

[54] **PLASTIC FOUNTAIN TOOTHBRUSH**[76] Inventor: **Jack Reitknecht**, 210 East Broadway, New York, N.Y. 10002[22] Filed: **Jan. 6, 1972**[21] Appl. No.: **215,798**[52] U.S. Cl. **401/175**[51] Int. Cl. **A46b 11/02**

[58] Field of Search 401/171-175

[56] **References Cited****UNITED STATES PATENTS**

2,025,591	12/1935	Folsom-Jones	401/175 X
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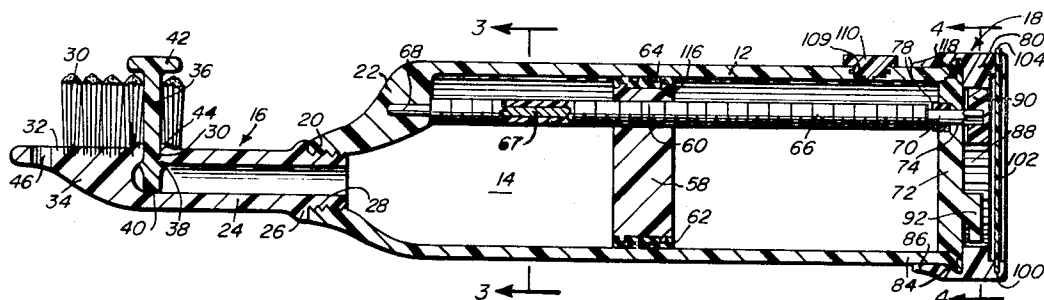
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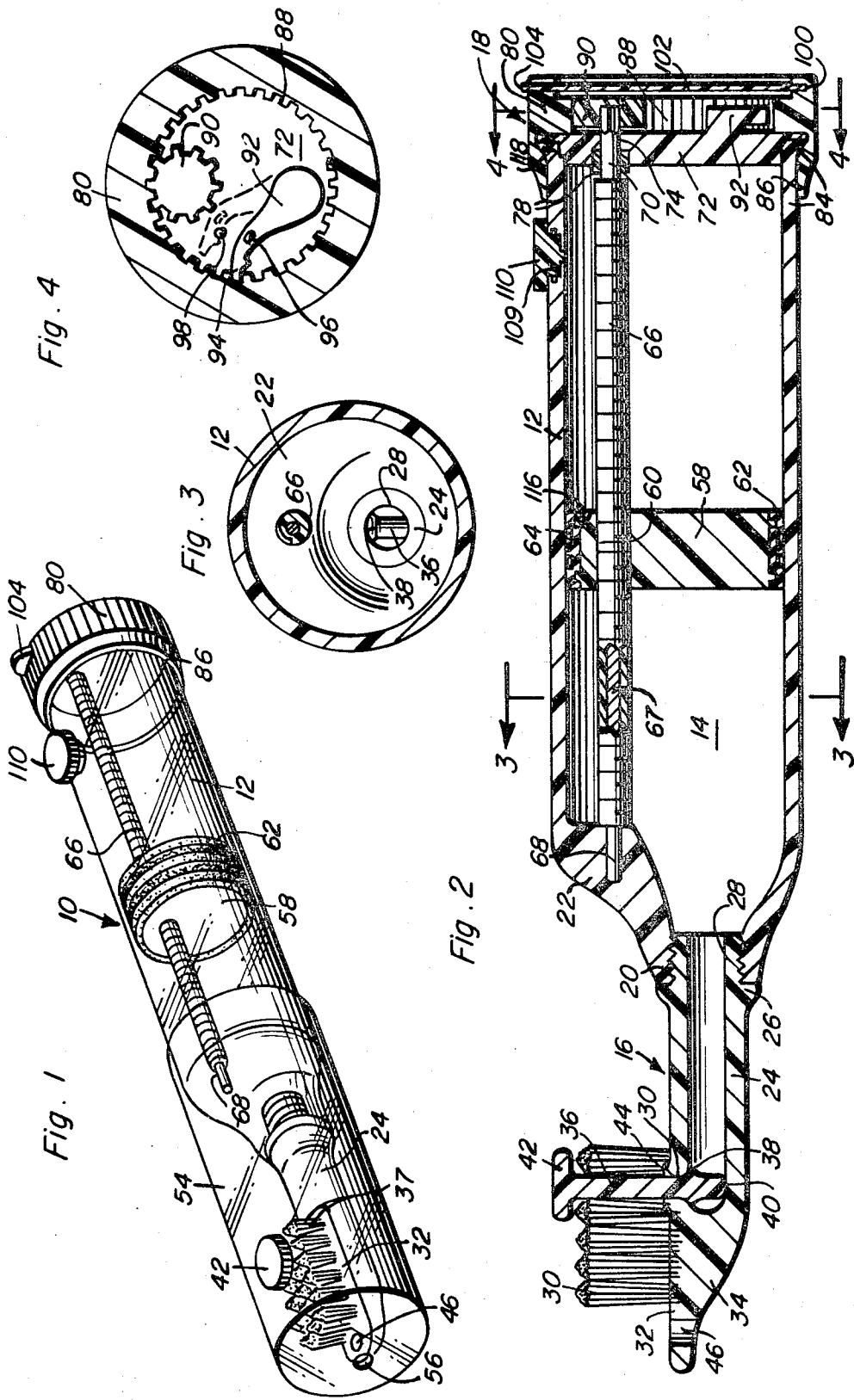
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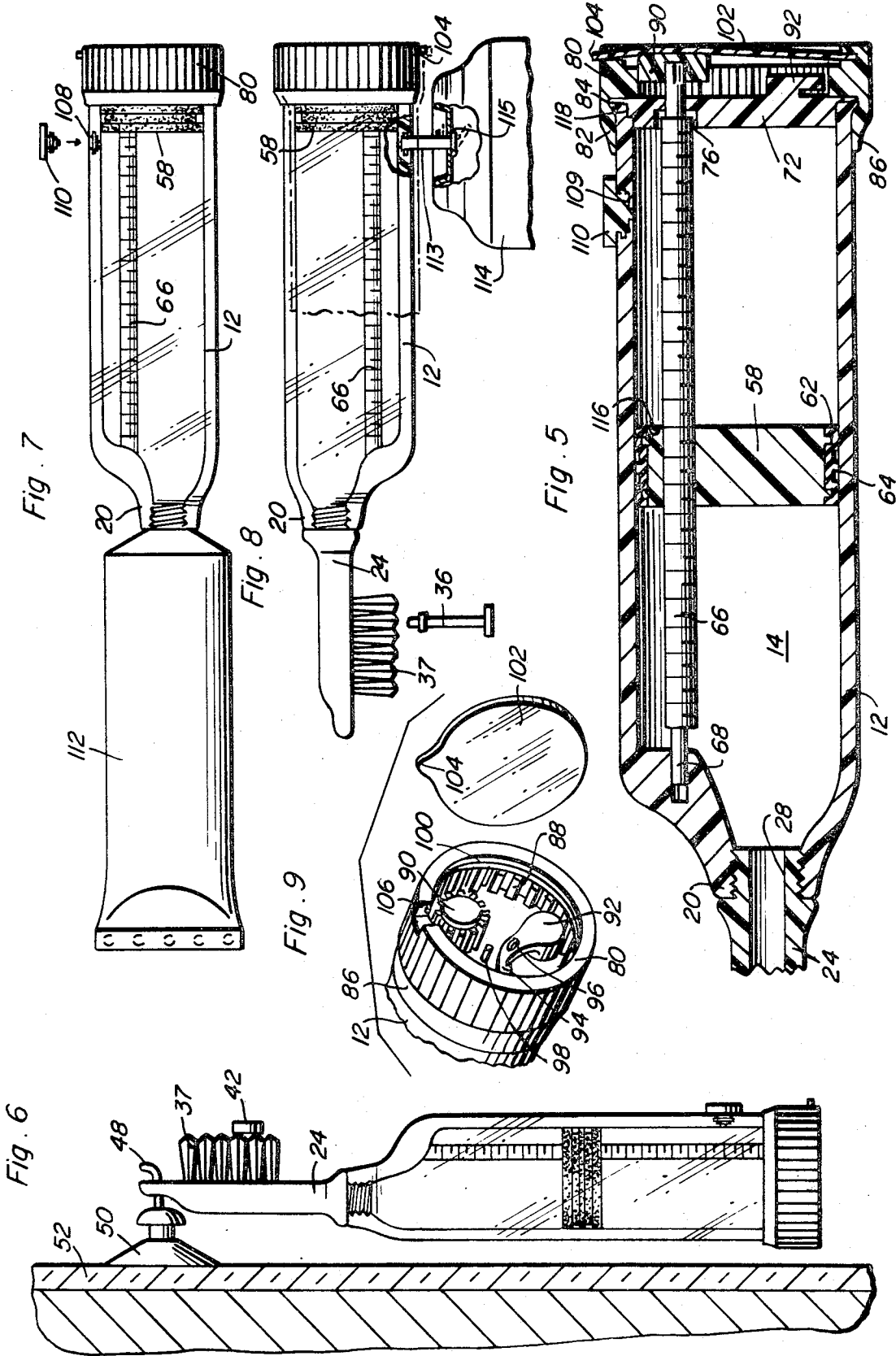
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ABSTRACT

