March 13, 1951 L. F. PERWAS 2,544,857

PRESSURE FEED FOUNTAIN BRUSH

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Fig. 1.

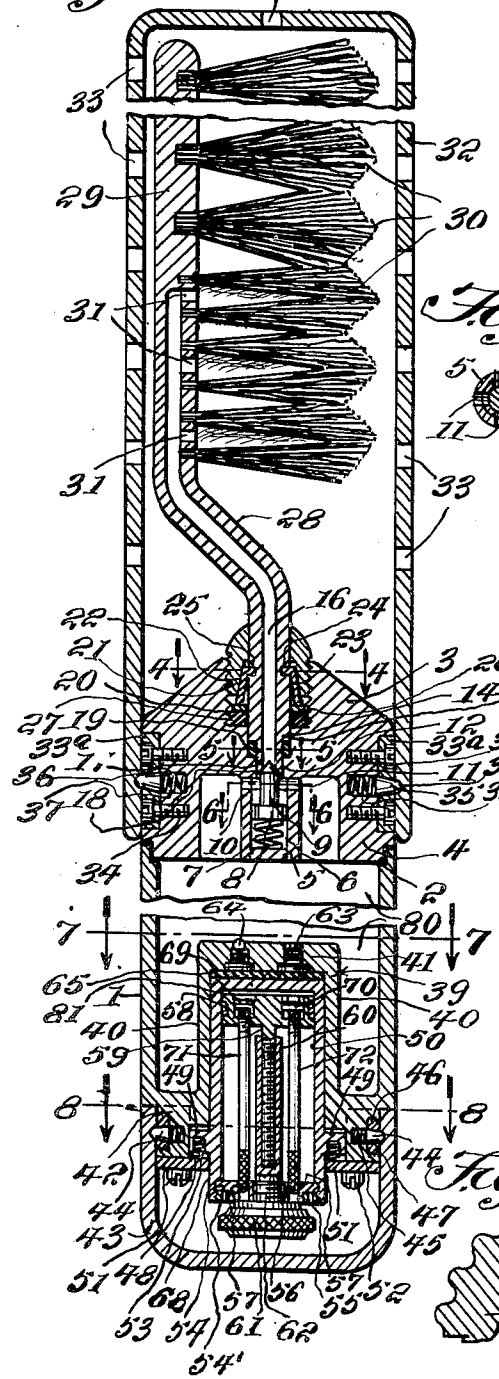

Fig. 2.

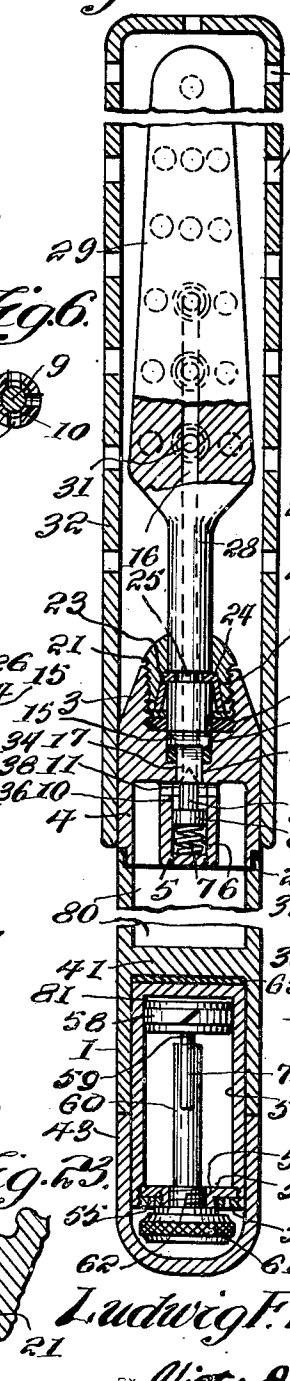

Fig. 6.



Fig. 5.

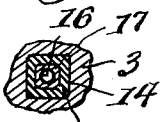

Fig. 4.

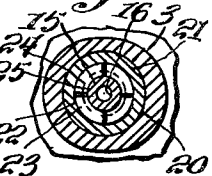

Fig. 3.

