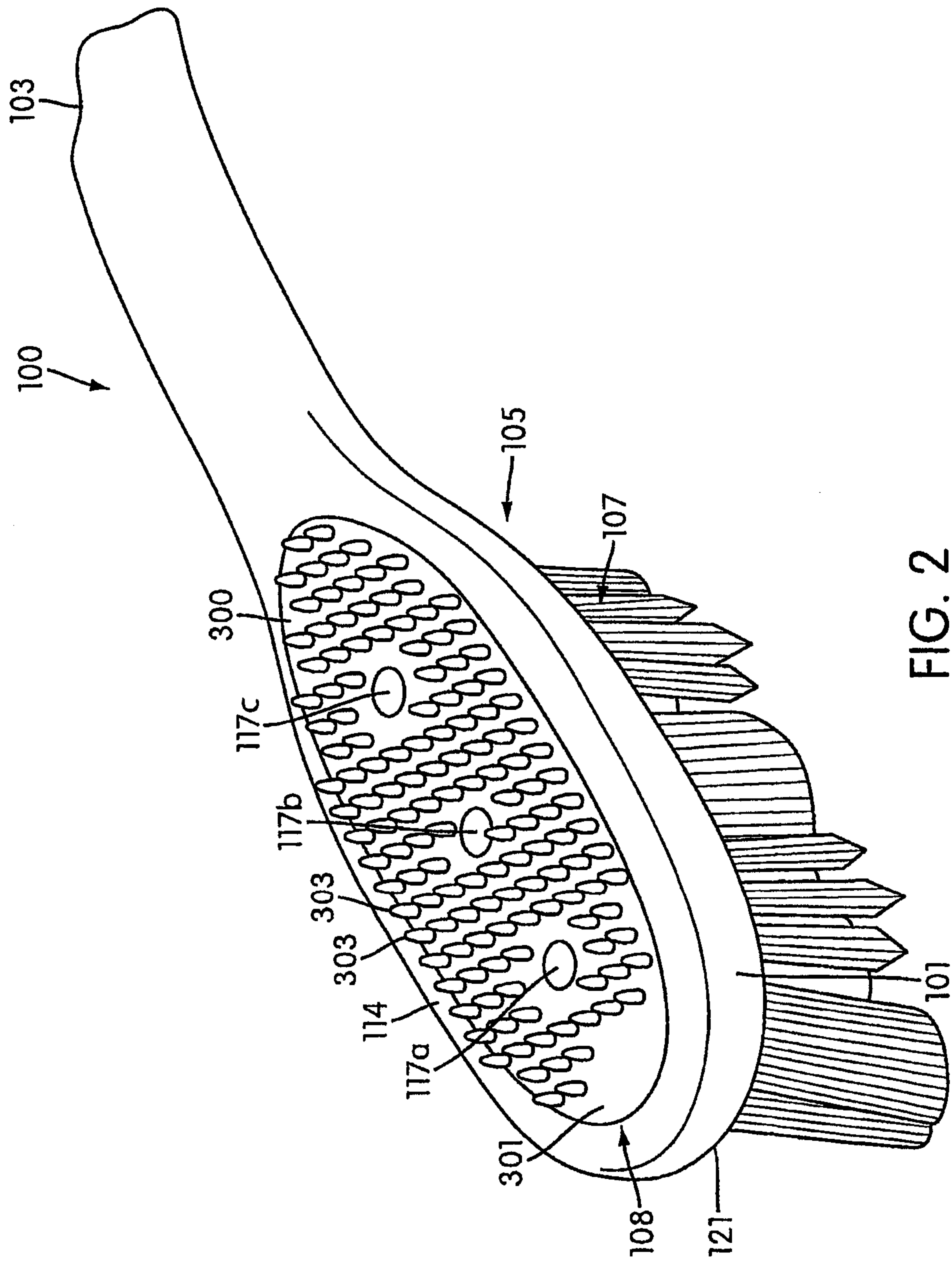
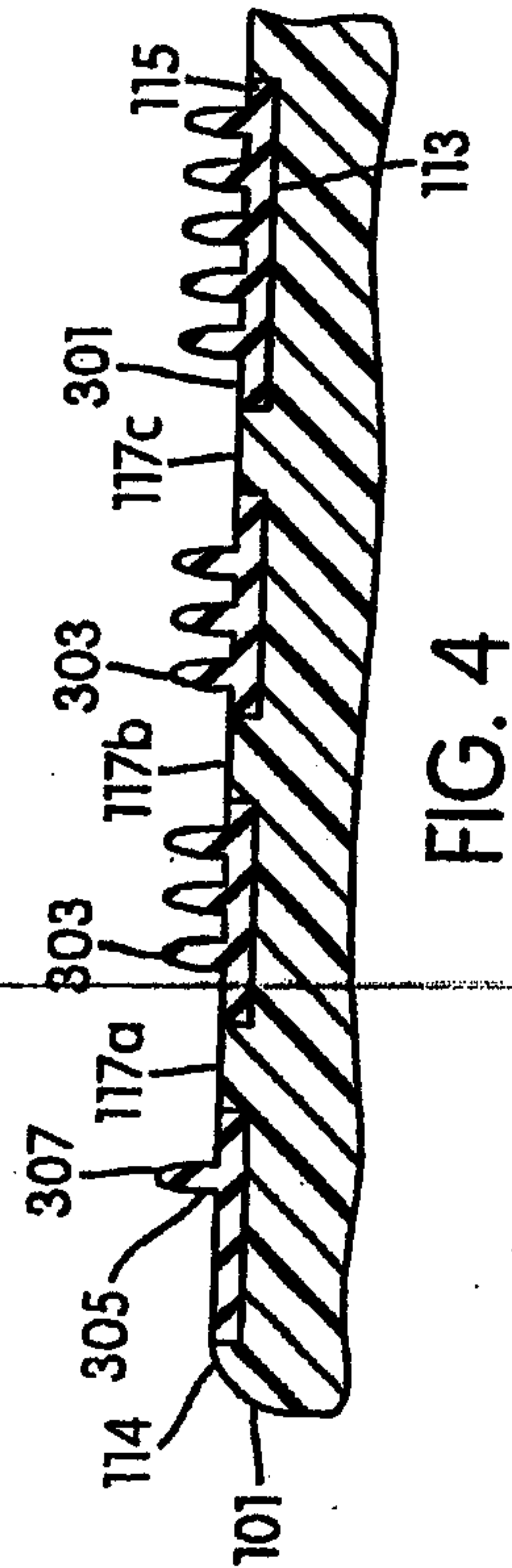
