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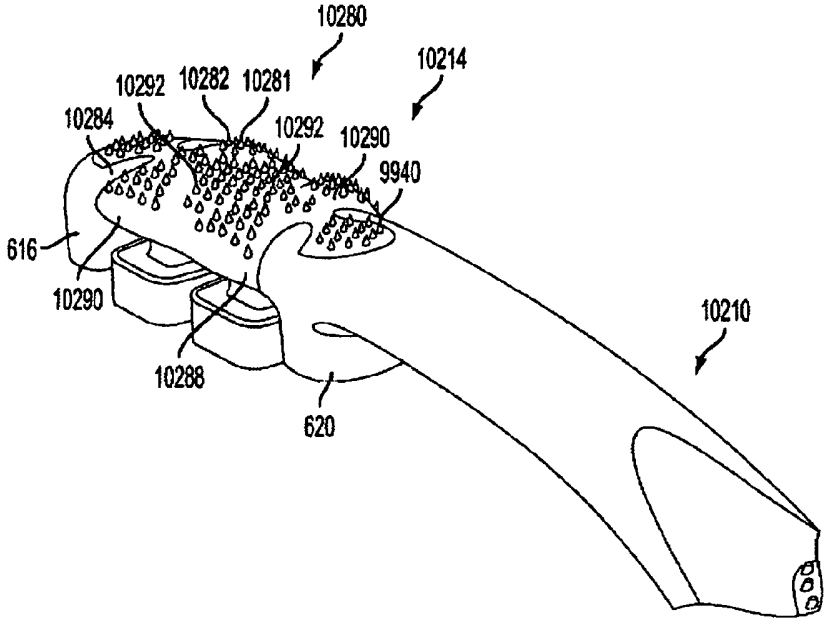

(57) Abstract: An oral care implement is provided having a handle and a head with a soft tissue cleanser and/or tooth cleaning elements. The tooth cleaning elements may be flexibly mounted in the head for movement from an initial position with respect to the head during use. The soft tissue cleanser may include a plurality of projections for cleaning the soft tissue. The soft tissue cleanser may include a face having hills and valleys upon which the projections are located. The handle may include a base with a gripping region and a projection protruding from the base in the gripping region. The handle may also have a grip surface with a plurality of spaced slot openings exposing portions of the base. The grip body may form opposite finger grips on the handle.

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ORAL CARE IMPLEMENT

FIELD OF THE INVENTION

[01] The present invention pertains to an oral care implement having various features that may include a cleanser for cleaning soft tissue surfaces in a user's mouth, tooth cleaning or tooth treating elements, movable cleaning features, vibratory mechanisms, and/or handle gripping features.

BACKGROUND OF THE INVENTION

[02] A variety of toothbrush configurations exist that have stationary and/or mechanically-driven movable cleaning elements. These conventional toothbrushes are dedicated to tooth cleaning/polishing operations and typically include a head portion directed to the cleaning/polishing operations, and a handle portion. The head typically has a flat or slightly altered surface to which the cleaning elements are attached, or to which mechanically-driven movable carriers for the cleaning elements are attached. The cleaning elements of these toothbrushes are configured for cleaning and/or for polishing a user's teeth, but are not configured for effective cleaning of soft tissue in a user's mouth, such as the user's tongue.

[03] Tongue scrapers exist as devices for removing micro debris disposed on a user's tongue. Conventional tongue scrapers are stand-alone devices directed to the singular purpose of scraping a user's tongue. These conventional devices typically include a handle and scraper portion without including other cleaning elements.

[04] Users manipulate conventional toothbrushes and tongue scrapers by grasping their handle portions. The handles are typically simple, linear rods of a relatively rigid material, which are neither comfortable for the user nor given to easy manipulation. As these devices are commonly used in wet conditions, their handles are often slippery during use.

[05] Many people use multiple oral care implements, such as toothbrushes and tongue scrapers, on a daily basis to accomplish multiple oral care tasks. For instance, a user may use a toothbrush to clean his teeth and then use a tongue scraper to remove debris from his tongue. The user may then re-use the toothbrush to further clean his tongue. Thus, the user may switch between various oral care implements during a single session in a wet environment.

BRIEF SUMMARY OF THE INVENTION

[06] The present invention pertains to an oral care implement that provides several advantages and that may be used for multiple functions. In one embodiment of the invention, an oral care

implement is provided that has a plurality of cleaning elements extending from the head, which are attached to a support that is flexibly attached to the head. The cleaning elements may include forward angled cleaning elements and/or rearward angled cleaning elements. The cleaning elements may further include a central support at the central portion of the support. The oral care implement may further include a soft tissue cleanser on the head, which may be disposed on an opposite face from the cleaning elements. The opposite face may include an undulating surface having hills and valleys upon which the projections are disposed.

[07] Embodiments of the invention may be multi-functional and include various combinations of features in advantageous combinations. Some embodiments include a soft tissue cleanser in combination with tooth cleaning features and/or in combination with gripping features on the handle that improve the user's grip and handling thereof. The embodiments may be manual or mechanically-driven devices, or combinations thereof. These and other aspects are discussed in relation to the following figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[08] 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.

[09] Figure 1 shows a side view, partially in section, of an embodiment of a toothbrush according to the invention and of a handle-closure part separated from one another (without a battery).

[10] Figure 2 shows a bottom view, partially in section, of another embodiment of a toothbrush according to the invention shown in the assembled state.

[11] Figure 3 shows a side view, partially in section, of the toothbrush according to Figure 2 and the closure part separated from one another (without a battery).

[12] Figure 4 shows a side view of a further embodiment of a toothbrush according to the invention shown in the assembled state.

[13] Figure 5 shows a front part of the toothbrush according to Figure 4 with different embodiments of exchangeable treatment heads.

[14] Figure 6 is a perspective view of an additional toothbrush embodiment in accordance with this invention.

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[15] Figure 7 is a side elevational view, in partial section, of the toothbrush shown in Figure 6.

[16] Figure 8 is a top, plan view of the toothbrush shown in Figures 6 and 7.

[17] Figure 9 is a side elevational view similar to Figure 7 partially broken away.

[18] Figure 10 is a side elevational view showing a subassembly of the bristle containing portion of the brush head in accordance with another aspect of this invention.

[19] Figure 11 is a side elevational view, in partial section, showing the subassembly of Figure 10 incorporated in a completed toothbrush.

[20] Figure 12 is a perspective view of a head of a further embodiment of the invention.

[21] Figure 13 is a partial cross-sectional view taken along line IX-IX in Figure 12.

[22] Figure 14 is a partial cross-sectional view of another embodiment of the invention taken along line IX-IX in Figure 12.

[23] Figure 15 is a partial cross-sectional view of a further embodiment taken along line IX-IX in Figure 12.

[24] Figure 16 is a partial cross-sectional view of an additional embodiment taken along line IX-IX in Figure 12.

[25] Figure 17 is a partial perspective view of yet another oral care implement in accordance with the present invention.

[26] Figure 18 is a partial cross-sectional view taken along line XIV-XIV in Figure 17.

[27] Figure 19 is a perspective view of a head of a further toothbrush embodiment in accordance with the present invention.

[28] Figure 20 is a top plan view of the head of Figure 19.

[29] Figures 21 and 22 are top plan views of the head illustrating alternative concave-shaped ridges for the head of Figure 19.

[30] Figure 23 is a partial cross-sectional view taken along line II-II in Figure 19.

[31] Figure 24 is a partial cross sectional plan view of an alternative structure taken along line II-II of Figure 19.

[32] Figures 25A and 25B are partial cross-sectional views of alternative ridge shapes for the embodiment of Figure 19.

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[33] Figures 26-39 are each a top plan view of the head illustrating an alternative ridge construction for the embodiment of Figure 19.

[34] Figures 40-44 are each a perspective view of a further embodiment of a head of an oral care implement in accordance with the invention.

[35] Figure 45 is top plan view of a further oral care implement in accordance with the present invention.

[36] Figure 46 is partial perspective view of a head portion of the oral care implement of Figure 45.

[37] Figure 47 is side view of a further oral care implement in accordance with the present invention.

[38] Figure 48 is partial perspective view of a head portion of the oral care implement of Figure 47.

[39] Figure 49 is side view of a further oral care implement in accordance with the present invention.

[40] Figure 50 is partial perspective view of a head portion of the oral care implement of Figure 49.

[41] Figure 51 is side view of a further oral care implement in accordance with the present invention.

[42] Figure 52 is partial perspective view of a head portion of the oral care implement of Figure 51.

[43] Figure 53 is partial perspective view of a head portion of yet another oral care implement in accordance with the present invention.

[44] Figures 54A-C show an additional oral care implement in accordance with the invention.

[45] Figure 55 is a perspective view of a head portion of an oral care implement in accordance with the invention.

[46] Figure 56 is a side view of the head portion shown in Figure 55.

[47] Figure 57 is a top view of the head portion shown in Figures 55 and 56.

[48] Figure 58 is a side view of a head portion of an oral care implement in accordance with the invention.

[49] Figure 59 is a top view of the head portion shown in Figure 58.

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[50] Figure 60 is a top view of a soft tissue cleanser side of an oral care implement in accordance with a further embodiment of the invention.

[51] Figure 61 is a partial perspective view of the oral care implement shown in Figure 60 without showing tooth cleaning elements attached to the pods.

[52] Figure 62 is a top view of a soft tissue cleanser side of an oral care implement in accordance with a further embodiment of the invention.

[53] Figure 63 is a partial perspective view of the oral care implement shown in Figure 62 without showing tooth cleaning elements attached to the pods.

[54] Figure 64 is a partial perspective view of an oral care implement according to a further embodiment of the invention without showing tooth cleaning elements attached to the pods.

[55] Figure 65 is a top view of a soft tissue cleanser side of an oral care implement in accordance with a further embodiment of the invention.

[56] Figure 66 is a partial perspective view of the oral care implement shown in Figure 65 without showing tooth cleaning elements attached to the pods.

DETAILED DESCRIPTION OF THE INVENTION

[57] The following embodiments describe aspects of the invention in the form of various oral care implement configurations that provide a variety of features and functions. Although these aspects are disclosed in the context of particular exemplary embodiments, the invention provides an oral care implement that includes one or more of the features described herein. The oral care implement may include a first feature described in one example configuration herein, as well as a second feature described in another example configuration herein.

[58] In other words, the invention contemplates mixing and matching features from the disclosed embodiments in various combinations into a single oral care implement. The present invention thus makes it possible to select a combination of cleaning/treating element configurations, tissue cleanser configurations, handle features, gripping features, mechanical driving features, materials and orientations, etc. to achieve intended results, and to deliver additional oral health benefits, such as enhanced cleaning, tooth polishing, tooth whitening, tongue cleansing, massaging of gums, etc.

[59] Oral care implements of various configurations are provided that generally include a handle and one or more cleaning features. The handle may include a mechanically-driven feature, such as rotating, vibrating, and/or moving cleaning elements. In one configuration, a

toothbrush is provided with a mechanical vibratory element and a head having a plurality of different types of cleaning/treating elements and cleaning areas which provide for an enhanced cleaning and/or treating effects. The cleaning/treating elements move by the mechanical vibratory device and/or independently of the mechanical vibratory device. Such a toothbrush, therefore, provides for synergistic and enhanced cleaning, scrubbing and massaging experience on the teeth and gums.

[60] A variety of toothbrush configurations are disclosed herein. One configuration is a toothbrush having multiple groupings of cleaning/treating elements that are uniquely mounted to the head of a toothbrush, which mounting facilitates flexible orientation of those groupings relative to the teeth and gums being cleaned. For example, the head of such a toothbrush could be designed to "wrap around" individual teeth resulting in deeper penetration of cleaning/treating elements between teeth. Such a configuration provides overall cleaning, for example, by independent movement of groups of cleaning/treating elements relative to the toothbrush head and each other.

[61] In one example, a first group is a central grouping or "island" of cleaning/treating elements flexibly mounted to the toothbrush head. A second group is fixedly mounted to the toothbrush head in a configuration surrounding at least part of the central grouping. The central group is attached to the toothbrush head via, a flexible elastomeric membrane, resilient plastic straps, webbing or other material that flexibly interconnects the first group with the toothbrush head.

[62] In another embodiment, the toothbrush head is divided into a plurality of separate cleaning areas. These areas include at least one and preferably two areas wherein the cleaning/treating elements are mounted to a base with other areas having the cleaning/treating elements mounted to pods wherein the pods have a greater degree of movability than do the bases. The pods are resilient so that during use, the cleaning/treating elements could be moved from their initial position and then returned to the initial position. The pods may be formed from a narrow or small diameter beam extending from the body of the toothbrush head to a cleaning/treating elements support pad. The narrow or small diameter beam may be enclosed in elastic material.

[63] In one other configuration, a relatively non-movable base is located at each of the distal and proximal ends of the toothbrush head with at least two elastic pods mounted between the two bases. These various cleaning areas are separated from each other by channels extending completely across the head in a transverse direction.

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[64] This application further discloses a toothbrush configuration having multiple groupings of cleaning/treating elements ("islands") uniquely mounted to the head of a toothbrush, which mounting facilitates flexible orientation of those groupings relative to the teeth and gums being cleaned. More particularly, the groupings of cleaning/treating elements are mounted relative to the toothbrush head using a transverse, flexible membrane or web extending from the periphery of the cleaning/treating elements to the sidewalls of the toothbrush head. In one example, such flexible mounting facilitates 360 degree limited angle wobble of the cleaning/treating elements, which, in turn, orients the cleaning/treating elements towards the teeth even if the toothbrush head is not angled directly parallel to the user's teeth.

[65] One exemplary toothbrush of this configuration includes a head in the form of a base having an upstanding wall to create a peripheral frame. In one embodiment, a thin resilient membrane or web is mounted within the frame. The membrane or web is capable of flexing to facilitate orientation of the cleaning/treating elements carried by the membrane relative to the teeth of the user.

[66] The cleaning/treating elements may be bristles secured to the membrane or web by in-molded technology. Additional cleaning/treating elements can be arranged on the periphery of the "islands" to facilitate cleaning in those areas between the "islands". In a one embodiment, these additional cleaning/treating elements are fixedly mounted to the toothbrush head outside the periphery of the membrane or web flexibly holding the "islands" of cleaning/treating elements. This combination of flexible and fixed mounting of cleaning/treating elements provides very effective brushing of teeth and massaging of gums.

[67] In use, for example, pressure applied to the toothbrush handle by a user causes a first group of cleaning/treating elements to contact the teeth being cleaned. As the force applied to the toothbrush exceeds a predetermined volume, a central group of cleaning/treating elements moves relative to the balance of the head. This movement, in turn, allows an outer group of fixed cleaning/treating elements to contact other areas of the teeth located at a greater distance from the head, including interproximal spaces between teeth.

[68] This desired flexibility of the central grouping of cleaning/treating elements may be accomplished with an elastomeric bridge between the central movable group of cleaning/treating elements and the surrounding outer group of cleaning/treating elements. This elastomeric bridge may be continuous or maybe a series of independent bridges with a void between each bridge to encourage greater flexibility. The width of this bridge can be adjusted to vary the amount of

force needed to push the central group of cleaning/treating elements into a position where the outer group can achieve their greatest cleaning potential.

[69] In another toothbrush configuration, the gap between the groups of cleaning/treating elements corresponding to the width of the elastomeric bridge between them can effectively be filled with elastomeric wipers that move as force is applied to the central group of cleaning/treating elements. For example, tapered elastomeric wipers can be mounted to the elastomeric bridge so that the narrower tip of the wipers flex in ward and outward as force is applied to and released from the toothbrush handle. This wiping action further enhances the cleaning and treating functions of the toothbrush.

[70] In a powered configuration, the toothbrush has a power source. The power source may be at least one battery, for example, 1, 2 or more batteries. The battery may be removable or fixed, rechargeable, non-rechargeable or rechargeable from an external source. Further, the battery may be of any size, such as, for example, AA, AAA, 9V and C. Alternatively, the power source may from an external source, for example via an AC adapter.

[71] Turning to the Figures, both the toothbrush illustrated in FIG. 1 and that according to FIGS. 2 and 3 each have a handle 1, a front bristle-carrying head part 3 and a neck part 4, which connects the head part 3 to the handle 1. The bristles combined to form clusters of bristles 6 are anchored in a bristle carrier 5 and form a profiled brushing surface with their free ends. In the embodiment illustrated, the bristle carrier 5 with the clusters of bristles 6 is positioned, in a manner which is known per se and thus is not described in detail, on a retaining part 2 of the head part 3 such that it can be exchanged. Also, as noted above, any of the arrangements of teeth cleaning elements disclosed herein could be used in place of the illustrated bristle pattern.

[72] The neck part 4 is provided with neck-part zones 7 which are preferably made of an elastically relatively compliant material component and provide for, or additionally increase, the elasticity of the neck part 4, with the result that, during use of the toothbrush, the bristle-carrying head part 3 can be forced back resiliently in the case of forces acting in the direction of the brushing surface. Optionally, the neck-part zones 7 are designed as notches which extend over part of the neck circumference and are filled with elastically compliant material (e.g., with a thermoplastic elastomer). It is understood that the form and number of neck-part zones can be different. It is also conceivable to have a flexible neck zone without using elastic material components, e.g., by providing constrictions or by way of a bellows.

[73] Integrated in the front head part 3, or in that region of the neck part 4 which is adjacent to the head part 3, is a mechanical vibratory device 10, by means of which vibrations which effect

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or enhance the teeth-cleaning action may be imparted to the bristle-carrying head part 3. The vibratory device 10 can be connected to an electric power source, accommodated in the handle 1, via electrical connections running in the neck part 4, as is described herein below. In one embodiment, neck-part zones 7 are made of an elastically compliant material which dampens the vibration between the vibrating head part 3 and the handle 1, with the result that the vibratory action is produced, in particular, in the head part and is transmitted to the handle 1 to a slight extent. This means that slight vibrations can be felt in the handle 1 during the teeth-cleaning operation, and the toothbrush is thus comfortable to handle. In another embodiment, the vibration produced is not damped by the handle 1 and can act to full effect in the head part 3.Instead of the neck-part zones 7 having elastically compliant-material, however, other vibration-damping elements could also be used. Further, the dampening may also be achieved, for example, by using a basic material, by the neck part being configured in a particular form, for example by the presence of a bellows/accordion part, etc. Alternatively, the neck could be formed with reduced thickness and/or of dual materials as disclosed in U.S. Patent application no. 11/053589, filed February 4, 2005, which is incorporated herein by reference.

[74] Accommodated in the handle 1 is a sheath or sleeve 20 which extends in the longitudinal direction of said handle and is made of electrically conductive material. Both the handle 1 and the sleeve 20 are open to the rear, this forming a cavity 21 which can be closed from the rear by a closure part 22 and into which it is possible to insert a battery 25, in the preferred embodiment illustrated a commercially available, non-rechargeable cylindrical battery, with a defined power (e.g. 1.5 V) as the power source for the vibratory device 10. It would also be possible, however, for a button cell or for a rechargeable storage battery to be used as the power source.

[75] A spring contact 29 for the positive pole 30 of the battery 25 (see FIG. 2) is fitted in the sleeve 20, on a transverse wall 28, and is connected to the vibratory device 10 via an electric line 31, a switch 32, which is installed in the sleeve 20 and can be actuated from the outside of the handle 1, and an electric line 33 running in the neck part 4. The electrical connection can be interrupted by means of the switch 32.

[76] The closure part 22 is provided with a threaded stub 22a made of an electrically conductive material and can be screwed into the handle 1 and/or into the sleeve 20 by way of said threaded stub. The threaded stub 22a is provided with a contact surface 22b which, with the closure part 22 screwed in, comes into abutment against the negative pole 35 of the battery 25 inserted into the sleeve 20. The negative pole 35 is electrically connected to the vibratory device

10 via the threaded stub 22a, the sleeve 20 itself and a line 34, which connects the sleeve 20 to the vibratory device 10 and runs in the neck part 4.

