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(54) **Oral care implement having diverging cleaning elements**

Mundpflegevorrichtung mit divergierenden Reinigungselementen

Accessoire de soin buccal pourvu d'éléments de nettoyage divergent

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(56) References cited:
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Description

Field of the Invention

[0001] The present invention relates generally to oral care implements, and specifically to toothbrushes, either manual or powered, that have a handle and a head having cleaning elements for oral cleaning.

Background of the Invention

[0002] A toothbrush is used to clean teeth by removing plaque and debris from the surfaces. Conventional toothbrushes are provided with a flat bristle trim that limit their ability to conform to the curvature of the teeth, to penetrate into the interproximal areas between the teeth, to sweep away the plaque and debris, and to clean along the gum line. Additionally, such toothbrushes have a limited ability to retain dentifrice for cleaning the teeth. During the brushing process, the dentifrice typically slips through the tufts of bristles and away from the contact between the bristles and the teeth. As a result, the dentifrice often is spread around the mouth, rather than being concentrated on the contact of the bristles with the teeth. Therefore, the efficiency of the cleaning process is reduced.

[0003] While substantial efforts have been made to modify the cleaning elements of toothbrushes to improve the aforementioned deficiencies, the industry continues to pursue arrangements of cleaning elements that will improve upon the preceding technology.

[0004] An example of an early attempt to improve the cleaning elements of a toothbrush is disclosed in an existing oral care implement having two or three circular brush sections which are arranged within holders that may be screwed into mating receptacles in the toothbrush handle so that they can be removed and replaced as needed. Each brush section contains stiff cleaning elements and is spaced from the other along the longitudinal axis of the handle at a distance less than the thickness of a tooth so that the brush operates on both the lingual (inside) and facial (outside) surfaces of the teeth.

[0005] Another example is a toothbrush with a head containing a flexible, rubber-like prophylaxis polishing cup or "prophy cup" similar to that used by dental personnel to professionally clean teeth. This prophyl cup is loaded with toothpaste by the user and applied to the teeth. According to this patent, the "soft rubber-like prophyl cup device follows the contours of teeth more effectively than bristles." A ring of cleaning elements ("bristle tufts") are placed about the periphery of the toothbrush head which co-act with the prophyl cups to clean the user's teeth and gums.

[0006] More recently, the strategic arrangement and combination of cleaning elements in the form of elastomeric prophyl cups and bristle tufts has become more common as a way of improving cleaning efficiency and maintaining the dentifrice in place during brushing. One

example of the combined use and strategic arrangement of elastomeric prophyl cups and bristle tufts is a toothbrush having a head portion comprising a plurality of inner loops formed by elastomeric walls. The central inner loop is surrounded by an outer loops formed of bristles. A central cleaning element, formed as a bristle tuft, is located within the elastomeric inner loops.

[0007] Another example of the combined use and strategic arrangement of elastomeric prophyl cups and bristle tufts can be found in a toothbrush having a head portion comprising a plurality of soft elastomer prophyl cups surrounded by bristle rings.

[0008] In another embodiment, a toothbrush is disclosed wherein the centralized prophyl cups are formed by groups of densely packed cleaning elements that are surrounded by bristle rings. The bristle rings in this embodiment are also disclosed as having one or more tufts at an inclination.

[0009] US2005/0273954, on which the pre-characterizing portion of claim 1 is based, discloses a device and system with moving squeegee fields.

Summary of the Invention

[0010] A first aspect of the present invention provides an oral care implement according to claim 1.

[0011] Optional features are recited in the dependent claims.

Brief Description of the Drawings

[0012] This invention is capable of use in a broad array of oral care implements and hygiene products. The drawings illustrate one use of the invention and are not to be construed as the only embodiment of the invention.

Figure 1 is a perspective view of an ansate oral care implement, in the form of a manual toothbrush, according to one embodiment of the present invention. Figure 2 is a front view of the toothbrush of Figure 1. Figure 3 is a right-side view the toothbrush of Figure 1, the left-side view of which is a mirror image.

Figure 4 is a top view of the toothbrush of Figure 1. Figure 5 is a close-up perspective view of the head of the toothbrush of Figure 1.

Figure 6 is a front view of the head of the toothbrush of Figure 5.

Figure 7 is a cross-sectional view of the head of the toothbrush of Figure 5 along view VII-VII of Figure 6.

Figure 8 is a cross-sectional view of the head of the toothbrush of Figure 5 along view VIII-VIII of Figure 6.

Figure 9A is a perspective view of an ansate oral care implement, in the form of a manual toothbrush, according to a second embodiment of the present invention.

Figure 9B is a close-up front view of the head of the toothbrush of Figure 9A..

Figure 10A is a perspective view of an ansate oral

care implement, in the form of a manual toothbrush, according to a third embodiment of the present invention.

Figure 10B is a close-up front view of the head of the toothbrush of Figure 10A.

Figure 11A is a perspective view of an ansate oral care implement, in the form of a manual toothbrush, according to a fourth embodiment of the present invention.

Figure 11B is a close-up front view of the head of the toothbrush of Figure 11A.

Figure 12A is a perspective view of an ansate oral care implement, in the form of a manual toothbrush, according to a fifth embodiment of the present invention.

Figure 12B is a close-up perspective view of the head of the toothbrush of Figure 12A.

Figure 12C is a front view of the toothbrush of Figure 12A.

Figure 13 is a perspective view of a cleaning element disc for integration into an oral care implement.

Detailed Description of the Drawings

[0013] In the following description, the invention is discussed in terms of a manual toothbrush incorporating the novel arrangement of cleaning elements. However, in other forms, the invention could be in the form of other oral care implements including a soft-tissue cleansing implement, a powered toothbrush, or other ansate implement designed for oral care.

[0014] Additionally, disc-like plates that incorporate the arrangement of cleaning elements for operable cooperation with a manual or powered oral care implement, such as a toothbrush or soft-tissue cleansing implement, are described.

[0015] Referring first to Figures 1-4 concurrently, a toothbrush **100** is illustrated according to one embodiment of the present invention. The toothbrush **100** generally comprises a handle **110** and a head **120**. The handle **110** provides the user with a mechanism by which he/she can readily grip and manipulate the toothbrush **100**. The handle **110** is generically illustrated and may be formed of many different shapes, sizes, materials and a variety of manufacturing methods that are well-known to those skilled in the art. If desired, the handle **110** may include a suitable textured grip (not shown) made of elastomeric material or can be a multipart construction. Stated simply, the details of the handle **110** are not limiting of the present invention and, thus, require no further discussion for purposes of the present invention.

[0016] The toothbrush **100** extends from a proximal end **112** to a distal end **113** along a longitudinal axis **A-A** (illustrated in FIG. 2 and as point **A** in FIG. 4). For purposes of simplicity, the longitudinal axis **A-A** of the toothbrush **100** is considered to be coaxial with the longitudinal axis of the head **120**. However, it is of course possible for the longitudinal axis of the head **120** and the

toothbrush **100** to not be coaxial with each other. The head **120** is operably connected to a distal end of the handle **110**. The head **110** and handle **120** of the toothbrush are preferably formed as a single unitary structure using a molding, milling, machining or other suitable process. However, in other embodiments, the handle **110** and head **120** may be formed as separate components which are operably connected at a later stage of the manufacturing process by any suitable technique known in the art, including without limitation thermal welding, a tight-fit assembly, a coupling sleeve, adhesion, or fasteners. Whether the head **120** and handle **110** are of a unitary or multi-piece construction (including connection techniques) is not limiting of the present invention.

[0017] It should be noted at this time that relative terms such as distal, middle, proximal, upper, lower, top, bottom, left, right etc. are merely used to delineate relative positions of the components of the toothbrush **100** with respect to one another and are not intended to be in any further way limiting of the present invention.

[0018] The head **120** generally comprises a front surface **121**, a rear surface **122** and a peripheral surface **123**. The front surface **121** and the rear surface **122** of the head **120** can take on a wide variety of shapes and contours, none of which are limiting of the present invention. For example, the front and rear surfaces **121,122** can be planar, contoured or combinations thereof. Moreover, if desired, the rear surface **122** may also comprise additional structures for oral cleaning, such as a soft tissue cleanser, such as the one disclosed in U.S. Patent 7,143,462. Furthermore, while the head **120** is normally widened relative to the neck **111** of the handle **110**, it could in some constructions simply be a continuous extension or narrowing of the handle **110**.

[0019] The front surface **121** comprises a collection of cleaning elements **130** extending therefrom for cleaning contact with an oral surface. While the collection of cleaning elements **130** is particularly suited for brushing teeth, the collection of cleaning elements **130** can be also be used to clean oral soft tissue, such as a tongue, gums, or cheeks instead of or in addition to teeth. As used herein, the term "cleaning element" is used in a generic sense to refer to any structure that can be used to clean or massage an oral surface through relative surface contact. Common examples of "cleaning elements" include, without limitation, filament bristles, fiber bristles, nylon bristles, spiral bristles, rubber bristles, elastomeric protrusions, flexible polymer protrusions, co-extruded filaments, flag bristles, crimped bristles, anti-bacterial bristles and combinations thereof and/or structures containing such materials or combinations.

[0020] Generally, the collection of cleaning elements **130** comprises a first set **131** of cleaning elements, a second set **132** of cleaning elements and a third set **133** of cleaning elements. The third set **133** of cleaning elements generally comprise a prophylaxis polishing cup **133** (a prophy cup) and a conical arrangement **134** of elongated cleaning elements. The conical arrangement

134 is located within and surrounded by the prophy cup **133**.

[0021] Referring now to FIGS. 5 and 6 concurrently, the details of the novel arrangement and orientation of the cleaning elements on the head **120** of the toothbrush **100** will now be discussed according to one embodiment of the present invention. It should be understood that the concepts and arrangements of particular subsets of the collection of cleaning elements will be described below in relation to certain shapes, axes, and hypothetical regions or zones. It is to be understood, however, that such concepts and arrangements can be described in a wide variety of terms and manners.

[0022] Conceptually, the head **120** comprises a distal region **124**, a middle region **125** and a proximal region **126**. The first set of cleaning elements **131a-j** extend from the distal region **124** of the head **120**. The second set of cleaning elements **132a-j** extend from the proximal region **126** of the head **120**. The third set of cleaning elements, which consists of the prophy cup **133a-b**, a plurality of angled cleaning elements **134a-f**, and a central cleaning element **135**, extend from the middle region **125** of the head.

[0023] In the illustrated embodiment, the cleaning elements **131a-j**, **132a-j** of the first and second sets are tufts or arcuate walls of densely packed fibrous bristles. However, one or more (or various subsets) of the cleaning elements **131aj**, **132aj** of the first and second sets can take on other forms, such as elastomeric walls or fingers.

[0024] When bristle tufts are used as the desired cleaning elements, the bristle tufts can be connected to the head **120** in any manner known in the art. For example, anchor free tufting (AFT) could be used to mount the cleaning elements. In AFT, a plate or membrane is secured to the brush head such as by ultrasonic welding. The bristles extend through the plate or membrane. The free ends of the bristles on one side of the plate or membrane perform the cleaning function. The ends of the bristles on the other side of the plate or membrane are melted together by heat to be anchored in place. Any suitable form of cleaning elements may be used in the broad practice of this invention. Alternatively, the bristles could be mounted to tuft blocks or sections by extending through suitable openings in the tuft blocks so that the base of the bristles is mounted within or below the tuft block.