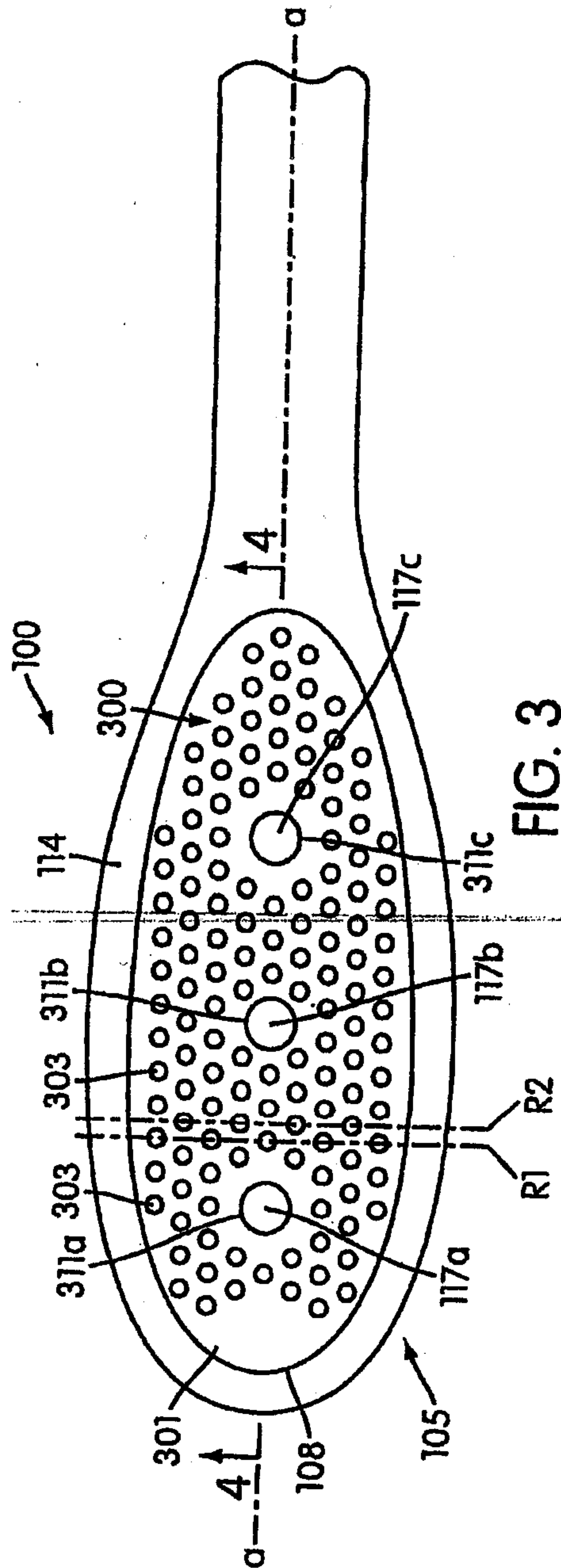


FIG. 2

