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(54) **FLEXIBLE TOOTHBRUSH**

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(57) **ABSTRACT**

A toothbrush comprises a handle portion and a head portion. The head portion has a base member and first and second lateral walls extending upwardly therefrom to define a space. The base member and first and second lateral walls have bristles arranged thereon extending into the space. At least one, and preferably both, of the first and second lateral walls are pivotable relative to the base member to permit the side walls to move into and out of the space in response to forces.

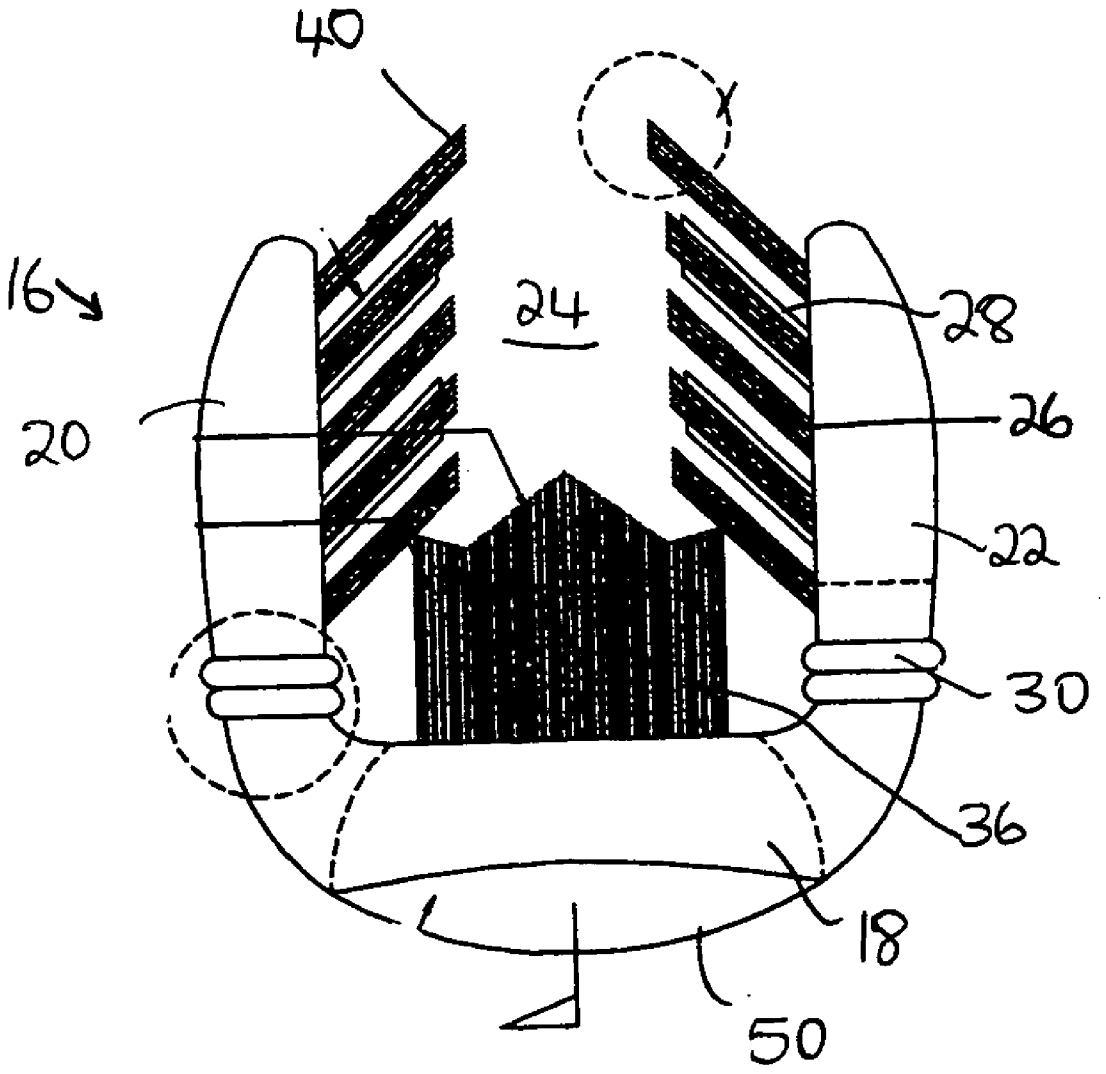
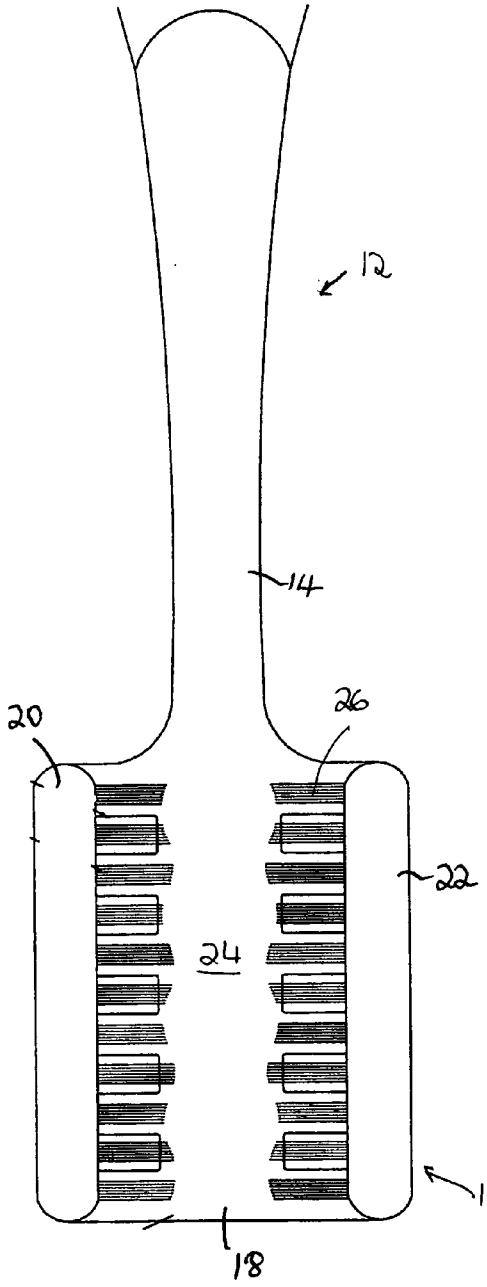