[77] Instead of being transmitted via the electrically conductive sleeve 20, it would also be possible for the power to be transmitted in some other way, for example using wires or an electrically conductive plastic.

[78] In the embodiment illustrated in FIG. 1, the vibratory device 10 comprises a vibratory element 11' which functions preferably in the manner of a vibratory armature, can be electrically connected directly to the power source via the lines 33, 34 and, with the power source connected, is made to vibrate.

[79] In the case of the toothbrush variant illustrated in FIGS. 2 and 3, the vibratory device 10 comprises a vibratory element 11 in the form of an eccentric, which produces mechanical vibrations and can be rotated about an axis located in the longitudinal direction of the toothbrush, and also comprises a drive which is arranged directly adjacent and is designed as a micromotor 15. The vibratory element 11 is connected to the shaft 15a of the micromotor 15, which can be electrically connected to the power source via the lines 33, 34. The micromotor 15 and the eccentric may be accommodated as a structural unit in a housing 12.

[80] Instead of an eccentric which can be driven in rotation, it would also be possible to have a vibratory element 11 which can be driven in a translatory manner. It would be possible, in the case of the toothbrush according to the invention, to arrange the bristle-carrying head part 3 such that it can be moved in relation to the neck part 4 in order for the latter, in the case of vibrations produced by means of the vibratory device 10, to be made to move in relation to the rest of the toothbrush.

[81] The electric lines 31, 33, 34 could also be realized by electricity-conducting plastic tracks. The switch 32, which connects or interrupts the lines 31, 33, may also be, for example, a magnetic switch. A preferred configuration of the switch 32, however, has a pulse switch arranged on a printed circuit board as well as further electronic components which store the switching state.

[82] It is also possible, however, for the electrical connection between the battery 25 and the vibratory element 11' (FIG. 1) or the drive 15 (FIGS. 2 and 3) to be produced or interrupted not by the switch 32, but by the closure part 22, which can be screwed into the handle and/or into the sleeve 20 or connected to the same in a bayonet-like manner, being turned (i.e., the switch 32 is dispensed with in the case of such a configuration).

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[83] Instead of the rear closure part 22 being screwed to the handle 1, it would, of course, also be possible to have some other type of releasable connection (e.g., plug-in connection, bayonet connection, etc.) and a corresponding configuration of the contact part interacting with the negative pole 35.

[84] It would also be possible for the closure part 22 to be in a form which is quite different to that illustrated in the drawing. For example, the closure part could be provided with a set-down surface or a foot part and thus serve as an element on which the toothbrush can be set down.

[85] The toothbrush illustrated in FIG. 4 corresponds essentially to that according to FIGS. 2 and 3. According to FIG. 4, the vibratory device 10 is arranged directly in the front head part 3. In this exemplary embodiment, the sleeve 20 is dispensed with; the battery 25 is connected directly to the vibratory device 10 via the lines 33, 34. It is also the case with this toothbrush that use is preferably made of an exchangeable bristle carrier 5, which can be positioned on a retaining part 2 of the head part 3, e.g., in the manner of a snap-in connection. The capacity for changing the bristle carrier 5 provided with the clusters of bristles 6 is particularly advantageous since the toothbrush provided with the vibratory device 10 can be used irrespective of the service life of the bristles, which is usually even shorter than the service life of the battery 25.

[86] As can be seen from FIG. 5, it is possible, instead of the bristle carrier 5 or 5a, which forms part of a conventional brush head and is provided with respective clusters of bristles 6 or 6a, to position other, optionally different bristle carriers or adapters 5b to 5d on the retaining part 2, these being provided with different interdental brushes 6b, 6c or interdental treatment parts 6d for effective cleaning of the spaces between the teeth. The interdental brush 6b may be designed, for example, as a helical brush made of coated wire with plastic filaments twisted in. The interdental brush 6c comprises bristles which, together, form a cluster tip. The treatment part 6d may be designed, for example, as a plastic element which has a tip and may preferably be provided with an abrasive coating for removing plaque and tartar from the spaces between the teeth. Of course, it would also be possible to use any other desired treatment heads. It is also the case with the variant according to FIGS. 4 and 5 that the bristle carrier 5 could be configured such that a vibration-induced movement in relation to the retaining part 2 were possible.

[87] For the introduction of the vibratory device 10, the connecting lines 33, 34 and further electronic components, it is possible for a toothbrush according to the invention, or the housing thereof, to be produced in two parts and for the two parts to be welded in a water-tight manner once the abovementioned parts have been positioned therein. It is also possible, however, for a

toothbrush according to the invention to be produced by injection molding preferably involving two or more components. The abovementioned parts are advantageously positioned as a unit in an injection molding made of a first material component and then encapsulated in the second material component (or in the further material component) by injection molding. It is not necessary here for full encapsulation to take place. Certain parts may be exposed, as a result of which it is possible to achieve an esthetic effect.

[88] It would also be possible, however, for the abovementioned electronic components to be inserted into a ready-molded handle 1. In a preferred embodiment, since it is not only the vibratory element 11, 11' itself but also the drive, i.e. the micromotor 15, which are arranged in the front head part 3, or in the directly adjacent front region of the neck part 4, it is not necessary for a mechanical drive element to be led through the flexible neck part 4 in order to connect the micromotor to the vibratory element 11. In this embodiment, electric lines 33, 34 (e.g., wires, cables or electrically conductive plastic tracks) run through the neck part 4.

[89] According to one embodiment of the invention, use is made of a mechanical vibratory device 10 which has a diameter of less than about 15 mm preferably less than about 6 mm, and is less than about 35 mm, preferably less than about 20 mm, in length. This ensures that the toothbrush may be of ergonomic configuration and is easy to handle. A toothbrush according to the invention corresponds, in size, more or less to the conventional manual toothbrushes, which makes them more straightforward to handle in comparison with the commercially available, considerably larger electric toothbrushes. A number of head configurations can produce an enhanced cleaning effect when the mechanical vibratory device is engaged.

[90] Figures 6-9 illustrate a toothbrush 610 in accordance with one embodiment of this invention. As shown therein toothbrush 610 includes an elongated hand-held handle 612 with a head 614 connected to and extending from the handle. The head 614 is divided into a plurality of separate cleaning areas which are spaced from each other. As illustrated the cleaning areas include a base 616 located at the distal end of the head 614 and projecting outwardly from the main body portion 930 of the head. Base 616 includes at least one and preferably a plurality of cleaning/treating elements 618. Head 614 further includes a base or supporting member 620 at the proximal end of head 614 cleaning/treating elements 618 also extend outwardly from base 620.

[91] Mounted between the cleaning areas which incorporate bases 616 and 620 are a pair of pods 622, 624. Each pod is provided with at least one and preferably a plurality of cleaning/treating elements. As later described the pods 622, 624 have a greater degree of

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movability than do the bases 616, 620. In a preferred practice of the invention the pods 622, 624 are resilient members so that the pod cleaning/treating elements add a motion range beyond the cleaning/treating elements 618 which are generally static or non-movable. Because the various cleaning/treating elements are separated from each other such as by channels 728, which extend completely across head 614 in a transverse direction, and because of the elastic nature of pods 622, 624, the cleaning/treating elements 626 may be capable of 360 degrees rotation about the vertical axis of each individual pod. The angle of the bend may be dictated by the ability of the material to bend.

[92] Toothbrush 610 thus provides a head 614 wherein the front (distal end) and the back (proximal end) areas are in a relatively fixed position and wherein the cleaning/treating elements, such as bristle strands, 618 do not have any extra degree of motion. The middle portion of head 614, however, has two areas of cleaning/treating elements 626, which are capable of 360 degree rotation.

[93] As best shown in Figure 9 the head 614 includes a main body portion 930 which supports the bases and pods. Body portion 930 and bases 616 and 620 are preferably made from conventional hard plastic materials, such as polypropylene, commonly used in the making of toothbrush handles and heads. Pods 622, 624, however, are made so as to be resilient. In a preferred practice of this invention, the resiliency of pods 622, 624 is achieved by providing a thin diameter beam 932 which extends from the main body portion 930 of the head of the toothbrush. Beam 932 is joined into the bottom of a thin pad or plate 934 which provides a support area onto which the cleaning/treating elements 626 are affixed. The manner of mounting the cleaning/treating elements 626 to the support pads 934 can be achieved utilizing various cleaning/treating elements, such as bristles and other cleaning materials, in known attachment methods.

[94] The desired flexibility or resiliency of the pods 622, 624 is enhanced by enclosing the thin beams 932 in elastic material 936 which could be acquired during the multi-injection molding process. The elastic material 936 serves as a rubber band by returning the beams 932 to their original form or initial position. This return action creates an active motion in the opposite direction of the beam bend which aids in the cleaning of teeth by introducing extra brushing strokes.

[95] As best shown in Figures 6, 7 and 9 the pods 622, 624 include a widened portion disposed toward the body 930. The support pads 934 are also widened. Each pod has a narrow

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or reduced diameter central portion 938 longitudinally intermediate the length of each pod. Thus, each pod is of generally mushroom shape.

[96] Beam 932 could be of any suitable shape such as having a cross-section which is circular, square or any other geometric shape that provides a thin dimension or thin diameter to the beam to facilitate the bendability of the beam. The elastomer 936 may be considered as a continuous layer of any suitable thickness which covers the entire central area of head 614 as illustrated so that both pods 622, 624 are incorporated as part of the same elastic material. The portion of the head 614 which includes pods 622, 624 may be formed as a separate subassembly similar to the subassembly later described with respect to Figures 10 and 11.

[97] Although the invention could be practiced with a single base and a single pod and could be practiced with the base having some, but a lesser degree of flexibility than the pod, the invention is preferably practiced wherein the base is generally static or non-movable. In addition, the invention is preferably practiced where there are a plurality of such bases and a plurality of pods. The drawings illustrate a configuration of the invention where there are a total of four separate cleaning areas with the pods being located in the central portion of head 614. The invention may be practiced in a configuration in which the cleaning/treating elements comprise a plurality of bristles or strands on each base and each pod.

[98] As illustrated in Figures 8 and 9, each base 616 and 620 and each pod 622 and 624 may have a generally oval outer surface. The bases and pods are longitudinally aligned, but spaced from each other by the depressions or open areas which form the channels 728. As also illustrated in Figure 8 the pods may have a larger outer surface or cleaning/treating element carrying surface than do the bases.

[99] As shown in Figure 7 the terminal surfaces of the cleaning/treating elements 618 and 626 are tapered so that the terminal surfaces of the cleaning/treating elements 618 taper outwardly in a direction toward the center of head 614 while the terminal surfaces of cleaning/treating elements 626 taper outwardly in a direction away from the center of head 614. Thus, the highest points of each set of cleaning/treating elements 618 and its adjacent set of cleaning/treating elements 626 are generally disposed toward each other for each pair of base and pod 616, 622 and 620, 624.

[100] Any suitable form of cleaning/treating elements may be used as the cleaning/treating elements 618 and 626 in the broad practice of this invention. The term "cleaning/treating elements" is intended to be used in a generic sense which could include conventional fiber bristles or massage elements or other forms of cleaning/treating elements such as elastomeric

fingers or walls arranged in a circular cross-sectional shape or any type of desired shape including straight portions or sinusoidal portions. Where bristles are used, 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.

[101] Using different cleaning materials as cleaning/treating elements of the toothbrushes may yield different effects. In an attempt to provide better stain removal a rubber-like material or elastomer can be used in combination with conventional bristles or used by itself to "brighten/whiten" the teeth.

[102] It is to be understood that the specific illustration of the cleaning/treating elements is merely for exemplary purposes. The invention can be practiced with various combinations of the same or different cleaning/treating element configurations (such as stapled or in-molded technology bristles, etc.) and/or with the same bristle or cleaning/treating elements materials (such as nylon bristles, spiral bristles, rubber bristles, etc.) Similarly, while Figure 7 illustrates the cleaning/treating elements to be generally perpendicular to the outer surface of head 614, some or all of the cleaning/treating elements may be angled at various angles with respect to the outer surface of head 614. It is thereby possible to select the combination of cleaning/treating element configurations, materials and orientations to achieve specific intended results to deliver additional oral health benefits, like enhanced cleaning tooth polishing, tooth whitening and/or massaging of the gums. Further, although shown as a manual toothbrush, the disclosed head and cleaning elements could be formed as part of a powered brush, e.g., as part of a vibrating brush (as in Figure 1) with the drive means disclosed for the brush of Figure 16, or other known powered brushes where the heads or parts of the heads (e.g., platforms) are driven.

[103] Figures 10-11 illustrate a further embodiment of this invention. The toothbrush 1110A has the ability to provide flexible support for the bristles 1026A, 1126A in designated areas. The flexibility is provided by designing the tuft holding areas 1034A, 1134A as plates which in combination with the stems 1038A, 1138A forms pods of mushroom shape. The mushroom stem 1038A, 1138A is made flexible to allow the plate 1034A, 1134A populated with bristles or cleaning/treating elements 1026A, 1126A to move in different directions while brushing, as described with respect to the flexible pods of Figures 6-9.

[104] Figures 10-11 show the toothbrush 1110A and in particular the cleaning/treating element or bristle carrying portion 1023, 1133 of the head 1114A. As shown in Figure 10 the bristle or cleaning/treating element carrying portion 1023 forms an initial subassembly. This subassembly is made by introducing the cleaning/treating elements 1026A into the mold cavity into which a

plastic material is injected. As the material injected cools off it permanently traps the bristles or cleaning/treating elements 1026A to form a brush or subassembly 1023.

[105] To achieve a functional flexibility and proper tuft retention the portion of the bristle holding part or subassembly 1023 which comprises the plates 1034A, stems 1038A and interconnecting support 1025 is preferably a blend of polypropylene (PP) and soft TPE. Once the PP/TPE blend is combined with the bristles 1026A the subassembly 1023 is formed. The subassembly 1023 is then overmolded with an entire toothbrush handle 1012A and head 1014A during a second injection cycle to form the completed toothbrush 1110A shown in Figure 11. If desired or required the entire handle 1112A and head 1114A absent the subassembly 1123 could be made first and the subassembly or bristle retaining portion 1123 made second.

[106] It is to be understood that the invention described in Figures 10-11 could be practiced where all portions of the head 1114 include the flexible mushroom sections without having less flexible base portions such as bases 616 and 620 of Figures 6-9. Similarly, the subassembly two shot techniques of Figures 10-11 could be utilized in the embodiment of Figures 6-9 for forming the two or more central pods as a single subassembly initially made separate from the remainder of the toothbrush head 1114. The final toothbrush would be made in a second injection molding process wherein the subassembly having interconnected pods 622, 624 would be molded to the handle 612 and head 614 made of more rigid material.

[107] As noted, Figure 7 illustrates the terminal surfaces of the cleaning/treating elements 618 and 626 to be tapered in an up and down or zigzag manner. Figures 10-11 show an alternative taper wherein the terminal surfaces form a smooth, gentle, concave shape. If desired, other shapes may be used such as a planar shape for the terminal surfaces or a convex shape as well as the zigzag or up and down shape shown in Figure 7. Similarly, the terminal ends of the cleaning/treating elements in the Figures 6-9 embodiment, as well as those of Figures 10-11, could have the various shapes such as zigzag, convex, concave or planar.

[108] Figure 12 shows an additional embodiment of the invention that is discussed in terms of a toothbrush. Nevertheless, the invention could be used in other oral care implements including simply a tissue cleansing implement. They also could be as powered brushes.

[109] As shown in Figure 12, toothbrush 5000 includes a plurality of nubs or other projections 5002 protruding from a back side 5004 of head 5006 as a cleanser 5008 of soft tissue in the mouth. Teeth cleaning elements 5016 preferably extend from a front side 5005 of head 5006. The projections 5002 are preferably arranged seriatim along at least one narrow base or pad in the form of a strip 5010 fixed to the head 5006. In the illustrated example, a plurality of

generally parallel strips 5010a, 5010b, 5010c, 5010d are fixed in a generally concave shape facing away from the handle. In this one construction, the strips extend along back side 5004 of head 5006 and each sidewall 5011, although extensions along the sidewalls are not necessary. Any number of strips could be included. The strips could define virtually any shape or orientation on the head. For example, strips 5010 could have any of the shapes disclosed for the ridges in co-pending U.S. Patent Application Serial No. 10/989,267, which is incorporated herein by reference. In the illustrated construction, strips 5010 are interconnected by an axial stem 5012 which extends into the handle and forms a part of the grip for the user. Further, this handle extension or even the stem is of course not necessary.

[110] In one construction, each projection 5002 is generally columnar and formed with a width W of about 1.1 mm and a height H of about 1.7 mm (FIG. 13). The projections are spaced apart from each other along strip 5010 a distance of about 1.0 mm. These height, width and spacing dimensions could, however, vary widely. In the illustrated embodiment, projections 5002 each includes a peripheral wall 5013 protruding outward from base 5010, and an inclined distal end surface 5014 at an angle of about 50 degrees to side surface 5004 of head 5006. The inclined end surface 5014 defines a narrow top edge 5016 along a portion of peripheral wall 5013, which is advantageous for cleansing the tongue and other soft tissue. Although the end surfaces 5014 are shown to be inclined in the same direction, they could be inclined in different directions.

[111] In an alternative construction (FIG. 17), head 5006 is additionally formed with at least one elongate ridge 5025. With this arrangement, the user is provided with a cleanser that obtains a beneficial dual cleaning effect by moving the discrete projections 5002 and the ridge 5025 across the tongue or other tissue. In the illustrated example, ridge 5025 is a curved, elongate projection protruding generally outward along the outer edge of the remote end 5027 of the head. Nevertheless, other arrangements, locations and shapes are possible. Additional ridges could also be provided. In one preferred construction, ridge 5025 is molded as one-piece with the head and formed of a relatively hard plastic such as polypropylene. The ridge, however, could be formed separately from the head and/or composed of other materials that are compatible for oral care implements.

[112] In one construction, ridge 5025 is, as noted above, formed of a relatively hard material (e.g., polypropylene), while projections 5002 are formed of a relatively soft material (e.g., a thermoplastic elastomer). This use of dual materials enables the benefits of both materials to be gained. The cleanser includes the firm engagement of the relatively hard scraper blade in ridge

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5025 and the relatively soft discrete projections that flex and turn as they dig into the tongue or other tissue.

[113] As seen in Figures 17 and 18, ridge 5025 is defined by a pair of opposite sidewalls 5033, 5034 which meet to form a scraper edge 5035. While edge 5035 is relatively narrow in this construction, it could be substantially widened. In one embodiment, sidewalls 5033, 5034 are formed with different slopes relative to side 5004 of head 5006, though they could have the same slope. In one preferred construction, sidewall 5033 is formed with a steeper slope than sidewall 5034 to define a more aggressive scraping action as the head is pulled across the tongue by the user. The shallower slope of sidewall 5034 facing generally away from the handle, makes the ridge less prone to pushing the tongue biofilm farther back in the throat as the ridge is pushed back toward the throat. In a preferred embodiment, sidewall 5033 is oriented at an angle α of 62 degrees relative to side 5004, whereas sidewall 5034 is oriented at an angle β of 43 degrees. Other angles could also be used for both sidewalls.

[114] In another alternative construction (FIG. 14), each projection 5002a is provided with an end surface 5014a having two inclined end face portions 5015a, 5017a and a top edge 5016a. As with ridge 5025, end face portion 5015a, generally facing toward the handle, is preferably inclined at a steeper angle relative to side 5004a than end face portion 5017a, although other arrangements including end face portions having the same inclination can be used. As one example, end face portion 5015a is oriented at an angle α of 62 degrees relative to side 5004a, and end face portion 5017a is oriented at an angle β of 43 degrees. The steeper angle of end face portion 5015a provides a more aggressive scraping action as the head is dragged out of the mouth. The shallower angle of end surface 5017a makes the projection less prone to pushing the tongue biofilm farther back in the throat.