[0025] The particular arrangement and number of the cleaning elements **131a-j**, **132a-j** of the first and second sets within the distal and proximal regions **124**, **126** can vary greatly as desired, and should not be considered as a limitation of the present invention unless specifically recited in the claims. In fact, in certain embodiments of the present invention, the first and second sets of the cleaning elements **131a-j**, **132a-j** may be omitted all together or substantially altered. Nonetheless, a particularly useful and effective arrangement of the first and second sets of the cleaning elements **131a-j**, **132a-j** has been developed (discussed below in relation to

FIGS.5-6) and is to be considered as part of certain embodiments.

[0026] The middle region **125** of the head comprises an arrangement of cleaning elements that is specifically designed to improve the efficacy of cleaning oral surfaces, retain dentifrice on the head **120** of the toothbrush during brushing and/or massaging, and distribute the dentifrice among the collection of cleaning elements on the head **120**. As mentioned above, the middle region **125** comprises a prophy cup **133** which is formed by arcuate cleaning element walls **133a-b**, angled elongated cleaning elements **134a-f** and central elongated cleaning element **135**. The cleaning element walls **133a-b** are elastomeric walls while the elongated cleaning elements **134a-f**, **135** are tufts of densely packed fibrous bristles. In other embodiments, however, the elongated cleaning elements **134a-f** can be elastomeric fingers.

[0027] Suitable elastomeric materials include any bio-compatible 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 A5 to A40 Shore hardness, and most preferably A25 Shore hardness. 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.

[0028] Referring now to FIGS 6-8 concurrently, the details and structural cooperation of the prophy cup **133**, the cleaning elements **134a-f**, and the central cleaning element **135** will be described. The cleaning elements **134a-f** extend from the front surface **121** of the head in an angled (i.e., inclined) manner (relative to a general plane formed by the top surface **121**). The cleaning elements **134a-f** are arranged in a spaced-apart manner that forms a ring that circumferentially surrounds an axis **B-B**. The axis **B-B** extends from the front surface **121** of the head **120** in a direction away from the rear surface **122** of the head **120**. In the preferred embodiment, the axis **B-B** extends from the front surface **121** of the head **120** in a substantially normal orientation. Of course, in other embodiments, the axis **B-B** may be at an angle other than normal to the front surface **121**. Each of the cleaning elements **134a-f** is inclined so as to radially diverge from the axis **B-B** at an angle Θ as it extends away from the front surface **121** of the head **120**. Preferably, for each cleaning element **134a-f**, the angle Θ is in a range of 1 to 15 degrees, more preferably 3 to 5 degrees, and most preferably 4 degrees. While all of the cleaning elements **134a-f** radially diverge from the axis **B-B** at the same angle Θ in the illustrated embodiment, it is possible for the angles of radial divergence to vary among the cleaning elements **134a-f**. Furthermore, while six cleaning elements **134a-f** are illustrated as forming the hollow cone, any number of cleaning elements can be used in other embodiments.

[0029] Conceptually, the cleaning elements **134a-f** col-

lectively form a hollow cone structure (which in the illustrated embodiment is a truncated cone). As used herein, the term "cone" is not limited to a circular cross-section and is intended to include truncated cones. The hollow cone structure formed by cleaning elements **134a-f** forms a funnel-like internal cavity **136** for receiving a dentifrice. The cleaning elements **134a-f** are equidistantly circumferentially spaced from one another so that a space exists between adjacent cleaning elements **134a-f**. While in the illustrated embodiments, the hollow cone is formed by spaced apart cleaning elements, in alternative embodiments the hollow cone can be formed by an angled wall (or angled wall segments) formed by an elastomer or densely packed bristles.

[0030] The hollow cone formed by the cleaning elements **134a-f** is concentrically arranged about the axis **B-B** and is congruent with the conical axis. The elongated central cleaning element **135** extends from the front surface **121** of the head **120** along the axis **B-B** within the funnel-like cavity **136**. The central cleaning element **135** is preferably a tuft of densely packed fibrous bristles but can also be an elastomer finger or other material or structure. Of course, the central cleaning element **135** may even be omitted in certain embodiments of the invention.

[0031] The hollow cone formed by the cleaning elements **134a-f** is circumferentially surrounded by a cleaning element wall (formed by arcuate sections of cleaning element walls **133a-b**). Collectively, the cleaning element walls **133a-b** form the prophy cup as a substantially closed loop that concentrically surrounds the hollow cone formed by the elongated cleaning elements **134a-f**. While the prophy cup is formed by two arcuate sections of cleaning element walls **133a-b** in the illustrated embodiment, the prophy cup (and the substantially closed-loop) can be formed by a single wall section or by more than two wall sections in other embodiments.

[0032] As a result of being circumferentially surrounded by the prophy cup (which is formed by the arcuate cleaning element walls **133a-b**), an annular channel **137** exists between the hollow cone (formed by the cleaning elements **134a-f**) and the cleaning element wall (formed by arcuate cleaning element walls **133a-b**). The arcuate cleaning element walls **133a-b** are circumferentially spaced from one another so that gaps **139** exist along the longitudinal axis **A-A** of the head **120**.

[0033] Referring solely now to FIG. 7, each of the cleaning elements **134a-f** extends at an incline from the first surface **121** of the head **120** and terminate in cleaning ends **144a-f** respectively. The prophy cup (which consists of arcuate cleaning element walls **133a-b**) extends normally from the first surface **121** of the head **120** and terminates in top surfaces **143a-b**. In other embodiments, the prophy cup (which consists of arcuate cleaning element walls **133a-b**) may extend from the first surface **121** of the head **120** at an inclined orientation, either inclined toward or away from the axis **B-B**.

[0034] The cleaning elements **134a-f** (and thus the hollow cone) has a height H_1 while the prophy cup (and,

thus, the arcuate cleaning element walls **133a-b**) has a height H_2 (measured relative to the front surface **121** of the head **120**). The height H_1 is preferably greater than the height H_2 . In one embodiment, the height H_1 is preferably in the range of 7 to 13 millimeters, most preferably 10 millimeters, while the height H_2 is preferably in the range of 5 to 11 millimeters, most preferably 6.5 millimeters. Thought of another way, cleaning element walls **133a-b** circumferentially surround only a base portion of the cleaning elements **134a-f** while a top portion of the cleaning elements **134a-f** extends beyond the top surfaces **143a-b** of the cleaning element walls **133a-b**.

[0035] In a preferred construction, the cleaning elements **134a-f** are preferably located within a range of 3 to 6 millimeters from the axis **B-B**, and most preferably 4 millimeters (measured from the base of the cleaning elements **134a-f**). The walls **133a-b** of the prophy cup are preferably located within a range of 6 to 12 millimeters from the axis **B-B**, and most preferably about 8 millimeters. As a result of the inclined/diverging orientation of the cleaning elements **134a-f** and their close proximity to the walls **133a-b** of the prophy cup, the inner top edge of the walls **133a-b** of the prophy cup abut against one or more of the cleaning elements **134a-f**. In one preferred embodiment, the width of the prophy cup **133** extends the substantial entirety of the width of the head **120**.

[0036] Referring now to FIGS. 5-8 concurrently, the mechanism of action of the novel cleaning element arrangement of the toothbrush **100** will be described. The following discussion is set forth as an explanation of the improved operation of the present invention. The following discussion is not to be construed as limiting the scope of the invention, unless specifically recited in the claims.

[0037] A dentifrice is initially applied to the head **120** of the toothbrush **100** which fills the cavity **136** formed by the hollow cleaning element cone (which is formed by the elongated cleaning elements **134a-f**). The funnel shape of the cavity **136** helps capture, hold and direct the dentifrice into the toothbrush during dentifrice application and subsequent brushing. The central elongated cleaning element **135** may further assist with dentifrice maintenance and dispersion. Once the dentifrice fills the cavity **136**, it can flow through the spaces between adjacent elongated cleaning elements **134a-f** and into the annular channel **137** formed between the hollow cleaning element cone (which is formed by the elongated cleaning elements **134a-f**) and the prophy cup (consisting of arcuate walls **133a-b**). The inclined orientation of the elongated cleaning elements **134a-f** results in the annular channel **137** having a substantially closed roof (at least in certain sections), thereby further helping to keep the dentifrice within the toothbrush **100**. The dentifrice then flows through the gaps **139** formed between the arcuate sections **133a-b**. Because the gaps **139** are located only along the longitudinal axis **A-A** of the head, the dentifrice escaping from the prophy cup via the gaps **139** is forced into the first and second sets **131a-j**, **132a-j** where it is further distributed during the brushing and/or massaging

of oral surfaces.

[0038] Finally, by surrounding the hollow cleaning element cone (which is formed by the elongated cleaning elements **134a-f**) with a shorter prophy cup (formed by arcuate walls **133a-b**), the prophy cup can provide additional support and rigidity to the elongated cleaning elements **134a-f** during brushing. More specifically, when the elongated cleaning elements **134a-f** are not under the standard forces imparted during brushing (i.e., in a non-use state), the elongated cleaning elements **134a-f** are either slightly spaced from the arcuate walls **133a-b** or abutted against the top inner edges of the arcuate walls **133a-b** in a non-forced state. However, when the elongated cleaning elements **134a-f** are subjected to standard forces imparted during brushing, the elongated cleaning elements **134a-f** flex outwardly from the axis **B-B** and come into contact with the arcuate walls **133a-b**, which provide additional support for the elongated cleaning elements **134a-f** so that more effective cleaning can be achieved. In some embodiments, the plurality of cleaning elements **134a-f** are also taller than any of the cleaning elements of the first and second sets that are immediately adjacent the prophy cup (not illustrated).

[0039] Additionally, as the arcuate walls **133a-b** are constructed of an elastomeric material, additional benefits are achieved. Specifically, the arcuate shaped elastomeric elements **133a-b** help spread toothpaste onto the tubules of the teeth. This helps reduce the sensitivity of the tooth because the tubules are thereby reduced in size. This is also a benefit with whitening because the toothpaste is spread onto the tubules. Moreover, elastomeric walls are better than bristles at this wiping toothpaste into the tubules of the teeth.

[0040] Referring back to FIGS. 5-6 and 8 concurrently, a preferred arrangement of the cleaning elements **131a-j**, **132a-j** of the first and second sets **131**, **132** within the distal and proximal regions **124**, **126** of the head **120** will be described according to one embodiment of the present invention. All of the cleaning elements **131a-j**, **132a-j** extend from the front surface **121** of the head in a substantially normal orientation.

[0041] The first set **131** comprises a first grouping consisting of cleaning element walls **131c-e** and elongated cleaning elements **131a-b**, **131f-g**. This first grouping of cleaning elements **131a-131g** is disposed in a par-elliptical arrangement along the distal periphery of the head **120**. The elongated cleaning elements **131a-b**, **131f-g** are preferably cylindrical bristle tufts whose free ends taper to a point. The cleaning element walls **131c-e** are preferably walls of densely packed bristles. The height of the cleaning element walls **131c-e** increase toward the distal end of the head **120**, thereby forming a tapered edge at the distal edge of the cleaning element field.