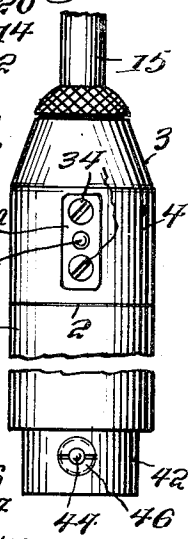

Fig. 4a.



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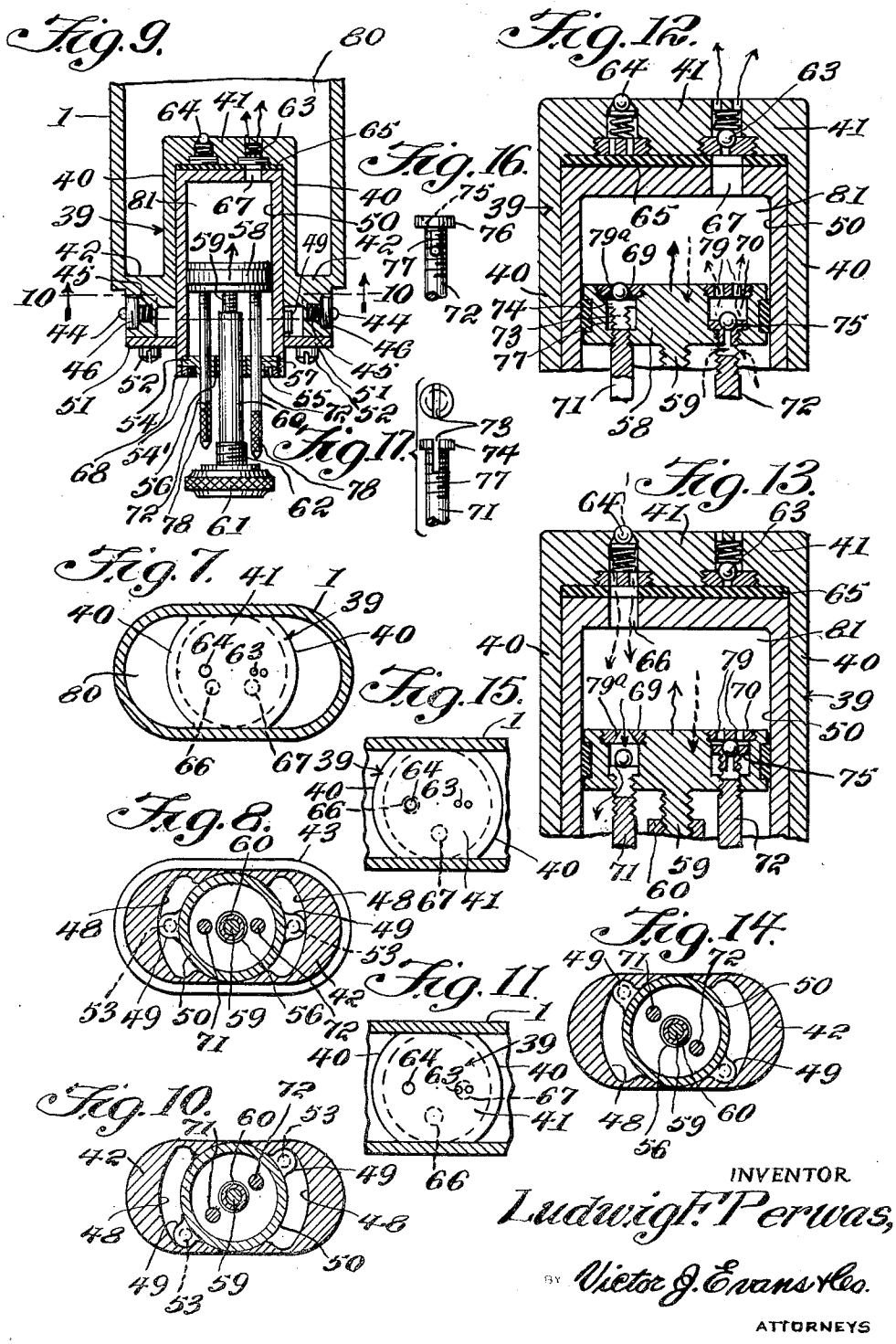

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Fig. 19.