[115] Of course, other projections can be used. For example, each projection could include a non-inclined distal end or an end that tapers to a pointed tip. The projections could have a wide variety of shapes beyond the cylindrical shape shown in Figure 12. For example, the projections could have a conical shape, irregular cross sections, or be inclined to the back side 5004. Moreover, the projections may also be ridge shaped to extend entirely or partially along the length of strip 5010.

[116] In a preferred construction, projections 5002 and strip 5010 are formed as a one piece member molded or otherwise secured to head 5006. The projections and strip are preferably formed as a one-piece member of a resilient thermoplastic elastomer such as styrene-ethylene/butylene-styrene block copolymer (SEBS) manufactured by GLS Corporation, but

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could be composed of other resilient materials, hard materials, or a combination of materials such as disclosed in U.S. Patent Application Serial No. 11/011,605, incorporated herein by reference. The projections and strips could also be formed of the same substance as head 5006 (e.g., polypropylene), but have a different color or the like to define it a different material from the head and thereby create at least a visually appealing brush.

[117] In one construction, strips 5010 are molded to overlie a generally planar surface 5004 of head 5006 (FIG. 13). Nevertheless, channels 5007 could be formed in side 5004 to receive strips 5010 therein so that side 5004 and the outer surfaces 5012 of strips 5010 having projections 5002 are generally co-planar (FIG. 15). Additionally, the strips of resilient material could be formed as an integral part of the head construction (FIG. 16). More specifically, in this alternative construction, the head includes a plurality of first members 5020 joined together by a resilient second member 5022 that acts as a living hinge to permit the first members to move relative to each other during use of the toothbrush. The second member also forms the base 5010c of soft tissue cleanser 5006 provided with projections 5002. Additionally, as discussed in regard to toothbrush 5000, projections 5002 or 5002a can be integrally formed as a one-piece member with elastomeric tooth cleaning elements extending in an opposite directions from the head.

[118] Referring now to Fig. 19, an oral care implement in accordance with the present invention is further illustrated in the form of a toothbrush 10 including a head 12 and a handle 14. Although discussed in terms of a toothbrush, it is understood that the device could be in the form of other oral care implements including simply a tissue cleansing implement.

[119] An oral care implement in accordance with the present invention is illustrated in the form of a toothbrush 10 including a head 12 and a handle 14. While figure 19 only illustrates the connection of the handle to the head, the handle is preferably an elongate member to be grasped by the user. The handle 14 could have any known shape adapted for the manipulation needed to clean the teeth and/or tongue of a user.

[120] The head 12 with a pair of opposite sides 16, 17 is shown with a generally oblong shape, although other known shapes could be used. A plurality of teeth cleaning elements 20 extend from one side 16 of the head 12. The teeth cleaning elements could be bristles and/or elastomeric members of various shapes and sizes. Any form or combination of elements 20 suitable for cleaning a user's teeth could be used.

[121] The other side 17 of head 12 includes at least one ridge and preferably a plurality of elongate ridges 22 to cleanse the tongue and other soft tissue of the mouth (e.g., the inner

surfaces of the cheeks). While the ridges are preferably formed on a head also provided with teeth cleaning elements, they could also be formed on other implements or other parts of the toothbrush. A head of the implement is simply meant to be the operative portion of the implement that is inserted into the mouth for cleaning of the tongue, and does not refer to a particular shape or structure of the head.

[122] In one construction of the invention, each ridge 22 projects orthogonally from a back surface 17a of the head and has a generally square-like cross-sectional configuration (Fig. 23). The ridge includes a distal end 29 remote from surface 17a that forms a contact region 29a adapted to contact and clean the tongue or other soft tissue in the mouth. In this embodiment, the contact region 29a is defined between and includes protruding corners or edges 25, 27. As can be appreciated, the contact region 29a has a width W extending transverse to the extension of the ridge across surface 17a. The width W of ridge 22 is at least as large as the height H of the ridge (i.e., the distance the ridge extends from surface 17a). With this width to height relationship, the risk of the ridge cutting or injuring the soft tissue of the tongue or other parts of the mouth is reduced. A narrow ridge that extends outward from head 12 a distance greater than its width has an increased risk of cutting or otherwise injuring the user as compared to a similarly narrow ridge (i.e., one with the same width) that extends from the head a distance less than the width of the ridge; such a ridge will not tend to cut or hurt the user. The tongue and other soft tissue in the mouth will give and bend some distance around the ridge so long as the ridge is not too tall for the width of the ridge engaging the tissue. In one exemplary embodiment, ridges 22 have a width W that is preferably about 0.8 mm and a height H about 0.6 mm. Nevertheless, a wide range of relative sizes are possible.

[123] Additionally, ridge 22 also includes a base 28 where the ridge is fixed to surface 17a. In a preferred construction, base 28 defines a width W1 that is at least as large as the height H of the ridge. In this way, the ridges do not experience undue bending as they are dragged over the tongue. Rather, ridges 22 are stably supported so that they tend to remain generally in a protruding orientation. As a result, edges 25, 27 are stably supported to dig into recesses in the tongue to effectively remove bacteria and debris.

[124] Alternatively, the ridges could have other shapes. For example, Figure 24 illustrates ridges 22' that are substantially wider than they are tall, i.e., base 28' and contact region 29a' each has a width W2 that is substantially greater than the height H2 of the ridge. In one example, the width is about twice the distance of the height. The increased width to height ratio of ridge 22' provides for a stiffer, smaller ridge to effectively cleanse the tongue. Such ridges

are beneficial in that they reduce the size of the head, which is preferred by some users. A shorter, wider ridge also further reduces the prospect of users injuring themselves. Moreover, such ridges can be made of softer materials without losing the desired stability.

[125] In another example (FIG. 25A) ridge 22" has a rounded distal end. Accordingly, the contact region 29a" has an arcuate, convex surface to engage the tongue or other soft tissue. In this example, the contact region 29a" (i.e., the surface adapted to engage the tongue) has a width W3 that is at least as large as the height H3 of the ridge. In this embodiment, the base 28" of ridge 22" also has a width W4 that is at least as large as height H to present a stable ridge. Of course, numerous variations may be formed in the shape of the ridge while maintaining the benefits of the invention.

[126] In addition, the ridges may be formed to gain only some of the benefits of the invention. For instance, ridge 22''' can be formed to taper to a narrowed distal end 29''' (Fig. 3b). In this instance, contact region 29a''' has a width W5 that is less than the height H5. However, the base 28''' of ridge 22''' has a width W6 that is at least as large as the height to form a stable ridge construction.

[127] Although the illustrated ridges have all been shown to extend generally perpendicular from surface 17a, they could be inclined relative to surface 17a. A perpendicular extension is preferred to provide effective cleaning regardless of whether the tongue cleaner is pushed or pulled over the tongue. The sides 24, 26 could also be inclined, curved, angular, irregular or otherwise shaped. Additionally, the ridges could project from a non-planar surface. As one example, surface 17a and ridges 22 could have an undulating configuration.

[128] Regardless of the cross-sectional shape of the ridge, each ridge 22 is preferably curved to define a concave side 24 facing toward handle 14 and a convex side 26 facing in the opposite direction. Although ridges that are continuously curved are preferred (Fig. 20), such concave-shaped ridges could be defined by non-continuous ridges (Fig. 21) or angular ridges (Fig. 22). Further, in one preferred construction, ridges 22 are progressively less curved as they are formed farther from handle 14. In one illustrated construction (Figs. 19 and 20), the ridges are generally concentric to each other curving generally about a common point near the connection of handle 14 to head 12.

[129] In use, the user grips the handle and typically pulls the tongue cleanser repeatedly over the tongue from back to front so that the concave sides 24 are scraped against the tongue to effectively gather and remove bacteria and debris on the tongue. Alternatively, the user may also commonly move the tongue cleanser forward and backward over the tongue. In either

event, the different curvatures of the ridges enable aligned segments of the ridges (i.e., along lines generally parallel to longitudinal axis 30) to engage the tongue surface at different angles for effective cleaning of the tongue. Nevertheless, the tongue cleansing ridges can be moved over the tongue in a number of ways to clean the tongue.

[130] Further, other ridge constructions could be used. For example, the oral care implement could include ridges 22a that are reversed so that the concave sides face away from the handle (e.g., Fig. 20), ridges 22b, 22g, 22i, 22j, 22s with different curved shapes (e.g., Figs. 27, 32-34 and 42), ridges 22c, 22d, 22k and 22r that are linear (e.g., Figs. 28, 29, 35 and 41), ridges 22e, 22l, 22m, 22n and 22o that include a mixture of curved and linear ridges (e.g., Figs. 30 and 37-40), or one continuous ridge member 22f, 22g forming successive ridges 22f', 22g', (e.g., Figs. 31 and 32). The ridges could be non-concentric or curved at all the same radius of curvature. While the ridges preferably extend substantially across the entire side 17 of head 12, they could extend only part way across the head. For example, ridges 22p, 22r, 22t, 22v could be provided only along the sides of surface 17a (Figs. 40-41 and 43-44). Ridges along the sides of head 12 could also be used with central ridges; i.e., side ridges 22p, 22t, 22v could be used with a central ridge(s) such as an oval or partially oval ridge 22q, 22u, 22w (Figs. 40, 43 and 44), any of the ridge patterns illustrated in Figures 20-22 and 26-39, or another ridge pattern. Any of the ridges could also be used with various projections, e.g., conical projections 31 (see, e.g., Figs. 38 and 40-44). Regardless of whether the ridge 22 each form a continuous segment across the head (e.g., Fig. 20) or is defined by aligned ridge sections 22h separated by gaps 23 (e.g., Fig. 21), they are in this application each considered a ridge. Also, regardless of whether successive ridges 22 are separated (e.g., Fig. 20) or interconnected to define a single ridge member 22f (e.g., Fig. 31), the successive sections extending laterally across the hand are each considered to be a ridge. Concepts of this invention can be used in connection with ridges having virtually any shape or orientation along surface 17a.

[131] As shown in Figures 19 and 23, head 12, handle 14 and ridges 22 can be molded together as a one-piece member of the same material, for example, polypropylene. Nonetheless, other arrangements are possible. For example, head 12 could be detachable from handle 14. Further, ridges 22 could be separately molded, glued or otherwise attached to side 17 of head 12. The ridges as well as the head and the handle could each be made from a material different from the other parts. Soft materials, such as TPE or the like, can be fixed to head 12 to form the ridges (see, e.g., Figs. 40-44). The ridges could be made of virtually any known material used to make oral care implements.

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[132] Figures 45-54 show additional embodiments of the invention that further illustrate the combinability of various aspects, features and functions disclosed herein into single oral care implement configurations. Figures 45-54 disclose oral care implement configurations that provide tongue cleanser functionality and include handle gripping features. As such, the oral care implements of Figures 45-54 generally include the aspects discussed along with Figures 12-44 pertaining to soft tissue cleansers (e.g., tongue cleansers). Further, it is understood that other features may be used along with these configurations.

[133] As an example of potential embodiments based on combinations of features disclosed herein, the mechanical drive features discussed along with Figure 1-5 and/or tooth cleansing features discussed throughout the specification may be combined with the soft tissue cleansers of Figures 45-54C. Thus, as illustrated in Figures 54A-C, embodiments of the invention include any one of heads 9014, 9214, 9414, 9614 and 9514 discussed hereafter in combination with handle 1 and neck part 4 shown in Figures 1-4 instead of bristle-carrying head part 3 shown in Figures 1-5. These embodiments provide powered oral care implement configurations that can provide enhanced cleansing benefits. For example, such combination devices can provide the functions of two devices in a single device. Further, these devices can simultaneously provide dual cleaning functionality. For instance, toothbrush features may be used to clean a user's teeth while the soft tissue cleanser features simultaneously clean soft tissues, such as the inside of a user's cheeks.

[134] Figures 45 and 46 disclose an oral care implement 9010 having a soft tissue cleanser for removing microbial and other debris from the soft tissue of a user's mouth, such as the user's tongue and inside of their cheeks and lips. As shown, implement 9010 generally includes a handle 8103 attached to a head 9014. The head and handle may be molded together as a one-piece member of the same material, for example, polypropylene or another thermoplastic elastomer. In addition, the head may be detachable from the handle.

[135] In general, head 9014 includes a plurality of tissue engaging elements 9012 disposed about a central portion 9016 of the head. Elements 9012 include projections in the form of ridges 9018 and nubs 9020, which extend from the head to engage the soft tissue in a user's mouth. The ridges and nubs may be separately molded, glued or otherwise attached to head 9014. In addition, they may be integrally formed therewith. The ridges and nubs could each be made from a material different from each other and/or different from other parts. Soft materials, such as TPE or the like, can be fixed to head 9014 to form the ridges. However, a harder material or virtually any known material used to make oral care implements may be appropriate

for the ridges and nubs. Ridges 9018 and nubs 9020 could have a variety of shapes, patterns, cross-sections, configurations, etc., as discussed along with Figures 12-44.

[136] Central portion 9016 is shown as a generally elliptically-shaped region on a face of head 9014 about which cleaning elements 9012 are disposed that has a bottom surface 9017 generally disposed below the tips of the ridges and nubs. It is understood, however, that the central portion may have a variety of shapes, sizes and depths. In the configuration shown, central portion 9016 is a relatively shallow depression that extends into the head about 10% to about 30% of the thickness of the head. In another configuration, the central portion may be shallow and may not extend into the head. For instance, the central portion may be formed by a surface 9017 of the head upon which the cleaning elements are disposed along with a ring of cleaning elements 9012 bounding the central portion. In such a configuration, the central portion would be a depressed region with respect to the protruding cleaning elements disposed about it, but would not otherwise extend into the head. In other configurations, the central portion may be depressed into the head about 0 to 10% of its thickness, or it may be depressed about 30% to 50% or more of its thickness.

[137] As shown, surface 9017 may be continuous to provide a non-interrupted boundary for the central portion 9016 and it may be relatively smooth. In alternate configurations, surface 9017 may include interrupting or undulating features, such as one or more notches, contour features, or features to permit partial flow of materials therethrough, such as a mesh or screen. In addition, surface 9017 may include irregular features, such as cleaning elements, projections, etc.

[138] Central portion 9016 and the ring of protruding cleaning elements 9012 cooperate to translate a downward force applied by the user into a concentrated force at the cleaning elements. Thus, the cleaning elements penetrate more deeply into the user's soft tissue than would be provided by a relatively uniform contact surface or a uniform field of cleaning elements. This permits ridges 9018 and nubs 9020 to more effectively penetrate the soft tissues. In an alternative construction in which the head includes toothbrush features on an opposite side thereof (see Figure 54), the ring of protruding cleaning elements configuration can effectively engage soft tissues in the inside of a user's cheeks and lips without the user applying significant force in the direction of the ring, as may be the case when the user cleans their teeth via the toothbrush features. As further shown, central portion 9016 includes a bottom surface 9017 for contacting soft tissue during use. The bottom surface can act as a guide to limit the penetration

depth of the nubs and ridges when excessive downward force is applied by the user. In addition, it can provide a collector for micro debris scraped during use of the oral care implement.

[139] A variety of ridges, nubs, or other cleaning element configurations may be used. In the configuration shown for oral care implement 9010, ridges 9018 are generally oriented away from a center of central portion 9012 in a radial manner. Central portion 9016 is elliptically shaped and is aligned with a longitudinal axis of handle 8103. As such, ridges 9018 are oriented generally perpendicular to the longitudinal axis of the handle, which provide blades oriented transverse to the scraping direction for most users. When a user scrapes the oral care implement 9010 forward and backward in a direction substantially parallel to the longitudinal axis of handle 8103, ridges 9018 act as small blades to scrape micro debris from the soft tissue. As also shown in Figures 45 and 46, the ridges may be angled upward toward engagement with soft tissue during use. Thus, inner portions 9022 of ridges 9018 engage soft tissue when the user applies a light downward pressure, and the ridges more fully engage the soft tissue when additional pressure is applied. As such, variable cleaning and scraping functionality is provided as desired by the user via their selection of a downward force.

[140] As further shown in Figures 45 and 46, nubs 9020 are provided along a portion of central portion 9016 disposed between handle 8103 and a distal end of head 9014. Nubs provide concentrated penetration into the user's soft tissue during use. In addition, in their location along central portion 9016 as shown in Figure 46, they can encourage dislodged micro debris into central portion 9016 to be captured therein and removed by the user. It is understood that various nub configurations, positions and orientations, as well as ridge and central portion configurations, positions and orientations, can provide various advantages and functionality.

[141] Figures 47 and 48 illustrate another possible configuration of cleaning elements in an example oral care implement 9210. Oral care implement 9210 generally includes the same aspects and features of oral care implement 9010, except that it additionally includes a narrow protrusion 9224 erected around the perimeter of central portion 9216. The narrow protrusion may be a semi-flexible, "blade-like" structure that assists with scraping a user's tongue or other soft tissue. In alternative constructions, it may be a rigid structure or relatively flexible structure. Narrow protrusion 9224 may be made from a flexible or semi-flexible, thermoplastic elastomer, a hard plastic structure or another rigid material, such as metal. As shown in Figures 47 and 48, blade-like protrusion 9224 may be continuous structure disposed about the central portion. In other configurations, it may a partial structure, such as an arc. It may also exist apart from or without the central portion, and it may include a truncated shape or shapes. The blade-

like protrusion provides an effective blade for scraping micro debris from a user's soft tissue. In a continuous configuration, it may further encourage micro debris scraped from the user's soft tissue to be retained within central portion 9216.

[142] Figures 49 and 50 illustrate another possible configuration of cleaning elements in an example oral care implement 9410. Oral care implement 9410 generally includes the same aspects and features of oral care implement 9210, except that cleaning elements 9412 only include nubs 9420 disposed about central portion 9416. The nubs provide concentrated penetration into the user's soft tissue, which can act to dislodge micro debris and thereby assist blade-like protrusion 9416 with scraping micro debris from the user's soft tissue.

[143] Figures 51 and 52 illustrate another possible configuration of cleaning elements in an example oral care implement 9610. Oral care implement 9610 generally includes the same aspects and features of oral care implement 9010, except with respect to cleaning elements 9612 and blade-like structure 9624. As shown, cleaning elements 9612 include a combination of blades 9618 extending substantially radially from the center of central portion 9616, as well as blades 9630 oriented substantially perpendicular to blades 9618. The mixture of blades in alternating orientations can improve scraping effectiveness of the oral care implement. In addition, blade-like structure 9624 includes notches 9632 spaced about its blade, which can further improve the scraping effectiveness of the oral care implement.

[144] Figure 53 illustrates a further possible configuration of an oral care implement. Oral care implement 9510 generally includes the same aspects and features of oral care implement 9210, except with respect to cleaning elements 9512 and blade-like structure 9524. As shown, cleaning elements 9512 include short blades 9534 interposed between pairs of longer blades 9518, which can further improve the scraping effectiveness of the blades. In addition, blade-like structure 9524 is truncated such that it only extends around a distal portion of central portion 9516, which can encourage dislodged micro debris to be retained within central portion 9516 when the oral care implement 9510 is scraped across soft tissue while being withdrawn from the user's mouth. Oral care implement 9510 further includes tooth cleaning elements 9536 extending from an opposite side of the head from cleaning elements 9512. Thus, a user can use the single oral care implement 9510 to effectively clean their teeth and to scrape their tongue, for which the handling of the implement is improved via gripping features of handle 8103. In addition, the user can simultaneously clean their teeth via cleaning elements 9536 and engage the inside of their cheeks and lips via 9512.

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[145] Figures 54A-C show an oral cleaning implement 9810 that includes a dual function head 4900 or 9514, and a powered handle 1. The handle is generally the same as powered handle 1 discussed along with Figures 1-5, which may be used to move or vibrate tooth cleaning features of the head, and/or soft tissue cleanser features of the head. Although the head is shown as either head 4900 or head 9514, the head may include any one of heads 9014, 9214, 9414, 9614 and 9514 or other dual function heads. As discussed above, these embodiments can provide enhanced cleansing benefits by simultaneously engaging proximate oral surfaces, such as cleaning a user's teeth, and cleaning or stimulating the inside of their cheeks and lips. Moreover, such combination devices can provide the functions of two devices in a single device.