[0042] Similarly, the second set **132** comprises a first grouping consisting of cleaning element walls **132c-e** and elongated cleaning elements **132a-b**, **132f-g**. This first grouping of cleaning elements **132a-132g** is disposed in a par-elliptical arrangement along the distal periphery of

the head **120**. The elongated cleaning elements **132a-b**, **132f-g** are preferably cylindrical bristle tufts whose free ends taper to a point. The cleaning element walls **132c-e** are preferably walls of densely packed bristles. The height of the cleaning element walls **132c-e** increase toward the distal end of the head **120**, thereby forming a tapered edge at the distal edge of the cleaning element field.

[0043] The first set **131** also comprises a second grouping, consisting of arcuate cleaning element walls **131h**, **131j** and central cleaning element **131i**. The arcuate cleaning element walls **131h**, **131j** are arranged so as to form a loop about a center point from which the central cleaning element **131i** extends. The arcuate cleaning element walls **131h**, **131j** are preferably elastomeric walls but can be densely packed bristles. This second grouping of cleaning element **131h-j** is located within the par-elliptical shape formed by the first grouping of cleaning elements **131a-g**. The central cleaning element **131i** extends a height that is greater than the height of the arcuate cleaning element walls **131h**, **131j**. The height of the central cleaning element **131j** is less than the height of the central cleaning element **135** of the third set **138**. However, the height of the arcuate cleaning element walls **131h**, **131j** is greater than the height of the arcuate wall elements **133a-b** of the third set **38**.

[0044] Similarly, the second set **132** also comprises a second grouping, consisting of arcuate cleaning element walls **132h**, **132j** and central cleaning element **132i**. The arcuate cleaning element walls **132h**, **132j** are arranged so as to form a loop about a center point from which the central cleaning element **132i** extends. The arcuate cleaning element walls **132h**, **132j** are preferably elastomeric walls but can be densely packed bristles. This second grouping of cleaning element **132h-j** is located within the par-elliptical shape formed by the first grouping of cleaning elements **132a-g**. The central cleaning element **132i** extends a height that is greater than the height of the arcuate cleaning element walls **132h**, **132j**. The height of the central cleaning element **132j** is less than the height of the central cleaning element **135** of the third set **138**. However, the height of the arcuate cleaning element walls **132h**, **132j** is greater than the height of the arcuate wall elements **133a-b** of the third set **38**.

[0045] Both of the loops formed by the arcuate cleaning element walls **132h**, **132j** and **131h**, **131j** respectively are located so that their center points are located along the longitudinal axis **A-A** of the head **120**.

[0046] Referring now to FIGS. 9A-9B concurrently, a manual toothbrush **200** according to a second embodiment of the present invention is illustrated. The toothbrush **200** is identical to the toothbrush **100** described above with respect to FIGS. 1-8 except that the central cleaning element **135** is omitted. In order to avoid redundancy, a further detailed description of the toothbrush **200** and its functioning is omitted with the understanding that the corresponding elements of toothbrush **200** are numbered the same as the toothbrush **100** except that

they are in the "200 series." The above discussion with respect to toothbrush **100** is thus applicable to the toothbrush **200**.

[0047] Referring now to FIGS 10A-10B concurrently, a manual toothbrush **300** according to a third embodiment of the present invention is illustrated. The toothbrush **300** is identical to the toothbrush **100** described above with respect to FIGS. 1-8 except that the hollow cone structure **334** is formed by eight elongated cleaning elements rather than six. In order to avoid redundancy, a further detailed description of the toothbrush **300** and its functioning is omitted with the understanding that the corresponding elements of toothbrush **300** are numbered the same as the toothbrush **100** except that they are in the "300 series." The above discussion with respect to toothbrush **100** is thus applicable to the toothbrush **300**.

[0048] Referring now to FIGS 11A-11B concurrently, a manual toothbrush **400** according to a fourth embodiment of the present invention is illustrated. The toothbrush **400** is identical to the toothbrush **100** described above with respect to FIGS. 1-8 except that the hollow cone structure **434** is formed by ten elongated cleaning elements rather than six. In order to avoid redundancy, a further detailed description of the toothbrush **400** and its functioning is omitted with the understanding that the corresponding elements of toothbrush **400** are numbered the same as the toothbrush **100** except that they are in the "400 series." The above discussion with respect to toothbrush **100** is thus applicable to the toothbrush **400**.

[0049] Referring now to FIGS 12A-12C concurrently, a manual toothbrush **500** according to a fifth embodiment of the present invention is illustrated. The toothbrush **500** is identical to the toothbrush **100** described above with respect to FIGS. 1-8 except that the central cleaning elements **135** is omitted and the elongated cleaning elements **534a-f** that form the hollow cone structure **534** converge upon the axis B-B, thereby forming a full cone rather than a truncated cone. In order to avoid redundancy, a further detailed description of the toothbrush **500** and its functioning is omitted with the understanding that the corresponding elements of toothbrush **500** are numbered the same as the toothbrush **100** except that they are in the "500 series." The above discussion with respect to toothbrush **100** is thus applicable to the toothbrush **400**.

[0050] Referring now to FIG. 13, a cleaning element disc **600** for incorporation into an ansate oral care implement is illustrated. The cleaning element disc **600** is essentially a plate-like disc that incorporates the third set **138** of cleaning elements described above with respect to FIGS. 1-8. The apparatus **600** generally comprises a circular base plate **601** and the third set **138** of cleaning elements described above with respect to FIGS. 1-8. In order to avoid redundancy, a further detailed description of the third set **138** of cleaning elements is omitted. However, it is to be understood that the cleaning element disc **600** can utilize any of the variations of the cleaning element arrangement disclosed above with respect to FIGS.

9A-12C.

[0051] The cleaning element disc **600** is particularly suited for use with powered toothbrushes wherein the cleaning element disc **600** will lock into place on the powered toothbrush and be operably coupled to a rotary element. The cleaning element disc **600**, however, can also be used in manual toothbrushes wherein the cleaning element disc **600** can snap lock/unlock into and out of the head of the toothbrush for replacement. Such techniques are known in the art.

[0052] Finally, it should be noted that in certain embodiments of the invention, a plurality of the third sets **138** of cleaning elements can be arranged on the head **120** of the toothbrush **100**. In such an embodiment, the third sets **138** of cleaning elements are preferably aligned along the longitudinal axis **A-A** of the head **120**. Moreover, in such an embodiment, any of the embodiments of the third sets can be used.

[0053] While a number of embodiments of the current invention have been described and illustrated in detail, various alternatives and modifications will become readily apparent to those skilled in the art without departing from the scope of the invention.

Claims

1. An oral care implement (100, 200, 300, 400, 500) comprising:

a handle (110);
a head (120) connected to the handle (110), the head (120) comprising a first surface (121) and second surface (122) opposite the first surface (121);
a plurality of cleaning elements (134) extending from the first surface (121) of the head (120) and forming a ring about an axis (B-B); and
a cleaning element wall (133, 233, 333, 433, 533) extending from the first surface (121) of the head (120) and surrounding the plurality of cleaning elements (134) so as to form a loop that surrounds the ring, wherein the cleaning element wall (133, 233, 333, 433, 533) is an elastomeric wall;

characterised in that each of the cleaning elements (134) extend from the first surface (121) of the head (120) at an inclined orientation so as to radially diverge from the axis (B-B).

2. The oral care implement (100, 200, 300, 400, 500) of claim 1 wherein the plurality of cleaning elements (134) are bristle tufts.
3. The oral care implement (100, 200, 300, 400, 500) of claim 1 wherein the cleaning elements (134) are spaced from a top inner edge of the cleaning element

wall (133, 233, 333, 433, 533) and are flexible into contact with the top inner edge of the cleaning element wall (133,233,333,433,533).

4. The oral care implement (100, 200, 300, 400, 500) of claim 1 wherein the cleaning element wall (133, 233, 333, 433, 533) comprises a plurality of arcuate sections (133a-b) that collectively define a substantially closed loop, each arcuate section (133a-b) separated from an adjacent arcuate section (133a-b) by a gap; and wherein the cleaning element wall (133, 233, 333, 433, 533) comprises only two arcuate sections (133a-b), and wherein the arcuate sections (133a-b) are arranged so that the gaps are located along a longitudinal axis of the head (120).
5. The oral care implement of any preceding claims, wherein the axis (B-B) extends from the first surface (121) in a substantially normal orientation.
6. The oral care implement of any preceding claim, wherein each cleaning element (134) radially diverges from the axis (B-B) at an angle θ in a range of 1 to 15 degrees, more preferably 3 to 5 degrees, and most preferably about 4 degrees.
7. The oral care implement of any preceding claim, wherein the cleaning elements (134) are equidistantly circumferentially spaced from one another.
8. The oral care implement of any preceding claim, wherein the cleaning elements (134) form a hollow cone, wherein the cleaning element wall is formed by arcuate sections of cleaning element walls (133a-b) which form a prophy cup (133) as a substantially closed loop that concentrically surrounds the hollow cone.
9. The oral care implement of claim 8, wherein the prophy cup (133) extends normally from the first surface (121), or alternatively wherein the prophy cup (133) is inclined either towards or away from the axis (B-B).
10. The oral care implement of any preceding claim, wherein the cleaning elements (134) are located within a range of 3 to 6mm from the axis (B-B), most preferably about 4mm, as measured from the base of the cleaning elements (134).
11. The oral care implement of claim 8 or 9, wherein the plurality of cleaning elements (634) and the cleaning element wall (633) are incorporated on a plate-like cleaning element disk (600) which is incorporated into the oral care implement.
12. The oral care implement of claim 11, wherein the oral care implement is a powered toothbrush and wherein the cleaning element disk (600) is locked

into place on the powered toothbrush and is operably coupled to a rotary element.

13. The oral care implement of any preceding claim, comprising a third set (138) of cleaning elements extending from a middle region (123) of the head (120), wherein the third set (138) consists of a conical arrangement of said cleaning elements (134), a central cleaning element (135) extending from the middle region (123) and a prophy cup (133) surrounding said cleaning elements, the oral care implement further comprising a first set of cleaning elements (131) extending from distal region (124) of the head (120) and a second set of cleaning elements (132) extending from a proximal region (126) of the head (120).

