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## TOOTH AND GUM SCRUBBER

This invention relates to improvements in oral hygiene apparatus and it particularly relates to a tooth and gum-brushing or scrubbing device.

Toothbrushes are almost universally made of a number of tufts of bristles projecting in like direction from the end of a handle. The bristle construction is selected, apparently on the basis that the individual bristles will penetrate deeply into crevices between the teeth because of their relatively small diameter. The bristle construction does not lend itself to retention of a cleansing agent in granular or powdered form so it is most often used with a cleansing agent in the form of a paste. Cleansing action then results from dissolution of the material to be removed or its suspension in the paste. Cleaning by abrasive action is difficult to accomplish with the paste because the abrading particles become suspended in the paste and are immobilized.

Cleaning by abrasion is far more readily accomplished when the abrasive powder is not suspended in a paste. Effective abrasive action requires that the abrasive powder be brought to bear against the teeth and the efficiency of a toothbrush to perform this task diminishes rapidly with each brush stroke. An object of the invention is to provide an improved tooth cleaning implement which can make an effective use of an abrasive powder.

Another object is to provide an implement which is more effective than a toothbrush in providing massaging action for the users gums reducing greatly the tendency to injure the gums with increased pressure. Another object is to provide a tooth scrubbing and gum massaging implement which is capable of retaining a powdered cleanser in cleaning contact with the teeth over many more strokes of the cleaning implement.

Unlike the toothbrush which is easily manipulated in a direction across the face of the user's teeth but is difficult to manipulate in a direction parallel to the direction to which the teeth extend, the electrically powered toothbrush is easily moved in both directions. It can be moved at much higher velocities than is practical in hand brushing. Applicant has found that this increased velocity results in sufficient agitation of saliva-wetted-abrasive powders so that it is not necessary to employ a brush or scrubber formed of bristles or filaments. Applicant has found that structures capable of retaining a supply of powder over many more strokes of the scrubber can also provide sufficient agitation for the saliva and powder to accomplish the cleaning task. Accordingly, another object of the invention is to provide a tooth and gum scrubber for use with motive means for oscillating an output shaft about its axis such, for example, as conventional electric toothbrush powered handles. Another object of the invention is to provide a tooth scrubber comprising a plurality of receptacles or cups extending in like direction from a common base which is carried on a handle, the cups and base being formed of an easily flexible resilient material. The powder receptacles are specially formed to provide an effective scrubbing action when rubbed against the teeth and gums. In addition, the receptacles are specially formed so that they will release powder gradually during the course of scrubbing action within the user's mouth.

In the drawings:

FIG. 1 is an isometric view of an electrically powered tooth and gum scrubber embodying the invention;

FIG. 2 is a view in front elevation of the scrubber unit of FIG. 1;

FIG. 3 is a cross-sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view of a fragment of a powder receptacle of alternative form; and

FIG. 5 is a cross-sectional view of a fragment of a powder receptacle of another alternative form.

In FIG. 1, the numeral 10 designates the whole of an electrically powered tooth and gum scrubber. It includes a motive power handle 14 of the kind which is associated with electric toothbrushes. It can be battery operated or powered from an external supply to the unit through the power cord 16. The

handle portion 14 of the unit has an output in the form of oscillatory movement about the axis of an output shaft which is not visible in FIG. 1 but is coupled to the handle element 18 of the tooth and gum-scrubbing unit. In addition to the handle, that unit comprises a scrubbing means which in this embodiment is the scrubbing element 20. When the switch 22 is actuated, the handle portion 14 of the unit serves as the motive power means for the scrubbing unit. It causes that unit to oscillate rotationally about the axis of the shaft 18.

It will be apparent that the scrubbing unit is particularly useful when it is subjected to such oscillatory motion during the scrubbing procedure in addition to being reciprocated along the axis handle or shaft 18. Since the oscillatory motion is most easily accomplished by a drive means such as the electrical power handle 14, the invention is particularly useful when coupled with such a motive power means. On the other hand, utility of the scrubber unit is not limited to the case in which it is used with such a motive power means. It is an effective cleaning and massaging device, specially adapted for use with cleaning powders, even when operated by hand.