A plastic fountain toothbrush incorporating an elongated plastic cylinder with a brush head at one end thereof, a piston longitudinally slidably disposed therein for discharging toothpaste through a passageway into the brush head and an operating mechanism for the piston to move it longitudinally at the end of the cylinder remote from the brush head. The entire construction is waterproof to enable the entire device to be easily cleaned or rinsed off with plastic materials being used throughout to enable the device to be economically manufactured. Use of the fountain toothbrush promotes oral hygiene by eliminating transfer of germs from one conventional toothbrush to another by contacting the dispensing portion of a conventional collapsible toothpaste tube with the brush heads of several toothbrushes in a family.

14 Claims, 9 Drawing Figures





PLASTIC FOUNTAIN TOOTHBRUSH

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a fountain toothbrush and more particularly to such a toothbrush constructed of plastic materials and incorporating novel structural features therein enabling efficient operation and economical manufacture.

2. Description of the Prior Art

Fountain toothbrushes have been developed previously but for various reasons have not replaced conventional toothbrushes in the market place. One example of previously developed fountain toothbrushes is disclosed in prior U.S. Pat. No. 3,039,476, issued June 19, 1962. Basically, previously known fountain toothbrushes have incorporated a cylindrical body receiving a quantity of toothpaste together with a piston movable longitudinally in the body for forcing the toothpaste to be discharged onto a brush head.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a fountain toothbrush in which the components are constructed of plastic material constructed in a manner that the components are of waterproof construction which enables effective cleansing of the brush without damage to the operating components and further enables the manufacturing cost of the toothbrush to be maintained at a very low cost so that the device will be economically feasible and competitive with conventional toothbrushes when considering the advantages derived from the fountain toothbrush.

Another object of the invention is to provide a fountain toothbrush that includes a piston slidable in the supply cylinder with an eccentrically disposed threaded shaft threadedly extending through the piston and a large knob is attached to the shaft for rotation thereof to facilitate movement of the piston. The threaded shaft is not only rotatably journaled but mounted for limited reciprocation and selective reciprocation to enable a given quantity of toothpaste to be discharged by rotating the knob which is geared to the shaft to rotate the shaft which will move the piston if the shaft is maintained stationary or if the shaft is permitted to move longitudinally, the piston will remain stationary and the shaft moved outwardly of the rotating knob where it can be engaged by a thumb or finger and moved longitudinally for moving the piston to discharge a predetermined quantity of toothpaste.