Patentansprüche

1. Mundpflegevorrichtung (100, 200, 300, 400, 500) umfassend:
 - einen Griff (110);
 - einen mit dem Griff (110) verbundenen Kopf (120), wobei der Kopf (120) eine erste Oberfläche (121) und eine zweite Oberfläche (122) gegenüber der ersten Oberfläche (121) umfasst;
 - eine Vielzahl von Reinigungselementen (134), die sich aus der ersten Oberfläche (121) des Kopfes (120) erstrecken und einen Ring um eine Achse (B-B) bilden; und
 - eine Reinigungselementwand (133, 233, 333, 433, 533), die sich aus der ersten Oberfläche (121) des Kopfes (120) erstreckt und die Vielzahl von Reinigungselementen (134) umgibt, um eine Schleife zu bilden, die den Ring umgibt, wobei die Reinigungselementwand (133, 233, 333, 433, 533) eine elastomere Wand ist;
- dadurch gekennzeichnet, dass** sich jedes der Reinigungselemente (134) aus der ersten Oberfläche (121) des Kopfes (120) in einer geeigneten Orientierung erstreckt, um radial von der Achse (B-B) zu divergieren.
2. Mundpflegevorrichtung (100, 200, 300, 400, 500) nach Anspruch 1, wobei die Vielzahl von Reinigungselementen (134) Borstenbüschel sind.
3. Mundpflegevorrichtung (100, 200, 300, 400, 500) nach Anspruch 1, wobei die Reinigungselemente (134) ab einer oberen Innenkante der Reinigungselementwand (133, 233, 333, 433, 533) beabstandet sind und flexibel in Kontakt mit der oberen Innenkante der Reinigungselementwand (133, 233, 333, 433, 533) sind.
4. Mundpflegevorrichtung (100, 200, 300, 400, 500)

nach Anspruch 1, wobei die Reinigungselementwand (133, 233, 333, 433, 533) eine Vielzahl bogenförmiger Abschnitte (133a-b) umfasst, die kollektiv eine im Wesentlichen geschlossene Schleife definieren, wobei jeder Bogenabschnitt (133a-b) von einem angrenzenden Bogenabschnitt (133a-b) durch eine Lücke getrennt ist; und wobei die Reinigungselementwand (133, 233, 333, 433, 533) nur zwei Bogenabschnitte (133a-b) umfasst, und wobei die Bogenabschnitte (133a-b) so angeordnet sind, dass sich die Lücken entlang einer Längsachse des Kopfes (120) befinden.

5. Mundpflegevorrichtung nach irgendeinem der vorhergehenden Ansprüche, wobei sich die Achse (B-B) aus der ersten Oberfläche (121) in einer im Wesentlichen normalen Orientierung erstreckt.

6. Mundpflegevorrichtung nach irgendeinem vorhergehenden Anspruch, wobei jedes Reinigungselement (134) von der Achse (B-B) mit einem Winkel θ in einem Bereich von 1 bis 15 Grad, bevorzugter 3 bis 5 Grad und am meisten bevorzugt um 4 Grad divergiert.

7. Mundpflegevorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die Reinigungselemente (134) abstandsgleich zirkumferenziell voneinander beabstandet sind.

8. Mundpflegevorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die Reinigungselemente (134) einen Hohlkegel bilden, wobei die Reinigungselementwand durch Bogenabschnitte von Reinigungselementwänden (133-a-b) gebildet ist, die eine Prophy-Tasse (133) als eine im Wesentlichen geschlossene Schleife bilden, welche den Hohlkegel konzentrisch umgibt.

9. Mundpflegevorrichtung nach Anspruch 8, wobei sich die Prophy-Tasse (133) normalerweise aus der ersten Oberfläche (121) erstreckt oder alternativ, wobei die Prophy-Tasse (133) in Richtung der Achse (B-B) oder von dieser weg geneigt ist.

10. Mundpflegevorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die Reinigungselemente (134) innerhalb eines Bereichs von 3 bis 6 mm, am meisten bevorzugt ca. 4 mm von der Achse (B-B), wie von der Basis der Reinigungselemente (134) aus gemessen, positioniert sind.

11. Mundpflegevorrichtung nach Anspruch 8 oder 9, wobei die Vielzahl der Reinigungselemente (634) und die Reinigungselementwand (633) auf einer tellerförmigen Reinigungselementscheibe (600) inkorporiert sind, die in die Mundpflegevorrichtung inkorporiert ist.

12. Mundpflegevorrichtung nach Anspruch 11, wobei die Mundpflegevorrichtung eine angetriebene Zahnbürste ist, und wobei die Reinigungselementscheibe (600) auf der angetriebenen Zahnbürste eingerastet ist und betriebsfähig an ein Drehelement gekoppelt ist.

13. Mundpflegevorrichtung nach irgendeinem vorhergehenden Anspruch, die einen dritten Satz (138) von Reinigungselementen umfasst, die sich aus einem mittigen Bereich (123) des Kopfes (120) erstrecken, wobei der dritte Satz (138) aus einer konischen Anordnung der genannten Reinigungselemente (134) besteht, wobei sich ein mittiges Reinigungselement (135) aus dem mittigen Bereich (123) erstreckt und eine Prophy-Tasse (133) die genannten Reinigungselemente umgibt, wobei die Mundpflegevorrichtung ferner einen ersten Satz Reinigungselemente (131), die sich aus dem distalen Bereich (124) des Kopfes (120) erstrecken und einen zweiten Satz Reinigungselemente (132) umfasst, die sich aus einem proximalen Bereich (126) des Kopfes (120) erstrecken.

Revendications

1. Instrument d'hygiène bucco-dentaire (100, 200, 300, 400, 500) comprenant :

un manche (110) ;
une tête (120) reliée au manche (110), la tête (120) comprenant une première surface (121) et une seconde surface (122) opposée à la première surface (121) ;
une pluralité d'éléments de nettoyage (134) s'étendant depuis la première surface (121) de la tête (120) et disposée en anneau autour de l'axe (B-B) ; et
une paroi d'éléments de nettoyage (133, 233, 333, 433, 533) s'étendant de la première surface (121) de la tête (120) et entourant circonférentiellement la pluralité d'éléments de nettoyage (134) de manière à former une boucle qui entoure l'anneau, laquelle paroi d'éléments de nettoyage (133, 233, 333, 433, 533) est une paroi élastomère ;

caractérisé en ce que chacun des éléments de nettoyage (134) s'étend depuis la première surface (121) de la tête (120) en étant incliné de façon à diverger radialement par rapport à l'axe (B-B).

2. Instrument d'hygiène bucco-dentaire (100, 200, 300, 400, 500) selon la revendication 1, dans lequel la pluralité d'éléments de nettoyage (134) est constituée de faisceaux de poils.

3. Instrument d'hygiène bucco-dentaire (100, 200, 300, 400, 500) selon la revendication 1, dans lequel les éléments de nettoyage (134) sont espacés d'un bord interne supérieur de la paroi d'éléments de nettoyage (133, 233, 333, 433, 533) et sont flexibles en contact avec le bord interne supérieur de la paroi d'éléments de nettoyage (133, 233, 333, 433, 533). 5
4. Instrument d'hygiène bucco-dentaire (100, 200, 300, 400, 500) selon la revendication 1, dans lequel la paroi d'éléments de nettoyage (133, 233, 333, 433, 533) comprend une pluralité de sections arquées (133a-b) qui définissent collectivement une boucle substantiellement fermée, chaque section arquée (133a-b) étant séparée d'une section arquée adjacente (133a-b) par un espace ; et dans lequel la paroi d'éléments de nettoyage (133, 233, 333, 433, 533) comprend seulement deux sections arquées (133a-b) et lesquelles sections arquées (133a-b) sont disposées de sorte que les espaces soient situés le long d'un axe longitudinal de la tête (120). 10
5. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, dans lequel l'axe (B-B) s'étend depuis la première surface (121) dans une direction substantiellement normale. 15
6. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, dans lequel chaque élément de nettoyage (134) diverge de l'axe (B-B) à un angle θ situé dans la plage de 1 à 15 degrés, plus préférentiellement de 3 à 5 degrés et plus préférentiellement encore d'environ 4 degrés. 20
7. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, dans lequel les éléments de nettoyage (134) sont espacés circonférentiellement en des emplacements équidistants les uns des autres. 25
8. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, dans lequel les éléments de nettoyage (134) forment une cavité en forme d'entonnoir, dans laquelle la paroi d'éléments de nettoyage est formée par des sections arquées de parois d'éléments de nettoyage (133a-b) qui forment une cupule de polissage (133) en tant que boucle substantiellement fermée qui entoure de manière concentrique la cavité en forme d'entonnoir. 30
9. Instrument d'hygiène bucco-dentaire selon la revendication 8, dans lequel la cupule de polissage (133) s'étend normalement depuis la première surface (121) ou en alternative dans lequel la cupule de polissage (133) est inclinée soit en direction, soit à distance de l'axe (B-B). 35
10. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, dans lequel les éléments de nettoyage (134) sont situés à une distance de 3 à 6 mm de l'axe (B-B), plus préférentiellement d'environ 4 mm, en tant que mesurée depuis la base des éléments de nettoyage (134). 40
11. Instrument d'hygiène bucco-dentaire selon la revendication 8 ou 9, dans lequel la pluralité d'éléments de nettoyage (634) et la paroi d'éléments de nettoyage (633) sont incorporés sur un disque d'éléments de nettoyage en forme de plaque (600) qui est incorporé dans l'instrument d'hygiène bucco-dentaire. 45
12. Instrument d'hygiène bucco-dentaire selon la revendication 11, lequel est une brosse à dents électrique et dans lequel le disque d'éléments de nettoyage (600) est verrouillé en place sur la brosse à dents électrique et est accouplé de manière fonctionnelle à un élément rotatif. 50
13. Instrument d'hygiène bucco-dentaire selon l'une quelconque des revendications précédentes, comprenant un troisième ensemble (138) d'éléments de nettoyage s'étendant depuis une région intermédiaire (123) de la tête (120), dans lequel le troisième élément (138) consiste d'une disposition conique desdits éléments de nettoyage (134), d'un élément de nettoyage central (135) s'étendant depuis la région intermédiaire (123) et d'une cupule de polissage (133) entourant lesdits éléments de nettoyage, l'instrument d'hygiène bucco-dentaire comprenant en outre un premier ensemble d'éléments de nettoyage (131) s'étendant depuis la région distale (124) de la tête (120) et un second ensemble d'éléments de brosse (132) s'étendant depuis la région proximale (126) de la tête (120). 55