[146] Figures 55-66 show additional embodiments of the invention that further illustrate the combinability of various aspects, features and functions disclosed herein into single oral care implement configurations. Figures 55-66 disclose oral care implement configurations that provide a tooth cleanser having separate groups of cleaning elements, which may each be mounted on a fixed base or a flexible pod, and which may provide a soft tissue cleanser in addition to the tooth cleanser. The configurations may be powered or manual devices, and the handles may include gripping features. As such, the oral care implements disclosed in Figures 55-66 generally include the aspects discussed along with Figures 6-11 pertaining to groups of cleaning elements that may include flexible pods, as well as the aspects discussed along with Figures 12-54C pertaining to soft tissue cleansers. However, it is understood that other features may used along with these configurations, such as mechanical drive features discussed along with Figure 1-5 and tooth cleansing features discussed throughout the specification.

[147] Figures 55-66 illustrate an oral care implement 9910 in accordance with another embodiment of the invention. As shown therein, toothbrush 9910 includes a head 9914 and a handle 8103. However, other handle configurations could be used, such as handle 612 shown in Figures 6-11 or handle 1 shown in Figures 1-5. Head 9914 is generally the same as head 614 discussed along with Figures 6-11, with the exception of cleaning elements 9918 and the contoured surface 9940 disposed on an opposite side of the head from the cleaning elements. Thus, head 9914 generally includes bases 616 and 620 that respectively support cleaning elements 9942 and 9944 in a substantially static configuration. Head 9914 also includes pods 622 and 624 disposed between the bases for respectively supporting cleaning elements 9946 and 9948. As discussed along with Figures 6-11, pods 622 and 624 can provide flexible mounts for cleaning elements 9946 and 9948 attached thereto, and may permit rotation and/or oscillation of the cleaning elements 9946 and 9948.

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[148] Figure 55 shows a contoured surface 9940 disposed on an opposite side of the head from the cleaning elements. Contoured surface 9940 includes hills 9950 and valleys 9952 to provide a rolling or undulating surface on a rear face of the head. As shown in Figure 55, surface 9940 may be relatively smooth for use with massaging oral tissues and, as illustrated in Figures 58 and 60-66, the surface may include soft tissue cleansing elements for engaging soft oral tissues and provide cleaning benefits thereto.

[149] Figure 57 is top view of head 9914, which shows a configuration of tooth cleaning elements 9918 for use with head 9914. Cleaning elements 9918 may be formed of elastomeric wall members, elongate bristle tufts, or other types of cleaning elements, which are independently flexible. In this way, the cleaning elements are able to provide a limited and controlled flow of the dentifrice, as well as maintain sufficient flexibility to provide improved cleaning of a user's teeth and stimulation of the user's gums via the cleaning elements.

[150] Cleaning elements 9918 are oriented for engaging surfaces to be cleaned in a generally intended application direction A (see Figure 56), which is generally perpendicular to the face of head 9914. Cleaning elements 9918, however, include a mixture of cleaning elements that are aligned with (non-angled) and oblique to direction A (angled). The arrangement of angled and non-angled cleaning elements provides effective engagement and cleaning of oral surfaces, which is further enhanced by the movable pods configuration. The cleaning elements 9946 and 9948 mounted on pods 622 and 624 are adapted to engage a user's teeth, gums and other surfaces in a various ways that take advantage of their flexible support configuration. As such, cleaning elements 9946 and 9948 include forward elements 9950 angled toward the tip end of the head, and rearward elements 9952 angled toward the handle. As shown, the forward and rearward elements 9950, 9952 are preferably placed on the forward and rearward sides of their respective pods, and more preferably, are placed in the corner regions of the pods. Such a location and orientation increases the likelihood that elements 9950 and 9952 will initially engage a surface to be cleaned prior to other cleaning elements on the respective pod, which encourages the respective pod to flex as the remaining cleaning elements thereon are engaging the surface.

[151] For instance, as oral care implement 9910 is moved forward such that head 9914 leads the toothbrush, forward elements 9950 will initially engage surfaces to be cleaned prior to rearward elements 9952 or other cleaning elements disposed between elements 9950 and 9952. The forward angle of elements 9950 will encourage pods 622 and 624 to bend rearward when the forward elements contact a surface to be cleaned while the toothbrush is moving forward.

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The rearward bending of the pods, and their action of springing forward in response to the bending, enhances the cleaning effectiveness of the cleaning elements 9946 and 9948 disposed on the pods. The angled configuration of elements 9950 and 9952 improves the bending of the pods in comparison with alternate embodiments wherein the cleaning elements are disposed perpendicular to the toothbrush face 9954 and are angled neither forward nor rearward.

[152] Cleaning elements 9946 and 9948 of the pods also include non-angled cleaning elements 9954, which are beneficial for penetrating surfaces to be cleaned. In addition, cleaning elements 9946 and 9948 include a pair of bent, upstanding walls 9956 in a central portion of the pods. Each one of the walls in the pair 9956 has a concave side opposing the concave side of the other wall in the pair. The bent configuration and opposed convex sides of upstanding walls 9956 improve retention of dentifrice therebetween during use of the oral care implement. In addition, the bent configuration provides a pair of geometrically rigid walls, which, in their central location of the pod, supports the pod to prevent overflexing of the cleaning elements 9946, 9948.

[153] Cleaning elements 9942 and 9944 disposed on static bases 616 and 620 are configured to cooperate with cleaning elements 9946 and 9948 on the movable pods, as well as to effectively clean oral surfaces. The bases each include a bristle 9960, a series of upstanding walls 9962, and angled cleaning elements 9964, 9966. Bristle 9960 is generally a non-angled column that effectively penetrates gaps and recesses between oral structures (e.g., teeth).

[154] The series of upstanding walls 9962 are arranged to generally form a concave wall directed toward the remaining cleaning elements 9918. Thus, the concave wall 9962 of the front base 616 has its concave side directed rearward toward the handle, and the concave wall on the rear base 620 has its concave side directed forward toward the remainder of bristles 9918. In such a configuration, the opposing concave walls work in concert to retain dentifrice within the field of bristles 9918 via their concave shape that cups the dentifrice, as well as via small gaps between the upstanding walls that form the concave walls, which reduce the flow of dentifrice therebetween. In addition, the upstanding walls forming the concave walls are non-angled cleaning elements that provide support to the head 9914 during use and resist overflexing of the cleaning elements when excessive downward force is applied by the user.

[155] Angled cleaning elements 9962 and 9964 are angled toward the movable pods 622 and 624 to cooperate with cleaning elements 9946 and 9948 attached thereto for effectively cleaning oral surfaces. As such, rear base 620 includes forward angled elements 9964, and front base 616 includes rearward angled elements 9966. Angled cleaning elements 9962 and 9964 are disposed close to one another inward of a respective pair of angled cleaning elements 9950 and 9952 of

the movable pods. Thus, as the pods flex back and forth, angled cleaning elements 9962 and 9964 interpose between corresponding angled cleaning elements 9964 and 9966. This provides a scissor-like action that enhances cleaning effectiveness and avoids interference between opposing cleaning elements 9964, 9966 and 9962, 9964 that may limit movement of the pods.

[156] Referring now to Figures 58-61, an oral care implement 10210 is shown in accordance with a further embodiment of the invention. As shown therein, oral care implement 10210 includes a handle 8103, a head 10214 having cleaning elements 10218 attached thereto on a first side, and a soft tissue cleanser 10280 disposed on a second side of the head that is opposite to the first side. Oral care implement 10210 generally includes the aspects and features of oral care implement 9910, except as pertaining to the configuration of cleaning elements and the soft tissue cleansing features. Cleaning elements 10218 primarily include upstanding walls, which may be elastomeric. The upstanding walls provide beneficial wiping and polishing of teeth, in addition to cleansing benefits. Cleaning elements 10218 also include a central columnar cleaning element 10270, which may be a bristle, for penetrating oral surfaces. As shown in Figure 58, each central cleaning element 10270 extends beyond other cleaning elements proximate thereto on the same pod. In addition, central cleaning element has a pointed tip. As such, central cleaning element 10270 effectively penetrates and engages oral surfaces and gaps between surfaces.

[157] Similar to the configuration of Figures 9 and 55, and as shown in Figure 59, the tips or terminal ends of cleaning elements 10218 are tapered such that the pods are respectively encouraged toward their adjacent static base while engaging surfaces to be cleaned. Thus, during use, cleaning elements 9948 are generally biased toward engagement with cleaning elements 9944 on rear base 620, and cleaning elements 9946 are generally biased toward engagement with cleaning elements 9942 on front base 616. This bias can work along with movement of the pods that is imparted via engagement of angled cleaning elements with cleaning surfaces when the device is being moved. Increasing movement and the flexing of bases 622 and 624 further enhances the cleaning effectiveness of the oral care implement.

[158] The soft tissue cleanser 10280 includes a plurality of projections 10281 extending from a face 10284 on a second side of head 10214, which is generally opposite from the direction in which tooth cleaning elements 10218 extend. Soft tissue cleanser 10280 is disposed on a contoured surface, such as contoured surface 9940 shown in Figure 55, which includes hills 9950 and valleys 9952 to provide a rolling or undulating surface on a second face of the head. Projections 10281 may be separately molded and glued to the contoured surface or otherwise

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attached thereto. In addition, they may be integrally formed with the head 10214. The projections could each be made from a material different from other projections and/or different from other parts. Soft materials, such as TPE or the like, can be fixed to head 10214 to form the projections. However, a harder material or virtually any known material used to make oral care implements may be appropriate for the projections.

[159] Projections 10281 include a plurality of nubs 10282, which extend from contoured surface 9940 to engage the soft tissue in a user's mouth. However, the projections could have a variety of shapes, patterns, cross-sections, configurations, etc., and the soft tissue cleanser could have a variety of configurations for the projections, such as those discussed along with Figures 12-54.

[160] As shown in Figure 61, nubs 10282 generally cover rear face 10284 in a cleanser field 10288, which extends from a region opposite the rear base 620 at a lower portion of the head to a region opposite the front base 616 at a tip portion of the head. The nubs are dispersed in a substantially continuous pattern over the cleanser field. The cleanser field includes hills 10290 proximate edge portions of face 10284, and valleys 10292 disposed between the hills and at a central portion of the face. The configuration of hills and valleys enhances the effectiveness of the soft tissue cleanser by concentrating the applied force at the hill portions during initial contact with a user's soft tissue, which can increase penetration into the soft tissue versus a relatively flat configuration. As the user applies addition force, the valleys contact the soft tissue to aid in cleansing the soft tissues. If excessive force is applied, the valleys help to limit excessive penetration. When the nubs in the valley regions engage the soft tissue, they provide the added benefit of dislodging debris that is loosened by the deeper penetration of nubs on the hills. Thus, projections on the hills and valleys work in concert to initially loosen and then dislodge debris in a user's soft tissue.

[161] Figures 62 and 63 illustrate another embodiment 10610 of an oral care implement according to the invention. Oral care implement 10610 generally includes the same aspects and features of oral care implement 10210, except with respect to the configuration of projections on the soft tissue cleanser 10680. Rather than having nubs across the cleanser field, soft tissue cleanser 10680 only includes nubs 10282 on the hills 10288. Instead, a plurality of ridges 10294 are disposed in some of the valley regions 10290 including a central portion of face 10284. The ridges may have the same general structure as the ridges discussed along with Figures 12-54 and can be made from the same or a different material than the nubs. For instance, the nubs and

ridges may be made of the same type of elastomer; however, the elastomer for the ridges may be more rigid than that for the nubs.

[162] Ridges 10294 have variable lengths that provide variable levels of soft tissue engagement during use. As such, longer and shorter ridges can work in concert to loosen and dislodge debris as the different lengths of ridges successively engage portions of soft tissue. Ridges 10294 taper from a wide base region disposed proximate the face 10284, to a narrower tip 10696. Thus, increasing levels of soft tissue engagement are provided depending on the amount of user force applied.

[163] Figure 64 illustrates another embodiment 10810 of an oral care implement according to the invention. Oral care implement 10810 generally includes the same aspect and features of oral care implement 10610, except with respect to the configuration of projections on the soft tissue cleanser 10880. Soft tissue cleanser 10880 differs from soft tissue cleanser 10680 in that it does not include ridges 10294. Thus, soft tissue cleanser includes nubs 10282 that are only located on hills 10288 along the side portions of face 10284. As such, gentle cleansing is provided via the nubs located on the hills. The gentle cleansing is beneficial for simultaneous functionality of the oral care implement, such as when a user cleans his teeth while simultaneously engaging soft tissues inside his cheek via soft tissue cleanser 10880. The gentle engagement can provide pleasant sensory stimulation along with gentle cleaning of the tissues.

[164] Figures 65 and 66 illustrate another embodiment 10910 of an oral care implement according to the invention. Oral care implement 10910 generally includes the same aspects and features of oral care implement 10610, except with respect to the configuration of projections on the soft tissue cleanser 10980. Soft tissue cleanser 10980 differs from soft tissue cleanser 10680 in that ridges 10994 are not provided in the central portion of face 10284, but are provided in valleys 10290 disposed between adjacent pairs of hills 10288. In addition, ridges 10994 are generally smaller than ridges 10294. As such, gentle cleansing is provided, which, similar to oral care implement 10810, can be beneficial during simultaneous functionality of the device.

[165] 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. Further, as noted above, it is intended that oral care implements according to the invention and associated methods may utilize various combinations of aspects, features and configurations discussed within the application.

What is claimed is:

1. An oral care implement comprising:

a handle;

a head attached to the handle, the head having a first face on a first side thereof;

a support flexibly attached to the head; and

a plurality of cleaning elements attached to the support and projecting outwardly from the face, the cleaning elements being movable in directions transverse to the outward direction from the head in which the cleaning elements extend.

2. The oral care implement of claim 1, wherein some of the cleaning elements are angled forward toward a tip portion of the head.

3. The oral care implement of claim 2, wherein some of the cleaning elements are angled reward toward the handle.

4. The oral care implement of claim 1, wherein the cleaning elements include a support element at the central portion of the support.

5. The oral care implement of claim 4, wherein the support element includes a column-shaped bristle extending further than other cleaning elements on the support.

6. The oral care implement of claim 4, wherein the support element includes a pair of opposing wall-like cleaning elements.

7. The oral care implement of claim 6, wherein the first wall-like cleaning element of the pair includes a first concave wall and the second wall-like cleaning element of the pair includes a second concave wall opposing the first concave wall.

8. The oral care implement of claim 7, wherein the cleaning elements further include a column-shaped bristle disposed between the first and second concave wall.

9. The oral care implement of claim 1, further comprising a soft tissue cleanser on a second face of the head opposite the first face.

10. The oral care implement of claim 9, wherein soft tissue cleanser includes a plurality of projections.

11. The oral care implement of claim 10, wherein the projections include nubs and ridges.

12. The oral care implement of claim 9, wherein the second face includes an undulating surface having a plurality of hills and valleys.

13. The oral care implement of claim 9, wherein the soft tissue cleanser is made from a resilient material.

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14. The oral care implement of claim 13, wherein the resilient material includes an elastomer.

15. The oral care implement of claim 1, further including a motor for driving at least a portion of the cleaning elements.

16. An oral care implement comprising:

a handle;

a head attached to the handle, the head having a first face and substantially opposite second face, the head having a first support flexibly connected to the first face and a plurality of first cleaning elements mounted to the support; and

a soft tissue cleanser on the second face of the head for cleansing soft tissue in a user's mouth, the soft tissue cleanser including a plurality of projections protruding outwardly from the head for removal of microbial and other debris from the soft tissue.

17. The oral care implement of claim 16, further comprising a second support flexibly connected to the first face and having a plurality of second cleaning elements mounted to it;

wherein the first cleaning elements and the second cleaning elements are tapered away from each other.

18. The oral care implement of claim 17, further comprising a front static support for supporting cleaning elements and a rear static support for supporting cleaning elements, the first support and the second support serially disposed between the front and rear static supports to form a line of supports.

19. The oral care implement of claim 16, wherein the second face includes an undulating surface having hills and valleys, and the projections include nubs disposed on the hills.

20. The oral care implement of claim 19, wherein the projections include ridges disposed in the valleys.

21. An oral care implement comprising:

a handle;

a head having a first face and a longitudinal axis generally aligned with the handle and traversing a central portion of the first face; and

a soft tissue cleanser disposed on the first face of the head for cleansing soft tissue in a user's mouth, the soft tissue cleanser comprising soft tissue cleanser elements disposed generally symmetrically about the longitudinal axis.

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22. The oral care implement of claim 21, wherein the soft tissue cleanser lacks soft tissue cleanser elements along the longitudinal axis.

23. The oral care implement of claim 21, wherein the soft tissue cleanser elements include nubs and ridges projecting from the first face.

24. The oral care implement of claim 21, further comprising tooth cleansing elements extending from a second face of the head for cleaning a user's teeth.

25. The oral care implement of claim 24, wherein the tooth cleansing elements extend in a direction substantially opposite the direction in which the soft tissue cleansing elements extend outwardly from the first face to permit simultaneous engagement of a user's teeth via the tooth cleansing elements along with engagement of soft tissues opposed to the teeth via the soft tissue cleanser.

26. An oral care implement comprising:

a handle having a grip feature;

a head having a first face; and

a soft tissue cleanser disposed on the first face of the head for cleansing soft tissue in a user's mouth, the soft tissue cleanser having a cleansing element that is similar in character to the grip feature of the handle.

27. The oral care implement of claim 26, wherein the grip feature includes a thumb grip having a first projection thereon and the cleansing element includes a second projection similar in character to the first projection.

28. The oral care implement of claim 27, wherein the first and second projections each include a discrete nub.

29. The oral care implement of claim 26, further comprising tooth cleansing elements extending from a second face of the head for cleaning a user's teeth.

30. The oral care implement of claim 29, wherein the tooth cleansing elements extend in a direction substantially opposite the direction in which the cleansing element is oriented outwardly from the first face to permit simultaneous engagement of a user's teeth via the tooth cleansing elements along with engagement of soft tissues opposed to the teeth via the soft tissue cleanser.

31. An oral care implement comprising:

a handle;

a head having a first face and a longitudinal axis generally aligned with the handle and traversing a central portion of the first face; and

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a soft tissue cleanser disposed on the first face of the head for cleansing soft tissue in a user's mouth, the soft tissue cleanser comprising a first section of soft tissue cleanser elements extending along the longitudinal axis and a second section of soft tissue cleanser elements extending along a second axis substantially parallel with the longitudinal axis.

32. The oral care implement of claim 31, wherein the second section extends along a first edge of the head.

33. The oral care implement of claim 32, further comprising a third section extending along a second edge of the head substantially opposite the first edge.

34. The oral care implement of claim 31, wherein the soft tissue cleanser elements of the first section include ridges and the soft tissue cleanser elements of the second section include nubs.

35. The oral care implement of claim 34, wherein the ridges are oriented substantially transverse to the longitudinal axis.

36. The oral care implement of claim 31, further comprising tooth cleansing elements extending from a second face of the head for cleaning a user's teeth.

37. The oral care implement of claim 36, wherein the tooth cleansing elements project in a direction substantially opposite the direction in which the soft tissue cleansing elements of the first section are oriented outwardly from the first face to permit simultaneous engagement of a user's teeth via the tooth cleansing elements along with engagement of soft tissues opposed to the teeth via the soft tissue cleanser.

38. An oral care implement comprising:

a handle;

a head having a first face and quadrants on the first face; and

a soft tissue cleanser disposed on the first face of the head for cleansing soft tissue in a user's mouth, the soft tissue cleanser comprising groups of cleanser elements, at least one group of cleanser elements disposed in each quadrant of the face.

39. The oral care implement of claim 38, wherein the groups of cleanser elements are longitudinally and laterally spaced apart from each other.

40. The oral care implement of claim 39, wherein the cleanser elements of the groups of cleanser elements include nubs.

41. The oral care implement of claim 40, further comprising ridges disposed between adjacent groups of cleanser elements.