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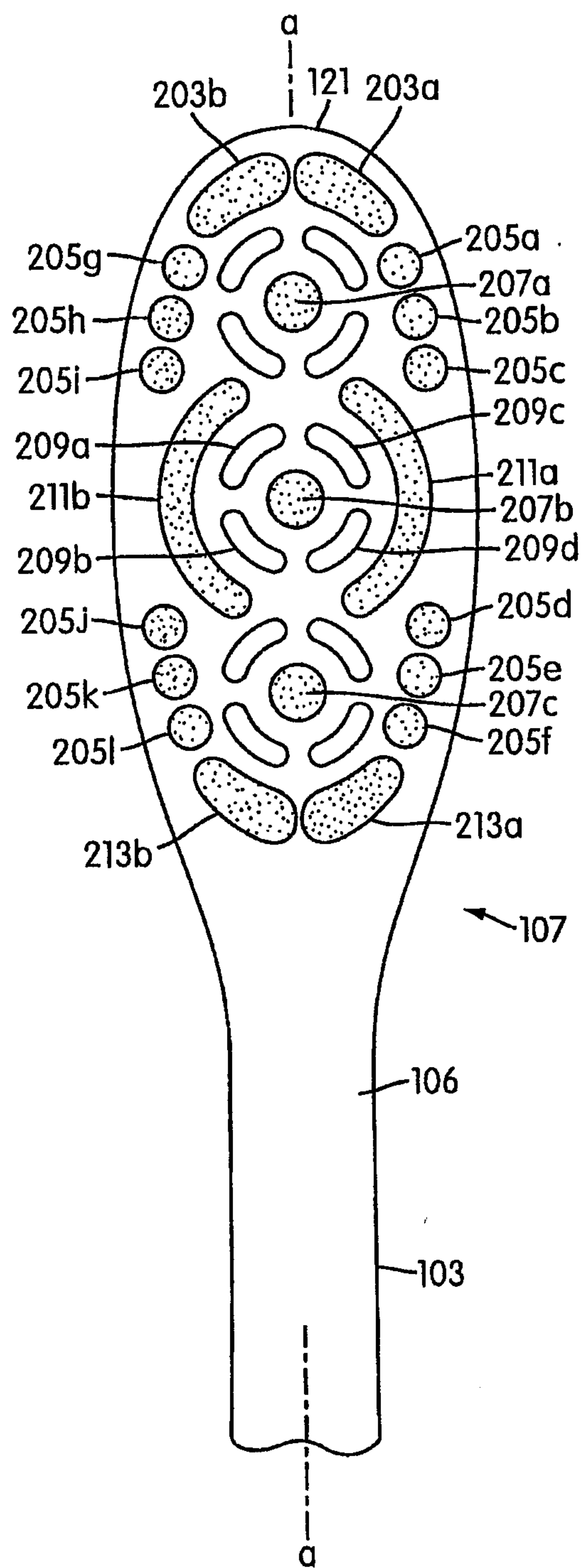