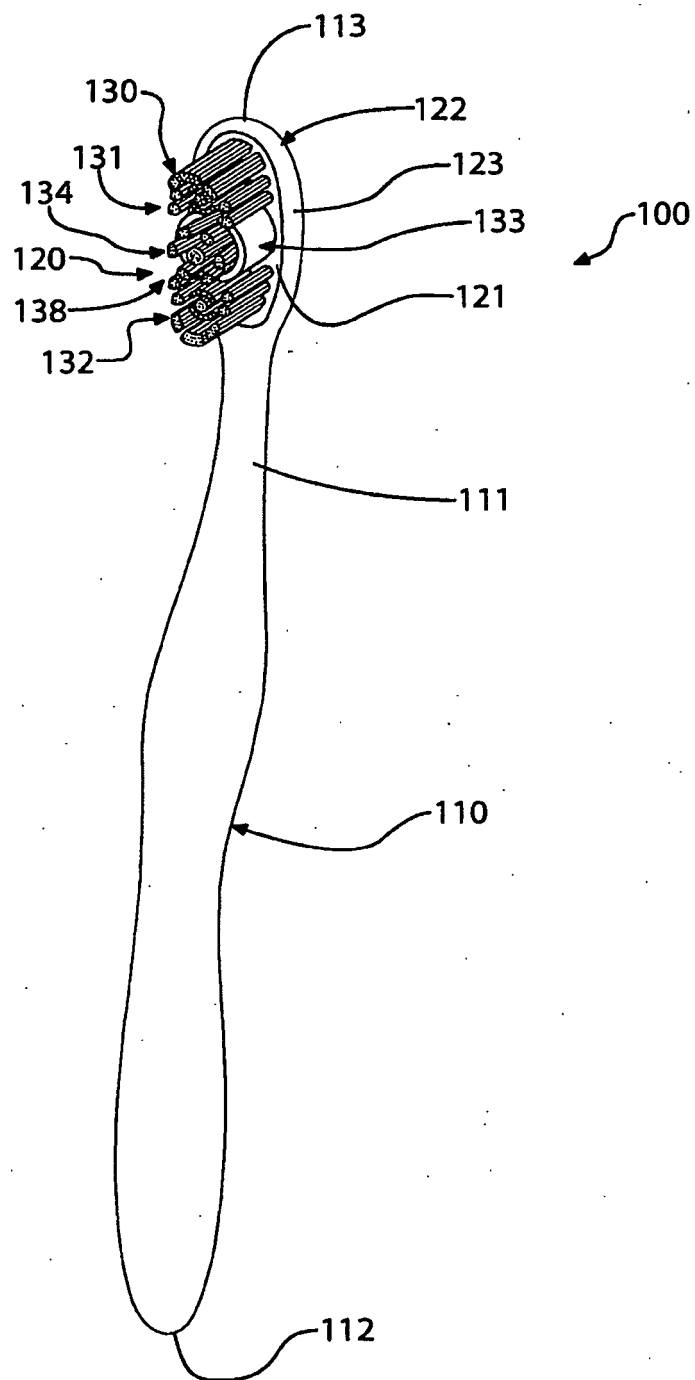


FIG. 1

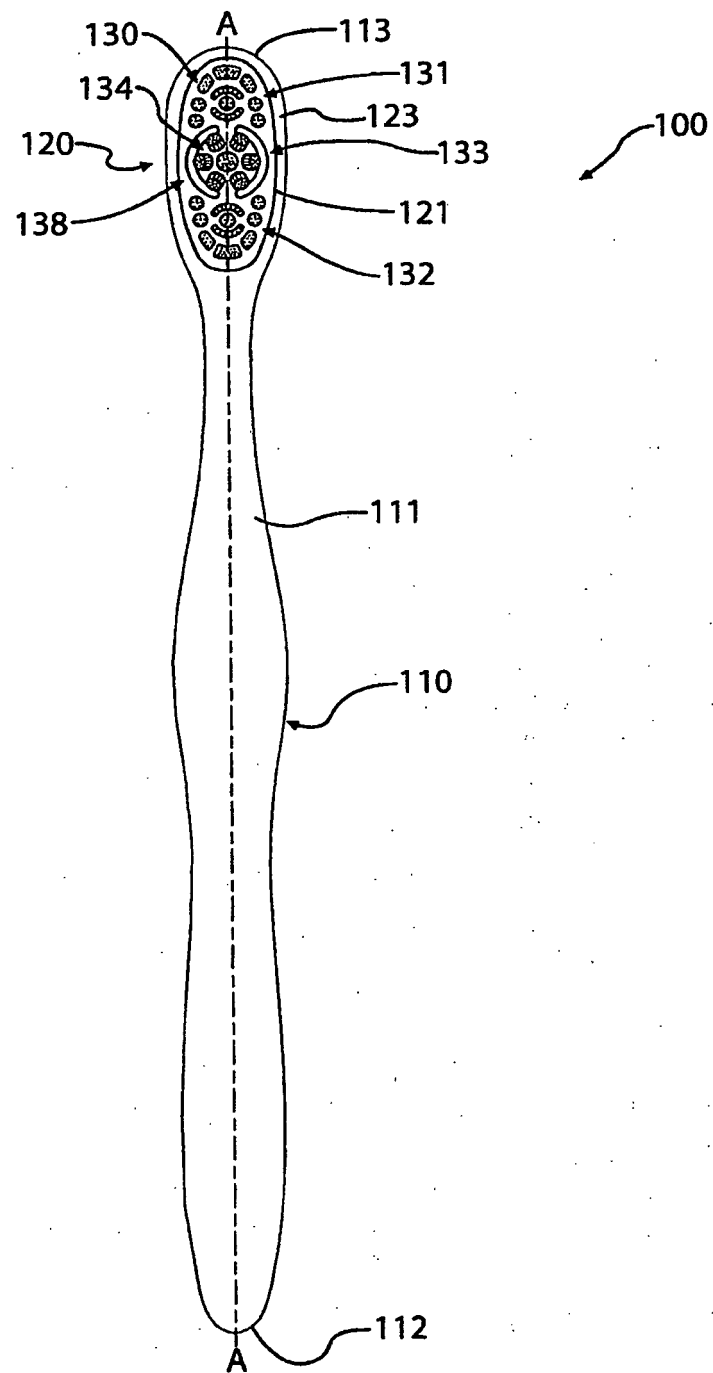


FIG. 2

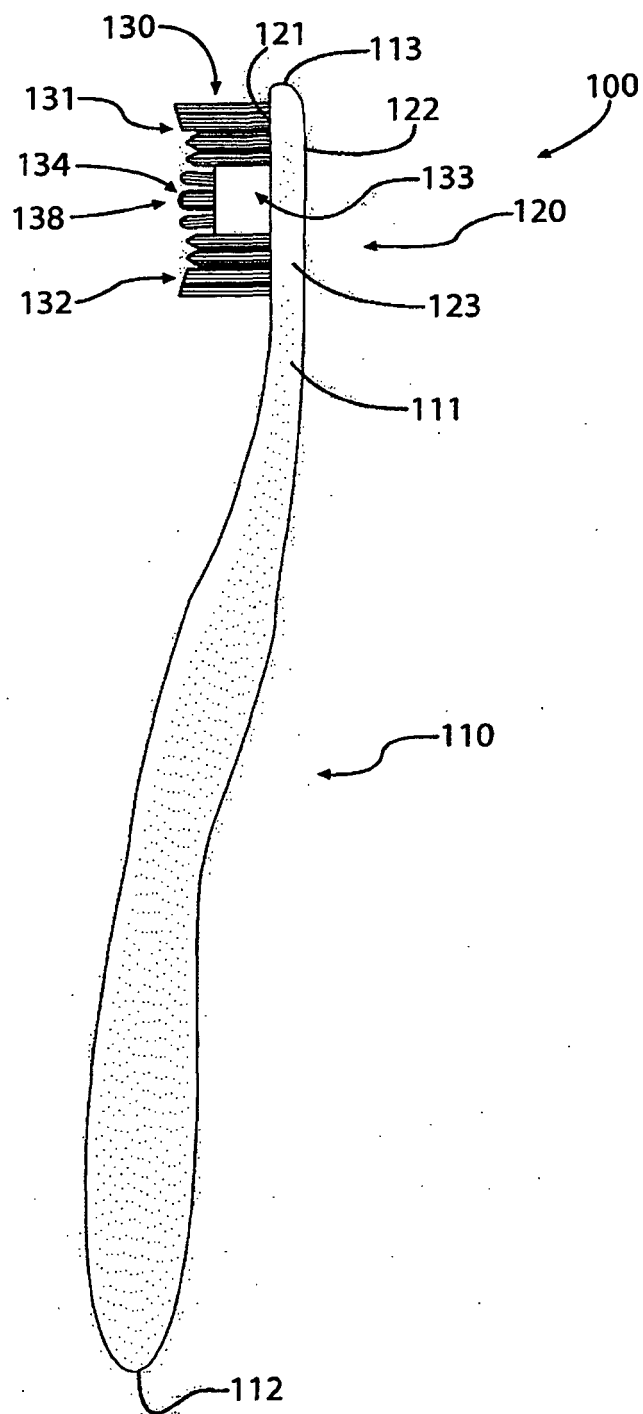


FIG. 3

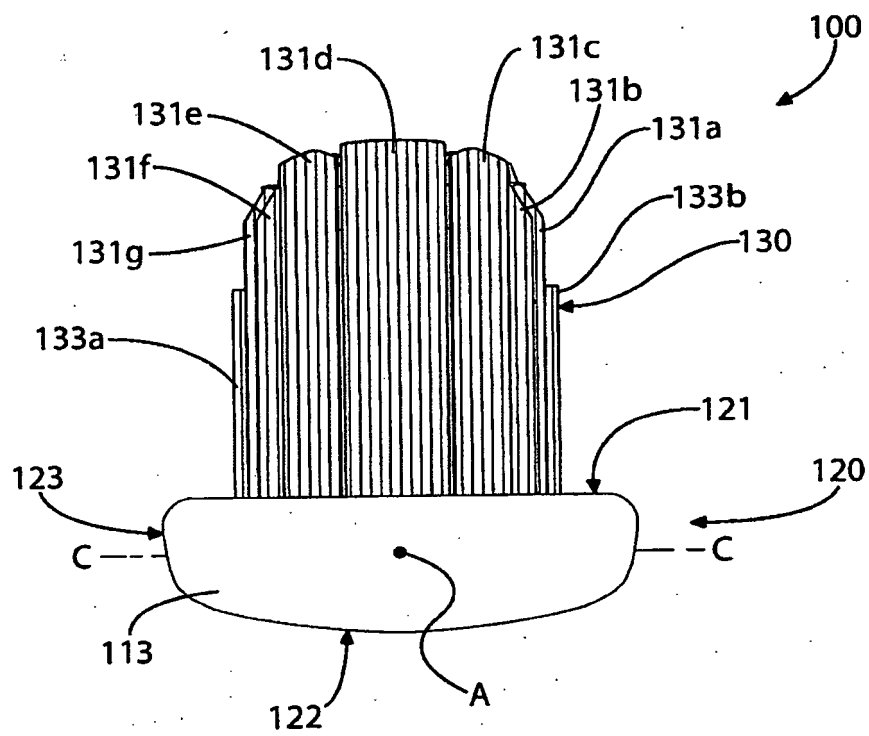


FIG. 4

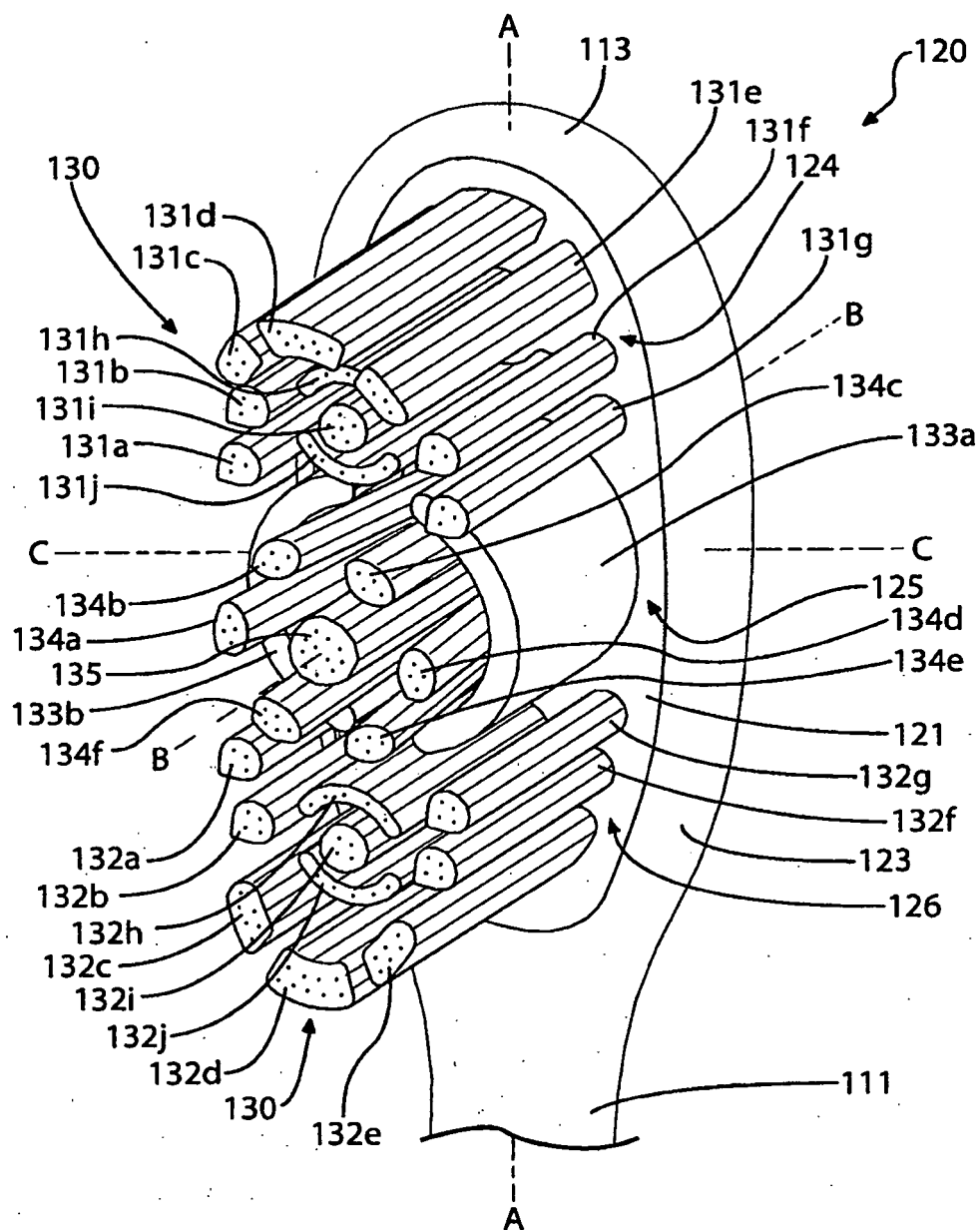


FIG. 5