42. The oral care implement of claim 38, further comprising tooth cleansing elements extending from a second face of the head for cleaning a user's teeth.

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43. The oral care implement of claim 42, wherein the tooth cleansing elements extend in a direction substantially opposite the direction in which the soft tissue cleansing elements are oriented outwardly from the first face to permit simultaneous engagement of a user's teeth via the tooth cleansing elements along with engagement of soft tissues opposed to the teeth via the soft tissue cleanser.

44. An oral care implement comprising:

a handle;

a head having a first face;

a first fixed cleaning element extending in an outward direction from the first face;

a first movable cleaning element extending in an outward direction from the first face; and

a soft tissue cleanser disposed on the head for cleansing soft tissue in a user's mouth.

45. The oral care implement of claim 44, further comprising a second fixed cleaning element extending in an outward direction from the first face.

46. The oral care implement of claim 45, wherein the first movable cleaning element is disposed between the first and second fixed cleaning elements.

47. The oral care implement of claim 46, further comprising a second movable cleaning element disposed between the first and second fixed cleaning elements.

48. The oral care implement of claim 44, further comprising soft tissue cleansing elements extending from the soft tissue cleanser.

49. The oral care implement of claim 48, wherein the soft tissue cleansing elements include nubs.

50. The oral care implement of claim 48, wherein the soft tissue cleansing elements include ridges.

51. The oral care implement of claim 48, wherein the soft tissue cleansing elements extend outwardly from the soft tissue cleanser in a direction substantially opposite the direction in which the first fixed cleaning element and the first movable cleaning element are oriented to permit simultaneous engagement of a user's teeth via the first fixed cleaning element and the first movable cleaning element along with engagement of soft tissues opposed to the teeth via the soft tissue cleansing elements.