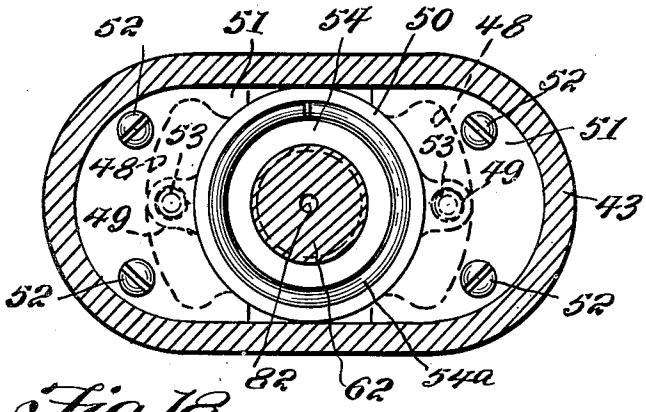



Fig. 20.

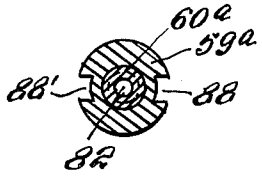



Fig. 18.

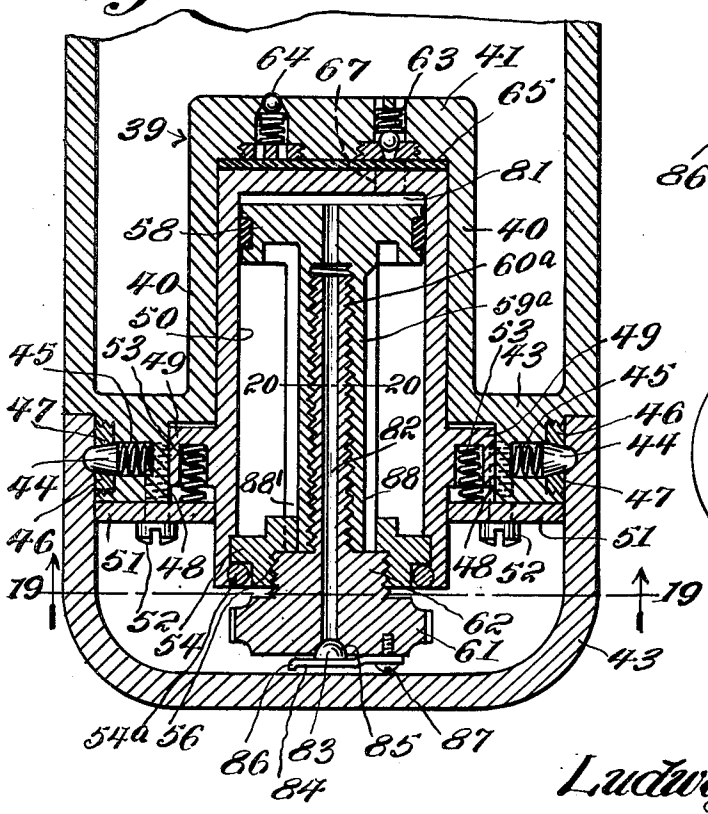



Fig. 21.

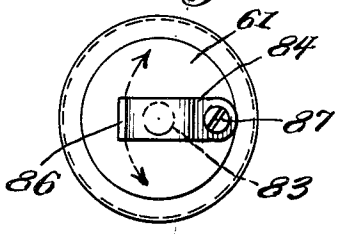
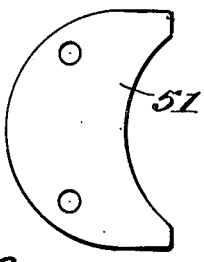



Fig. 22.

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PRESSURE FEED FOUNTAIN BRUSH

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Fig. 24.