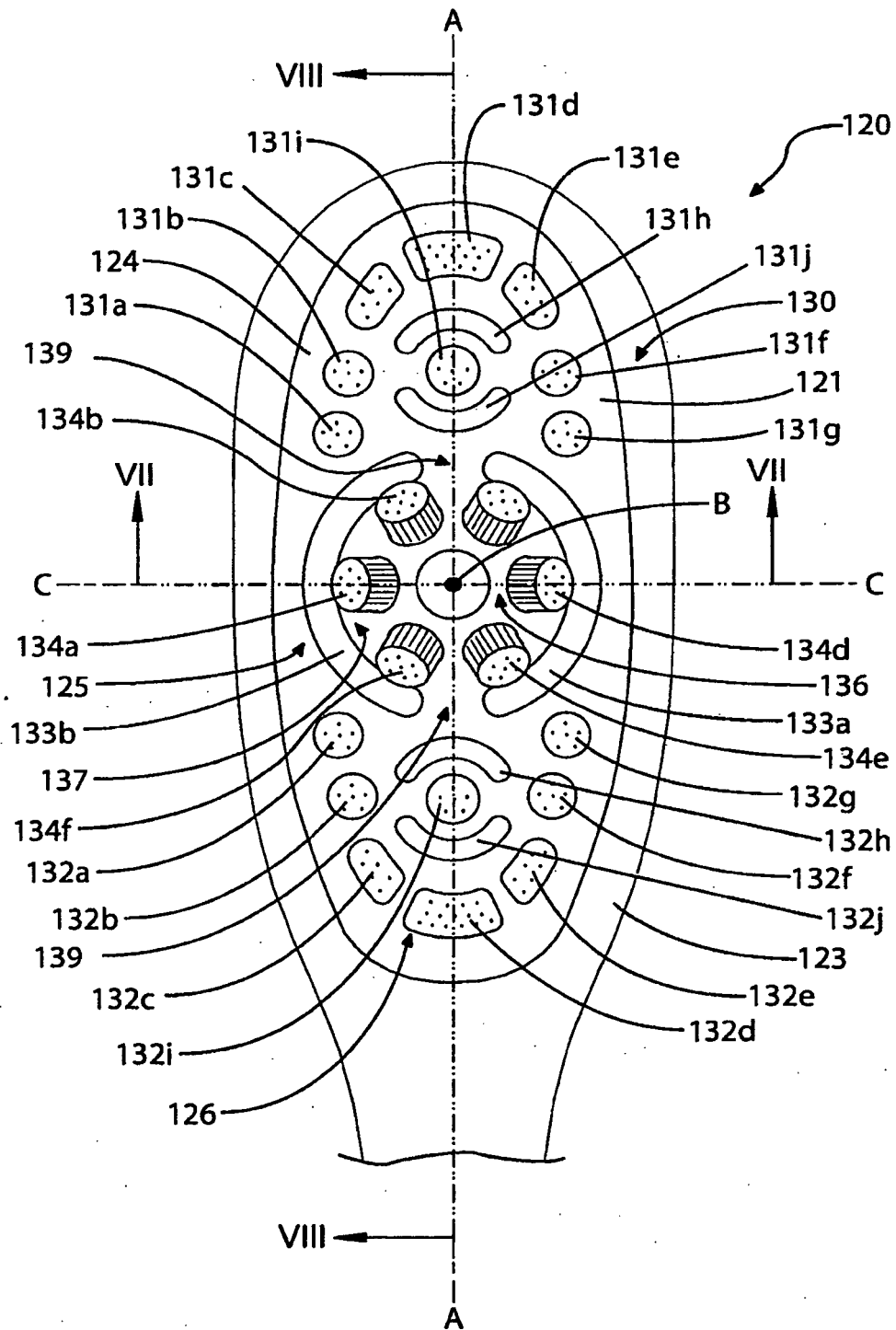


FIG. 6

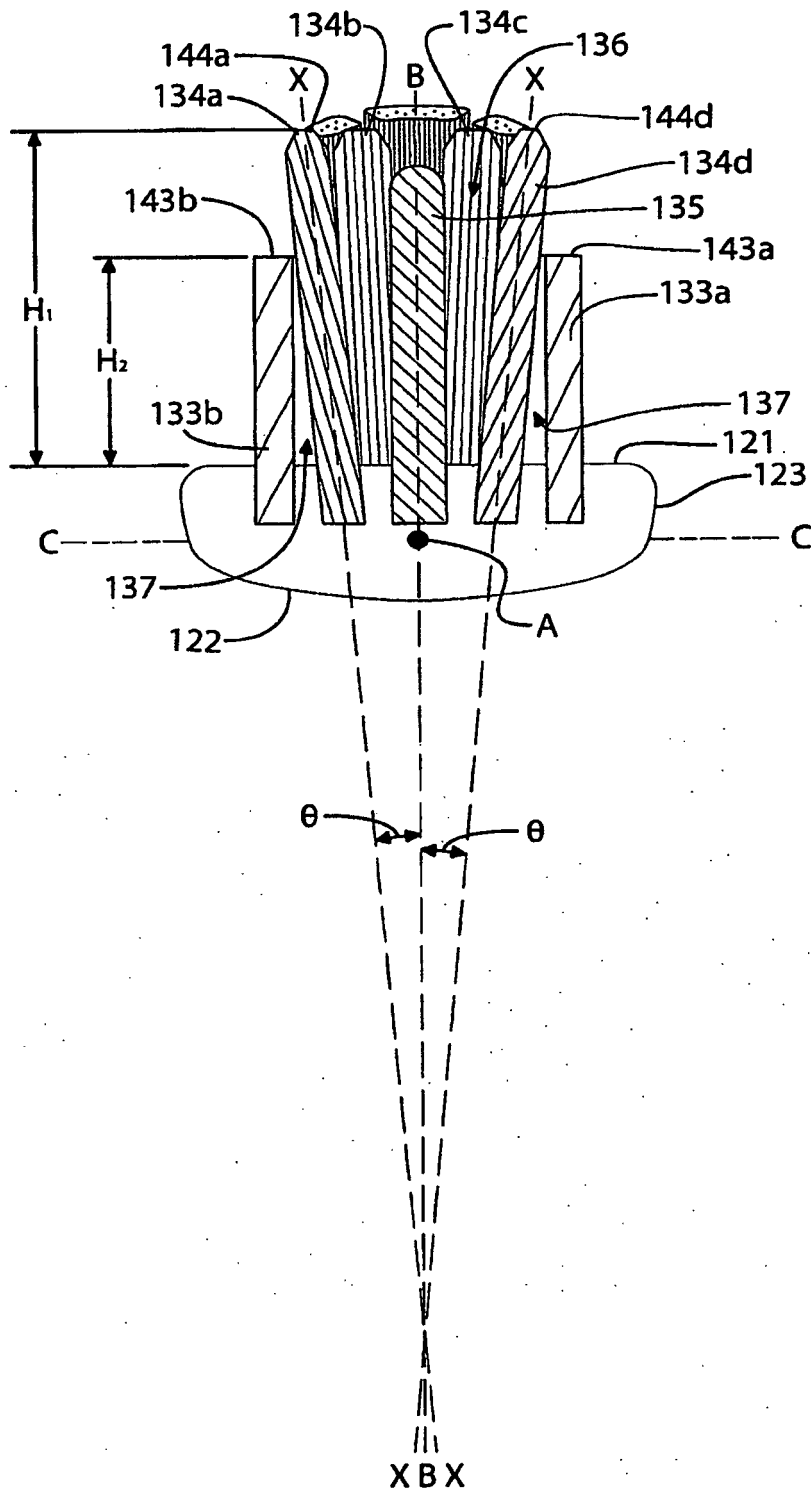


FIG. 7

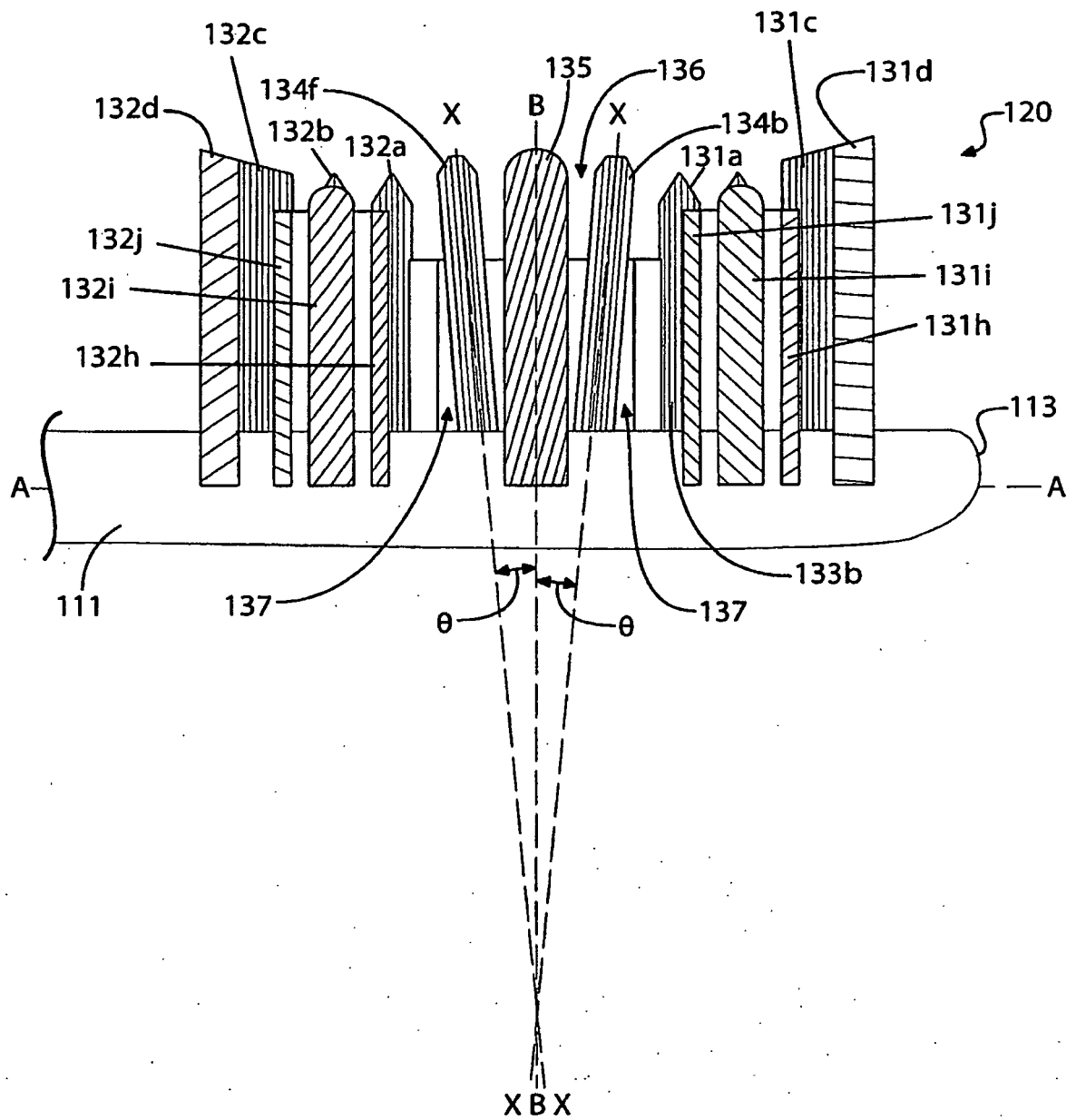


FIG. 8

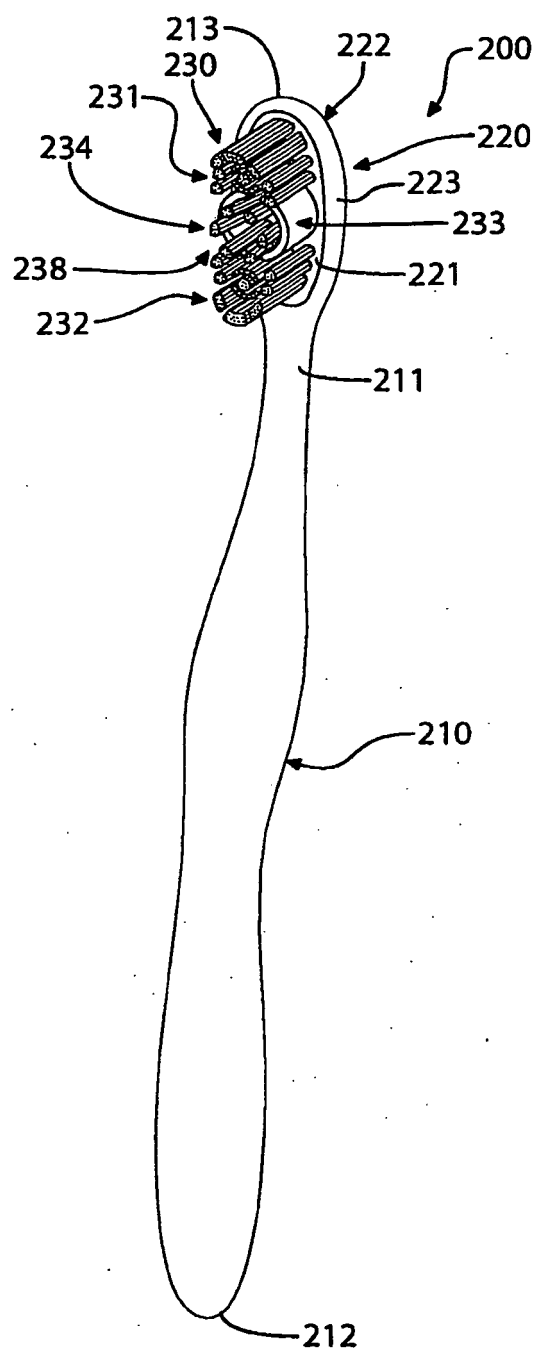


FIG. 9A

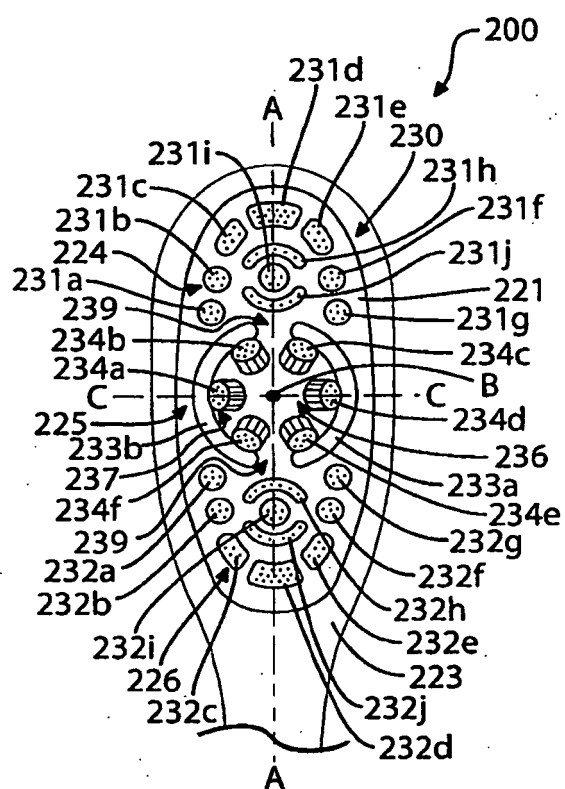


FIG. 9B