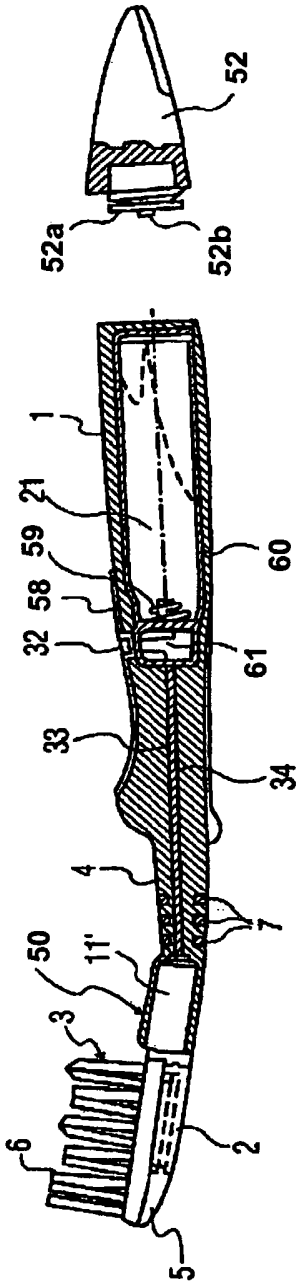


FIG. 1

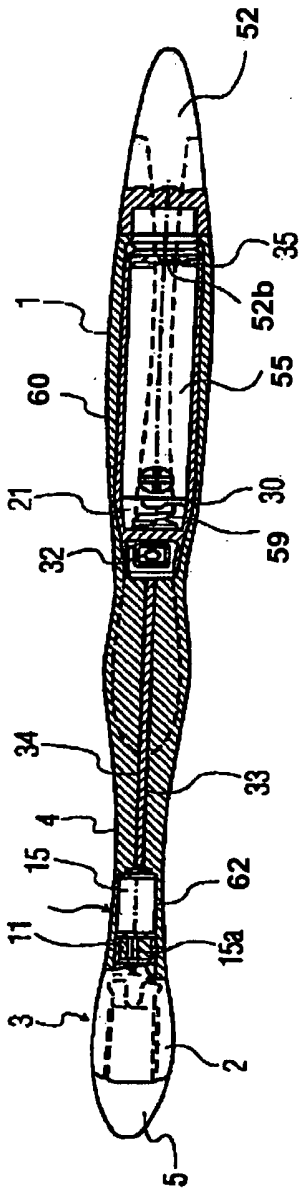


FIG. 2

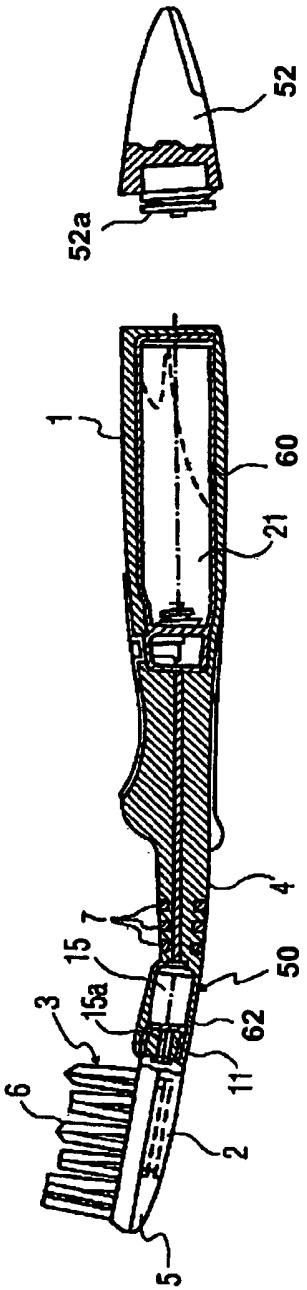


FIG. 3

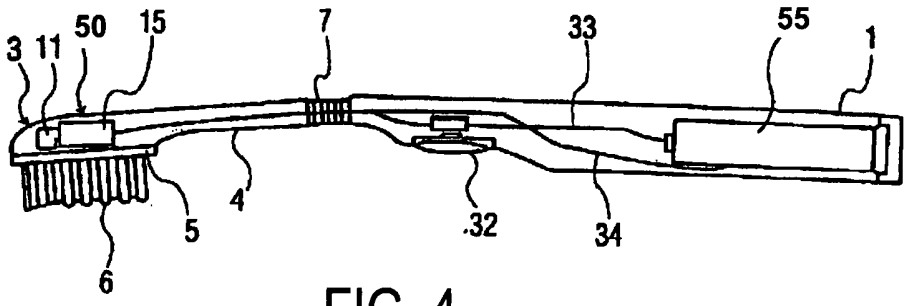


FIG. 4

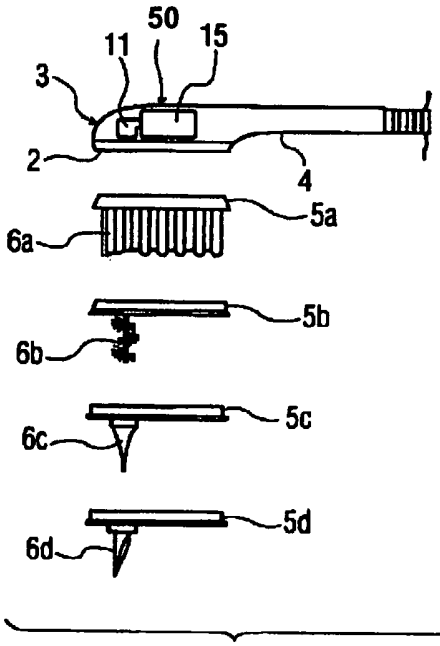


FIG. 5

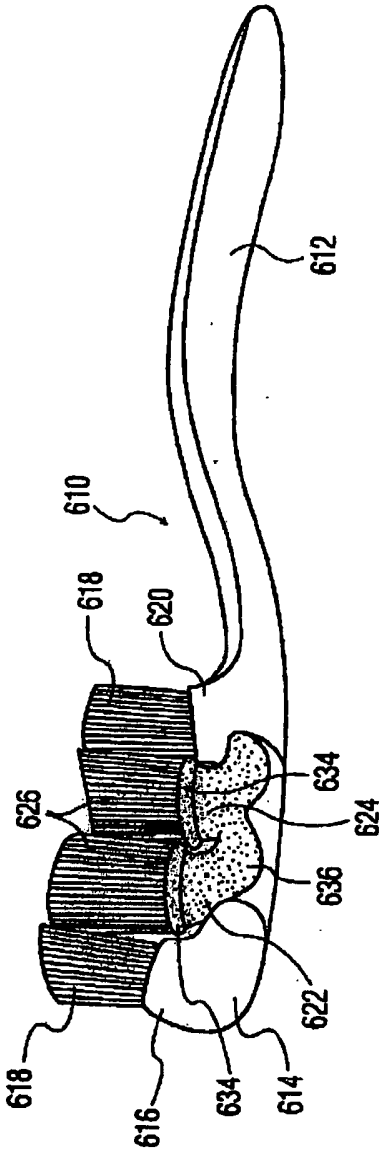


FIG. 6

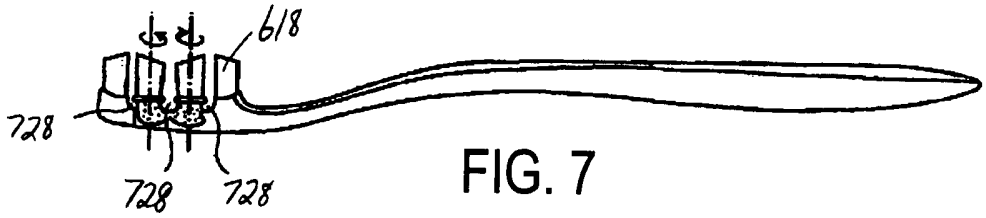


FIG. 7

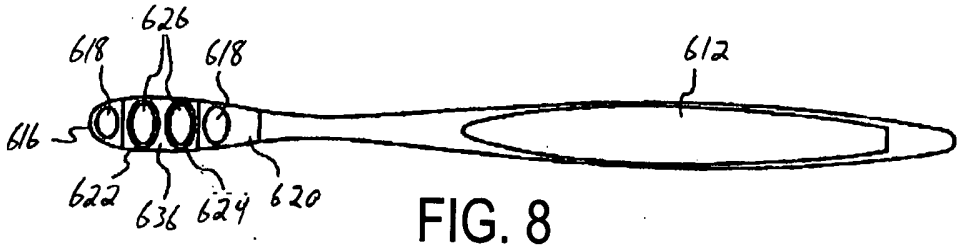


FIG. 8

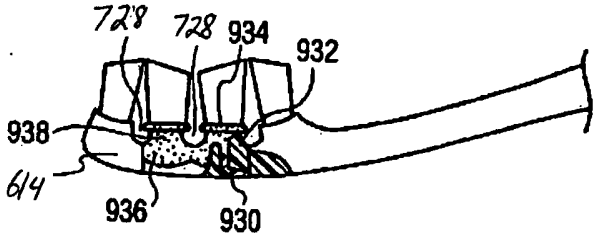


FIG. 9

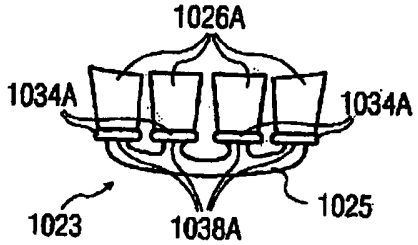


FIG. 10

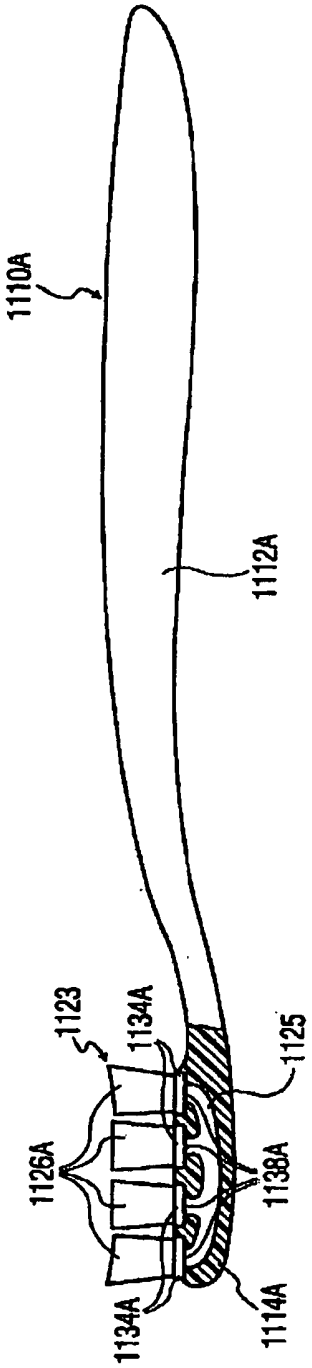


FIG. 11

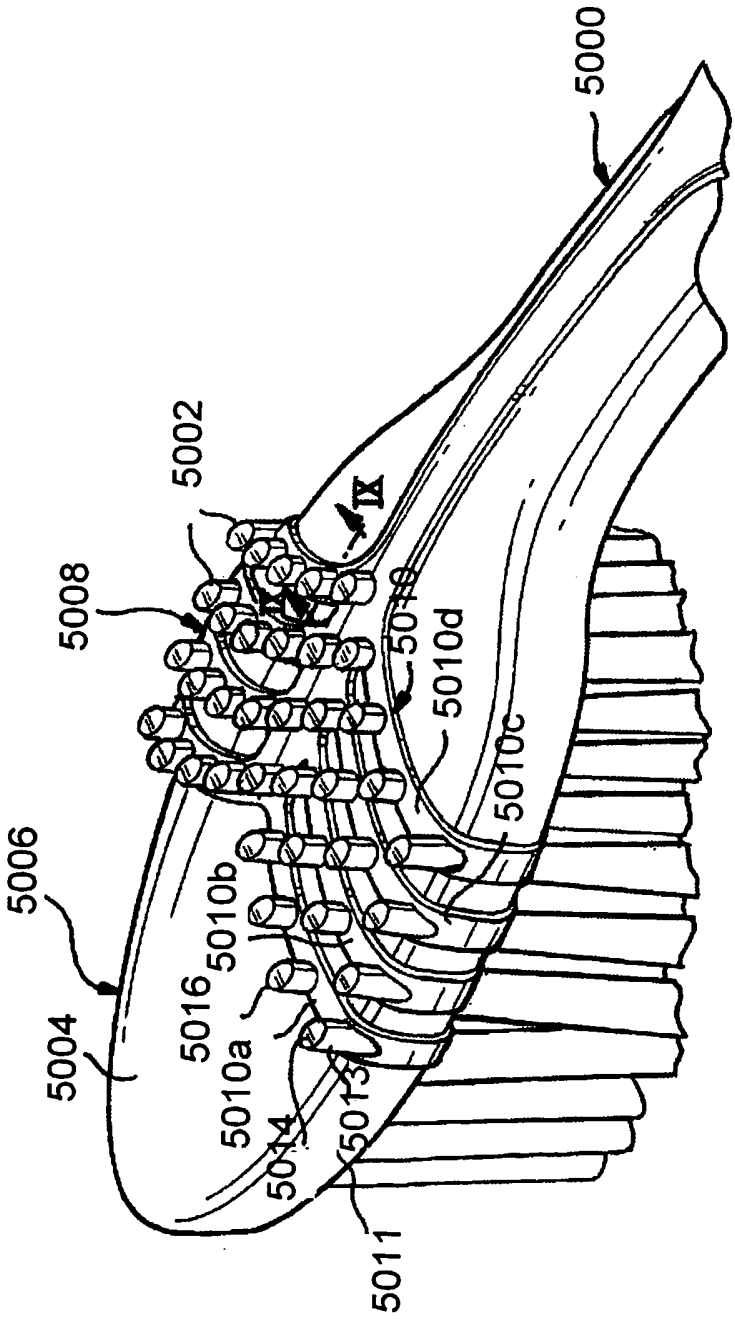


FIG. 12

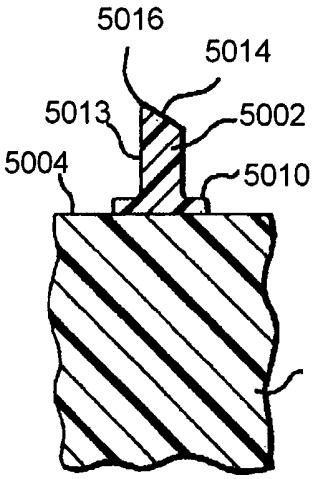


FIG. 13

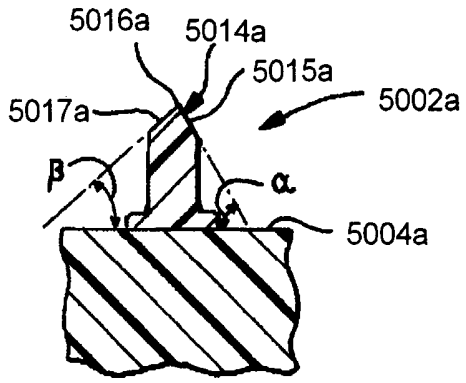


FIG. 14

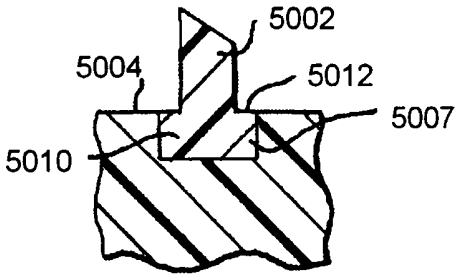


FIG. 15

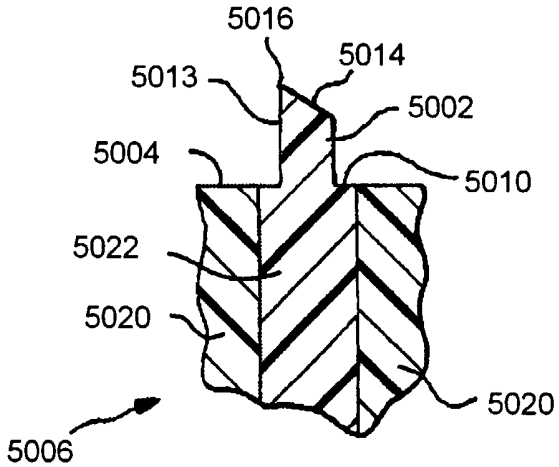


FIG. 16

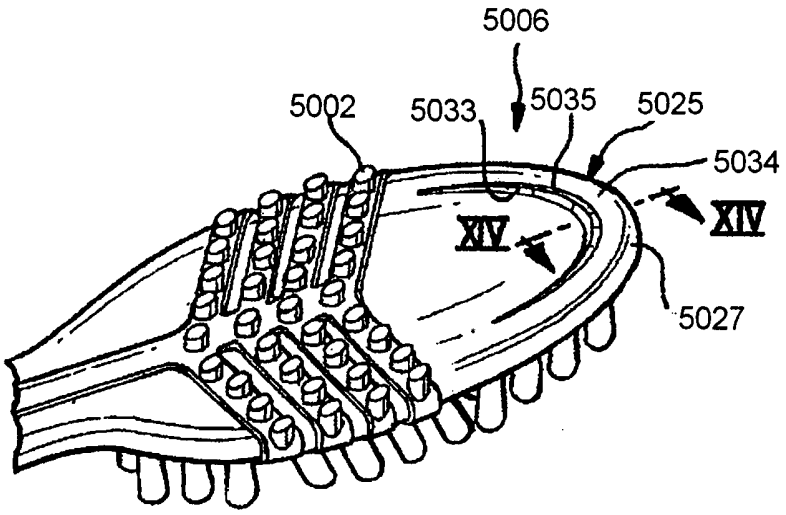

5006
5002
5033
5035
5025
5034
XIV
XIV
5027

FIG. 17

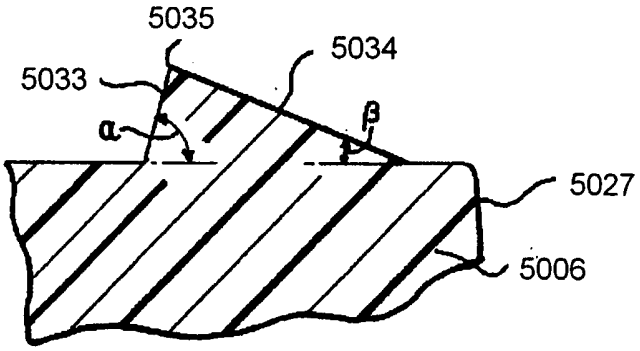

5035
5034
5033
α
β
5027
5006

FIG. 18

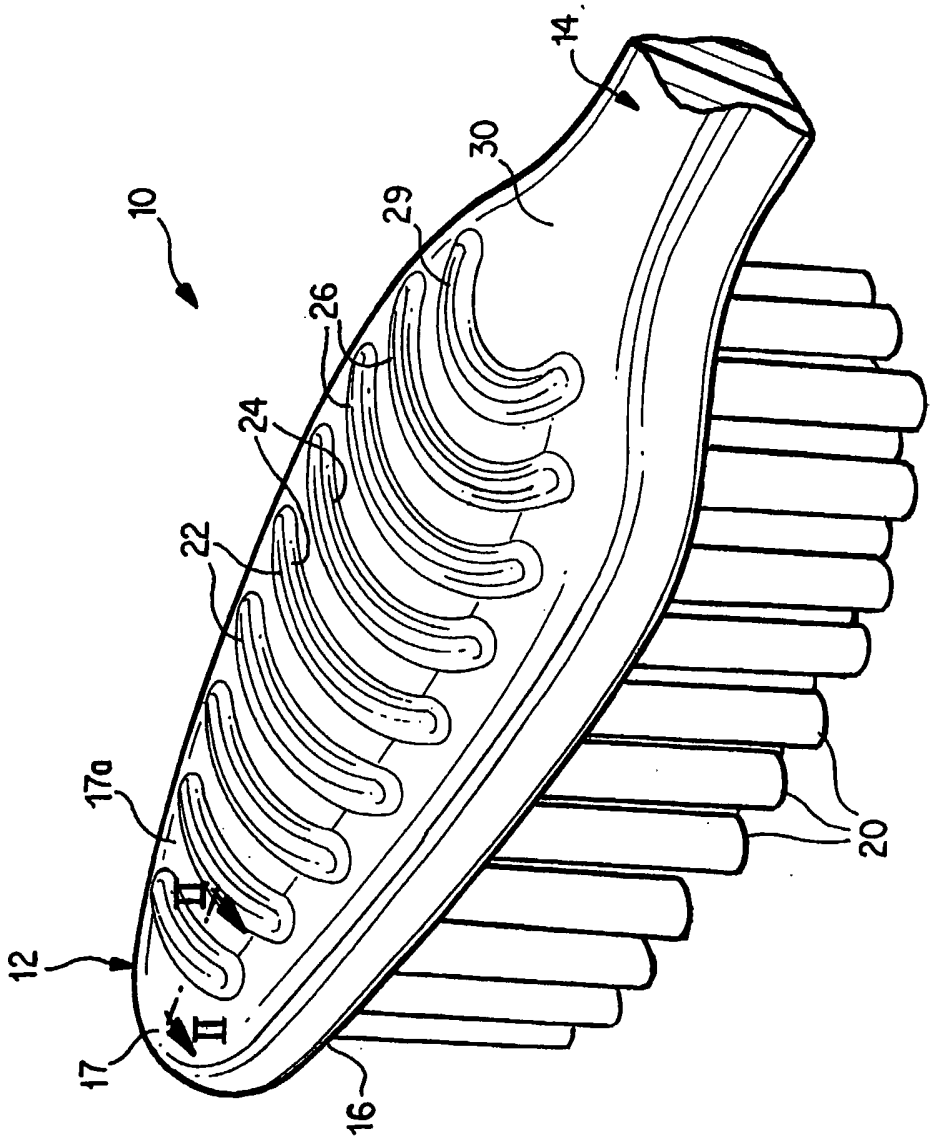


FIG. 19

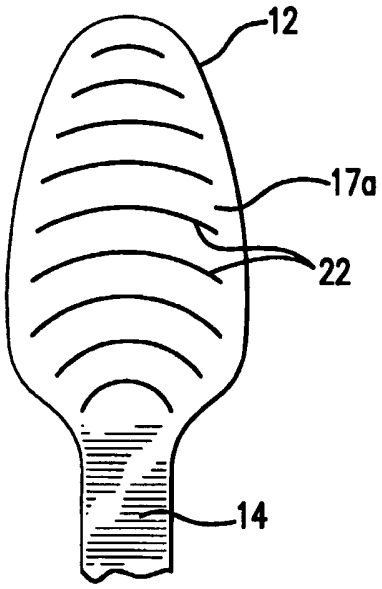


FIG. 20

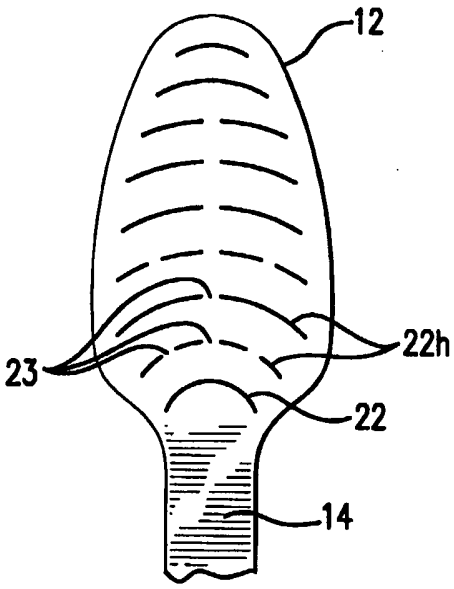


FIG. 21

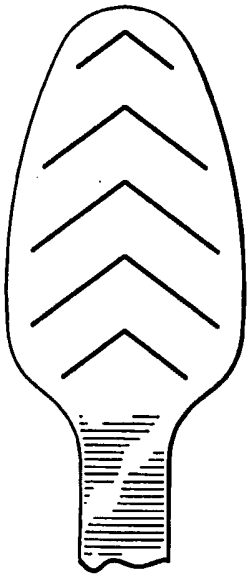


FIG. 22

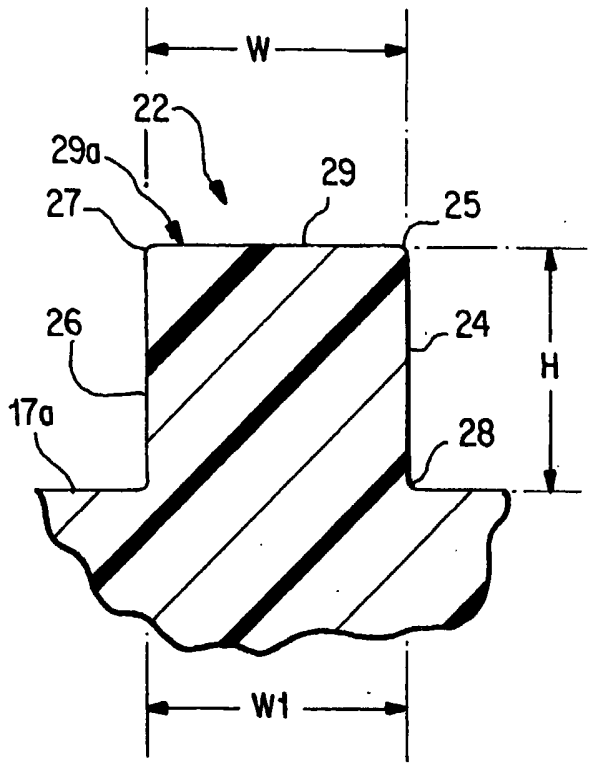


FIG. 23

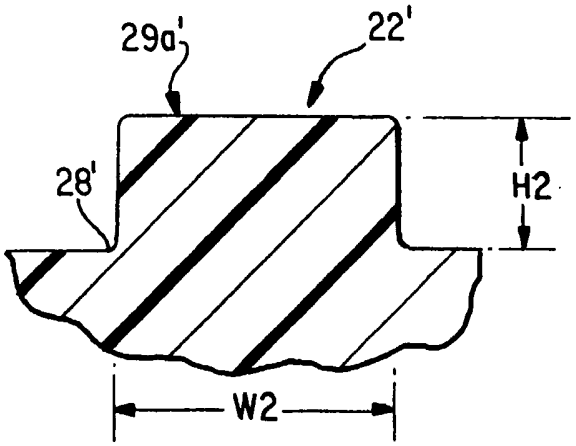


FIG. 24

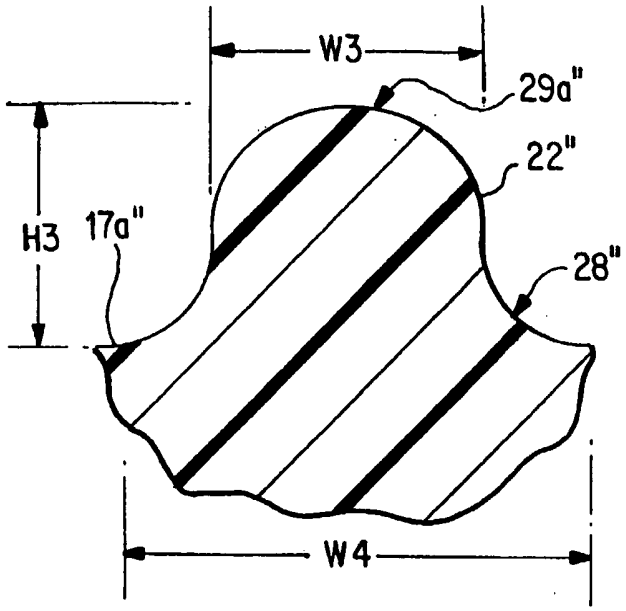


FIG. 25A

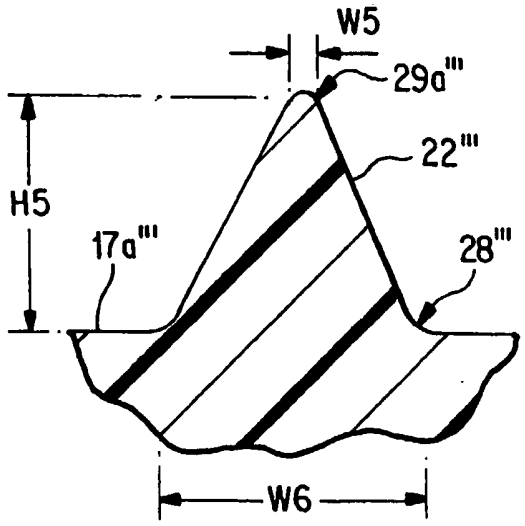


FIG. 25B

