FLEXIBLE BRUSH HEAD AND MEANS TO RETAIN IT IN A PREDETERMINED POSITION

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This invention pertains generally to the field of brushes, and more particularly to an improved form of brush in which the bristle tufts are disposed with an angular relationship to each other, so that the free ends of the same are adapted to contact each other. The invention has particular application to the toothbrush art, although similar applications may be found in brushes employed for cleaning fingernails, and other planar objects.

It is among the principal objects of the present invention to provide an improved form of brush element which may be formed from substantially flat stock and which may be maintained in a bent or curved position by a simple means wherein the bristles are angularly aligned.

Another object of the invention lies in the provision of means for maintaining said flat brush element in a curved or bent condition, the means also serving to support the brush element upon a handle so that the same may be utilized.

A further object of the invention lies in the provision of a toothbrush having detachable handle and brush elements, the former including means for engaging the latter and simultaneously shaping the same.

Another object of the invention lies in the provision of an improved toothbrush adapted to simultaneously clean the distal and buccal surfaces of the upper teeth of the user, while simultaneously cleaning the cusps of the lower teeth. In a similar manner, the brush may be used to clean the distal and buccal surfaces of the lower teeth while cleaning the cusps of the upper teeth.

Still another object of the invention lies in the provision of novel gum massage means, positioned to massage portions of the gums, while bristle components of the device are simultaneously positioned to clean the teeth.

A feature of the invention lies in the fact that the brush element is inherently flexible so that opposed groups of bristles apply a resilient force upon the teeth other than that normally found in the bristles per se, thus permitting the use of relatively stiff bristles without involving danger to the sensitive areas of the mouth of the user.

Another feature of the invention lies in the fact that unusual skills are required in the use of the invention, the toothbrush being employed in a manner similar to that involved in the use of conventional toothbrushes.

These objects and features, as well as other incidental ends and advantages, will become more clearly apparent during the course of the following disclosure, and be pointed out in the appended claims.

On the drawings, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

Figure 1 is a view in perspective showing a first embodiment of the invention.

Figure 2 is a fragmentary exploded view showing the upper portion of Figure 1.

Figure 3 is a view in perspective showing the brush element which comprises a part of the device.

Figure 4 is a fragmentary sectional view as seen from the plane 4—4 on Figure 1.

Figure 5 is a fragmentary exploded view in perspective showing a second embodiment of the invention.

Figure 6 is a fragmentary exploded view showing an alternate form of the second embodiment of the invention.

Figure 7 is a fragmentary exploded view in perspective showing an alternate form of the first embodiment.

Figure 8 is a fragmentary exploded view in perspective showing a second alternate form of the first embodiment.

Figure 9 is a fragmentary exploded view in perspective showing a third alternate form of the first embodiment.

Figure 10 is a fragmentary view in perspective showing the device in use by a user.

Figure 11 is a fragmentary enlarged sectional view showing the engagement of the brush with the teeth of the user.

Figure 12 is a fragmentary view in perspective showing a third embodiment of the invention.

Figure 13 is a transverse vertical sectional view as seen from the plane 13—13 on Figure 12.

Figure 14 is a view in elevation showing a fourth embodiment of the invention.

Figure 15 is an exploded view in perspective of the fourth embodiment.

In accordance with the invention, the first embodiment of the invention, generally indicated by reference character 10, includes broadly a brush element 12 and a handle element 14. As may be seen on Figure 2 the brush element 12 and handle element 14 are detachably interconnectable, so that when the brush element has become worn, it may be replaced without discarding the handle element.

The brush element 12 includes a main body 16, the same including a central member 18 and side members 20 and 22. The body 16 is preferably formed from flat synthetic resin, of a type having a high degree of flexibility. I have found polyethylene to be very satisfactory.

Extending into the body 16 and lying in the plane thereof are a pair of longitudinal channels 24 and 26 which are relatively circular in cross section when the body 16 is in a flat condition, as shown on Figure 3. As may be seen on Figures 1 and 2, the channels 24 and 26 become elongated in cross section when the side members 20 and 22 are bent with respect to the central member 18.

The body 16 includes three bristle sections 28, 30 and 32, each of which is made up of individual tufts of bristles 34, in a well known manner. The bristle sections 30 and 32 which are positioned upon the side members 20 and 22, respectively, extend from the inner surface 36 of the body 16, while the bristle section 28 extends from the outer surface 37 of the central member 18. Extending into the inner surface 36 is a pair of rabbet portions 38 and 40, the purpose of which is to provide means for engaging a locking means on the handle element 14, wherein the elements 12 and 14 are maintained in positive interconnection.

