This invention relates to fountain toothbrushes and more particularly to a toothbrush designed to receive and dispense a liquid dentifrice.

Devices of this character which have been manufactured heretofore have proven unsatisfactory in several major aspects. A primary difficulty has been the controlling of the quantity of the liquid dispensed. A second objectionable feature has been the difficulty in refilling the dentifrice reservoir; and a tendency toward leakage has further impaired the proper functioning of such devices.

It is a major purpose of the present invention to provide a fountain toothbrush which will eliminate the disadvantages enumerated above and will be both economical of manufacture and simple in operation.

A further object of the present invention is to provide a brush of the character specified which will uniformly dispense a predetermined maximum quantity of liquid dentifrice.

A further object of the invention is to provide a fountain toothbrush which will rely upon suction both for the filling thereof and for the positioning of a portion of the liquid contents in dispensing position, thus guarding against leakage.

A still further object of the invention is to provide a fountain toothbrush comprising a compact, self-contained article which may, if desired, be carried freely in pocket or purse when traveling.

A still further object of the invention is to provide a fountain toothbrush which may be readily assembled and disassembled for cleaning and the like.

Further objects of the invention will be hereinafter more fully described.

The accompanying drawing illustrates one practical toothbrush embodying the invention which will be described in detail to enable others to understand and use the same, but the invention is not considered restricted to the specific construction shown in the drawings in which:

Fig. 1 is a side elevation of a novel fountain toothbrush constructed in accordance with the present invention, with the bristles protecting the cover illustrated in section;

Fig. 2 is a side elevation of the cover detached;

Fig. 3 is a longitudinal sectional view through the entire brush;

Fig. 4 is a longitudinal sectional view through a detachable nozzle which may be used in replenishing the contents of the brush reservoir;

Fig. 5 is a vertical sectional view taken on the line 5--5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a vertical sectional view of the line 6--6, looking in the direction of the arrows;

Fig. 7 is a vertical sectional view taken on the line 7--7 of Fig. 3, also looking in the direction of the arrows; and

Fig. 8 is a side elevation of the valve controlling the entrance of liquid into the brush reservoir.

As shown in the drawings, the improved fountain toothbrush comprises a handle portion 10 formed from any desired tubular material and externally screw threaded adjacent one end thereof as at 11 for engagement with an internally threaded cap or cover 12. This cap is intended as a protective member designed to enclose the bristles of the brush when the device is not in use. If desired, frictional instead of threaded engagement may be provided between the cap and handle and the former may have a spring clip 13 whereby the brush may be conveniently carried and retained in pocket or purse.

The opposite end of the brush handle is of slightly reduced diameter as indicated at 14 and is also externally screw threaded for engagement with a closure member 15. The end wall of this closure is provided with a plurality of apertures or passages 16 concentrically spaced adjacent the periphery thereof. From an examination of Fig. 3 of the drawings it will be apparent that the passages 16 are so located that when the closure 15 is in normal position, tightened upon the extremity 14 of the brush handle, the passages 16 will be closed by the thickness of the material from which the brush handle is manufactured.

The closure 15 is further provided with a centrally located threaded extension or nipple 17 projecting exteriorly therefrom and designed to be engaged by a relatively small cap or the like 18.

As stated above, the handle 10 is tubular, being provided with co-axial bores 19 and 20 disposed in end to end relationship, the bore 20 being of reduced diameter and located within the reduced extremity 14 of the brush handle. A tubular sleeve 21 is fitted within the bore 19 for snug reciprocal movement, this sleeve being internally screw threaded adjacent each extremity thereof as indicated at 22 and 23.

An end closure 24 is provided, with a preferably reduced inner extremity for threaded engagement within the outer extremity of the sleeve or reservoir 21, and this closure member carries the brush portion proper 25, in any desired manner. An internal passage 26 extends through the closure 24 and communicates with a dentifrice passage 27 in the brush portion 25, this second passage exiting at a point substantially adjacent.
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to the center of the brush bristles. The inner face of the closure 24 is preferably formed with a conical seat 39 adapted to receive the complementarily conformed plunger 29 whereby liquid dentifrice may be forced into the passages 26 and 27 and thence to the brush bristles.

An externally screw threaded cap 30 is provided for engagement within the inner extremity of the sleeve or reservoir 21 and this cap is of sufficient length to permit the threaded or other engagement therewith of second caplike member 31. As will be more readily apparent from an examination of Fig. 3, the overall length of the sleeve or cylinder 31 with the cap 31 positioned thereon, through the medium of the end closure 30, is identical with the length of the bore 19 in the handle 10 so that the end closure 24 projects beyond the brush handle while the end wall of the cap member 31 abuts the shoulder formed at the junction of the co-axial bores 19 and 20.

A chamber 32 is formed within the cap 31, and the end wall of said cap is provided with a plurality of concentrically spaced apertures or ports 33 providing communication between the chamber 32 and the bore 20. Centrally located and aligned apertures 34 and 35, respectively, are provided in the end closure 30 and the cap 31, adapted to receive the longitudinally reciprocable plunger stem or rod 36 upon one extremity of which the conical plunger 29 is securely mounted. The other extremity of this stem is designed to project through the end closure 15 of the handle proper and terminates in a manipulating knob or the like 37. Normally this knob is enclosed within the cap 18.

A suitably conformed check valve member is provided, for maintaining the apertures or ports 33 closed, a preferred embodiment thereof comprising a flat head portion 38 and a tubular stem 39 reciprocably mounted upon the plunger stem 36 within the chamber 32. A coil spring 40, or the like, of light construction, surrounds this valve stem and normally urges the valve head against the inner surface of the end wall of the cap 31.