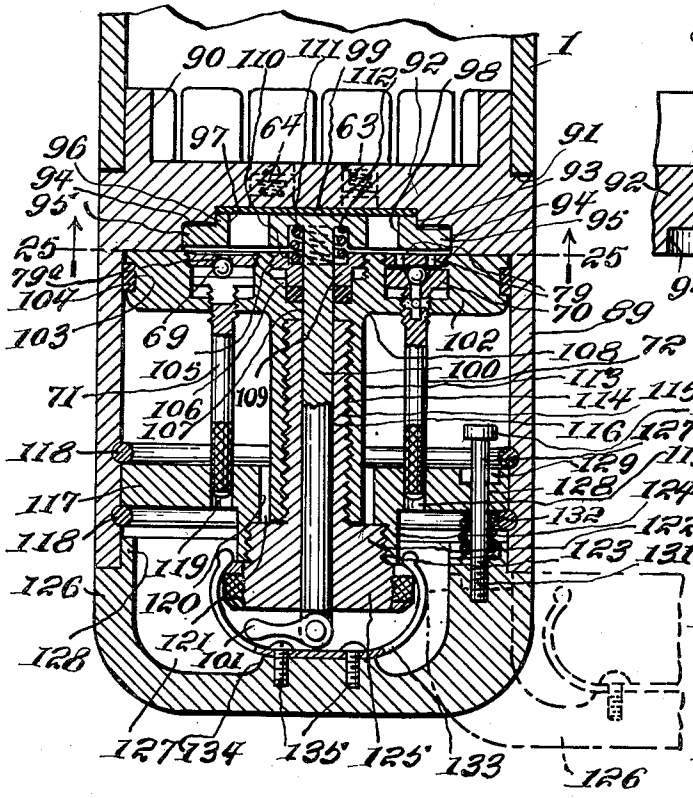


Fig. 26.

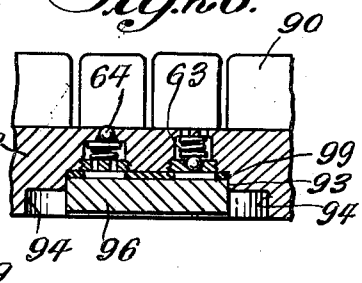


Fig. 27.

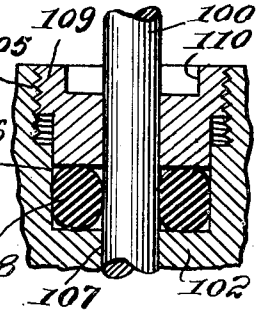


Fig. 25.

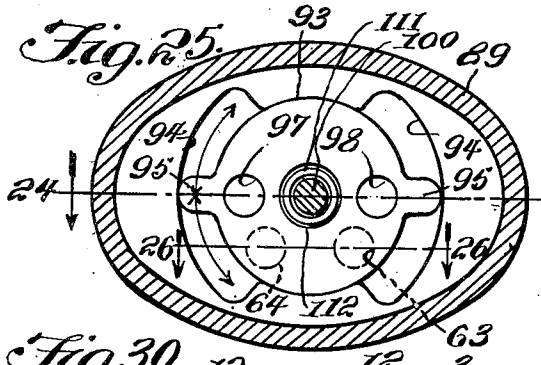


Fig. 29.

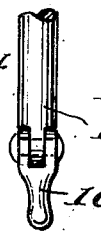


Fig. 28.

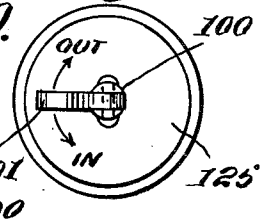


Fig. 30.

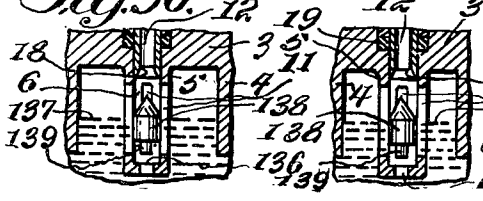


Fig. 31.