The handle element 14 is preferably molded from a synthetic resinous material, preferably of a type having less flexibility than that employed in the formation of the brush element 12 and a higher degree of resiliency. Examples of suitable materials would include polystyrene, cellulose acetate and other synthetic resinous materials possessing similar qualities. Metal may also be used.

The handle element includes a handle member 46 adapted to be grasped by the hand of the user and a brush element engagement member 48, which provides means for the interconnection of the handle member 46 with the brush element 12. If desired a suitable hole 50 may be provided for hanging the brush in a well known manner.
The brush element engagement member includes a central support member 52, the same having an offset projection 54. As may be seen on Figures 1 and 2, the member 52 is adapted to lie upon the surface 36 of the central member 18, the offset portion 54 being seatable within the cavity of the rabbet portion which is first positioned upon the member 52. The brush element engagement member 48 also includes a pair of channel engagement portions 56 and 58 which are adapted to enter the longitudinal channels 24 and 26 when the brush element 12 is engaged thereupon. As may be seen on Figures 1 and 2 the portions 56 and 58 are of substantially elliptical cross section so as to conform to the shape of the channels 24 and 26 when the same are distorted as shown on Figure 2.

The device 10 is assembled by slipping the central member 18 between the portions 56 and 58, and the central support member 52. The portions 56 and 58 will then enter the channels 24 and 26, and when the brush element 12 is fully seated the projection 54 will enter either the rabbet 38 or the rabbet 48.

Referring to Figures 10 and 11 of the drawings, there may be observed the method in which the device is used. When brushing the tops of the lower bleusigds, the bristle element 28 is positioned in the normal manner. This simultaneously aligns the bristle sections 30 and 32 to brush the sides of the upper teeth. By rotating the brush through substantially 180° the same is so positioned as to engage sides of the lower teeth while brushing the cusps of the upper teeth.

Although in use the side members 20 and 22 are subjected to considerable forces which tend to straighten them with respect to the central member 18, the engagement of the portions 56 and 58 prevents the straightening from taking place. This is due to the fact that the portions 56 and 58 have a cross section which corresponds to the distorted cross section of the channels 24 and 26 when the side members are properly positioned. Thus the brush element may be formed in a flat configuration and afterward bent immediately before engagement with the handle element, thereby simplifying the need for expensive moldings, castings or the like.

Turning now to the second embodiment of the invention as shown on Figure 5, parts corresponding to those of the first embodiment are designated with similar reference characters with the additional suffix "a." The second embodiment of the invention differs from the first embodiment in that the brush element 12a and handle element 14a are formed integrally, use being made of a separate clip 60a having channel engagement portions 56a and 58a which serve to maintain the brush element in proper configuration during use. The clip 60a is engaged by sliding the same to the left as seen on Figure 5 until the central member 62a has moved to the point where the rabbet portion 66a is engaged by the offset projection 68a. This engagement maintains the clip in position while the brush is being used.

Turning now to the first alternate form of the second embodiment, parts corresponding to those of the principal form have been designated by similar reference characters with the additional suffix "b." The alternate form of the second embodiment differs from the principal form in that the clip 60b is inserted from the opposite end of the brush element, as compared with the principal form. The clip is held in position by a bifurcated portion 72b of the central member 70b, the same having downwardly extending portions 73b.

Turning now to the first alternate form of the first embodiment of the invention, parts corresponding to those of the principal form have been designated by similar reference characters with the additional suffix "c." The first alternate form differs from the principal form in the omission of the central support member, offset portions 74c and 75c being employed to engage corresponding rabbet portions in the longitudinal channel 24c and 26c. This form is particularly useful where the material from which the handle element is made is unusually strong, as for example when the handle element is formed from metallic material rather than from synthetic resinous stock.

Turning now to the second alternate form of the first embodiment, parts corresponding to those of the principal embodiment have been designated by similar reference characters with the additional suffix "d." The second alternate form of the first embodiment differs from the principal form in the provision of a narrow support member 79d, which serves merely to maintain the brush element upon the handle element, without providing the functions of the wider support element 52 of the principal form. This form also possesses utility where the handle element 14d is formed from exceptionally strong material.