FIG. 1



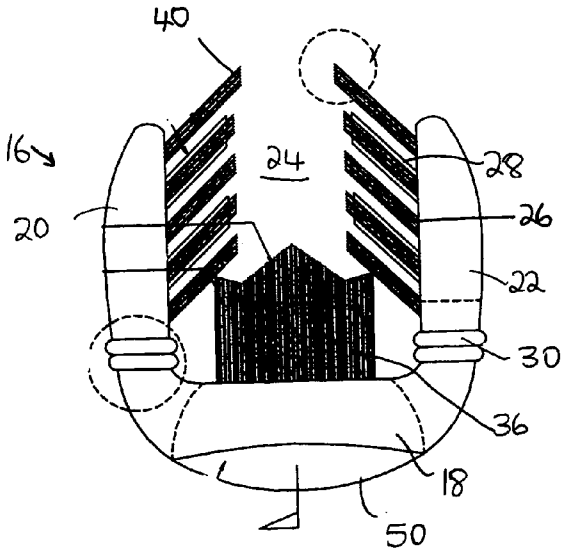


FIG. 2

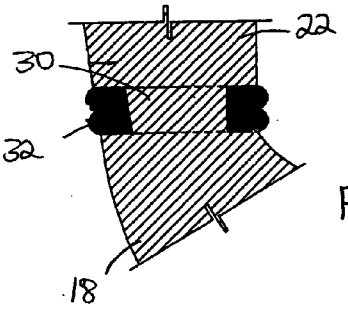


FIG. 3

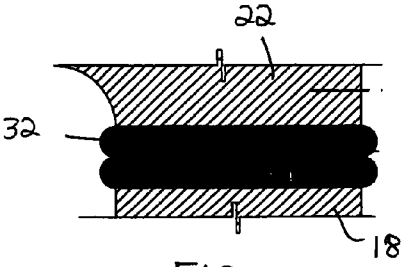


FIG. 4

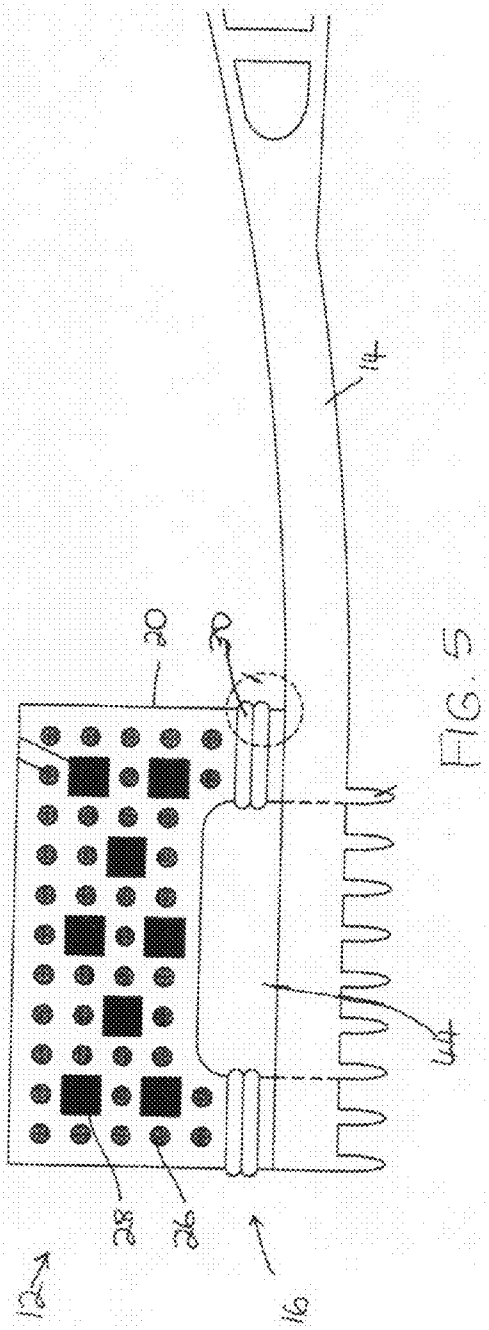


FIG. 5

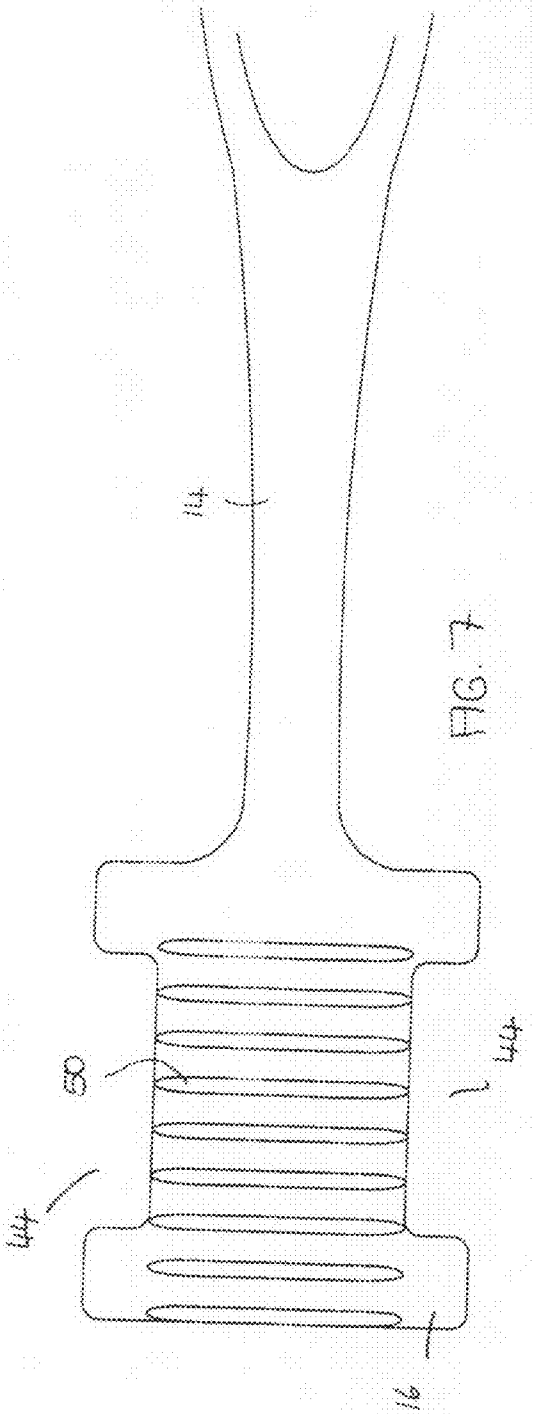