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Patented Mar. 13, 1951

2,544,857

# UNITED STATES PATENT OFFICE

2,544,857

## PRESSURE FEED FOUNTAIN BRUSH

Ludwig F. Perwas, New York, N. Y.

Application July 28, 1945, Serial No. 607,621

8 Claims. (Cl. 15—133)

1

My present invention, in its broad aspect, has to do with improvements in fountain tooth brushes, wherein the dentifrice is contained in a reservoir in the handle and pressure means are provided both for re-filling the reservoir and discharging its contents to the bristles of the brush head for use. More particularly, it is my purpose to provide improved means for (1) attaching the brush head to the handle, (2), for regulating intake and discharge of dentifrice through the brush head, and preventing leakage of dentifrice through the brush head when the device is not in use, (3), for increasing and decreasing air pressure in the dentifrice receptacle for discharging dentifrice from the receptacle, and refilling the receptacle, such means including a piston device in an air pressure compartment and a plurality of cooperating valves for regulating the operation of the device and controlling the flow of air, and (4), improving the means for retaining the brush head cap in place.

Other and equally important objects and advantages of my invention will be apparent from the following description and drawings, and it is pointed out that changes in form, size, shape, materials and construction and arrangement of parts is within the purview of my broad inventive concept and the scope of the appended claims.

In the drawings wherein I have shown preferred forms of my invention:

Figure 1 is a longitudinal section partly fragmentary, and taken through its greatest width;

Figure 2 is a longitudinal section partly fragmentary, with the device turned 90° from Figure 1, and through its lesser width;

Figure 3 is a detail side view showing the nut for attaching the brush head and showing the attaching means for the cap;

Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a section on the line 5—5 of Figure 1;

Figure 6 is a section on the line 6—6 of Figure 1;

Figure 7 is a section on the line 7—7 of Figure 1, showing the neutral position with valves shut off;

Figure 8 is a section on the line 8—8 of Figure 1, showing the neutral position with the valves shut off;

Figure 9 is a sectional detail of the piston and valves in position to pump air into the dentifrice receptacle;

Figure 10 is a section on the line 10—10 of Figure 9, with the piston cylinder turned to pump air in;

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Figure 11 is a fragmentary top plan view of the air pressure chamber with the ports set to pump air into the dentifrice receptacle;

Figure 12 is a section through the air pressure compartment showing the piston and valves in position to pump air into the dentifrice receptacle for discharge;

Figure 13 is a section through the air pressure compartment showing the piston and valves in position to pump air out of the dentifrice receptacle and into the air pressure chamber to refill the dentifrice receptacle;

Figure 14 is a transverse section showing the piston cylinder turned and the valves set to pump air out of the air pressure chamber;

Figure 15 is a fragmentary top plan view of the air pressure chamber showing the ports set to pump air out;

Figure 16 is a view of the valve seat of the valve for pumping air out of the air pressure chamber;

Figure 17 is a view of the valve seat of the valve for pumping air into the air pressure chamber;

Figure 18 is a fragmentary longitudinal section showing a modified form of piston and air valve structure;

Figure 19 is a section on the line 19—19 of Figure 18;

Figure 20 is a section on the line 20—20 of Figure 18;

Figure 21 is a top plan view of the piston operating nut showing the spring pressed valves;

Figure 22 is a detail of one of the attaching plates for the piston cylinder;

Figure 23 is a fragmentary view of the knurled surfaces showing that all edges and crevices are rounded to prevent injury to the mouth upon contact therewith.

Figure 24 is a sectional view on the line 24—24 of Figure 25 showing another modified form of the invention;

Figure 25 is a sectional view on the line 25—25 of Figure 24;

Figure 26 is a sectional view on the line 26—26 of Figure 25;

Figure 27 is an enlarged detail view of the packing gland;

Figure 28 is a bottom view of the piston and control therefor;

Figure 29 is an enlarged view of the piston control in operative position;

Figure 30 is a fragmentary front view of a modified valve strcture, and

Figure 31 is a fragmentary side view of the same.