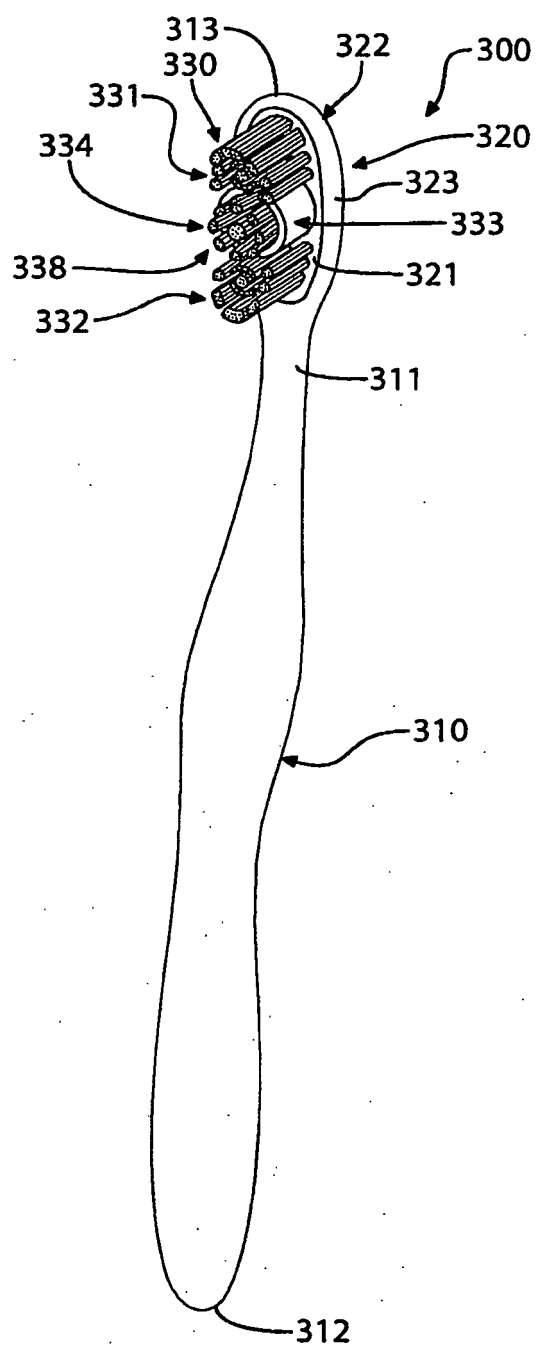


FIG. 10A

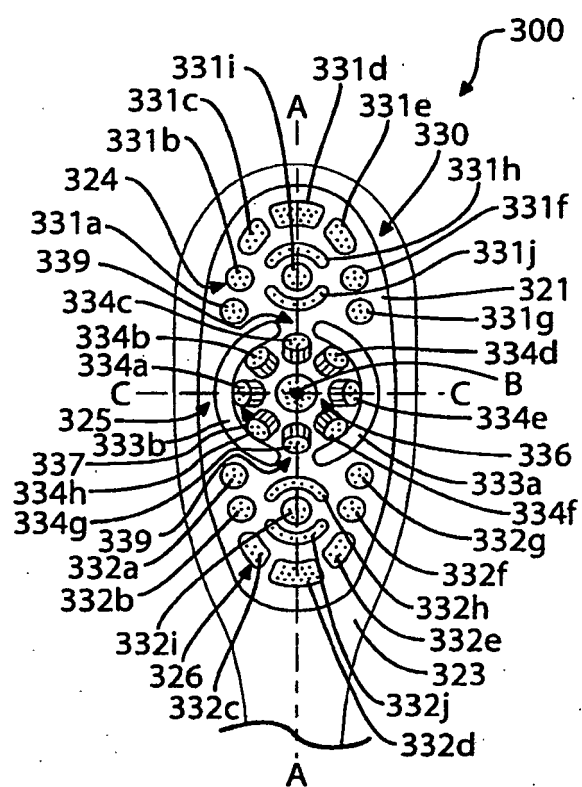


FIG. 10B

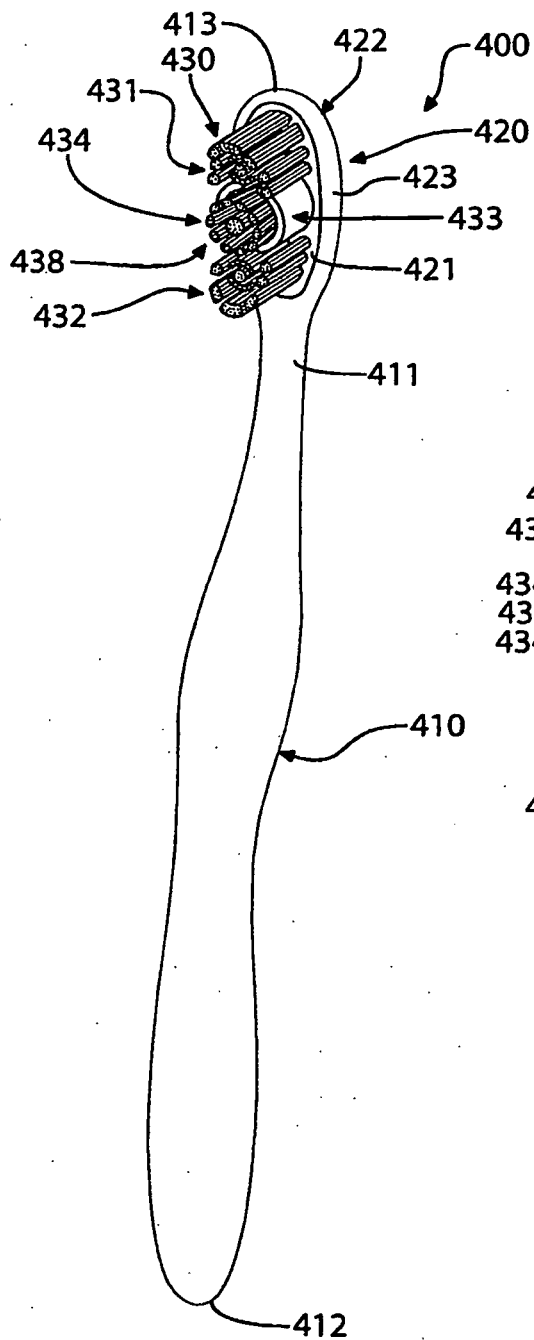


FIG. 11A

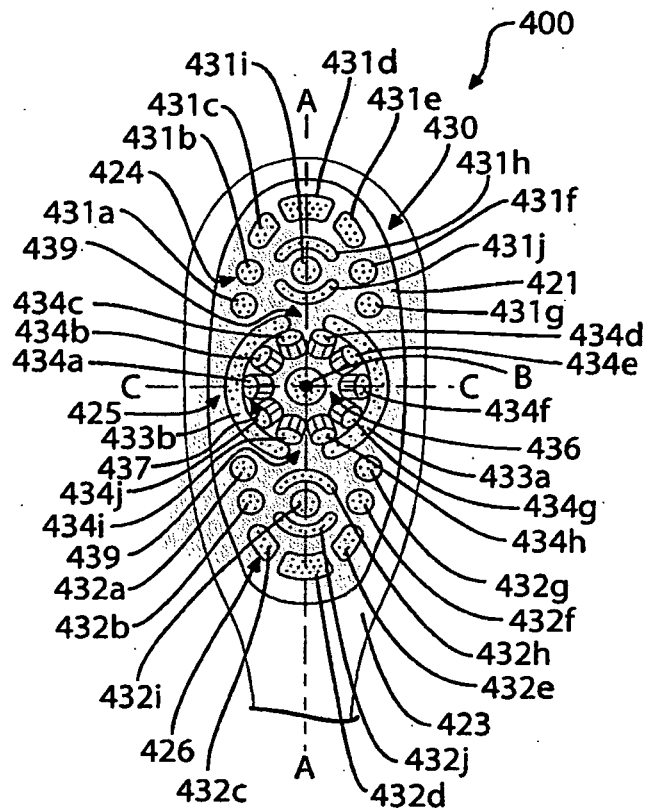


FIG. 11B

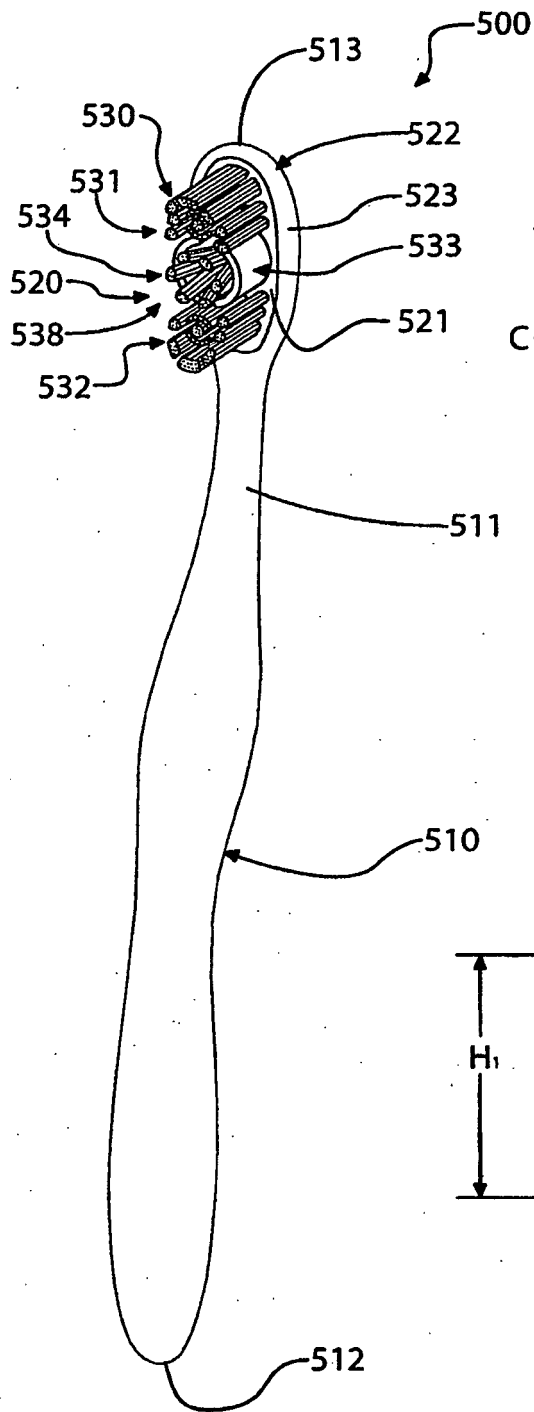


FIG. 12A

