

March 4, 1952

LE ROY E. WALKER ET AL

2,587,794

FOUNTAIN TOOTHBRUSH

Filed Aug. 22, 1947

2 SHEETS—SHEET 1

FIG. 1.

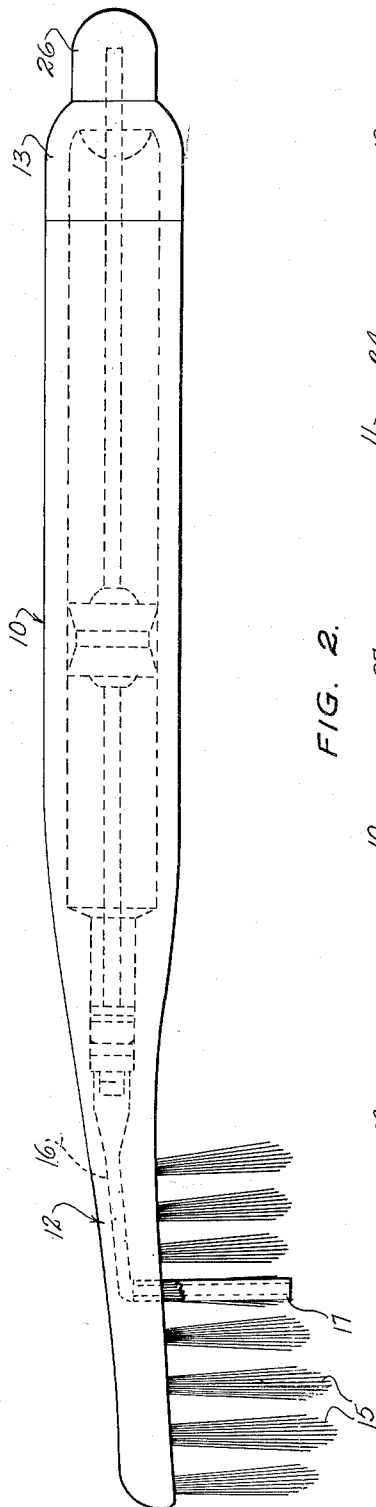


FIG. 2.

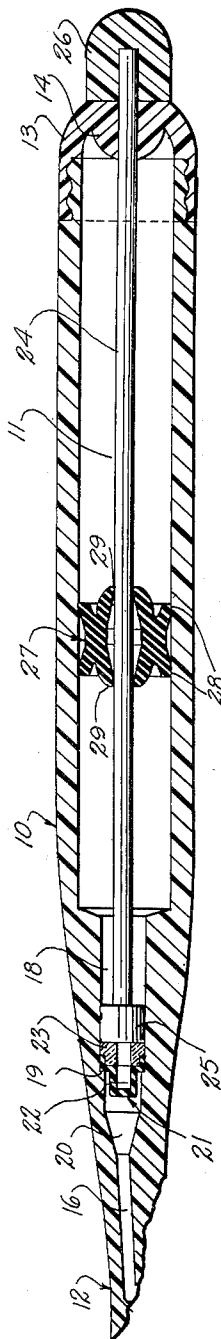


FIG. 5.

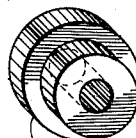


FIG. 4.

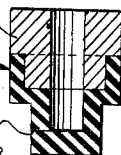
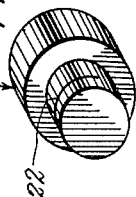


FIG. 3.



INVENTOR.
LE ROY E. WALKER,
GLEN R. MORTON,
BY

McMurray, Corman + Davidson
ATTORNEYS,

March 4, 1952

LE ROY E. WALKER ET AL

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2 SHEETS—SHEET 2

FIG. 6.