FIG. 7

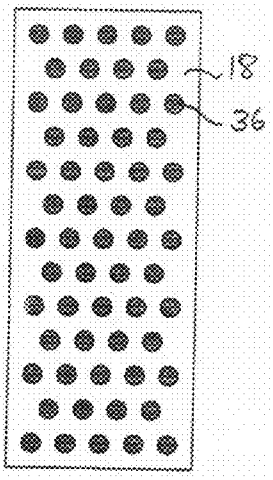


FIG. 6

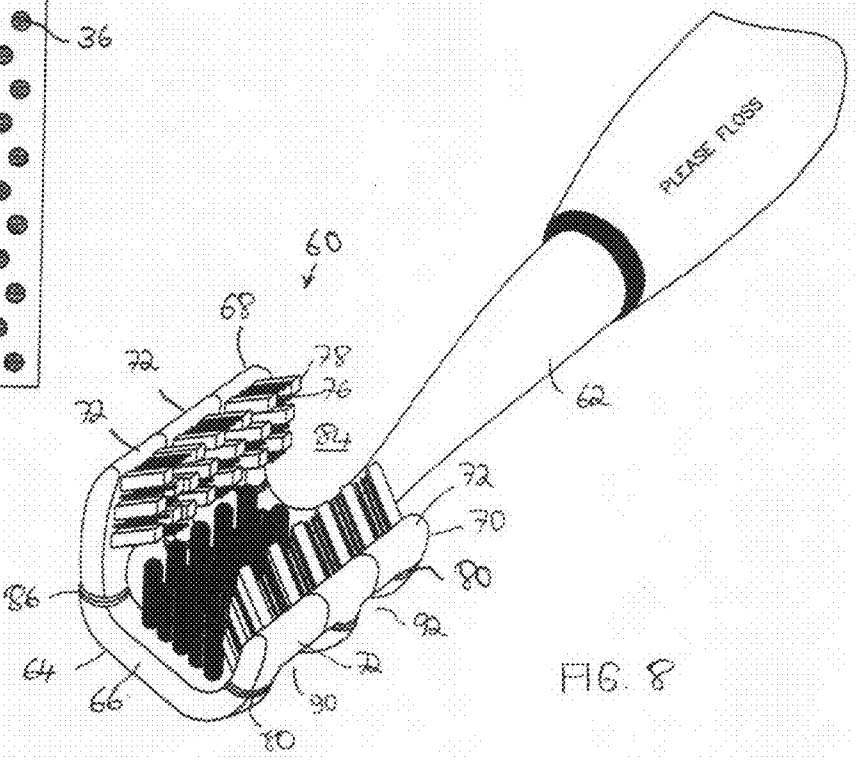


FIG. 8

FIG. 9

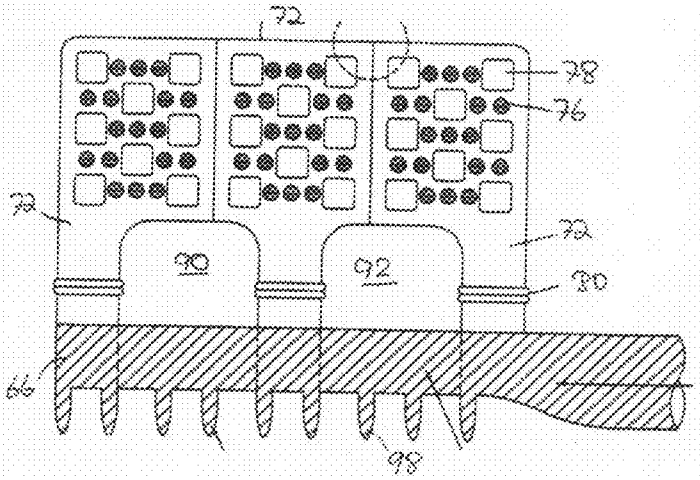


FIG. 9A

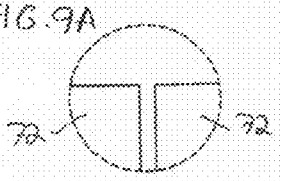
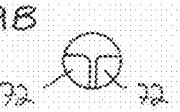