In the drawings, wherein like characters of reference are used to designate like or similar parts throughout the several views:

The numeral 1 designates a hollow, elliptical body, which functions on the handle of my device, and which may be formed of plastic, and to which is attached by a plastic weld 2 a conical head 3. The head 3 is annularly flanged as at 4 at its base, and a centrally located boss 5 is provided on the base of the head which is formed with a bore 6 to receive the spring 7 and head 8 of a valve 9, having a star shaped stem 10. The inner end of the wall of the boss is provided with opposed radial passages 11 that lead laterally through the boss to communicate with the passage 12. The passage 12 is formed with a square enlargement as at 14 to receive the square straight part of the shank 15 of the brush head—see Figure 5—which is formed with a bore 16 and a reduced tip 17 fitting in the passage 12 and beveled to provide a valve seat 18 for the valve 9 which normally engages the seat 18 under pressure of spring 7 to close the bore 16. Packing 19 is provided. The passage 12 is again enlarged as at 20 and threaded to receive a knurled nut 21 which has a conical depression 22 in its base to receive the split clamping member 23—see Figures 1 and 4, which has flanged parts 24 engaging in a groove 25 in the brush head shank 15. The member 23 engages a washer 26 which presses on the packing 27. The brush head shank is curved at 28 and leads into the head 29, has bristle tufts 30, and the bore 16 is continued into the head and communicates with a series of ports 31 in the head between the tufts. A cap 32 having a plurality of openings 33 is designed to cover and protect the brush, and fits down over the head 3.

To detachably hold the cap 32 on the head 3, I provide on the head latch means including a pair of countersunk opposed plates 33*a* held in place by screws 34. Each plate has a beveled opening to receive a conical ball headed latch 35. Each latch is pressed by a spring 36 in a cavity 37 in the head 3 back of each plate. The latches 25 engage in depressions 38 in the cap to removably hold the cap in place.

The opposite end of the body 1 is formed with an inwardly extending hollow casing 39 having side walls 40 and an inner end wall 41 and connected with the body by a web 42. The web 42 has an end channel to receive a cap 43 which is removably held in place by conical ball headed latches 44 pressed by springs 45 and retained by threaded countersunk nuts 46 having conical openings 47 to seat the latches so that they detachably engage in depressions in the cap to removably hold the cap in place. The web 42 is formed with arcuate opposed recesses 48 to receive the opposed ears 49 of a cylinder 50, mounted in the casing 39 for limited rotational movement. Substantially arcuate plates 51 are attached to the web by screws 52 over the recesses 48 and ears 49 to hold the cylinder in place, and springs 53 are provided in the ears and bearing against the plates to give a proper fit, forces the gasket 65 secured to the head of the cylinder 50 against the inner wall 41. The outer end of the cylinder has a removable head 54 retained in position by a nut 54' which is formed with wrench openings 55, and a central threaded opening 56 to each side of which are opposed smaller openings 57.

Mounted on the cylinder 50 is a piston 58 provided with a sectional rod formed with an exteriorly threaded part 59 and an interiorly threaded part 60 received thereon so that the rod may be extended or reduced in length. A knurled nut 61 is provided on part 60 which has a threaded reduced boss 62 engaging in the opening 56 in the head 54 so that by engaging the nut with the head the piston is held in its innermost position as shown in Figure 1, but by detaching the nut, the piston may be pulled out as shown in Figure 9.

As shown in Figures 12 and 13, the end 41 of the casing 39 is provided with a pair of spring seated ball valves 63 and 64. These valves are opposed, valve 63 being an intake valve for air into the interior of the body 1, and valve 64 being an outlet valve for air from the body 1. A gasket 65 is mounted on the head of the cylinder 50 beneath the valves. The rotatable cylinder 50 and gasket 65 have ports 66 and 67 adapted to selectively register with valves 64 and 63 and to lie between the valves—as in the neutral position of Figures 7 and 8—to close both valves. The cylinder 50 is rotated in one direction to open valve 63—as shown in Figures 13, 14 and 15—to release air from the body 1, and in the opposite direction to open valve 64 to allow air to enter the body 1—as shown in Figures 10, 11 and 12. The cylinder is rotated by grasping the protruding end 68 with the fingers.