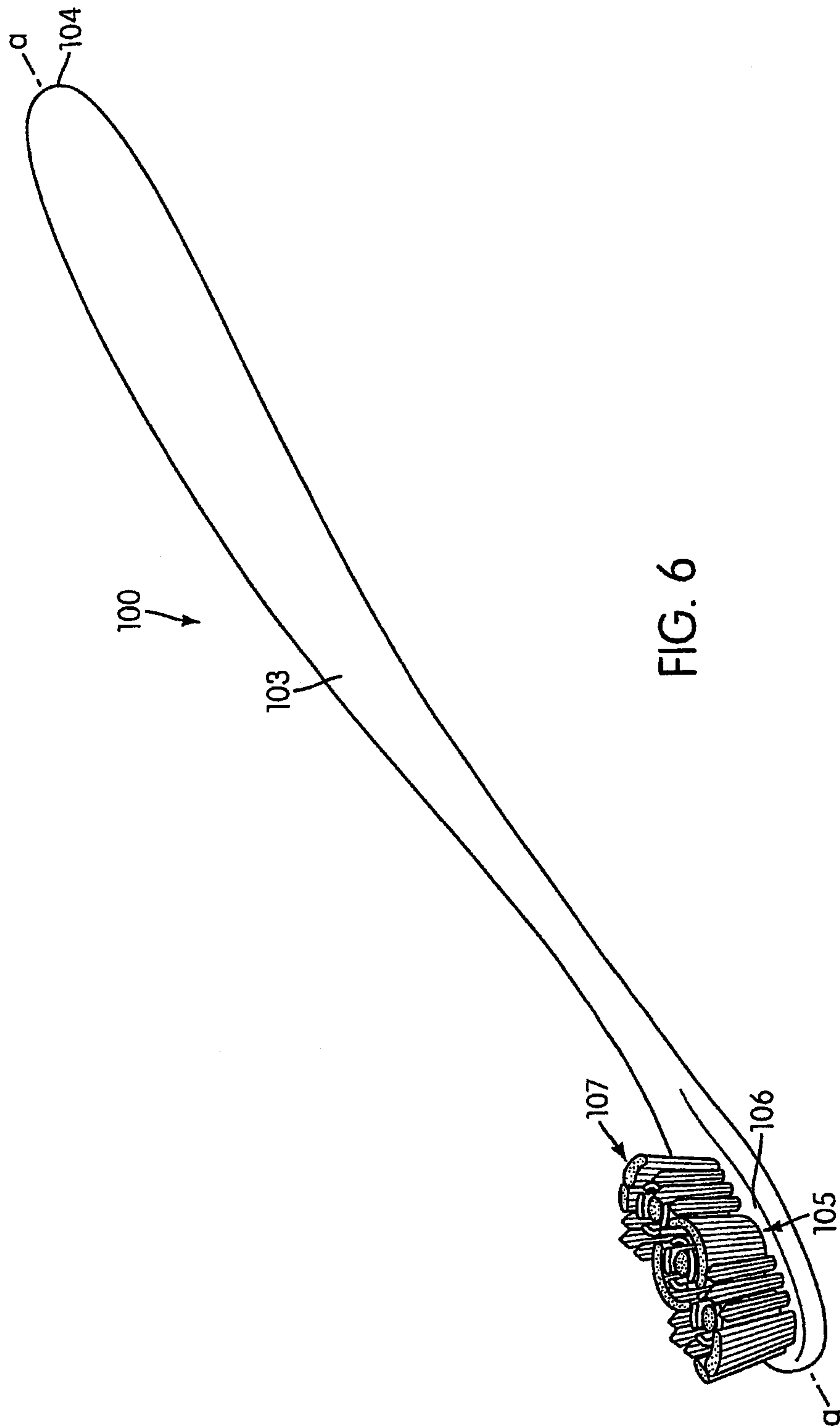


FIG. 5

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