FIG. 9B



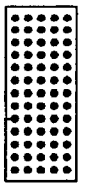


FIG. 13

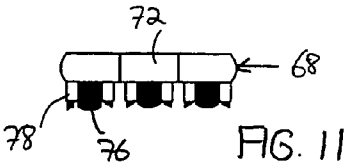


FIG. 11

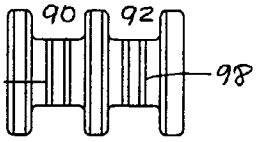


FIG. 12

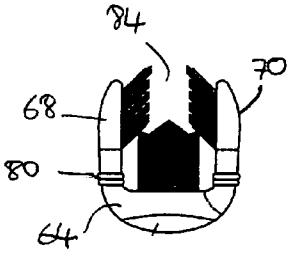


FIG. 10

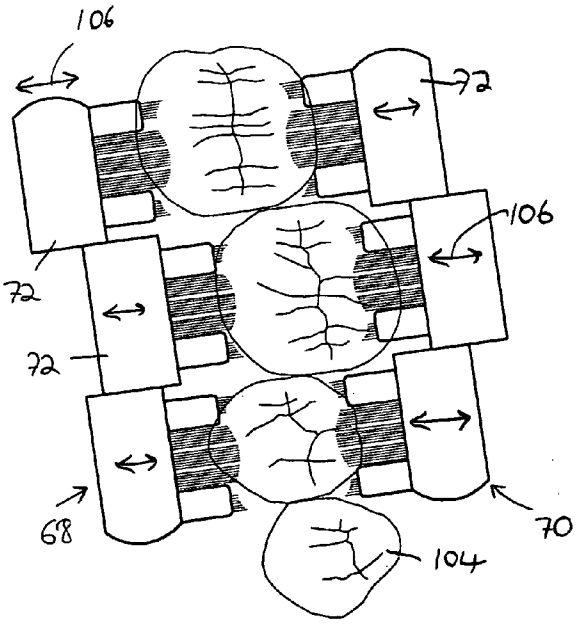


FIG. 15

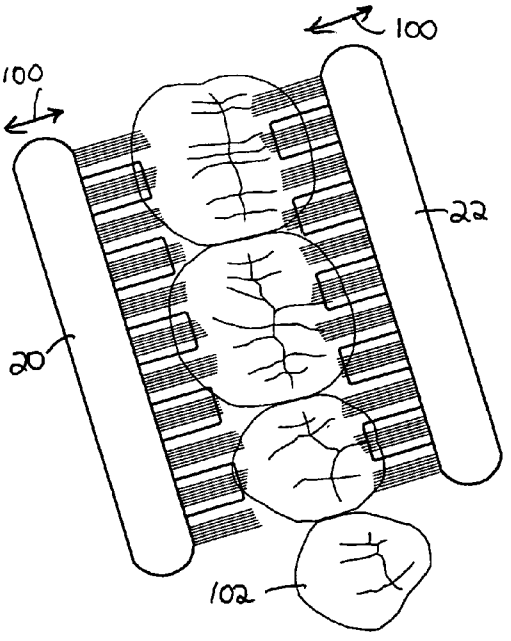


FIG. 14

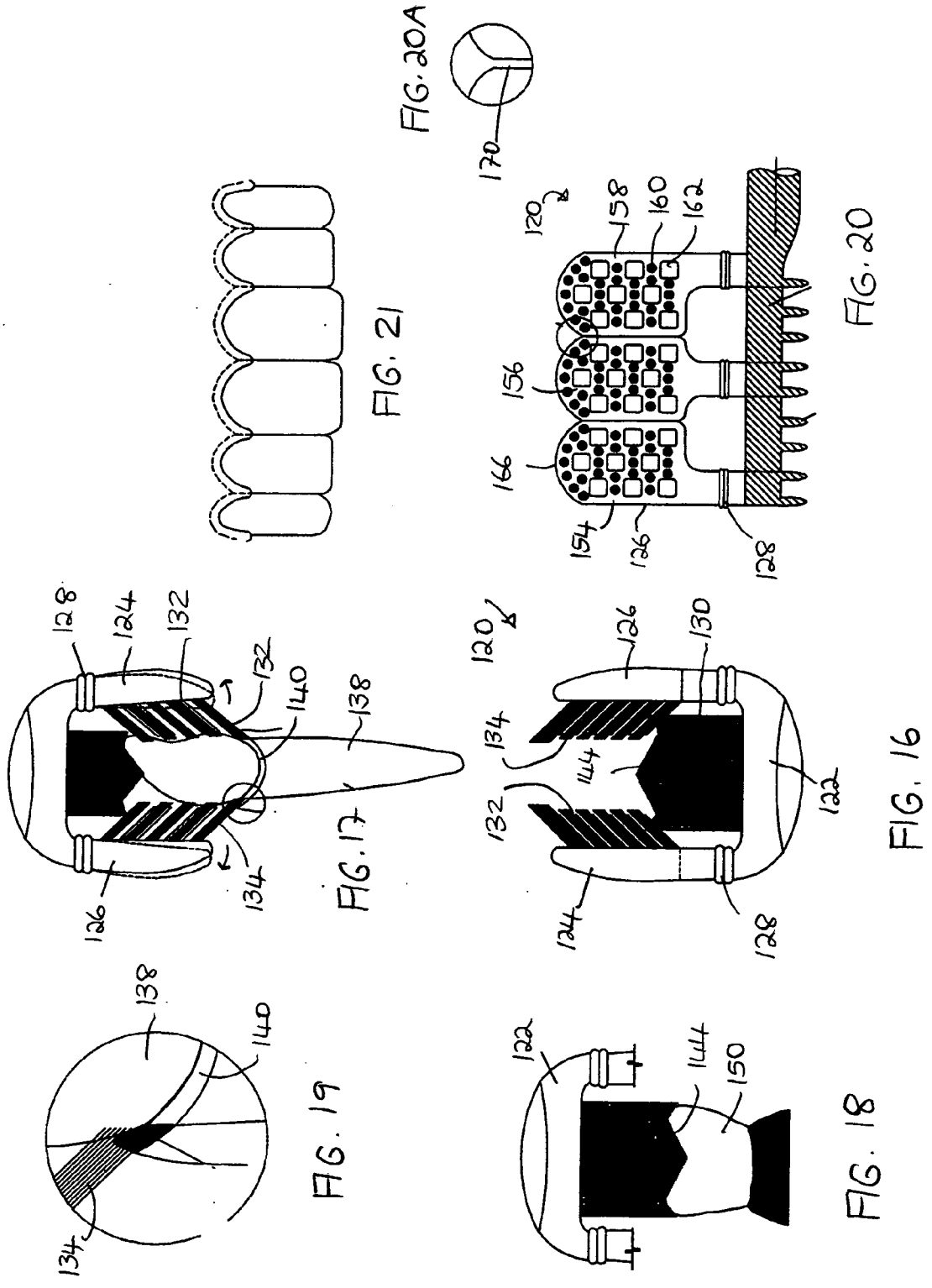


FIG. 20A

FIG. 21

FIG. 20

FIG. 17

FIG. 16

FIG. 19

FIG. 18

FLEXIBLE TOOTHBRUSH

FIELD AND BACKGROUND OF THE INVENTION

[0001] This invention relates to a flexible toothbrush. More particularly, the invention is for a flexible toothbrush with differently oriented bristles for cleaning the sides and the undersurface of the teeth in one motion.

[0002] The use of toothbrushes and the routine of brushing teeth on a daily basis is a well established practice for the vast majority of people. A common toothbrush will typically have a handle which is grasped and held by the user, as well as a head portion. The head portion comprises a base which may be extension of the handle, and bristles mounted in the base and extending upwardly therefrom. The bristles are most often oriented in one plane, although they may have different lengths and mounting configurations in the base in an effort to optimize the efficiency of the toothbrush.

[0003] As is well known, the user moves the bristles over the teeth for the purpose of dislodging food particles or other debris in the tooth crevices and spaces between the teeth, and also for preventing the build up of plaque or at least the rate at which plaque builds up on the teeth.

[0004] Different bristle configurations and toothbrush shapes have been developed and marketed over the years with the express objective of improving the effectiveness of the toothbrush, in order to maximize the consequence of the sweeping motion of the toothbrush to dislodge debris and reduce plaque buildup. The literature is replete with many designs and variations of toothbrushes. Different toothbrushes may work better with children or with adults, or with people with special needs and requirements in order to protect the teeth.

[0005] The teeth themselves vary from one person to another very substantially. Some people may have straight teeth while others may have teeth which are moderately or severely misaligned relative to each other. Further, each tooth has different types of surface. For example, the thickness of the enamel covering the teeth may vary depending on the location on the tooth. In this regard, it should be noted that the thickness of the enamel layer on the occlusal area, or the chewing surface, will be greater than the thickness of the enamel later on the sides of the teeth.

[0006] The present invention utilizes all or many of these factors in the design and construction of the toothbrush of the invention, which thus addresses physical aspects of the teeth in order to make the brushing process more productive in cleaning and caring for the teeth.

SUMMARY OF THE INVENTION

[0007] According to one aspect of the invention, there is provide a toothbrush comprising: a handle portion; a head portion having a base member and first and second lateral walls extending upwardly therefrom to define a space, the base member and first and second lateral walls having bristles arranged thereon extending into the space, at least one of the first and second lateral walls being pivotable relative to the base member to permit the side walls to move into and out of the space in response to forces.

[0008] In one form, at least one of the first and second lateral walls are connected to the base member such that the first and/or second lateral walls pivot into and out of the space in response to the forces. A point of connection between the base member and the first and second lateral walls facilitate the pivoting.

[0009] Preferably, the point of connection comprises a reduced size connection constituting a point of weakness to allow the pivoting of the first and/or second lateral walls relative to the base member. Both the first and the second lateral walls may be pivotable relative to the base member.

[0010] Preferably, at least one of the first and second lateral walls are comprised of two or more wall portions, each of the wall portions being separately connected to the base member so that each of the wall portions is pivotable relative to the base member independently of other wall portions. In one embodiment, both the first and second lateral walls are comprised of two or more wall portions. The first or second lateral walls may be comprised of three wall portions.