A further object of the invention is to provide a fountain toothbrush in accordance with the preceding objects in which the operating knob is provided with an internal ring gear meshing with a gear on the end of the shaft for rotating the shaft and including a pawl mechanism for releasably locking the knob in one direction of rotation, thus enabling the piston to be retracted for refilling from a supply container of toothpaste.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the plastic fountain toothbrush of this invention.

FIG. 2 is a longitudinal, sectional view of the toothbrush.

FIG. 3 is a transverse, sectional view taken substantially on a plane passing along section line 3—3 of FIG. 2 illustrating the eccentricity of the threaded operating shaft.

FIG. 4 is a transverse, sectional view taken substantially upon a plane passing along section line 4—4 of FIG. 2 illustrating the structural details of the operating mechanism for the shaft.

FIG. 5 is a sectional view similar to FIG. 2 but illustrating the threaded shaft moved longitudinally outwardly in relation to the cylinder to enable pressure to be exerted on the pinion gear thereon for discharging a predetermined quantity of toothpaste.

FIG. 6 is an elevational view of the toothbrush illustrating the manner in which it can be supported on a supporting hook or the like.

FIG. 7 is an elevational view of the toothbrush illustrating the manner in which the supply of toothpaste may be replenished from a collapsible tube.

FIG. 8 is an elevational view of the toothbrush illustrating the manner in which the toothbrush may be refilled with toothpaste from a pressurized container.

FIG. 9 is an exploded group perspective view of the operating mechanism for the toothbrush.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now specifically to the drawings, the plastic fountain toothbrush of the present invention is generally designated by the numeral 10 and includes an elongated cylindrical body 12 defining an interior cylinder 14 for receiving a supply of toothpaste. Mounted on one end of the cylindrical body 12 is a brush head assembly generally designated by the numeral 16 and at the opposite end of the cylindrical body 12, an operating mechanism generally designated by the numeral 18 is provided.

The end of the body 12 having the brush head 16 attached thereto is provided with an internally threaded neck 20 eccentric to the longitudinal center line of the cylindrical body 12 with the neck 20 being joined with the body 12 by a smoothly curved and thickened transition area 22.

The brush head 16 includes a straight tubular member 24 having a threaded end portion threaded into the internally threaded neck 20 and an abutment flange 26 which limits the threaded movement thereof. The tube 24 includes a passageway 28 that communicates with the cylinder 14 and extends to a discharge orifice 30 which communicates with a flattened surface 32 of the brush head which also tapers on the opposite surface from the flat surface as designated by numeral 34. A plurality of tufts of bristles 37 are mounted in the flat surface 32 of the brush head in a conventional manner with the bristles having a desired degree of stiffness and being of conventional plastic material employed in constructing toothbrush bristles.

The orifice 30 is closed by a plug 36 having a rounded peripheral projection 38 thereon which is held

against the inner end of the orifice 30 by the end of the plug 36 engaging the opposite side of the passageway 28 as at 40. The upper end of the plug 36 is provided with a knob 42 to facilitate insertion and removal thereof. The discharge end of the orifice 30 is formed by a projection 44 which defines a shoulder for effective separation of the toothpaste that has been discharged from the toothpaste still in the passageway 28 and orifice 30. The plastic construction of the plug 36 and the orifice 30 enables the plug to be inserted and removed and provides an antiseptic closure and waterproof seal for the orifice 30.

The tip end of the brush head 16 is provided with an aperture 46 adapted to receive a hook 48 on a suction cup 50 mounted on a mirror 52 or other flat smooth surface, as illustrated in FIG. 6, or the aperture 46 may be employed for supporting the toothbrush from any suitable supporting device.

The brush head may be protected by a removable cylindrical cap 54 having an opening 56 in one end thereof and the other end may be frictionally or screw-threadedly engaged with the transition area 22 of the cylindrical body 12 to protect the bristles when desired with the aperture 56 enabling air circulation to facilitate drying of the bristles.

Disposed in the cylindrical body 12 is a piston 58 having an eccentrically disposed threaded aperture 60 therethrough. The periphery of the piston is provided with a peripheral sealing member 62 slidably fitting the interior of the cylinder 14 with the sealing member 62 including three spaced peripheral ribs or rings separated by void spaces 64 with the sealing member 62 being constructed of softer and more resilient material than the remainder of the piston 58.