The sleeve or reservoir 21 is provided with co-axial bores 41 and 42, the bore 41 being relatively shorter in length and of reduced diameter and positioned contiguous to the internally threaded portion 22. This bore 41 is carefully conformed, in diameter and length, so as to provide a dispensing chamber capable of receiving therein only a predetermined maximum quantity of liquid dentifrice, sufficient for one brushing of the teeth, and the plunger 25 is designed to fit snugly within this bore. The larger bore 42 provides a bypass for fluid past the plunger when the plunger is in the dotted line position of Fig. 3.

In operation, when it is desired to supply dentifrice to the bristles, the cap 18 is removed and the plunger stem retracted a distance substantially the length of the bore 41 or until the plunger is withdrawn from said bore, to the position illustrated in dotted lines in Fig. 3. Liquid dentifrice will then flow into the chamber 41 from the storage reservoir and the plunger is returned to normal position only this quantity of dentifrice will be forced through the passages 26 and 27 exiting within the bristles of the brush proper.

To initially fill the reservoir within the brush, or when refilling is required, the cap 16 is loosened slightly to free the passages 18 from the end of the brush handle and this capped end of the brush is introduced into a dentifrice container, beneath the level of fluid therein. The brush portion 25 is then grasped and the cylindrical reservoir 21 is partially withdrawn from the handle. Dentifrice is thus sucked or drawn through the passages 16 into the handle portion. The cap 15 is then tightened to normal position, shutting off the passages 16 therein, and the reservoir 21 is returned to proper position within the handle. During this return movement wherein the liquid within the handle forces open the valve 38, against the tension of the spring 40, and flows through the apertures 33 into the chamber 32 and reservoir 42.

A tapered tubular element 43 is provided having an internal bore 44 terminating in diametrically spaced passages 45, for filling the instant device from relatively narrow-necked bottles. This member 43 is further provided with an internally screw threaded socket 46 adapted to engage the similarly threaded reduced portion 15. In the use of this auxiliary filling member the cap 16 is first removed and the member 43 substituted therefor, the passages 45 in the filling tube 43 aligning with a pair of the passages 16 in the cap 15. The free extremity of the member 43 is then positioned within a bottle of dentifrice below the level of the liquid therein. The cap 15 is then loosened slightly and the filling operation proceeds in an identical manner as described above.

It will be noted that the plunger 25 fits within the complementarily conformed seat 20, after dentifrice has been forced from the chamber 41, and functions as a valve to effectively seal the exit passage 26 and thus prevent any possibility of leakage.

The fountain toothbrush thus described is relatively inexpensive, light in weight, economical in construction and convenient to operate. It may be easily cleaned, from time to time, and contains no complicated arrangement of parts or structure which may get out of order.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What I claim is:

1. A fountain brush comprising a tubular handle, means to close one end of said handle, a tubular reservoir having one end closed, said reservoir being mounted for sliding movement in said handle with the closed end adjacent said one end of said handle, said closed end of said reservoir being provided with, for providing communication between said reservoir and said handle, a check valve mounted on said reservoir to close said port for admitting fluid into said reservoir and preventing fluid passing out of said reservoir, a plunger mounted for reciprocation in said reservoir adjacent the other end thereof, a rod having one end secured to said plunger and the other end extending through the closed end of said reservoir and out through the means to close said one end of said handle and slidably movable therethrough, the projecting end of said rod providing a manipulating handle for reciprocating said plunger, and a closure mounted on the open end of said reservoir for supporting a brush and for closing said open end and having a passage communication
with said reservoir for receiving fluid therefrom upon reciprocation of said plunger. 2. A fountain brush comprising a tubular handle, means to close one end of said handle, a tubular reservoir having one end closed, said reservoir being mounted for sliding movement in said handle with the closed end adjacent said one end of said handle, said closed end of said reservoir being provided with at least one port providing communication between said reservoir and said handle, a check valve mounted on said reservoir to close said port for admitting fluid into said reservoir and preventing fluid passing out of said reservoir, a plunger mounted for reciprocation in said reservoir adjacent the other end thereof, a rod having one end secured to said plunger and having the other end projecting through the closed end of said reservoir and out through the means to close said one end of said handle and slidably movable therethrough, the projecting end of said rod providing a manipulating handle for reciprocating said plunger, and a closure mounted on the open end of said reservoir for supporting a brush and for closing said open end and having a passage communicating with said reservoir for receiving fluid therefrom upon reciprocation of said plunger, said reservoir having a bore of reduced diameter adjacent the open end in which said plunger is operative, said plunger movable out of said bore toward the closed end of said reservoir for admitting fluid to the open end of said reservoir.

3. A fountain brush comprising a tubular handle, means to close one end of said handle, a tubular reservoir having one end closed, said reservoir being mounted for sliding movement in said handle with the closed end adjacent said one end of said handle, said closed end of said reservoir being provided with at least one port providing communication between said reservoir and said handle, a check valve mounted on said reservoir to close said port for admitting fluid into said reservoir and preventing fluid passing out of said reservoir, a plunger mounted for reciprocation in said reservoir adjacent the other end thereof, a rod having one end secured to said plunger and having the other end projecting through the closed end of said reservoir and out through the means to close said one end of said handle and slidably movable therethrough, the projecting end of said rod providing a manipulating handle for reciprocating said plunger, and a closure mounted on the open end of said reservoir for supporting a brush and for closing said open end and having a passage communicating with said reservoir for receiving fluid therefrom upon reciprocation of said plunger, said reservoir being provided with a by-pass which is operative when the plunger is in a position spaced from the open end thereof for admitting fluid from the reservoir past the plunger to the open end.

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