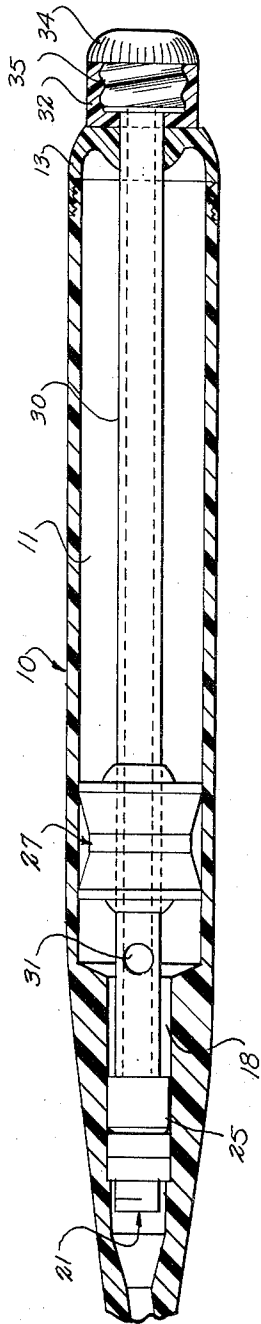


FIG. 7.

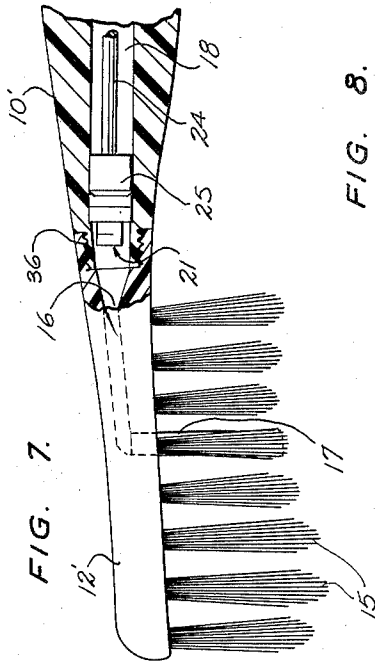


FIG. 9.

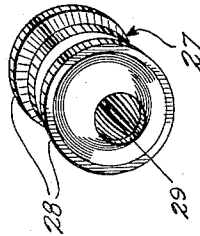
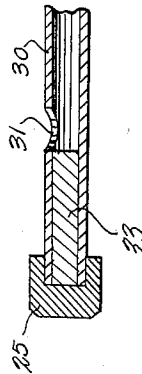


FIG. 8.



INVENTOR.
LE ROY E. WALKER,
GLEN R. MORTON,
BY

McMorrow, Berman & Davidson
ATTORNEYS

UNITED STATES PATENT OFFICE

2,587,794

FOUNTAIN TOOTHBRUSH

Le Roy E. Walker, Mullen, and Glenn R. Morton,
Grand Island, Nebr.

Application August 22, 1947, Serial No. 770,148

2 Claims. (Cl. 222-378)

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This invention relates to improvements in fountain-type brushes, and more particularly to an improved, fountain-type toothbrush having a hollow handle portion providing a receptacle or reservoir for dentifrice.

It is among the objects of the invention to provide an improved fountain toothbrush having a brush portion provided with the usual bristle tufts and a hollow handle portion providing a dentifrice receptacle or reservoir having a capacity sufficient for a large number of applications of dentifrice and dentifrice-ejecting means carried by the handle portion and manually operated to eject measured quantities of dentifrice, each sufficient for a single application onto the bristles of the brush portion, which brush eliminates the necessity of keeping a separate dentifrice container available, particularly while traveling when ordinary toothpaste tubes are frequently lost or broken and spill their contents onto articles in a traveling bag or toilet kit in which they are transported, facilitates the economical use of dentifrice by measuring out the proper amount for each application, which provides a rigid, sealed container for the dentifrice, protecting the dentifrice against leakage and contamination, which is effective to eject the proper amount of dentifrice onto the bristles by a single manual operation of the ejecting mechanism, deposits the dentifrice on the outer ends of the bristle tufts, which is arranged to clearly indicate the quantity of dentifrice therein at all times, is simple and durable in construction, economical to manufacture, and neat and attractive in appearance.

