ORAL HYGIENIC DEVICE
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This invention relates to an oral hygienic device, specifically a sanitary toothbrush for cleaning the teeth, and includes a unitary dentifrice-dispensing toothbrush. Several well-founded reasons exist for the use of disposable toothbrushes, that is, toothbrushes intended to be used once and then discarded. One reason is the unsanitary condition of a toothbrush after even a single use. Another reason is based on the growing awareness on the part of the public that a most effective control of dental caries and periodontal diseases is by brush cleaning the teeth and stimulation of the gums regularly after eating. It is inconvenient if not personally objectionable, however, to carry a conventional toothbrush in one's pocket or purse for use in a program of regular brushing for persons who do not have all meals at home. It is suggested that with increased education in dental health that brushing the teeth regularly after meals may become as commonplace a practice as it is to wash the hands in preparation of eating a meal.

An object of this invention is a sanitary, disposable, inexpensive but efficient tooth brushing device. Another object of this invention is a device of the character described which is conveniently portable. A further object of this invention is a tooth cleaning device for a character described which can be easily manipulated in the mouth to bring the brushing head of said device into contact with the teeth. An additional object of this invention is a device of the character described containing a dentifrice for dispensing at the brush head.

The tooth brushing device in accordance with the invention is constructed from a tube of flexible, resilient plastic material. One end of the tube is slit to provide a plurality of bristles forming the brushing head of the toothbrush. The tube is folded and sealed at the overlapping tube portions along the fold lines to provide a handle portion and a head portion extending substantially perpendicularly therefrom. A dentifrice material or mouth cleansing aid may be contained in the brush head, in the handle, or in both, as described below. The novel construction of the one-piece oral hygienic device of this invention is illustrated in the embodiments shown in the drawings, in which:

FIG. 1 is a side elevational view of a tube of plastic material slit at one end to provide a plurality of bristles for the brushing head;
FIG. 2 is an end view of the slit tube of FIG. 1, as viewed from the slit end;
FIG. 3 is a side elevational view of a device of this invention made from the tube shown in FIG. 1;
FIG. 4 is a top view of the device shown in FIG. 3;
FIG. 5 is a top view of a dentifrice dispensing device of this invention, taken partly in cross-section;
FIG. 6 is a cross-sectional view of the device of FIG. 5 taken along the lines 6—6; and
FIG. 7 is a side elevational view of another embodiment of a dentifrice-dispensing device of this invention.

In the drawings the numeral 1 designates a length of a hollow tube of thermostatic material from which the disposable toothbrush may be constructed, for example, an extruded polyethylene tube having an outer diameter of about 7/8" and an inner diameter of 3/8". A plurality of bristles are formed at one end of the tube, as by slitting.

As shown in FIG. 5, the tube 1 is bent in a U-fold the base of which is indicated at 3 wherein the numeral 4 designates the fold line at the outer surface of the tube at the base of the U-fold. The numeral 5 designates the inner fold line at the base of the U-fold formed by the overlapping portions of the tube at the base. The base of the U-fold is located closer to the base of the bristles 2 than to the opposite end of the tube. One of the legs of the U-bent tube is bent away from the other to provide a cup-shaped bristled end portion 7 and a handle portion 8 extending substantially perpendicularly therefrom. As shown in the drawings, the bristled end of the tube is bent downwardly from the handle 8 along a line 12. The distance from the fold line 12 to the outer fold line 4 is at least equal to the distance between the inner fold line 5 and outer fold line 4 at the base of the U-fold.

The overlapped tube portions at the base 3 of the U-fold are sealed together with deformation of the plastic tubing thereat and along the fold line 12 to maintain the cup-shaped bristled end portion 7 at substantially a right angle to the remaining portion of the tube 1 forming the handle 8. With this construction, the disposable toothbrush of this invention retains the advantageous features of easy manipulation in brushing the teeth, therefore provided only in toothbrushes of more expensive and complex construction, the expense of which is a deterrent to sanitary, single use. Reference to FIG. 4 shows how the bristles 2 flex and spread outwardly when applied against a surface in a brushing action.

The overlapped portions of the toothbrush tube at the base 3 of the U-fold may be most conveniently sealed together by means of conventional heat and pressure sealing operations. In this instance the base of the U-fold of the aforementioned 3/8" outer diameter tube of polyethylene may be compressed between the bars of a pressure-heat seal device and retained therein until the overlapped portions of the tube are fusion sealed together. During this operation the bristled end portion 7 is bent along the line 12, the heat at the edge of the bar adjacent thereto serving to deform the plastic tube into a crease line therealong. In this sealing operation the cup-shaped bristled end portion 7 is sealed from the handle portion 8. The base 3 of the U-fold may be thinned and fanned out as a result of the heat sealing step as shown in FIG. 3 and more clearly in FIG. 4.

When sealed as shown at 9, for example by means of pressure and heat seal techniques, the hollow tube 4 handle 8 provides a compartment for a dentifrice material. FIGS. 5 and 6 illustrates a dentifrice-dispensing embodiment of the toothbrush of this invention. In this embodiment, the fusion seal between the overlapped tube portions at the U-fold is interrupted with a pressure-rupturable seal between the wall surfaces inside the tube at the inner fold at the base of the U-fold. Compression of the handle containing the dentifrice causes said seal to rupture and provide a passageway from the handle to the cup cavity and bristles forming the brushing head of the toothbrush. This embodiment is shown in FIGS. 5, 5 and 6 with the seal ruptured to provide an opening 10 through which the dentifrice material 11 may pass into the cup-shaped bristled end portion 7. The pressure-rupturable seal may be formed, for example, by the controlled application of heat and pressure in the region about the intended opening 10 to form a seal thereat weaker than the seal at the remaining portions of the fusion seal at the base of the U-fold.