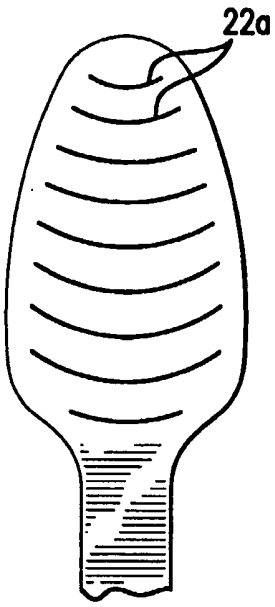


FIG. 26

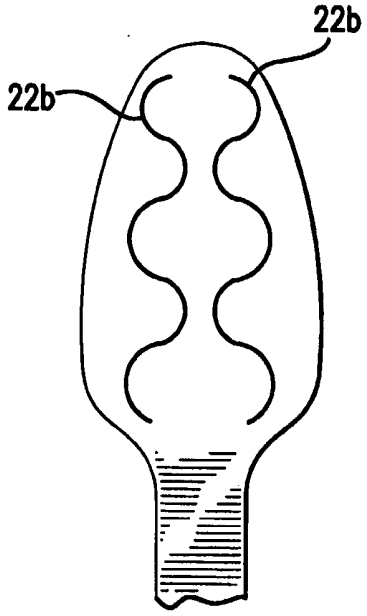


FIG. 27

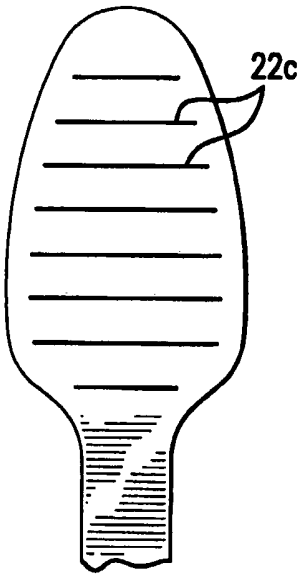


FIG. 28

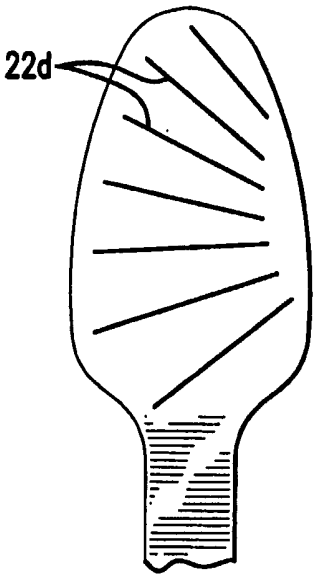


FIG. 29

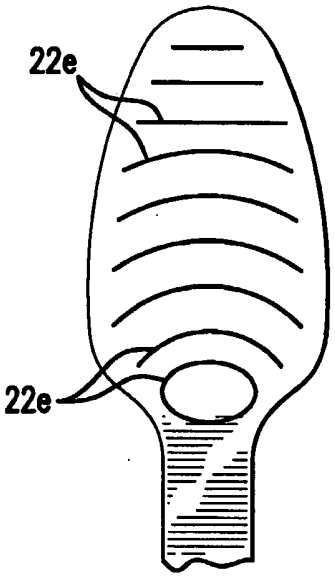


FIG. 30

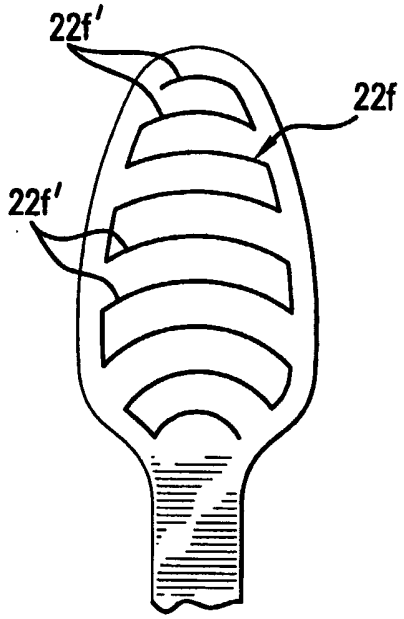


FIG. 31

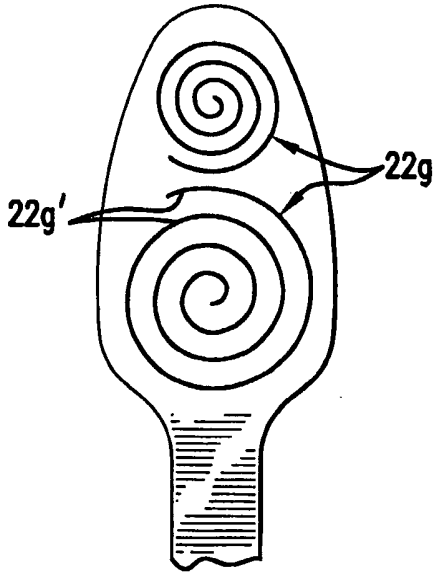


FIG. 32

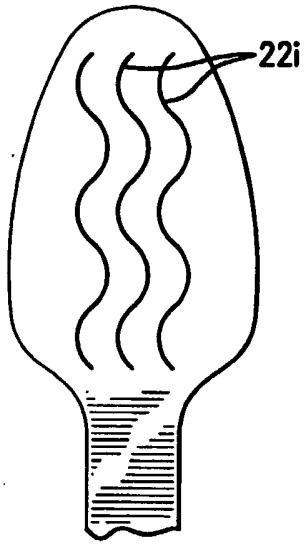


FIG. 33

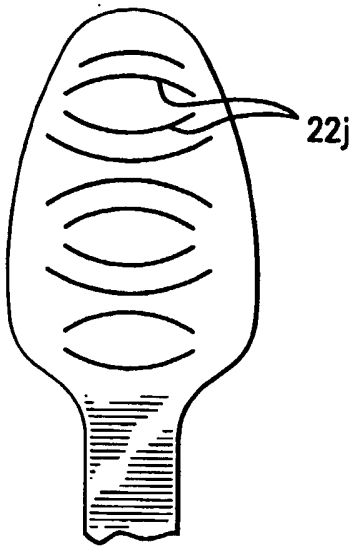


FIG. 34

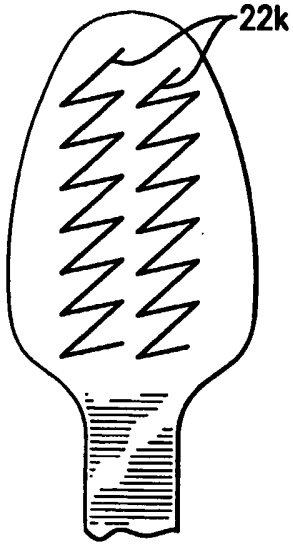


FIG. 35

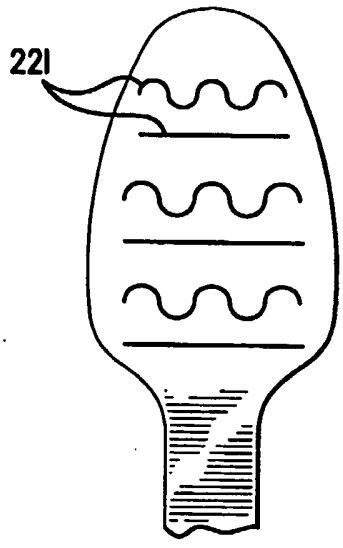


FIG. 36

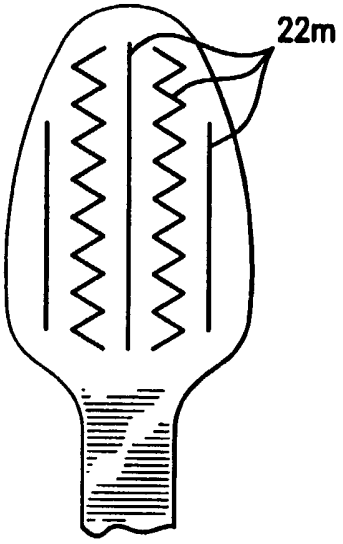


FIG. 37

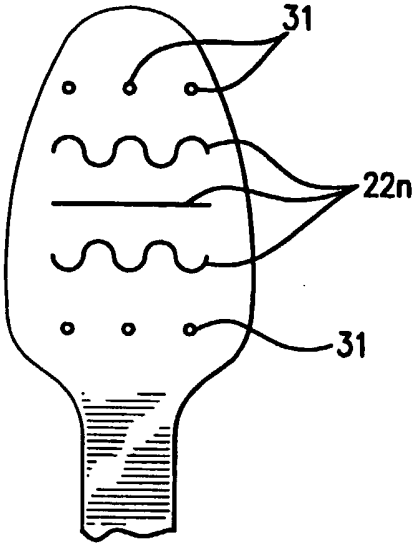


FIG. 38

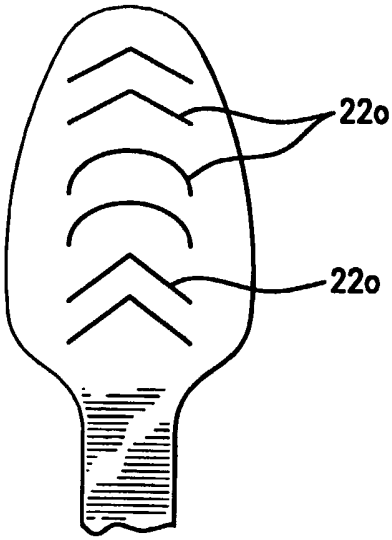


FIG. 39

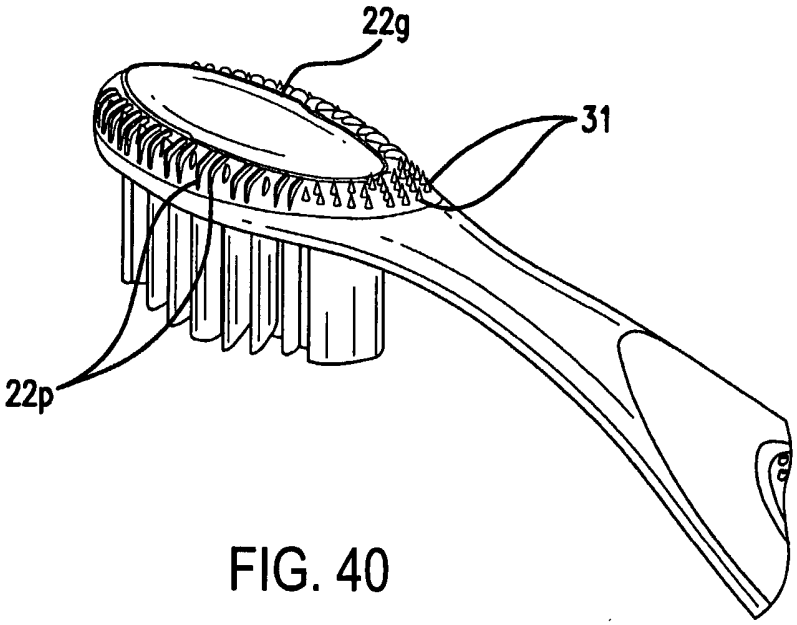


FIG. 40

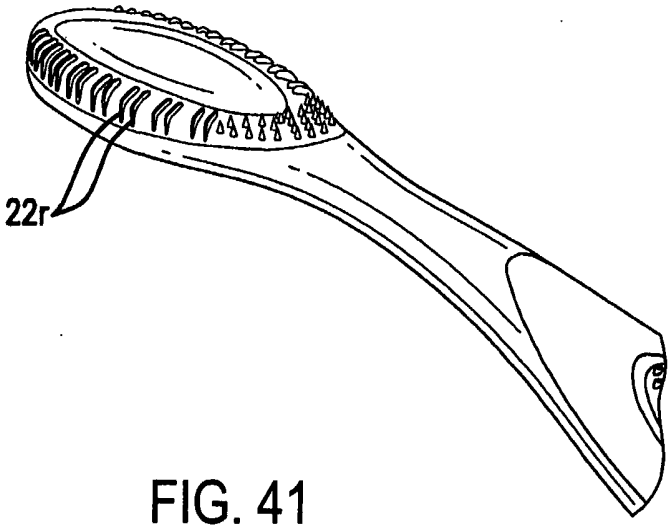


FIG. 41

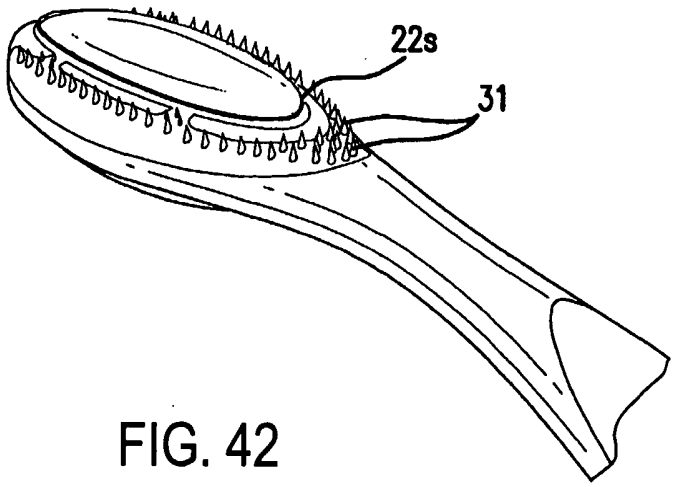


FIG. 42

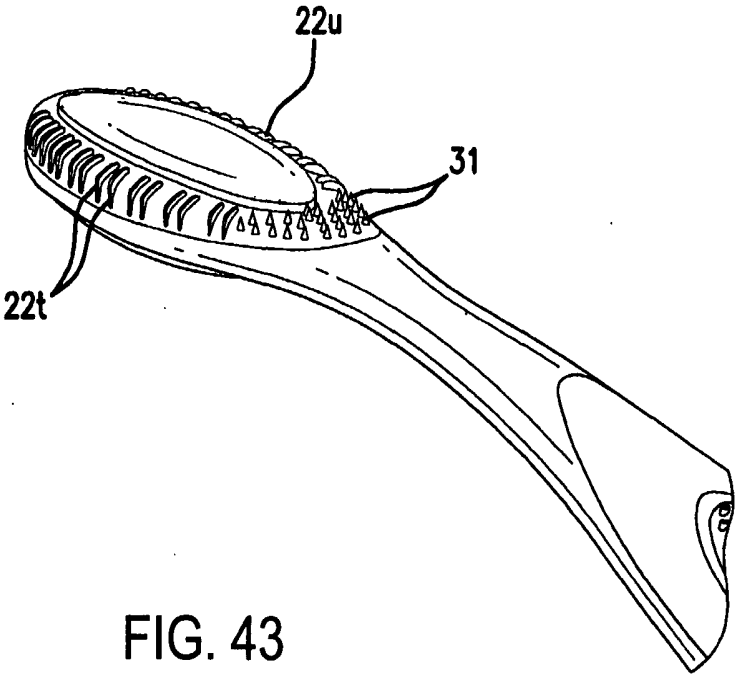


FIG. 43

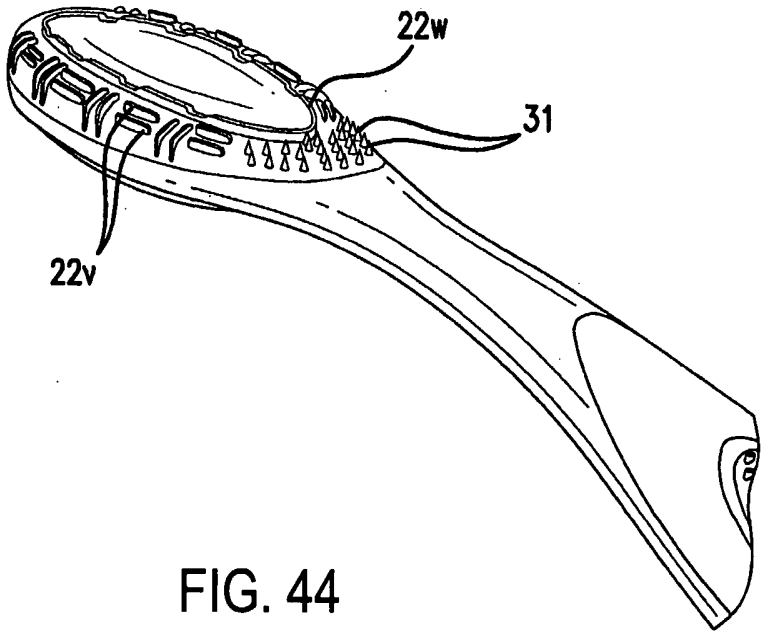


FIG. 44

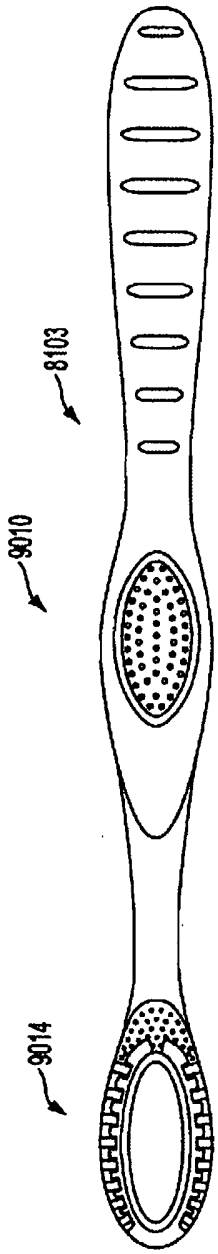


FIG. 45

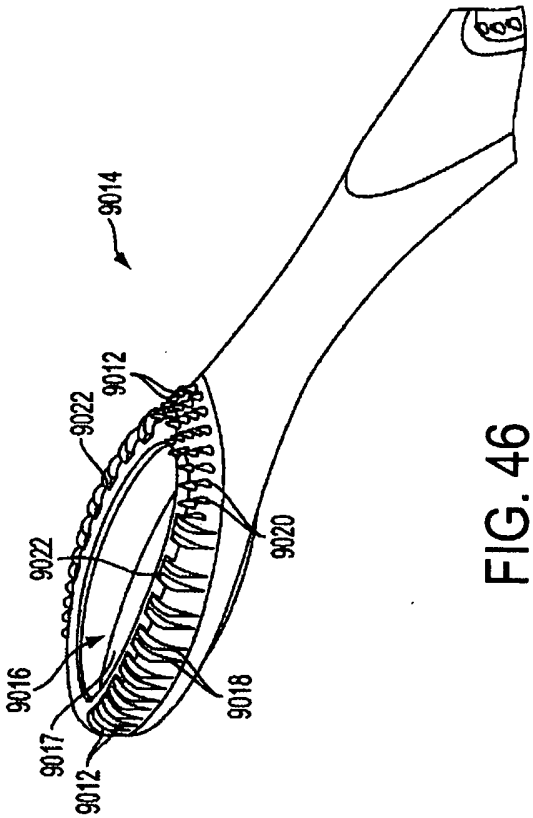


FIG. 46

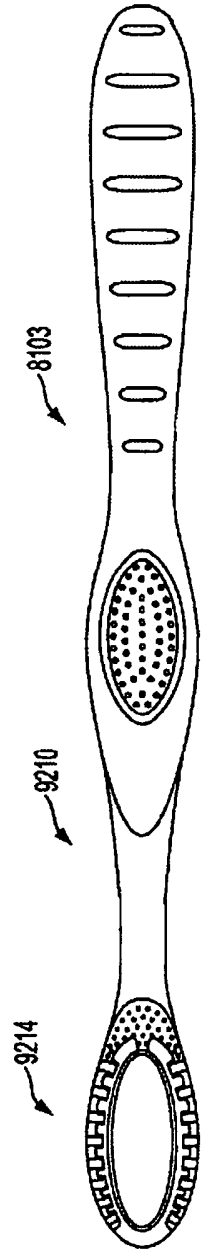


FIG. 47

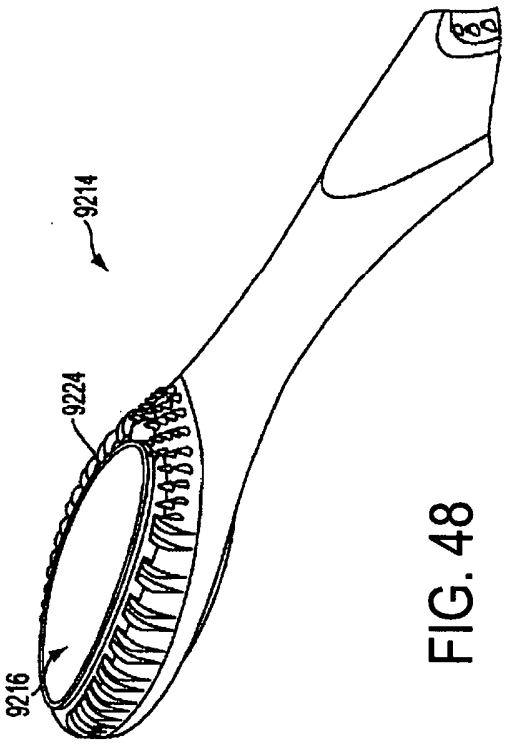


FIG. 48

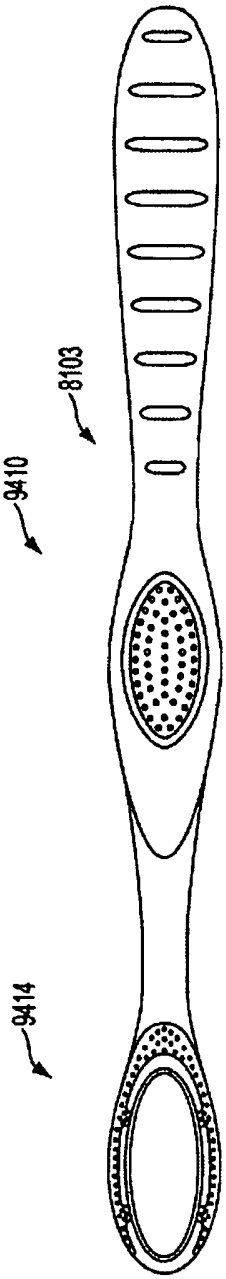


FIG. 49

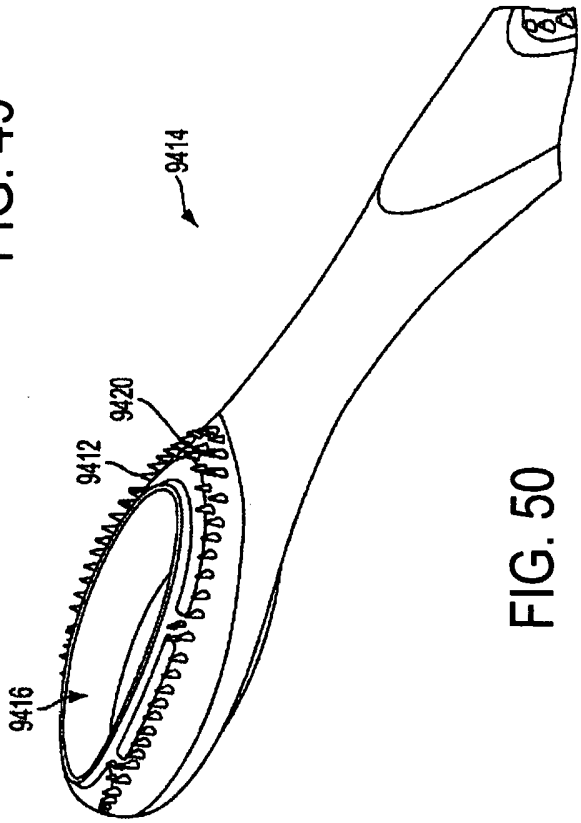


FIG. 50

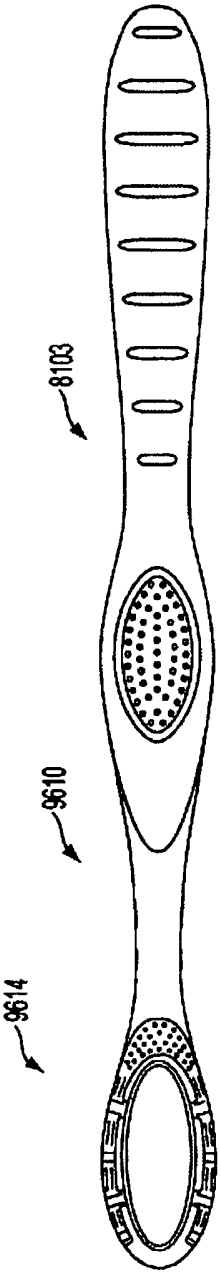


FIG. 51

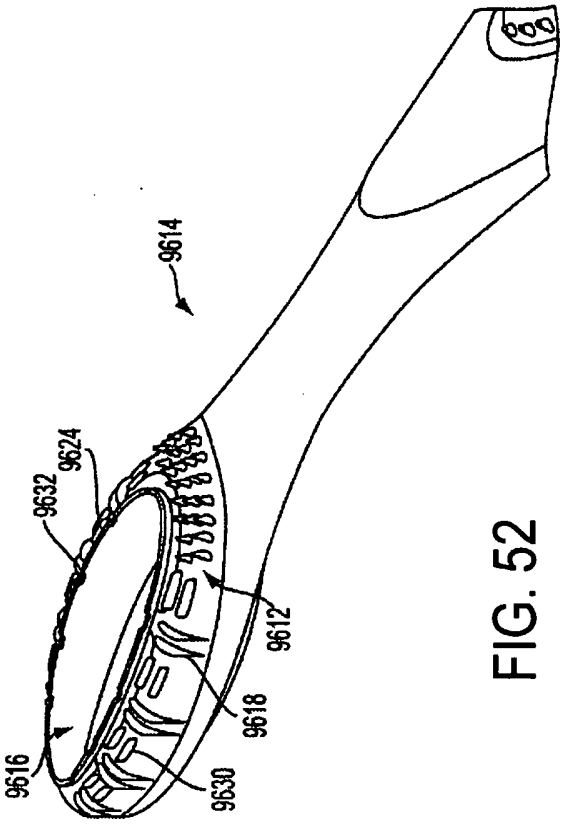


FIG. 52

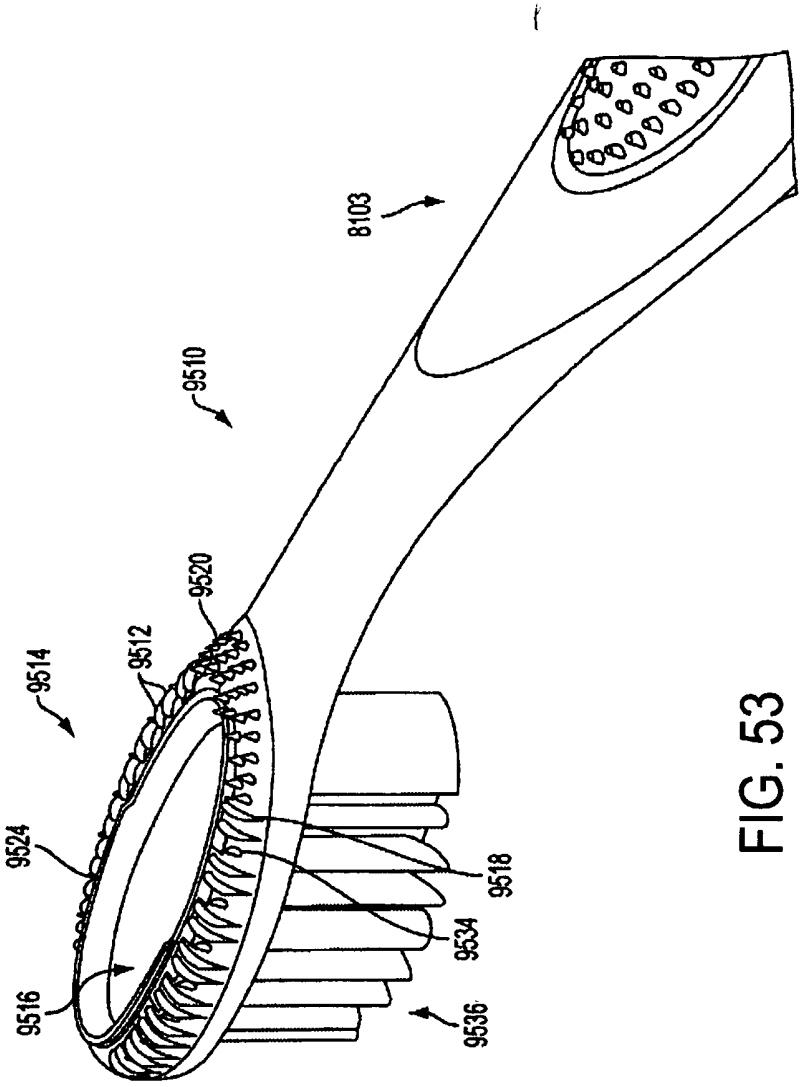