Threaded through the piston 58 is an elongated threaded shaft 66 which may be constructed of solid rigid plastic material, stainless steel or of plastic material reinforced by a steel core 67 as illustrated. The shaft 66 has a reduced forward end 68 journaled in a socket in the transition area 22 and a reduced rearward end 70 that extends into the operating mechanism 18.

The operating mechanism 18 includes a one-piece assembly that includes a closure plug 72 telescoping into the interior of the cylinder 12 and including a bore 74 which journals the reduced end 70 of the shaft 66 thus rotatably journaling the shaft. The surface of the plug 72 encircling the bore 74 is provided with a cavity 76 that receives a cylindrical spacer 78 in a selective manner, that is, the spacer may be positioned therein or omitted therefrom. When the spacer 78 is in place, any rotation of the shaft 66 will move the piston 58 longitudinally in the cylinder 14. When the spacer 78 is omitted, rotation of the shaft 66 in a clockwise direction will cause movement of the shaft 66 longitudinally toward the plug 72 and leave the piston 58 stationary until the shoulder at the inner end of the reduced portion 70 comes into contact with the bottom of the recess 76 which then enables the shaft 66 to be moved longitudinally to move the piston 58 a predetermined increment of movement for discharging a predetermined amount of toothpaste.

The operating mechanism 18 also includes an enlarged cylindrical knob 80 that is externally knurled and provided with a flange 82 extending telescopically over the end of the cylindrical body 12 which includes

a peripheral projecting rib 84 thereon with the flange 82 being correspondingly recessed to not only provide a sealing engagement with the body 12 but also a rotatable engagement with the body 12. The inner end of the knob 80 is tapered as at 86 for close fitting engagement with the exterior surface of the cylindrical body 12. Also, the knob 80 is of annular construction and includes an internal gear 88 on the inner surface thereof which is in meshing engagement with a pinion gear 90 mounted on the end of the shaft 66 with the gear 90 and reduced end 70 of the shaft 66 having a polygonal configuration or otherwise rigidly connected for rotation together. Thus, as the knob 80 is rotated, the gear 90 will be rotated at a greater rotational speed thus rotating the shaft 66.

Also formed integrally with the plug 72 is a pawl 92 having a free end 94 engaging the internal gear 88 with the resiliency of the material enabling the knob 80 to be rotated in a clockwise direction but prevented from rotation in a counterclockwise direction. The pawl may be disengaged by the provision of a slight upward projection 96 in the form of a tab on the upper end thereof which will receive the thumbnail or fingernail to enable the pawl 92 to be pivoted to the dotted line position illustrated in FIG. 4 with the end 94 out of engagement with the teeth 88. The pawl 92 may be retained in inoperative position by a projection 98 on the outer surface of the plug 72 with the resiliency of the plastic material enabling the pawl to be lifted slightly away from the surface of the plug 72 so that it can go over top of the projection 98 and then be retained in retracted position by the projection 98.

The outer end portion of the knob 80 is of reduced thickness and provided with a groove 100 that receives a closure plate 102 that is constructed of flexible material such as transparent plastic or the like. The plate 102 is provided with a tab 104 thereon which is received in a notch 106 in the outer end of the knob 80 to enable removal and insertion of the closure plate 102. As illustrated, the closure plate 102 forms a sealed closure for the operating gear mechanism and pawl mechanism and provides an area for engaging the thumb or finger thereon when the gear 90 and shaft 66 are moved longitudinally as illustrated in FIG. 5 with the cover plate being sufficiently flexible to enable the gear 90 to move to the position on FIG. 5 and enabling thumb pressure to be engaged with the plate to move the gear 90 inwardly into the position illustrated in FIG. 2 to move the piston a predetermined increment of movement.