The piston 58 has two ball valves 69 and 70, which are opposed. Valve 69 complements valve 64 and permits air to pass through the piston head toward the piston rod, and valve 70 complements valve 63 and permits air to pass through the piston from the side having the rod to the opposite side. Closure stems 71 and 72 are provided—one for valve 69 and the other for valve 70. The stem 71 for valve 69—see Figure 17—has a slot 73 and flange 74, and the stem 72 for valve 70—see Figure 16—has a cup-shaped, or outwardly flared recess 75 and a flange 76. Each stem is threaded at 77 to engage in threaded openings in the piston 58 and is knurled as at 78. The valve 70 has double ports 79 and valve 69 one port 79*a*.

While it is believed that the operation and advantages of my invention are apparent from the foregoing, it is pointed out that the receptacle or chamber 80 in the body 1 holds the dentifrice (not shown) which is dispensed to the brush bristles through the bore 16. The cylinder has an air pressure compartment 81 above the piston. To fill my chamber 80 with dentifrice, the nut 61 unscrewed and pulled out as in Figures 9, 12 and 13, the cylinder 50 first having been turned from the neutral position shown in Figures 7 and 8, to the position shown in Figures 10 and 13 so that valve 64 is open through port 66. The piston is now drawn out and the air in chamber 80 withdrawn to chamber 81 and the dentifrice sucked up into chamber 80 through bore 16 and channels 11, the valve 9 having been unseated by pressure on head 8 and against spring 7. The piston 58 is now returned to its passive position as shown in Figure 1, stem 72 having been turned to open valve 74 and the cylinder having been returned to the neutral position of Figures 7 and 8. To dispense the dentifrice, air pressure is built up in chamber 80 by turning the cylinder, and stems 71 and 72 to expel air from chamber 81 into chamber 80 and the valves are placed in the positions shown in Figures 9, 12 and 14, the piston having first been retracted by opening valve 70 by turning stem 72 and leaving the cylinder in neutral position. As

much or as little dentifrice may be expelled as desired, and after use, the piston is each time returned to normal.

In Figures 18, 19, 20 and 21, a modified form is shown in which the piston 58 has a single air channel 82 leading through the sections 59a and 60a of the rod, and a ball valve 83 mounted on a plate spring 84 is provided to open and close the channel 82. The outer end of the channel has a seat 85 and the spring is bent up as at 86 to form a finger-nail grip to swing the valve spring on the attaching screw 87. Opposed air slot 88 and key way 88' are provided on each side of the rod section 59. The operation and construction of the form of my device is simplified through elimination of valves 69 and 70, stems 71 and 72. Otherwise, the pumping operation is the same as previously indicated with the principal embodiment. The key way 88' locking the piston and sleeve in order that the stem may be extended and the head 54 is retained in position by a snap ring 54a.

In Figures 24, 25, 26, 27, 28 and 29 a modified form is shown in which the pump unit housing 89 is attached to the hollow-elliptical body 1 by a plastic weld or similar means. To facilitate assemblying the body 1 and housing 89, the housing is provided with a slotted upstanding circular ring portion 90 formed on the end wall 92 of the housing 89 which being of a smaller diameter than the body 1 is adapted to be inserted in the open end thereof and the edge thereof contacts a shoulder 91 on the housing 89. It is at this point of assembly that the plastic weld is made resulting in an integral unitary structure.

The end wall 92 of the casing 89 is provided with a circular recess 93 having extremely from opposite edges thereof arcuate recesses 94 of the circular control unit 96 which is received in the recess 93 for limited rotational movement therein.

The control unit 96 is provided with an air passage 97 for the inward flow of air and a passage 98 for an outward flow of air and these passages are aligned in operative positions with the valves 64 and 63 respectively by the ears 95 and the control unit 96 has a circular rubber, cork or other resilient material gasket 99 cemented thereto to form an air tight fit between the unit 96 and the end wall 92 of the housing 89.

The control unit 96 is provided with a depending rod 100 having a pivoted handle 101 on the free end thereof and the air passages are moved into and out of alignment by rotation of the rod 100 by means of the handle 101.