[0011] Preferably, the base member has mounted thereon traditional nylon bristles selectively arranged thereon to clean an occlusal surface of a tooth being brushed. Further, each of the lateral walls may have a combination of traditional nylon bristles and rubber bristles interspersedly mounted thereon and selectively arranged thereon to clean and polish a smooth side surface of a tooth being brushed. In one embodiment, the traditional and rubber bristles are mounted so as to extend into the space at an angle which is approximately 45 degrees to the first and second lateral walls respectively. The first and second lateral walls may have a set of top bristles and a set of lower bristles, the top bristles being slightly longer than the lower bristles, the top bristles being configured to clean the sulcus or below the gum area.

[0012] Preferably, the traditional bristles mounted on the base member have a contoured upper surface designed to reach and clean fissures and crevices in the tooth.

[0013] In a preferred embodiment, the toothbrush further comprises at least one opening formed between the first and second lateral walls and the base member to facilitate flow of liquid and debris away from the toothbrush. A tongue cleaner may also be formed on the head of the toothbrush.

[0014] According to another aspect of the invention, there is provided a toothbrush comprising: a handle portion; a head portion having a base member and first and second lateral walls extending upwardly therefrom to define a space, the base member and first and second lateral walls having bristles arranged thereon extending into the space, the bristles of the base member comprising nylon traditional bristles, and the bristles of the first and second lateral walls comprising a combination of traditional nylon bristles and rubber bristles.

[0015] Preferably, the traditional and rubber bristles on the first and second lateral walls are mounted so as to extend into the space at an angle which is approximately 45 degrees to the first and second lateral walls respectively. The bristles on the first and second lateral walls may comprise a set of top bristles and a set of lower bristles, the top bristles being slightly longer than the lower bristles, the top bristles being configured to clean the sulcus or below the gum area. At least one, or both, of the first and second lateral walls is pivotable relative to the base member to permit the side walls to move into and out of the space in response to forces.

[0016] According to yet a further aspect of the invention, there is provided a flexible toothbrush comprising a handle and a head, the head having a base member, a first lateral wall extending upwardly therefrom and a second lateral wall extending upwardly therefrom such that the first and second lateral walls are spaced from each other, the base member and

first and second lateral walls defining a space and being generally U-shaped in cross section.

[0017] The head comprises a set of base bristles expending into the space, while the first and second lateral walls have first and second each have a set of first and second lateral bristles respectively, also extending into the space. The set of base bristles and the sets of first and second lateral bristles together leave an open unbristled area in the space which in use accommodates a tooth or teeth which are being brushed by the toothbrush.

[0018] In a preferred form of the invention, the first and second lateral walls are attached to the base member in a manner that allows them some degree of flexibility. In this regard, the flexible lateral walls are able to flex by being resilient and capable of moving into and out of the space. A significant advantage of such a construction is that the configuration of the teeth of the user slightly push out the lateral walls when required so that a set of teeth that are not perfectly aligned with respect to each other will still be able to be thoroughly brushed, since the head of the toothbrush and particularly and the lateral walls will move and deform in response to the tooth configuration to provide every tooth with the best possible exposure to the toothbrush and hence the optimal cleaning.

[0019] In one embodiment, the flexibility of the lateral walls is achieved by providing a point of connection between the lateral walls and the base member which is thinner or weakened and thus allows the lateral walls to shift slightly at the point of connection in response to the alignment or misalignment of the teeth.

[0020] Preferably, different types of bristles may be used in the head of the toothbrush. The head may have the traditional nylon or other material bristles as well as rubber bristles. There may be a combination of traditional and rubber bristles on the lateral arms, while the base member may have only the traditional bristles.

[0021] The combination of the traditional and the rubber bristles may have enhanced effects in cleaning both the buccal and lingual surfaces of the teeth. These may comprise the smooth surfaces. On these surfaces and areas, the enamel may be thinner to that on the occlusal surfaces which are used for chewing and are therefore thicker and able to withstand more abrasion and contact with other substances. The traditional bristles will have a better effect in unclogging plaque and other debris, while the rubber bristle will polish the enamel as it moves over the tooth surface. This design will therefore lessen the opportunity for abrasion on the more sensitive and thinner parts of the tooth where there is less enamel if rubber is used partly or fully or in addition to the regular traditional bristles alone.

[0022] This double treatment of the teeth using both traditional bristles and rubber bristles will emulate more closely the type of procedure encountered at a dentist since the teeth are both cleaned and polished every time the teeth are brushed using the toothbrush in accordance with the present invention.

[0023] Preferably, there may be openings or holes constructed between the lateral walls and the base member of the head of the toothbrush. This enhances the hygienic properties of the toothbrush by providing outlets for plaque and debris removed by the toothbrush during the brushing and ensuring that at least some of this detritus does not remain in or on the toothbrush. The flow or removal of the debris from the tooth into the mouth is thus optimized so that it does not get captured by the toothbrush and provide a platform which can result in bacterial colonization.

[0024] The length and orientation of the bristles may vary as well. For those bristles on the base member of the head of the toothbrush, some may be longer and some shorter to provide a bristle surface designed to reach debris in crevices and creases and for unclogging plaque. As noted above, the bristles on the base member are entirely traditional type bristles in accordance with one aspect of the invention, although other types of bristles could be used. This is because occlusal enamel is much thicker than that on the smooth side surfaces of the teeth.

[0025] On the base member, the traditional bristles may be shaped like a crown and pointed in the middle to properly penetrate and cleanse the fissural areas. Fissures and pits on the tooth are deep openings or crevices that are highly adapted to entrapping plaque and debris. Plaque which collects in these areas is very difficult to dislodge and remove, and the traditional bristles on the base member are most suitable since the base member will typically brush over the chewing or occlusal surfaces of the tooth. Such bristles will best debride the occlusal areas and help to reduce the chances for the developments of caries or dental decay.

[0026] The bristles on the lateral walls are preferably a combination of traditional bristles and rubber bristles selectively arranged on the lateral wall for maximum effect. This combination will be responsible for the cleaning of the buccal and lingual surfaces of the tooth, which are the smooth surfaces with thinner enamel when compared to the occlusal surface. In the combination of bristles, the traditional bristles will unclog plaque and remove debris, as generally described above, while the rubber bristle will polish the enamel simultaneously. This combination will, therefore, decrease the chances of abrasion when compared to the use of all traditional bristles, and have the effect of both cleaning and polishing the teeth at the same time, whenever the teeth are brushed with a toothbrush in accordance with the invention.

[0027] In one preferred embodiment of the invention, the bristles, both traditional type and rubber bristles, may oriented at an angle, preferably extending at an upward angle into the space. Furthermore, bristles at the top of the lateral wall (or remote from the base member) may be a little longer than the remaining bristles, by about a millimeter or so in one embodiment of the invention. These longer bristles are configured to reach the gums of the user more effectively, and the benefits of massaging the gums, or penetrating and cleaning the sulcus, are well known and acknowledged as a prudent from of oral hygiene and care.