A further object resides in the provision of a fountain-type toothbrush having a hollow handle portion providing a dentifrice reservoir and including manually-operated dentifrice-ejecting means, and a brush portion including bristles supported in a back which is provided with a dentifrice canal leading to the outer ends of said bristles, and is detachably secured to the handle portion so that the brush portion may be renewed when necessary, or desired, continuing the handle portion and the dentifrice-ejecting mechanism in use.

Other objects and advantages will become apparent from a consideration of the following description in conjunction with the accompanying drawings, wherein:

Figure 1 is a longitudinal elevation of a fountain-type toothbrush illustrative of the invention;

Figure 2 is a longitudinal cross-section of the toothbrush illustrated in Figure 1;

Figure 3 is a perspective view of a check valve constituting an operative component of the improved toothbrush;

Figure 4 is a longitudinal cross-section of the

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check valve illustrated in Figure 3, and a rigid support therefor;

Figure 5 is a perspective view of the check-valve support shown in longitudinal cross-section in Figure 4;

Figure 6 is a longitudinal cross-section of a somewhat modified form of fountain-type toothbrush;

Figure 7 is an elevation of a fragmentary portion of a still further modified form of toothbrush, a portion being broken away and shown in cross-section to better illustrate the construction thereof;

Figure 8 is a longitudinal cross-section of a tubular plunger and piston constituting an operative component of the modified form of toothbrush illustrated in Figure 6; and

Figure 9 is a perspective view of a follower constituting an operative component of both forms of the toothbrush as illustrated in Figures 2 and 6.

With continued reference to the drawings, and particularly to Figures 1 to 5 inclusive, and Figure 9, the improved toothbrush comprises a handle portion, generally indicated at 10, preferably, but not necessarily having the form of an elongated, cylindrical barrel with a longitudinally-extending bore 11 therein. The handle portion 10 may be formed of any suitable material, but a number of advantages have been found in forming this barrel of a transparent or substantially transparent synthetic resin plastic material. A brush portion, generally indicated at 12, extends from one end of the handle portion 10 and may be integral therewith, as illustrated in Figures 1 and 2. The end of the handle portion 10 opposite the brush portion is open and is provided with external screw threads which receive an internally-screw-threaded end-closure cap 13 having a thickened end-wall 14 provided with a central bore or aperture.

The brush portion 12 is provided on one side thereof with conventional bristle tufts 15 and internally thereof with a dentifrice canal 16. The canal 16 is provided near its outer end with a right-angle turn and emerges to the bristle surface of the brush at substantially the center bristle tuft which center tuft is omitted and replaced by a tubular, flexible member 17 preferably formed of flexible plastic material and which extends the dentifrice canal to the outer ends of the bristle tufts 15 so that dentifrice forced through the canal 16 will be carried to the outer ends of the bristles and deposited thereon.

A counter-bore 18 smaller than the handle bore 11, but larger than the dentifrice canal 16 is provided in the end of the dentifrice canal adjacent the inner-end of the handle bore and connects the dentifrice canal with the handle bore. This counter-bore is provided internally

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with an annular stop shoulder or abutment 19 in the end portion thereof adjacent to the dentifrice canal 16, and said end portion is preferably flaired into the canal 16 by a frustro-conical portion as indicated at 20. The counter-bore 18 has a volumetric capacity equal to the volume of a proper quantity of dentifrice for a single application, and is used as a means for properly measuring the dentifrice ejected onto the bristles of the toothbrush for each application of dentifrice.

A check valve, generally indicated at 21, and illustrated in detail in Figures 3 and 4, is mounted in the end portion of the counter-bore 18 adjacent the canal 16 and is positioned against the internal shoulder 19. This check valve comprises a hollow, cylindrical cup of flexible and resilient material having two coaxial, juxtaposed portions of different external and internal diameters. The smaller diameter portion of the cup has an end-wall and is provided with an arcuate cut or slit 22 which opens to permit passage of fluid dentifrice material under pressure from the interior to the exterior of the cup, but closes to preclude the passage of material from the exterior to the interior of the cup. The larger portion of the cup is mounted on an annular boss provided on an apertured support 23 of substantially rigid material, which supports the flexible cup in operative position against the shoulder 19 and in the corresponding end portion of the counter-bore 18.