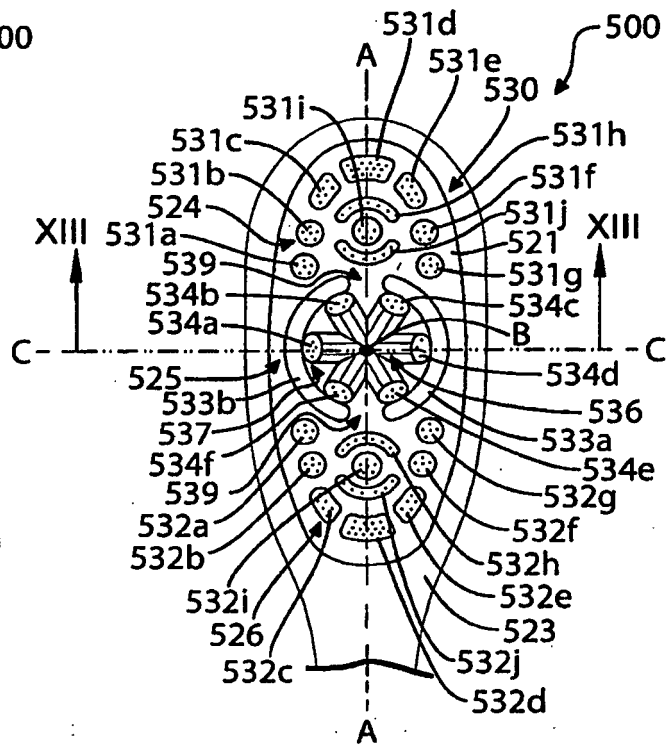


FIG. 12B

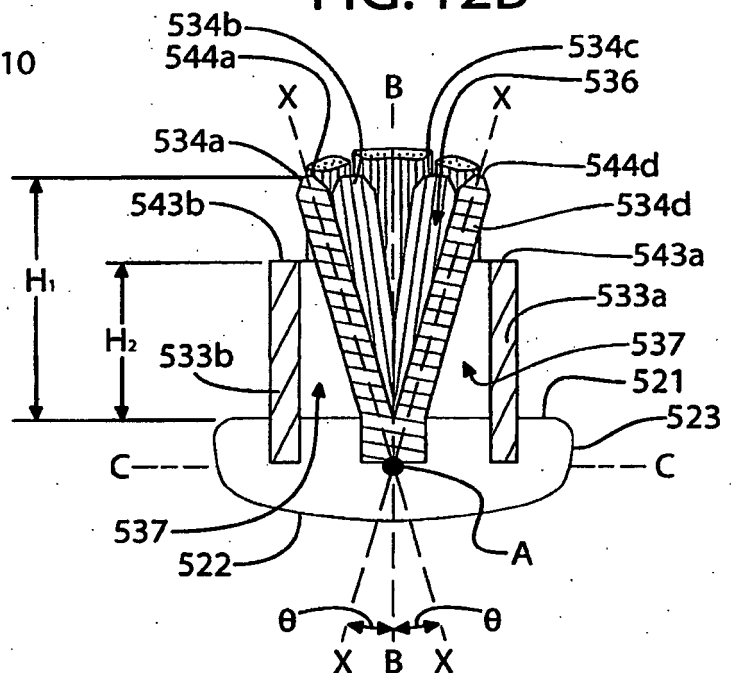


FIG. 12C

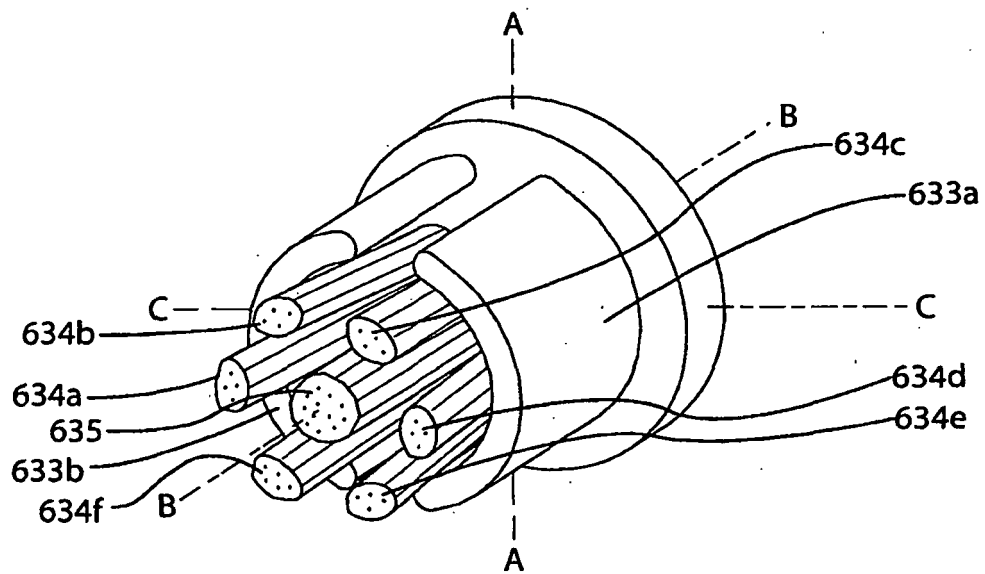


FIG. 13

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20050273954 A [0009]
- US 7143462 B [0018]