Turning now to the third alternate form of the first embodiment of the invention, parts corresponding to those of the principal form of the first embodiment have been designated by similar reference characters with the additional suffix "e." The third alternate form corresponds to the first alternate form of the first embodiment with the additional provision of a tongue 83 as adapted to enter a groove 85 correspondingly shaped, this structure providing additional reinforcement during use.

Turning now to the third embodiment of the invention, parts corresponding to those of the first and second embodiments have been designated by similar reference characters with the additional suffix "f." The third embodiment of the invention differs from the first and second embodiments in the incorporation of resilient gum agitators 90f, which are so positioned that when the bristle portions contact the buccal and distal surfaces of the teeth, the portions 90f will contact the adjacent gum line. Thus it is possible to both cleanse the teeth and massage the gums simultaneously. The axes of the portions 90f are substantially parallel to those of the bristles so that the massaging may take place with a smooth even pressure in no way injurious to the gums.

Turning now to the fourth embodiment of the invention, parts corresponding to those of the first embodiment have been designated by similar reference characters with the additional suffix "g." The fourth embodiment of the invention is adapted to be employed for the cleaning of fingernails or other objects having planar surfaces. The angularly disposed bristle sections 30g and 32g alone are employed, and the handle element shown in the first embodiment is replaced by a handle member 94g of length substantially equal in length to that of the brush element. The handle element 94g is engaged with the brush element by a dovetail mounting 95g and axial motion between the handle element and the brush element is prevented by detent means 96g. As is the case in the other embodiments, the portions 56g and 58g enter the channels 24g and 26g to maintain the shape of the brush element.

It may thus be seen that the have invented novel and highly useful improvements in brush construction, in which there is provided a means for maintaining a substantially flat brush element in bent condition irrespective of the forces exerted upon the same. The brush may be manufactured at a low cost consistent with durability, and may be formed in an initially flat configuration, to be bent to proper condition upon engagement with a handle element. The assembled device is easy to use and may be readily cleaned by removing the same from the associated handle to allow the same to return to its flat condition, wherein the faces of the bristles are once again exposed. Owing to the simplicity of structure, the device is substantially trouble-free throughout its useful life, and when needed a worn
brush element may be discarded to be replaced with a fresh element.

I wish it to be understood that I do not consider the invention limited to the exact details shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the present invention pertains.

I claim:

1. A brush comprising a brush element and a handle element; said brush element comprising a substantially flat main body of flexible material having a degree of resiliency and having first and second planar outer surfaces disposed in parallel relation, said brush element having bristles embedded therein; said main body having a pair of elongated channels lying within said body, the axes of which are substantially parallel, said channels extending from said first outer surface in a direction toward said second outer surface, thereby forming zones of reduced cross-section along said parallel axes, said channels causing said main body to have a predisposition to bend in said zones and parallel to said axes in a direction toward said second outer surface to form a centrally disposed flap portion and a pair of side flap portions; said bending serving to distort the cross-sectional shape of said channels; and said side flap portions in angular disposition with respect to said centrally disposed flap portion.

2. Structure according to claim 1 in which said main body element is formed of polyethylene.

3. A brush comprising a brush element and a handle element; said brush element comprising a substantially flat main body of flexible material having a degree of resiliency, and having first and second planar outer surfaces disposed in parallel relation, said brush element having bristles embedded therein; said main body having a pair of elongated channels lying within said body, the axes of which are substantially parallel, said channels extending from said first outer surface in a direction toward said second outer surface, thereby forming zones of reduced cross-section along said parallel axes, said channels causing said main body to have a predisposition to bend in said zones and parallel to said axes in a direction toward said second outer surface to form a centrally disposed flap portion and a pair of side flap portions; said bending serving to distort the cross-sectional shape of said channels; and said side flap portions in angular disposition with respect to said centrally disposed flap portion.

4. In a brush, the improvements comprising a brush element including a substantially flat main body of flexible material having a degree of resiliency, and having first and second planar outer surfaces disposed in parallel relation, said brush element having bristles embedded therein; said main body having a pair of elongated channels lying within said body, the axes of which are substantially parallel, said channels extending from said first outer surface in a direction toward said second outer surface thereby forming zones of reduced cross-section along said parallel axes, said channels causing said main body to have a predisposition to bend in said zones and parallel to said axes in a direction toward said second outer surface to form a centrally disposed flap portion and a pair of side flap portions; said bending serving to distort the cross-sectional shape of said channels.

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