An elongated plunger rod 24 extends longitudinally through the handle bore 11 and into the counter-bore 18 and is provided on its inner end with a piston 25, preferably formed of flexible material, reciprocable in the counter-bore. At its opposite end the plunger 24 extends through the aperture in the thickened end portion 14 of end-closure cap 13 and a knob or button 26 is secured on the outer end of the plunger for manual movement thereof.

With the mechanism so far described, if the counter-bore 18 is filled with dentifrice, an inward manual movement of the plunger rod 24 will force the piston 25 through the counter-bore as far as the check valve 21 and will force the dentifrice contained in the counter-bore through the check valve and into the dentifrice canal 16 from which it will flow through the canal extension 17 to the outer ends of the bristles 15. Withdrawal of the piston 25 from the counter-bore 18 by pulling outwardly on the knob 26 will create a vacuum in the counter-bore which serves to re-fill the counter-bore with dentifrice for a subsequent ejection of dentifrice from the counter-bore by the piston 25, and to impart movement of a suction operated follower, generally indicated at 27, and illustrated in detail in Figures 2 and 8.

The follower 27 is fabricated of flexible material, preferably a suitable synthetic rubber material, is generally cylindrical in shape and is provided with a central bore or opening extending therethrough to slidably receive the plunger 24, the size of the follower being such that it is slidably received in the bore 11 of the handle portion 10. This follower is provided with a pair of oppositely-disposed, spaced-apart, external annular lips 28 which contact the interior of the handle portion 10 and provide a fluid-tight seal between the follower and the handle portion for both directions of movement of the follower relative to the handle portion and with a pair of spaced-apart, annular internal lips 29 which provide fluid-tight seals between the follower and

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the plunger 24, for both directions of movement of the follower relative to the plunger. The follower 27 thus provides a movable fluid-tight seal between the plunger 24 and the interior of the barrel of the handle portion 10 to prevent leakage of air to the inner-end portion of the handle bore.

With the follower 27 in place, when the piston 25 is withdrawn from the counter-bore 18 the vacuum created in the counter-bore by rearward movement of the piston 25 will be applied to that portion of the handle bore 11 between the follower 27 and the counter-bore, and will act to move the follower 27 inwardly to thereby compress the dentifrice contained in this portion of the handle bore and force dentifrice into the counter-bore 18 until the counter-bore is completely re-filled.

With this arrangement the handle bore 11 may be filled with dentifrice by removing the cap 13, the plunger 24, the follower 27 and the piston 25 from the handle and pouring or forcing dentifrice into the handle bore. After the dentifrice has been forced into the handle bore the plunger is forced through it and the follower 27 positioned within the handle bore 11 at the outer end of the body of dentifrice contained in the handle bore.

Movement of the piston 25 through the counter-bore 18 will force the contents of the counter-bore into the dentifrice canal 16 and out of the end of this canal onto the bristles 15. Withdrawal of the piston from the counter-bore will cause the follower 27 to move inwardly, re-filling the counter-bore in the manner indicated above, after which a measured quantity of dentifrice may again be forced through the dentifrice canal 16 and onto the bristles 15 by forcing the piston 25 through the counter-bore.

In the modified arrangement shown in Figure 6, the construction is the same as that illustrated in Figures 1 to 5 inclusive, and Figure 8, and described above, except that the plunger 30 of Figure 6 is made tubular and provided in its end portion adjacent the piston 25 with a lateral opening or outlet 31 and the knob or button 32 corresponding to the knob 26, is made hollow and provided with internal screw threads of a diameter to receive the threaded extension on the end of a conventional toothpaste tube.