Adjacent the operating mechanism 18, the cylindrical body is provided with an opening 108 which receives a closure plug 110 which has the particular configuration as illustrated in FIG. 2 and FIG. 5, so that the plastic material from which the components are constructed provides a releasable closure plug 110 and one in which the inner end of the closure plug is of reduced diameter and stops flush with the interior of the cylinder so that no toothpaste will reside in this opening when the plug 110 is in place. In filling the cylinder, the piston is retracted and if a conventional toothpaste tube 112 is used, the brush head 16 is removed and the toothpaste tube is screw-threaded into neck 20. Toothpaste is forced into the cylinder 14 when the plug 110 is removed and the tube squeezed as

illustrated in FIG. 7. If a pressurized aerosol container 114 is used, the plug 110 is removed along with the plug 36 in the brush as illustrated in FIG. 8 so that toothpaste may be injected into the cylinder 14 in front of the piston 58.

The opening 108 is provided with an annular shoulder 109 which is recessed inwardly from the outer surface of the body 12 and which faces outwardly to form an abutment which engages the end of the discharge nozzle and valve actuator 113 on the aerosol container 114. Depression of the tubular actuating member or nozzle 113 will actuate the valve 115 in the aerosol container 114 which has been schematically illustrated in FIG. 8. Thus, when the toothbrush assembly is moved downwardly from the full line position of FIG. 8 to the broken line position, by virtue of the valve actuator 113 being depressed, due to its engagement with the shoulder 109, the valve 115 will be open thus allowing the cylindrical body 14 to be filled with toothpaste from the container. This same structure, of course, will also activate any other similar tubular valve actuator and discharge nozzle to enable filling of the cylindrical body by any other pressurized source such as a machine for filling a plurality of toothbrushes. The construction of the opening 108 is such that it will closely telescopically receive the tubular member 113 so that the tubular member 113 will discharge into the body 12 without leakage. In either filling arrangement, the plug 110, when reinserted, will close the opening 108 and be flush with the surface of the cylinder 14.

For assembly purposes, the piston 58 is provided with a recess or cavity 116 therein in alignment with the shaft 66 and adjacent the periphery of the piston 58 to designate the eccentricity of the threaded bore 60. The plug 72 is provided with a radial projection 118 that is received in a corresponding recess in the end of the cylindrical body 12 so that when the projection 118 and cavity 116 are aligned with the bore which receives the reduced end 68 of the shaft 66, the assembled plug, piston and shaft 66 may be readily inserted into the cylindrical body 12.

This toothbrush is safe and promotes oral hygiene by reducing transfer of germs, bacteria, and the like. Small children can utilize the toothbrush since the large knob provides adequate gripping surface and does not require the application of a large force to rotate the same. Use of this toothbrush completely eliminates contact between several toothbrushes of a family with the mouth of a single tube of toothpaste which practice has been found to spread germs and bacteria throughout a family. The waterproof construction enhances the sanitary features of the invention and the plastic construction enables the device to be economically manufactured on a one use throw away basis or for re-use by refilling. The toothbrush is useful with toothpaste having different viscosities and the structure of the device facilitates assembly by machine which again reduces the overall cost of the device and renders it economically feasible. The device also may be used for dispensing other flowable materials having various viscosities and the audible clicking of the ratchet pawl and the structure in which the shaft is moved longitudinally in one direction by rotation of the knob and then in a direction to dispense material by thumb pressure provides for the dispensing of a measured quantity of material.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A fountain toothbrush comprising an elongated cylindrical body, a brush head mounted on one end of said body and including bristles thereon and a passage communicating the interior of the body with the bristles, a piston longitudinally reciprocally mounted in the cylindrical body for discharging toothpaste from the body, through the passageway into the bristles when the piston moves towards the brush head, and means engaged with the piston for moving the piston longitudinally in the body, said means for moving the piston including an elongated threaded shaft journaled in said body and threaded through the piston, and an operating mechanism mounted on the end of the cylindrical body opposite from the brush head and engaged with the shaft for rotating the shaft for moving the piston in the cylindrical body, said shaft being received in a threaded bore in the piston with the threaded bore and shaft being eccentric in relation to the cylindrical body whereby the eccentricity of the threaded bore and shaft prevents rotation of the piston in relation to the body thereby moving the piston longitudinally when the shaft is rotated, said operating mechanism for the shaft including a knob disposed peripherally of the cylindrical body, and gear drive means interconnecting the knob and shaft for rotating the shaft upon rotation of the knob, said gear means including an internal gear integral with the knob and a drive gear mounted on the shaft in meshing engagement with the internal gear.