[0028] Each tooth may have a sulcus or pocket and free or unattached gingiva that wraps around the tooth at the point where the tooth emerges from the gum. In a healthy adult, the pocket depth ranges from 1 to about 2 or more millimeters. For this reason, the bristles in the lateral walls of the toothbrush of the invention are about 1 or so millimeters longer than the others, so that they can better penetrate, clean and massage the sulcus without damaging the gingiva.

[0029] In one embodiment, the toothbrush head of the invention has the base member and one lateral wall on each side thereof. However, in other embodiments of the invention, there may be more than one lateral wall on each side of the base member, or, alternatively, each lateral wall may be comprised of two or more, preferably three, portions. Each portion may move independently in the flexible manner disclosed herein so as to best optimize the cleaning effect of the

toothbrush of the invention in cleaning and polishing teeth which may not be perfectly aligned but which may be crooked in one or more locations.

[0030] The toothbrush of the invention may also include a tongue scraper, which may be formed on the outer surface of the head, for scraping and cleaning the tongue, thus rendering the toothbrush into an instrument which has multiple purposes and comprises an all in one oral cleaning tool.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] In the drawings:

[0032] FIG. **1** is a top schematic view of a toothbrush in accordance with one embodiment of the invention;

[0033] FIG. **2** is an end view of a toothbrush in accordance with one aspect of the invention;

[0034] FIGS. **3** and **4** show details of the toothbrush shown in FIG. **2** of the invention and relating to the flexible lateral arms;

[0035] FIG. **5** is a view along Section A-A in FIG. **2** of the drawings, showing the lateral wall and arrangement of the bristles;

[0036] FIG. **6** shows a plan view of the bristle arrangement on the toothbrush in accordance with one aspect of the invention;

[0037] FIG. **7** shows a back schematic view of a toothbrush in accordance with the invention;

[0038] FIG. **8** shows a perspective view of a toothbrush in accordance with the invention;

[0039] FIG. **9** shows a section through the toothbrush, in side view, showing the lateral walls;

[0040] FIGS. **9**(*a*) and **9**(*b*) show alternative details of the lateral wall in FIG. **9** of the drawings;

[0041] FIG. **10** shows a front view of the toothbrush in FIG. **8** of the drawings;

[0042] FIG. **11** shows a partial top view of the toothbrush shown in FIG. **8** of the drawings;

[0043] FIG. **12** shows a back view of the head of the toothbrush shown in FIG. **8** of the drawings;

[0044] FIG. **13** shows a schematic plan view of a bristle arrangement of the toothbrush in FIG. **8** of the drawings;

[0045] FIG. **14** shows a schematic view of a toothbrush in accordance with one aspect of the invention, having two lateral walls, and their relationship to teeth;

[0046] FIG. **15** is a schematic plan view of a toothbrush having lateral walls, each having there portions flexible relative to each other, and the relationship thereof with certain teeth misaligned;

[0047] FIG. **16** is a front view a toothbrush in accordance with another embodiment of the invention showing an alternative bristle arrangement;

[0048] FIG. **17** shows the toothbrush illustrated in FIG. **16** from the rear and surrounding a tooth;

[0049] FIG. **18** is a detail of FIG. **16** showing the configuration of the base member bristles penetrating the fissures and crevices of a tooth;

[0050] FIG. **19** is a detail of the toothbrush shown in FIG. **16** showing the bristles penetrating the sulcus;

[0051] FIG. **20** is a side view of the toothbrush shown in FIG. **16** of the drawings;

[0052] FIG. **20**A is a detail of the wall portion shown in FIG. **20** of the drawings; and

[0053] FIG. **21** is another design of a toothbrush on accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0054] Reference is now made to FIG. **1** of the drawings which shows a schematic view of a toothbrush **12** in accordance with one embodiment of the invention and having a handle **14** and a head **16**. The head **16** comprises a base member **18**, a first lateral wall **20**, and a second lateral wall **22**. The base member **18** and first and second lateral walls **20** and **22** define a generally U-shaped structure, best seen in FIG. **2** of the drawings, as will be described further below. Note that the base member **28** and first and second lateral walls **20** and **22** define a space **24** in which the teeth of the user are accommodated during the brushing procedure.

[0055] The first and second lateral walls **20** and **22** have selectively arranged traditional bristles **26** and rubber bristles **28**. The traditional bristles **26** and rubber bristles **28** collectively operate to both clean and polish the teeth as the toothbrush moves over them.

[0056] FIG. **2** of the drawings shows an end view of a toothbrush head **16** as generally seen in FIG. **1** of the drawings. It will be seen that each of the lateral walls **20** and **22** is connected to the base member **18** at a connection point **30**. The connection point **30** is better seen in terms of its structure and layout in FIG. **3** of the drawings. It will be seen that the point of connection **30** is in fact an area of reduced size or diameter attachment, which slightly weakens the rigidity of the connection between the lateral wall **20** and **22** and the base, thereby allowing the lateral wall **20** and **22** to move back and forth in response to some applied force or pressure. Further details relating thereto will be described below. A flexible ring **32** surrounds the connection point **30**.

[0057] Reverting to FIG. **2** of the drawings, it will be seen that the base member **18** has an upwardly extending set of bristles **36**, which have a contoured upper surface **38**, including a central peak and lateral peaks. The contour of the upper surface **38** will generally engage with the chewing surface or occlusal area of the tooth, which largely has a thicker enamel, and will, by the stroke of a toothbrush, help to remove debris and plaque therefrom.

[0058] It will also be seen that the bristles **26** and **28** on the lateral walls **20** and **22** extend upwardly at an approximately 45° angle. The bristles **26** and **28** are selectively interspersed and placed in a pattern, to be described below, which may best address the dual objectives of the bristles on the side walls, namely, the cleaning and polishing of the tooth.

[0059] It will also be seen in FIG. **2** of the drawings that the top set of bristles **40** are slightly longer than those below it. As described, the purpose of these longer bristles is to enable their reach into the sulcus, or the space between the tooth and the gingiva or gum which surrounds the tooth, so as to brush and sweep out any debris which has accumulated therein.

[0060] The rings **32** around the connection point **30** are comprised of rubbers and help to achieve additional flexibility. The configuration preferably helps to promote the application of only a passive pressure to the tooth, thereby avoiding excessive forces on the tooth which can lead to accelerated enamel abrasion.

[0061] The design of the toothbrush, and particularly the base and lateral walls **20** and **22** with the configured bristles **26** and **28** will seclude pressure and forces primarily on the occlusal area, which is the chewing surfaces. These surfaces are harder and thicker compared to the facial, buccal and

lingual areas of the tooth, which are the smooth surfaces. Therefore, the arrangement of the bristles, the substrates on which they are mounted, the type of the bristle used and the angles thereof are all selected and configured to provide greater pressure and cleaning intensity on the chewing surface of the tooth, while providing less pressure on the smoother or side-surfaces of the tooth.