The unit is shown without the motive power means in FIG. 2. The slot 24 at the end of the handle or shaft 18 is designed to permit coupling the unit to the internal drive shaft of an electric drive handle. The scrubbing unit 20 and handle 18 are arranged so that the center of gravity of the unit lies on the axis of the lower end which is coupled to the electric-drive shaft whereby to minimize the secondary vibrations when the unit is in use. Except for this requirement, any handle means which permits insertion of the scrubber means within the user's mouth, and permits its manipulation there, is adequate. At its upper end, shaft 18 is widened to accommodate the full width of the scrubbing means 20. In this embodiment that scrubbing means comprises a plurality of spaced, open receptacles which lie substantially in the same plane and which are formed of a flexible and resilient material. They are held in spaced relation by a handle means which is capable of moving them in unison relative to the user's teeth and gums. In this embodiment, that scrubbing means comprises a base 26 from which integrally formed cleanser receptacles extend in like or similar direction. The receptacles lie in substantially a common plane, it being understood, however, they may be arranged at slightly different elevations or in slightly different directions or to define a gently sloping surface or may be otherwise modified so that the tooth area which is engaged is increased so that manipulation within the mouth is facilitated.

In this embodiment, the receptacles are formed in three rows. The center row is offset from the other two whereby the receptacles do not lie in columns. None the less, the particular placement of the receptacles is not critical. It is important only that there be a number of them, that they be spaced apart a small distance, and they be arranged so that there is a minimum amount of tooth area that is not scrubbed over each stroke of the unit. Three of the receptacles are shown in cross section in FIG. 3 where they are designated by the reference numerals 28, 30 and 32 respectively. In this embodiment those receptacles are generally circular when seen in elevation as in FIG. 2. They are not as high as they are wide. However, they project upwardly a substantial distance no less than half their width. This construction is advantageous because it is desirable that the receptacles flex along their entire height and not merely at the upper rim of the cup.

The receptacles are provided with an inner recess which converts them to cups. The primary purpose of these cups is to retain the cleansing material, particularly when that material is a powder. Three forms of receptacles are shown in the drawing. The receptacles of FIGS. 1, 2 and 3 are shaped as truncated cones which are converted to cups by recesses formed centrally into them to a depth which approaches, but which is less than, the width across the receptacle. In fact, the recesses in FIG. 3 and in FIG. 5 are substantially semicircular and so are necessarily less deep than the receptacle is wide. The recess in FIG. 4 is substantially more shallow. The latter illustrates the minimum depth whereas the form of the FIGS. 3 and

5 illustrates the maximum depth to achieve full advantage of the invention. All three forms of receptacles shown in the drawings are circular in elevational view. Circular construction is preferred but is not essential to successful practice of the invention.

The receptacles 28, 30 and 32 in FIG. 3, the receptacle 34 of FIG. 4 and the receptacle 36 of FIG. 5 all are arranged so that the angle formed at the intersection of the wall that defines the recess and the wall that serves as the upper rim of the cup make an obtuse angle in the quadrant that contains the wall of a cup. Construction lines have been drawn in FIG. 4 to illustrate this feature. Construction line 40 is drawn along the interior wall of the cup where it meets the upper wall. A construction line 42 is drawn along that wall. The angle X between them is an obtuse angle and the two lines meet at a relatively sharp corner whereas the outside wall of the cup is rounded off as at 44. The construction is similar in FIG. 5 where the inner wall 46 of the cup forms a sharp corner with the upper wall 48 of the cup. But the upper wall is rounded off and merges gradually into the outer sidewall 50.