2. The structure as defined in claim 1, wherein said cylindrical body includes a closure plug having an eccentric bore therein journaling the shaft, said shaft having a reduced end portion extending through the bore and the plug, said plug having a recess surrounding the bore with the recess facing the shoulder between the shaft and the reduced end thereof whereby the shaft may move longitudinally in relation to the body with the reduced end portion of the shaft moving through the bore in the plug until the shoulder on the shaft engages the bottom of a recess in the plug.

3. The structure as defined in claim 2, together with a spacer selectively insertable into the recess in the plug to prevent longitudinal movement of the shaft in relation to the body when the spacer is positioned in the recess and permit longitudinal movement of the shaft in relation to the body when the spacer is omitted from the recess.

4. The structure as defined in claim 2, wherein said knob includes a peripheral flange defining the internal gear with the peripheral flange extending beyond the internal gear and including an inwardly facing peripheral groove therein, a flexible closure plug received in said peripheral groove for preventing water from entering the interior of the flange and coming into contact with the gears.

5. The structure as defined in claim 2, wherein said operating mechanism also includes a ratchet pawl engageable with the internal gear to enable the internal

gear and knob integral therewith to be rotated in one direction and preventing reverse rotation thereof.

6. The structure as defined in claim 5, wherein said operating mechanism includes means rendering the ratchet pawl inoperative for enabling the piston to be retracted into a position remote from the brush head.

7. The structure as defined in claim 6, wherein said body includes an opening adjacent the operating mechanism but outwardly of the piston when retracted, a closure plug for the opening to enable toothpaste to be forced into the cylindrical body through the end of the body having the brush head therein or through the opening with the closure therefor being removed when toothpaste is being forced into the cylindrical body.

8. The structure as defined in claim 1, wherein said brush head includes a discharge orifice defined by a peripheral wall, a closure plug for the discharge orifice, said closure plug including a rounded shoulder that can be inserted through the discharge orifice with the shoulder being spaced from the inner end of the plug, the inner end of the plug engaging an opposed surface of the passageway in the brush head to hold the shoulder against the inner end of the orifice thereby forming a seal for the orifice.

9. The structure as defined in claim 1, wherein said brush head includes an opening at the tip end thereof for receiving a hook-type support or the like to enable the toothbrush to be suspended from a support.

10. The structure as defined in claim 1, wherein said piston and operating mechanism for the shaft includes index means to enable alignment of the piston and

operating mechanism when assembled with respect to the cylindrical body.

11. The structure as defined in claim 2, wherein said cylindrical body and knob are provided with rotatably interengaging peripheral rib means and recess means for relative rotation of the knob, said knob and internal gear being constructed of one-piece molded plastic material.

12. The structure as defined in claim 11 wherein said rib means and recess means enables the knob to be snapped onto the body by longitudinal movement thereof and automatically meshing and engaging all components of the operating mechanism to facilitate assembly thereof.

13. The structure as defined in claim 5 wherein said ratchet pawl is unitarily constructed with said closure plug by being formed as a one-piece molded structure from flexible resilient material to permit the pawl to oscillate when engaging the internal gear and enable the pawl to be selectively moved between operative position in engagement with the internal gear and inoperative position disengaged therefrom.

14. The structure as defined in claim 7 wherein the opening in the body adjacent the operating mechanism includes an outwardly facing annular shoulder recessed inwardly from the outer surface of the body and forming an abutment for engaging and depressing the tubular valve actuator and discharge nozzle on an aerosol container or other pressurized source to enable filling of the body.

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