With this arrangement the extension or spout of a toothpaste tube may be screwed into the knob 32 and the dentifrice forced into the handle bore 11 through the tubular plunger 30 and the lateral opening 31 therein. With this arrangement it is not necessary to remove the cap 13 or the plunger, piston and follower from the hollow handle in order to refill the dentifrice reservoir provided in the handle.

The portion of the tubular plunger 30 between the lateral openings 31 and the piston 25 is preferably filled with a plug 33 of solid material to prevent the accumulation of a non-removable quantity of dentifrice in this end portion of the plunger and a screw plug 34 having an externally-screw-threaded boss 35 thereon is threadable into the hollow knob 32 to close the outer end of the tubular plunger 30 after the dentifrice reservoir in the hollow handle 10 has been filled.

In the modified form shown in Figure 7 the construction is the same as that illustrated in Figures 1 and 2, or in Figure 6, and described above, except that the brush portion 12' is made separable from the handle portion 10' so that

the brush may be renewed when necessary or desired, continuing the handle portion and the dentifrice-ejecting mechanism in use. As illustrated, the handle portion 10' is provided on the brush-receiving end thereof with an externally-screw-threaded cylindrical boss or extension 36 and the brush portion 12' is provided with an internally-screw-threaded socket which receives the extension 36 to detachably secure the brush in operative position on the handle. The handle portion may be made completely symmetrical so that the rotational position of the brush relative thereto is entirely immaterial.

There is thus provided a fountain-type tooth-brush having a dentifrice reservoir of a capacity to hold a quantity of dentifrice sufficient for a large number of applications, and manually-operated means carried by the handle and effective to eject a measured quantity of dentifrice sufficient for a single application from the dentifrice reservoir onto the bristles of the brush at each manual operation of this ejecting mechanism. A quantity of dentifrice sufficient for a large number of applications can be carried in the brush and ejected for use, when desired, thus avoiding the necessity of keeping a separate dentifrice container available. The brush is small in size and light in weight so that it can be conveniently carried, and if desired, may be provided with a cap to cover the bristles so that it may be carried in a pocket or in a purse or hand-bag.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. In a dispensing device, a tubular handle adapted to contain fluid material, said handle having a main bore to accommodate the fluid material and a reduced diameter bore opening into one end of said main bore, said reduced bore having therein an abutment spaced from said one end of the main bore, a check valve in said reduced bore comprising a resilient material cup having a first portion filling said reduced bore and bearing against said abutment, said first portion having an open end facing the said one end of the main bore, and a second portion of reduced diameter remote from the open end of the first portion, said second portion being closed and being spaced from the sides of said reduced handle bore and positioned beyond said abutment, said second portion being provided in its side with a normally closed discharge slit, and a piston operable in said reduced handle bore toward said cup to compress fluid material present in said reduced bore between said piston and said cup in a manner to

distort said second portion of the cup and open the slit therein to discharge the compressed fluid material into the space in said reduced bore around said second cup portion and beyond said abutment.

2. In a dispensing device, a tubular handle adapted to contain fluid material, said handle having a main bore to accommodate the fluid material and a reduced diameter bore opening into one end of said main bore, said reduced bore having therein an abutment spaced from said one end of the main bore, a check valve in said reduced bore comprising a resilient material cup having a first portion filling said reduced bore and bearing against said abutment, said first portion having an open end facing the said one end of the main bore, and a second portion of reduced diameter remote from the open end of the first portion, said second portion being closed and being spaced from the sides of said reduced handle bore and positioned beyond said abutment, said second portion being provided in its side with a normally closed discharge slit, and a piston operable in said reduced handle bore toward said cup to compress fluid material present in said reduced bore between said piston and said cup in a manner to distort said second portion of the cup and open the slit therein to discharge the compressed fluid material into the space in said reduced bore around said second cup portion and beyond said abutment, said check valve further comprising a rigid material support having a first portion fitting said reduced handle bore and abutting the open end of the first portion of the cup and a second portion of reduced diameter extending into and fitting the open end of the first portion of said cup.

LE ROY E. WALKER.
GLENN R. MORTON.

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