The unit is used by wetting the scrubbing means and then applying powdered tooth cleaner to its wetted upper surface. Powder that touches the wetted upper surface of the scrubbing unit absorbs moisture and tends to adhere to the surface of the scrubber. Additional qualities of the powder are not wetted. They fill the spaces between the receptacles and they also fill the cups of the receptacle. If the scrubber is tilted, the loose powder between receptacles may fall away but unless it is turned nearly upside down, loose powder will remain within the cups. After the unit is inserted in the user's mouth, the upper layer of powder within the cups will be wetted and is easily washed away in the saliva surrounding the teeth during the scrubbing action. The cup walls are shaped so that the powder that adheres to the cup walls, and any dry powder within, is not rubbed away as the surface of the scrubber is rubbed over the surface of the teeth. Nonetheless, as the upper layer of powder in the cup is dissolved or washed away, successive layers of powder become available. The fact that the inner cup wall makes an obtuse angle with the upper wall of the cup means that a shield is formed for the powder remaining within the cup whereby that powder is removed only by the action of saliva rather than by being rubbed out of the cup. When the cup is too deep, the powder is not effectively washed out but becomes a paste at the bottom of the cup. Conversely, when the cup is too shallow, a larger proportion of the powder can be rubbed out of the cup.

In preferred form the cups project from the base a distance no less than half their breadth and the recesses have depth no greater than receptacle width. All the embodiments illustrated meet these requirements.

It is not essential to creation of a shield that the inner and upper walls of the cup meet on a distinct line. However, any rounding at this point should be only minimal. On the other hand, a rounded corner at the intersection of the upper and outer walls of the cup is advantageous because it tends to make that wall wedge shaped and facilitates bearing into the crevices between teeth without making the wall so thin that it is easily worn away. The circular or near circular form is advantageous because it means that deformation to make an out-

of-round condition in one direction is accompanied by deformation entirely around the rim of the cup. Substantial scrubbing action results from the application of sufficient force to deform the cup at any point of its rim. In preferred form the cups have an upper end diameter no greater than three-sixteenths of an inch.

The scrubbing means is advantageously formed of a soft synthetic plastic or rubber material. A handle means to which the scrubbing means is attached is advantageously formed with a material which is flexible but in much lesser degree. The two are attached by any suitable means such, for example, as by having one molded to an irregular surface of the other so that interlocking conformations result. Such conformations are shown in FIG. 3 where they are generally designated by the reference numeral 56. In preferred form the base 26 is sufficiently thick so that it is flexed in a small degree when the scrubber is used.

It will be apparent upon examination that the scrubbing device with its several projections or receptacles is capable of massaging the gums of a user with little danger that the gums will be cut and torn as might occur when excessive pressure is applied with a conventional bristle-type toothbrush.

The form of receptacle illustrated in FIG. 5 is advantageous because less tooth powder is retained in the spaces between receptacles when powder is first applied with brush. In this form, the sidewalls of the receptacle are less steep than they are in the forms illustrated in FIGS. 3 and 4. This form is more or less effective as a gum-massaging unit when the recess that forms the cup has more than minimum depth.

One of the advantages of the invention is that it is useful with cleanser materials in paste form although full advantage of the invention is realized when the powders are used.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. A tooth and gum scrubber comprising:

scrubbing means for retaining a supply of cleanser adjacent a user's teeth and gums including a plurality of spaced open receptacles lying substantially in a plane and formed of flexible, resilient material; and

handle means connecting said receptacles for moving them in unison relative to the user's teeth and gums;

said receptacles comprising recessed, truncated cones each projecting from a common base a distance less than the diameter of the cone adjacent its base, the recesses defining a cup interior having depth no greater than recess width and in which the truncated cones are formed with a rounded corner at the intersection of their upper and outer walls and being unrounded at the intersection of the upper wall of the cone and the wall of the recess.

2. The invention defined in claim 1 in which said receptacles have a diameter no greater than three-sixteenths of an inch at the upper, smaller diameter end of said truncated cones, the recesses having depth less than their diameter and the receptacles being formed in offset rows.

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