Another modification if a dentifrice-dispensing device in accordance with this invention is shown in FIG. 7. In this modification the dentifrice is contained in the cavity of the cup-shaped bristled end portion 7. As shown, the cup-shaped portion is crimped together and lightly heat sealed along a line adjacent the base 6 of the
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3. The seal conveniently may be easily broken by applying the free tips of the bristles to the teeth, causing them to spread apart and apply a splitting action to the seal under slight pressure. In this modification the hollow tubular handle may be filled with a mouthwash. The mouthwash may be removed therefrom either through a pressure-rupturable seal at the U-fold as described with reference to the embodiment in FIGS. 5 and 6 or from the opposite end of the tube through an opening therein provided in any convenient manner.

The present toothbrushes may be made in a variety of sizes, preferably a size which is conveniently portable but which is not difficult to handle. An example of such a size is a toothbrush made from a 2½" to 3" length of the aforesaid tube. The toothbrush may be individually packaged and may be sterilized in manners known in the packaging and contents sterilizing arts. They may conveniently be made available in dispenser machines located in public washrooms. They may also be assembled in kit form with other personal use items, for example, a hospital entrance kit for incoming patients.

Embodiments other than those specifically shown and within the scope of this invention will be obvious from the foregoing disclosure. For example, the hollow tubular handle may be subdivided into more than one compartment to contain different teeth cleaning or oral cleaning aids. Two compartments may be formed in the handle, for example, by crimping the tube together intermediate the U-fold end and opposite end of the handle and sealing the walls together therealong. These and other modifications incorporated with the essential novel features of this invention as defined in the claims are intended to be within the scope thereof.

What is claimed is:

1. A one-piece oral hygienic device having a bristled end portion and integral therewith a handle for manipulating said device in use, comprising: a tube of flexible, resilient plastic material slit at one end to provide a bristled end, said tube being bent in a U-fold wherein the base of said U-fold is spaced from but closer to the base of the bristles at the slit end than the opposite end of said tube, one leg of the U-bent tube being bent away from the other along a line located at a distance from the outer fold line at the base of said U-fold not less than the distance of the inner fold line at the base of said U-fold from said outer fold line to thereby provide a cup-shaped bristled end portion and a handle portion extending substantially perpendicularly therefrom and terminating at said opposite end.

2. A one-piece oral hygiene device having a bristled end portion and integral therewith a handle for manipulating said device in use, comprising: a tube of flexible, resilient plastic material slit at one end to provide a bristled end, said tube being bent in a U-fold wherein the base of said U-fold is spaced from but closer to the base of the bristles at the slit end than the opposite end of said tube, one leg of the U-bent tube being bent away from the other along a line located at a distance from the outer fold line at the base of said U-fold not less than the distance of the inner fold line at the base of said U-fold from said outer fold line to thereby provide a cup-shaped bristled end portion and a handle portion extending substantially perpendicularly therefrom and terminating at said opposite end.

3. A one-piece oral hygiene device having a bristled end portion and integral therewith a handle for manipulating said device in use, comprising: a tube of flexible, resilient plastic material slit at one end to provide a bristled end, said tube being bent in a U-fold wherein the base of said U-fold is spaced from but closer to the base of the bristles at the slit end than the opposite end of said tube, one leg of the U-bent tube being bent away from the other along a line located at a distance from the outer fold line at the base of said U-fold not less than the distance of the inner fold line at the base of said U-fold from said outer fold line, the portions of the overlapped tube at the base of said U-fold being fusion sealed together, to thereby provide a cup-shaped bristled end portion and a handle portion extending substantially perpendicularly therefrom and terminating at said opposite end.

4. A one-piece oral hygiene device having a bristled end portion and integral therewith a handle for manipulating said device in use, comprising: a tube of flexible, resilient thermoplastic material slit at one end to provide a bristled end, said tube being bent in a U-fold wherein the base of said U-fold is spaced from but closer to the base of the bristles at the slit end than the opposite end of said tube, one leg of the U-bent tube being bent away from the other along a line located at a distance from the outer fold line at the base of said U-fold not less than the distance of the inner fold line at the base of said U-fold from said outer fold line and between said outer fold line and the base of the bristles, the portions of the overlapped tube at the base of said U-fold being fusion sealed together, to thereby provide a cup-shaped bristled end portion and a handle portion extending substantially perpendicularly therefrom and terminating at said opposite end.

5. A one-piece oral hygiene device in accordance with claim 4 wherein the handle portion contains a dentifrice material and is sealed at said opposite end, wherein the fusion seal at the overlapped tube portions is interrupted with a pressure-rupturable seal between the inner wall surfaces of said tube at the U-bent overlapped portions thereof along a path extending from the handle portion to the cup-shaped bristled end portion to thereby provide a passageaway along said path upon rupture of said seal for the passage of said dentifrice material from the handle to the bristled end portion.

6. A one-piece oral hygiene device in accordance with claim 4 wherein said cup-shaped bristled end portion contains a dentifrice material between the fusion seal at the U-fold and the base of said bristles, and wherein the fusion seal at the overlapped tube portions thereof is interrupted with a pressure-rupturable seal along a path extending from the handle portion to the cup-shaped bristled end portion to thereby provide a passageaway along said path upon rupture of said seal for the passage of said dentifrice material from the handle to the bristled end portion.

7. A one-piece oral hygiene device in accordance with claim 4 wherein said cup-shaped bristled end portion contains a dentifrice material between the fusion seal at the U-fold and the base of said bristles and is sealed in a pressure-rupturable seal along the base of said bristles to retain said dentifrice therein.

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