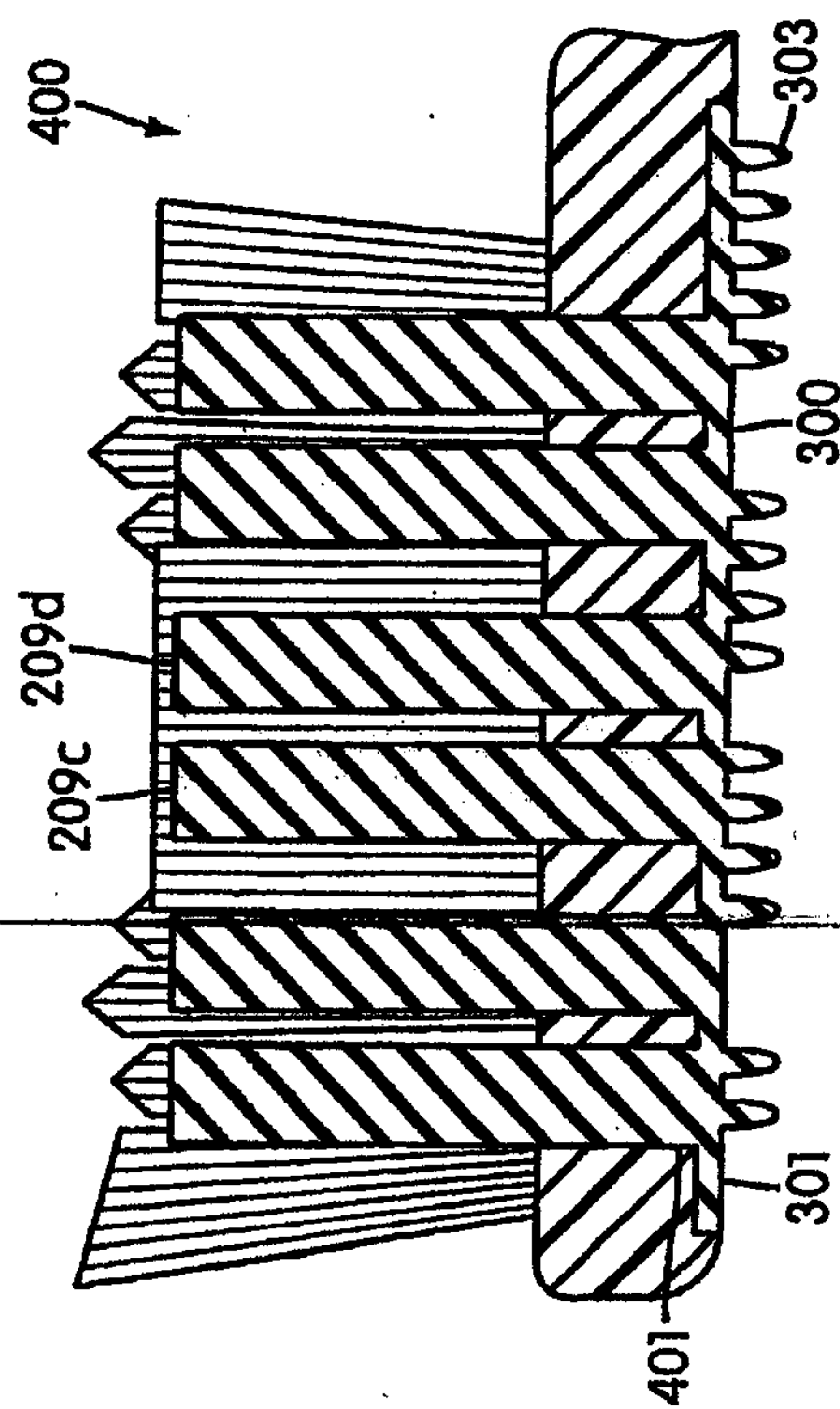


FIG. 7