[0062] It is generally acknowledged that one of the leading causes of enamel abrasion is the product of faulty brushing of the teeth, and is an effect not only of using a toothbrush with hard bristles, but also by using excessive force over a period of time on the enamel when brushing the teeth.

[0063] In FIG. **5** of the drawings, a schematic side view of the toothbrush **12** is shown, including the handle **14** and the head **16**. The first lateral wall **20** is shown, as is the connection point **30**, two of them, which allows the lateral wall **20** to rock or pivot slightly thereon, so as to move back and forth into and out of the space **24** in response to the position of teeth and the tooth brushing action.

[0064] It will be seen from FIG. **5** that an opening **44** is provided to allow flow of fluid, which may contain debris and plaque, so that these will not become permanently embedded or attached to the toothbrush. The opening **44** thus allows appropriate flow to preserve hygienic conditions to the extent possible.

[0065] The layout of the various bristles **26** and **28** are shown schematically in FIG. **5** of the drawings. The circular depictions represent the traditional bristles, while the square depictions represent the rubber bristles **28**. The traditional bristles **26** and rubber bristles **28** together effectively combine to provide both a cleaning and polishing action respectively, as described above.

[0066] FIG. **6** of the drawings is a detailed view of the set of bristles **36** shown on the base member **18**. FIG. **6** shows one particular configuration or arrangement of this set of bristles **36**. This set of bristles on the base **18**, or middle area, are preferably entirely of the traditional bristle type, and not combined with the rubber bristles which will typically be mounted on the lateral walls. Since enamel on the occlusal areas is much thicker than that on the smooth surface of a tooth, these traditional bristles are more appropriately located on the base member, and are shaped like a crown and pointed in the middle to properly penetrate and cleanse fissural areas on the tooth. Fissures are deep openings or crevices where plaque and debris are highly likely to be trapped. Plaque which collects in this area is very difficult to remove. The traditional bristles are a good primary mechanism for unclogging this plaque and debris, which is why the set of bristles **36** is comprised almost entirely (but not necessarily) of these traditional bristles. In this way, fissures, crevices and the like, located on the occlusal area will be properly debrided and cleared of debris to thereby facilitate the prevention of caries development.

[0067] In FIG. **7** of the drawings, there is shown a back view of the toothbrush in accordance with the invention, such as that seen in FIG. **5**. The back of the toothbrush includes a tongue scraper **50**, which may be comprised of rubber. This tongue scraper **50** is moved over the tongue to remove or scrape off matter embedded therein and to clean it. Further, FIG. **7** also shows the holes **44** on the side of the toothbrush head **16**, constructed into the toothbrush **12** to facilitate good hygiene. Without these openings, plaque and debris removed, as well as other debris in the mouth, may become encrusted or attached to the toothbrush, and may also serve as a platform that leads to bacterial colonization.

[0068] FIG. **8** of the drawing shows a toothbrush in accordance with a further aspect of the invention. The toothbrush **60** has a handle **62** and a head **64**. The head **64** is comprised of the base member **66**, a first lateral wall **68** and a second lateral wall **70**.

[0069] In this embodiment shown in FIG. **8**, each of the lateral walls **68** and **70** is comprised of three independently movable wall portions **72**. The base member **66** has the upwardly extending set of traditional bristles, while the first and second lateral walls **68** and **70** have the combination of the traditional bristles **76** and rubber bristles **78**. The fact that the first and second lateral walls **68** and **70** each have three independently movable wall portions **72**, each separately mounted to the base member **66**, allows each wall portion **72** to move back and forth independently of the other wall portions **72**, and in response to passive forces provided by the configuration and position of the teeth.

[0070] It will be noted that each wall portion **72** is secured to the base member through a connection point **80**, which, in one embodiment is generally comprised of a reduced size connection to the extent that each wall portion **72** is able to possess somewhat resilient properties and is capable of moving into and out of the space **84**, according to the position of the teeth as well as the brushing action of the user. The connection point **80** for each of the wall portions **72** will also have a ring **86** of generally similar type and configuration to that described above with respect to FIGS. **3** and **4** of the drawings.

[0071] FIG. **8** thus shows a toothbrush which in effect has seven individual heads having superior flexibility properties. This embodiment particularly shows a toothbrush designed not just for the perfectly aligned set of teeth, but one which may also be more suitable for people with mild to moderate teeth malalignment.

[0072] FIG. **9** of the drawings shows a side view of one of the lateral arms **68**, showing each of the wall portions **72** mounted to the base member **66**. Each wall portion **72** is mounted through the connection point **80** having the ring **86**, as described. FIG. **9**A shows a detail of FIG. **9**, where it can be seen that each wall portion **72** is spaced just slightly from its adjacent wall portion **72**, thus allowing each wall portion **72** to move forward and backward into and out of the space **84** in response to the forces described above. In FIG. **9**A, the corners of adjacent wall portions are squared off. FIG. **9**B shows an alternative to the configuration in FIG. **9**A where the corners of adjacent wall portions **72** are rounded. This structure may help to prevent the corners overlapping slightly when the wall portions **72** may be bent toward each other by the force of brushing or the alignment of the teeth.

[0073] FIG. **9** also clearly illustrates the position of the two holes **90** and **92** through which fluids, debris and other material can flow out of and away from the toothbrush to facilitate and maintain hygienic conditions.

[0074] FIG. **10** shows an end view of the toothbrush seen in FIG. **8** of the drawings, while FIG. **11** shows a top view of one of the lateral arms, illustrating the three wall portions **72** on each of the lateral arms. FIG. **12** shows a back view, including the holes **90** and **92**, and showing a tongue scraper. FIG. **13** shows a bristle configuration on the base member in accordance with one aspect of the invention. It will be appreciated that many different bristle arrangements can be used within the scope and concept of the invention.

[0075] FIG. **14** shows the schematic representation of a toothbrush where the lateral wall is a solid or continuous piece, as seen in FIGS. **1** and **2** of the drawings. These lateral walls are therefore also accorded numbers **20** and **22** for convenience. It will be seen that each of the lateral walls **20** and **22**, based on its pivoted mounting on the base, is capable of moving back-and-forth in the direction shown by arrows **100**. This type of configuration would be more suitable for a person with a generally well-aligned set of teeth, although too, it would be completely adequate as well for users whose teeth configuration may not be perfect.