FIG. 53

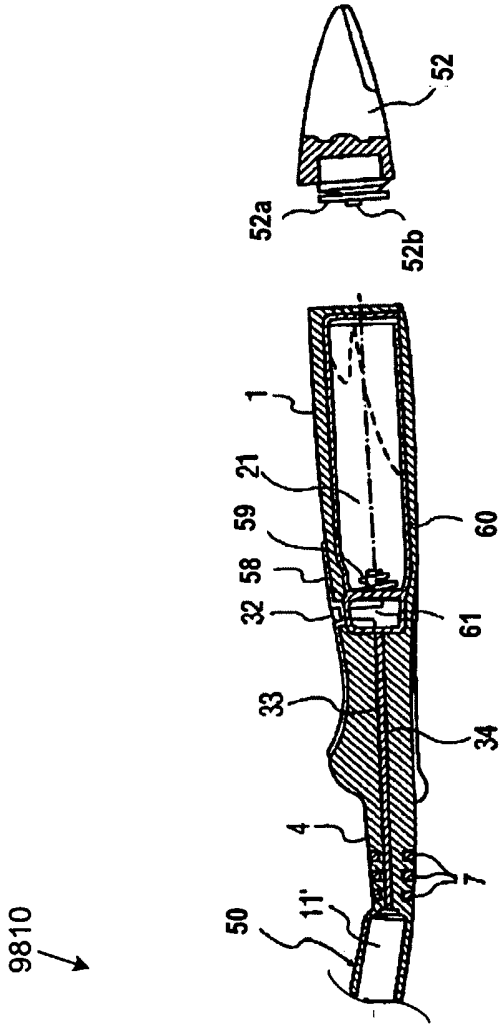


FIG. 54A

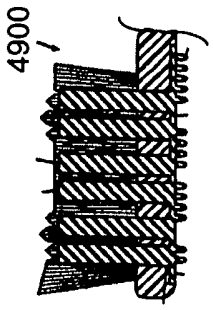


FIG. 54B

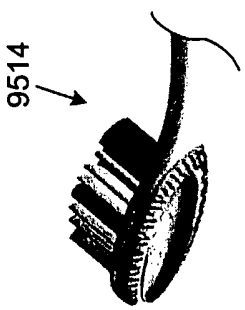


FIG. 54C

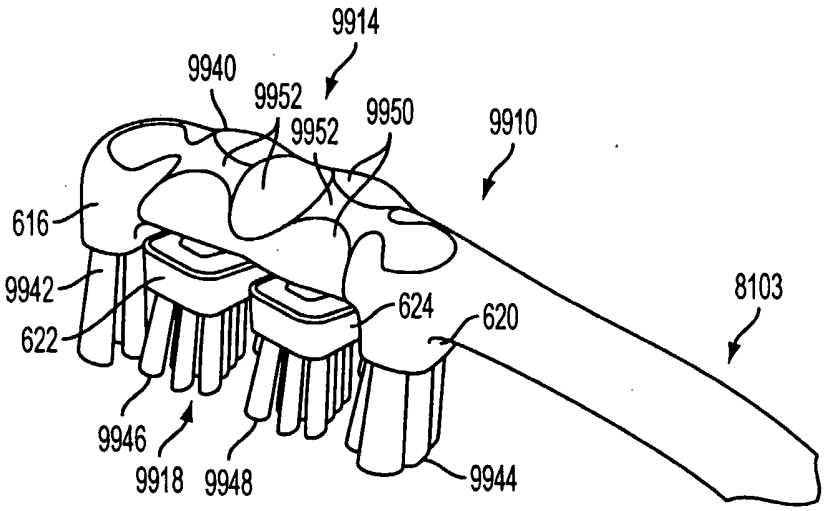

9914
9940
9952
9952
9950
9910
616
9942
622
624
620
8103
9946
9918
9948
9944

FIG. 55

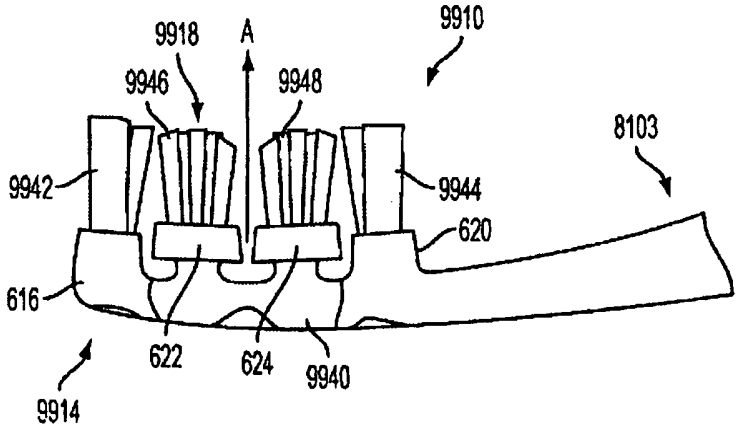
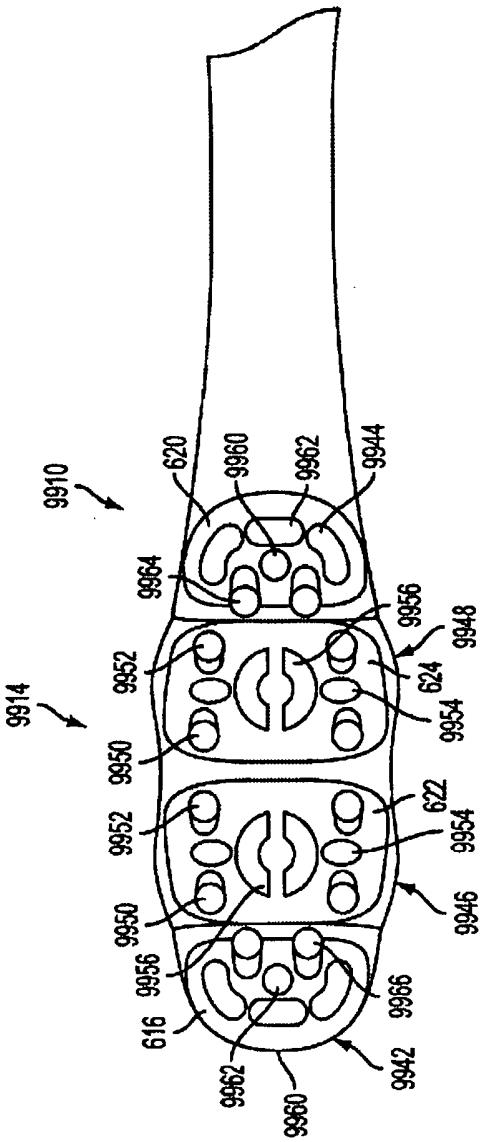


FIG. 56


9910
620
9960
9962
9944
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9956
9948
9952
624
9914
9954
9950
622
9952
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9956
9966
616
9942
9962
9960

FIG. 57

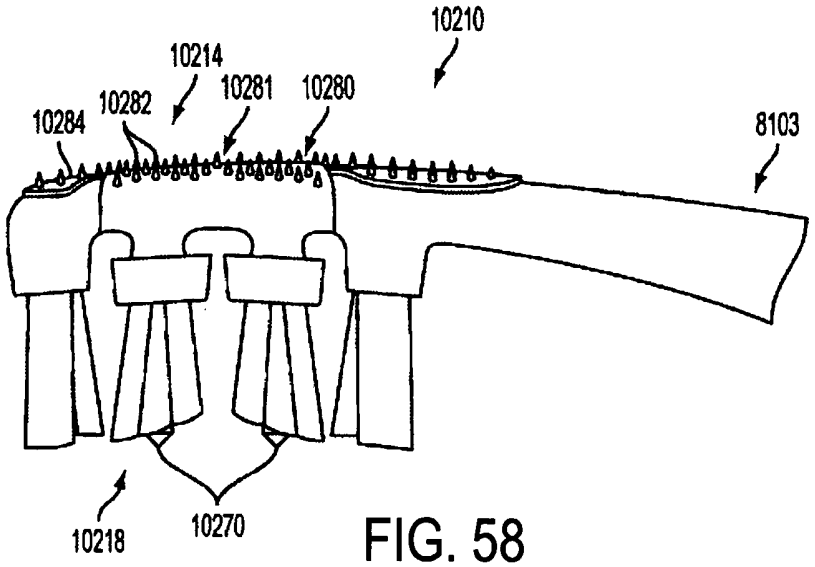
10210
10214
10281
10280
10282
10284
8103
10218
10270

FIG. 58

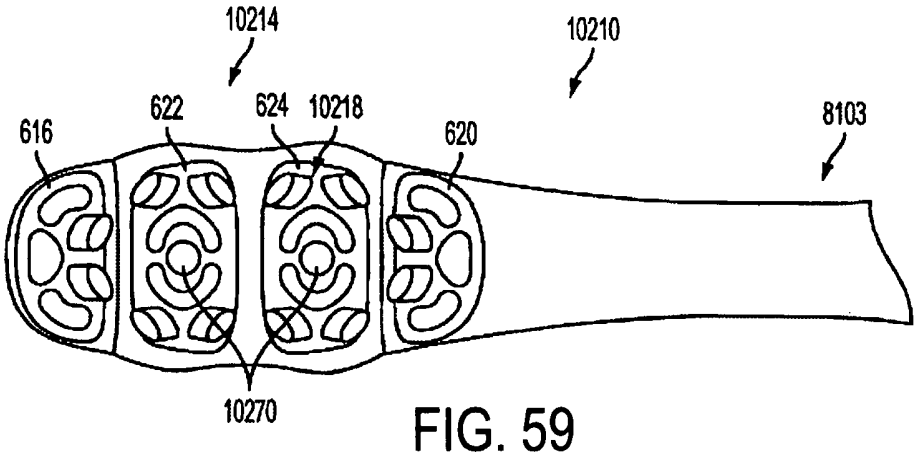
10214
10210
622
624
10218
616
620
8103
10270

FIG. 59

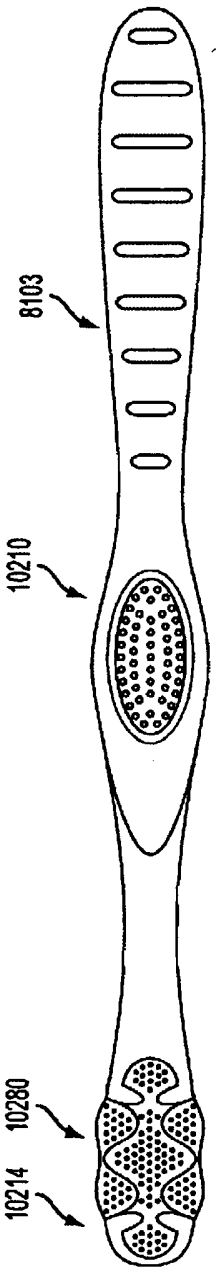
8103
10210
10280
10214

FIG. 60

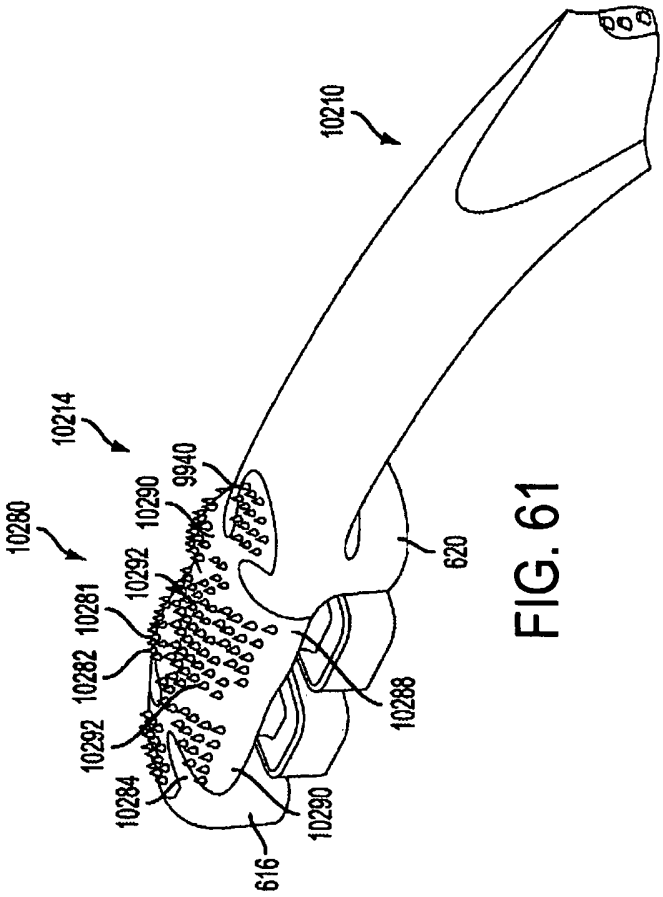
10210
10214
9940
10290
10280
10292
10281
10282
10292
10284
10290
616
10288
620

FIG. 61

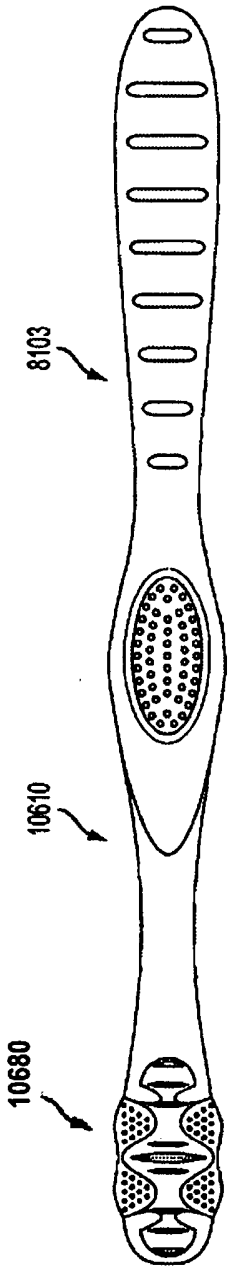
8103
10610
10680

FIG. 62

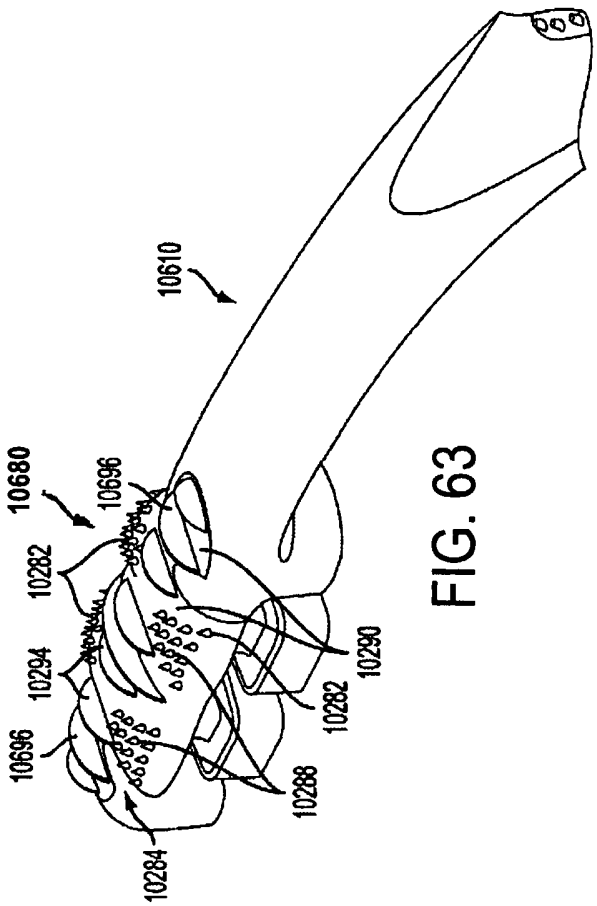
10610
10680
10696
10282
10294
10696
10284
10288
10292
10290

FIG. 63

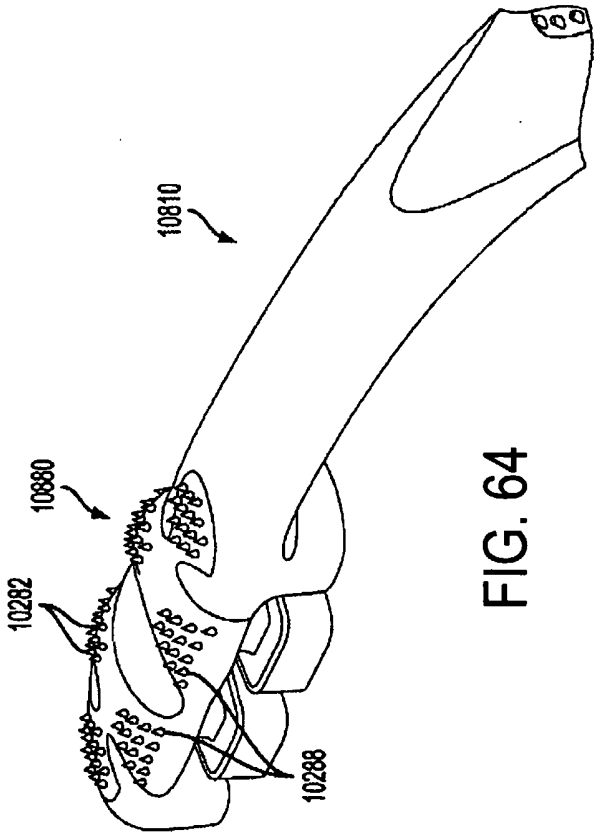

FIG. 64

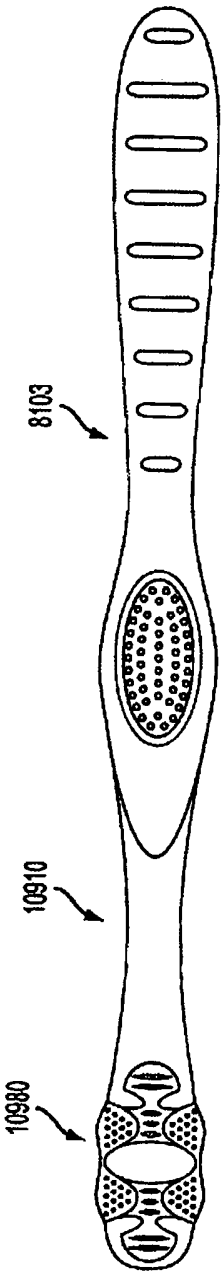
8103
10910
10980

FIG. 65

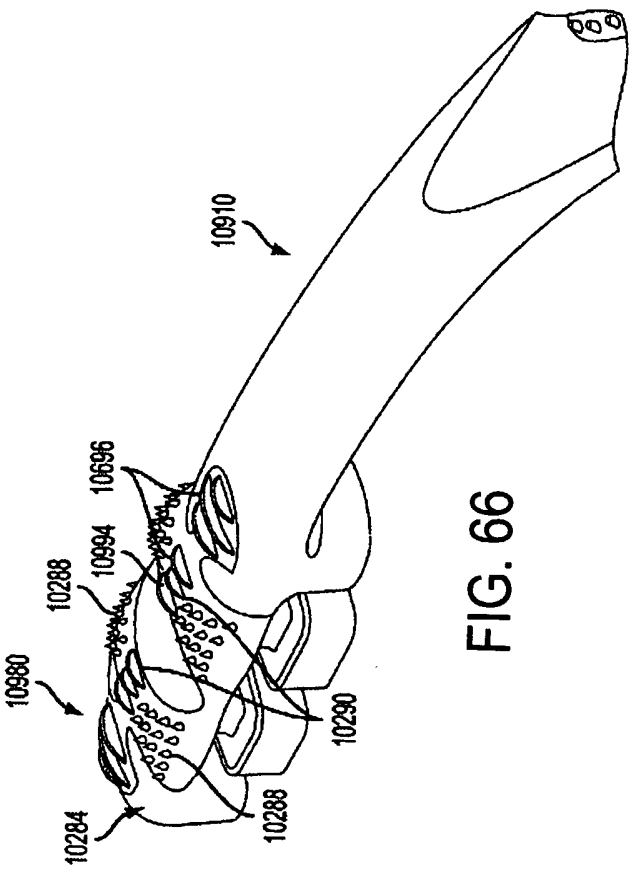
10910
10696
10994
10288
10980
10290
10284
10288

FIG. 66