[0076] In FIG. **15** of the drawings, there is shown a representation of a set of teeth **104** which is moderately misaligned. In this illustration, it will be seen that each of the lateral walls, having reference numerals **68** and **70** for continuity and convenience, has three wall portions **72**, as also shown in FIG. **8** of the drawings, and similar reference numerals have therefore been used in FIG. **15** of the drawings to those in FIG. **8**. It will be seen in FIG. **15** that each of the wall portions **72** and its attached bristles **76** and **78** is capable of moving back-and-forth into the space **84**, occupied by the set of teeth **104**, in both of the opposing directions indicated by the various arrows **106**. It is clearly seen in this illustration that the sweep of the toothbrush along the teeth is able to effectively reach all of the teeth in the most optimal manner, due to the resilience of the wall portion **72**, and their ability to move back-and-forth in the space **84** in response to the position of the teeth.

[0077] In FIG. **16** of the drawings, there is shown another toothbrush **120** in accordance with the invention. The toothbrush **120** a base member **122** and lateral walls **124** and **126**. The lateral arms **124** and **126** move about pivot points **128** as described above. The base member **122** has a set of bristles **130** and the lateral walls each have a set of bristles **132** and **134** respectively. The bristles **132** and **134** are configured in terms of length and shape so that all they are capable of penetrating the sulcus. This is in fact illustrated in FIG. **17** of the drawings which illustrates a tooth **138** and its sulcus **140**. It will be seen that the longer end bristles on the set of bristles **132** and **134** penetrate the sulcus. FIG. **19** of the drawings is a detail of FIG. **17** showing the sulcus **140**, tooth **138** and the bristles **132** and **134** penetrating the sulcus.

[0078] FIG. **17** also shows how the lateral walls **124** and **126** can move in response to pressure or force. These lateral walls **124** and **126** are shown in solid lines in resting position and in phantom lines in an alternative position according to the location of teeth and the force of the brushing action.

[0079] In FIG. **16** of the drawings, it will be seen that set of bristles **130** on the base member **122** has a contour **144** on its upper surface, and FIG. **18** is a detail which illustrates how this specially designed contoured surface in practice penetrates the fissures and the crevices of the tooth for optimal cleaning effect.

[0080] FIG. **20** of the drawings illustrates a side view of one of the lateral walls **126** which has three wall portions **154**, **156** and **158** adjacent each other. Traditional and rubber bristles **160** and **162** respectively are arranged on the lateral wall **126** as described above. In FIG. **20**, the ends **166** of the wall portions **154**, **156** and **158** are rounded or arc shaped. FIG. **20**A shows a detail form FIG. **20** illustrating the space **170** between the wall portions.

[0081] In FIG. **21** of the drawings, there is shown another design of the toothbrush of the invention which mimics the scallop contour of the gingival margin for proper gingival adaptation that will promote proper or optimal cleaning of the sulcus and gingival area for each individual tooth.

[0082] The invention is not limited to the precise details described herein. Many variations may be made, such as to the type, size, length, design, material, orientation, hardness or softness and configuration of the bristles, as well as the number of wall portions.

1. A toothbrush comprising:
a handle portion; and
a head portion having a base member and first and second lateral walls extending upwardly therefrom to define a space, the base member and first and second lateral walls having bristles arranged thereon extending into the space, at least one of the first and second lateral walls being pivotable relative to the base member to permit the side walls to move into and out of the space in response to forces.

2. A toothbrush as claimed in claim **1** wherein the base member and first and second lateral walls define a generally U-shaped structure, the space being formed thereby.

3. A toothbrush as claimed in claim **1** wherein at least one of the first and second lateral walls are connected to the base member such that the first and/or second lateral walls pivot into and out of the space in response to the forces.

4. A toothbrush as claimed in claim **1** wherein **3** further comprising a point of connection between the base member and the first and second lateral walls.

5. A toothbrush as claimed in claim **4** wherein the point of connection comprises a reduced size connection constituting a point of weakness to allow the pivoting of the first and/or second lateral walls relative to the base member.

6. A toothbrush as claimed in claim **1** wherein both the first and the second lateral walls are pivotable relative to the base member.

7. A toothbrush as claimed in claim **5** further comprising a rubber ring formed about the point of connection.

8. A toothbrush as claimed in claim **1** wherein at least one of the first and second lateral walls are comprised of two or more wall portions, each of the wall portions being separately connected to the base member so that each of the wall portions is pivotable relative to the base member independently of other wall portions.

9. A toothbrush as claimed in claim **8** wherein both the first and second lateral walls are comprised of two or more wall portions.

10. A toothbrush as claimed in claim **8** wherein first or second lateral walls are comprised of three wall portions.

11. A toothbrush as claimed in claim **1** wherein the first and the second lateral walls are each comprised of three wall portions.

12. A toothbrush as claimed in claim **1** wherein the base member has mounted thereon traditional nylon bristles selectively arranged thereon to clean an occlusal surface of a tooth being brushed.

13. A toothbrush as claimed in claim **1** wherein each of the lateral walls has a combination of traditional nylon bristles and rubber bristles interspersedly mounted thereon and selectively arranged thereon to clean and polish a smooth side surface of a tooth being brushed.

14. A toothbrush as claimed in claim **13** wherein the traditional and rubber bristles are mounted so as to extend into the space at an angle which is approximately 45 degrees to the first and second lateral walls respectively.

15. A toothbrush as claimed in claim **13** wherein the first and second lateral walls have a set of top bristles and a set of lower bristles, the top bristles being slightly longer than the lower bristles, the top bristles being configured to clean the sulcus or below the gum area.

16. A toothbrush as claimed in claim **12** wherein traditional bristles mounted on the base member have a contoured upper surface designed to reach and clean fissures and crevices in the tooth.

17. A toothbrush as claimed in claim **16** wherein the contoured upper surface comprises a substantially central peak, a pair of median valleys and a pair of end peaks.

18. A toothbrush as claimed in claim **1** further comprising at least one opening formed between the first and second lateral walls and the base member to facilitate flow of liquid and debris away from the toothbrush.

19. A toothbrush as claimed in claim **1** further comprising a tongue cleaner formed on the head of the toothbrush.

20. A toothbrush comprising:

a handle portion; and

a head portion having a base member and first and second lateral walls extending upwardly therefrom to define a space, the base member and first and second lateral walls having bristles arranged thereon extending into the space, the bristles of the base member comprising nylon traditional bristles, and the bristles of the first and second lateral walls comprising a combination of traditional nylon bristles and rubber bristles.

21. A toothbrush as claimed in claim **20** wherein the traditional and rubber bristles on the first and second lateral walls are mounted so as to extend into the space at an angle which is approximately 45 degrees to the first and second lateral walls respectively.

22. A toothbrush as claimed in claim **20** wherein bristles on the first and second lateral walls comprise a set of top bristles and a set of lower bristles, the top bristles being slightly longer than the lower bristles, the top bristles being configured to clean the sulcus or below the gum area.

23. A toothbrush as claimed in claim **20** wherein at least one of the first and second lateral walls is pivotable relative to the base member to permit the side walls to move into and out of the space in response to forces.

24. A toothbrush as claimed in claim **23** wherein both of the first and second lateral walls are pivotable relative to the base member.

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