Mounted for reciprocal movement within the housing 89 and on the rod 100 is a piston 102. The piston is provided with an annular peripheral recess 103 for the reception of packing 104 to make an air-tight fitting therebetween.

At the medial point of the piston 102, there is provided a circular internally threaded recess 105 and a smaller smooth walled recess 106 having an opening 107 therein to conform to the rod 100. A packing ring 108 having contact on the inner side thereof with the rod 100 is positioned in the recess 106 and is retained in position by a gland nut 109 which is threadedly received in the recess 105. The upper surface of the nut 109 is provided with a circular recess 110 to receive one end of a compression spring 111, the other end of which is received in a circular recess 112 in the under surface of the control unit 96. This compression spring 111 forces the unit 96 into an air-tight contact within the recess 93 of the end wall 92.

The piston 102 is provided with a depending circular portion 113 at the medial point of its under surface and the portion 113 is provided with an internally threaded bore 114 to receive the complementary threaded piston rod 115 having a bore 116 for reception of the rod 100.

The piston 102 has two ball valves 69 and 70 which are opposed. Valve 69 complements valve 64 and opening 97 in the control 96 and permits air to pass therethrough when in operative position, and valve 70 complements valve 63 and opening 98 in the control 96 and permits air to pass therethrough when in operative position.

Closure stems 71 and 72 are provided one for valve 69 and the other for valve 70. The stems 71 and 72 being constructed as shown in Figures 16 and 17 respectively and the valve 70 has double ports 79 and valve 69 one port 79a.

The lower end of the housing 89 is provided with a guide and anchorage plate 117 which is retained in position by means of split wire retaining rings 118. The plate 117 is provided with vertical openings 119 to slidably receive the stems 71 and 72, and an opening 120 having a plurality of air-slots 121 inwardly thereof which are adapted to slidably receive the portion 113 of the piston 102.

The rod 115 has an externally threaded reduced boss 122 engaging in the recess 123 which is formed in the depending internally threaded circular portion 124 of the plate 117. A knurled knob 125 of larger circumference than the boss 122 is provided on the end of the rod 115 so that by manipulating the knob 125 the piston 102 is held in its innermost position or the piston may be pulled out as previously described.

The housing 89 is provided with a cover 126 having the cavity 127 formed therein and an upwardly extending reduced portion 128 on the periphery of the cavity 127 which is adapted for insertion into the housing 89.

The cover 126 is pivotally hinged to the casing 89 by a hinge pivot pin 127 which is positioned in plate 117 in the opening 128, the upper edge of which is recessed at 129 to receive the head 130 of the pin 126. The lower end of the pin 127 is threaded for reception in the threaded bore 131 of the cover 126, a spring 132 positioned on the pin 127 contacts the under surface of the plate 117 and the upper edge of the cover 126 and thus forces the cover 126 downwardly into position to permit it being pivoted past the lower edge of the housing 89 for the manipulation of the piston rod 115.

A spring clip 133 secured to a circular boss 134 in the cover 126 by screws 135 grasps the knob 125 and retains the cover 126 in closed position by pulling the cover 126 downward, the clip 133 releases the knob 125 and the cover can be swung clear of the housing as described.

The housing 89 functions as both a supply chamber and a piston chamber controlled by operation of the unit 96 to permit air to enter or leave as the piston 102 is reciprocated.

The operation of the modified form is the same as previously described for the forms shown in Figures 1 to 22 inclusive.

In Figures 30 and 31, the head 3, flange 4, boss 5 having the cavity 6 are the same as shown in Figure 1, but in this instance, the boss 5 is provided with an opening 136 in the bottom thereof which permits the dentifrice 137 to enter and act on the tapered cylindrical float valve 138. The

end of the valve 138 will therefore engage the valve seat 18 when the dentifrice expands due to climatic conditions and prevent the loss of the dentifrice. The valve 138 is provided on the lower end with a stem 139 which is received in the opening 136 of the boss 5. The boss 5 is provided with opposed radial passages 11 led laterally through the boss 5 to communicate with the passage 12 when the valve 138 is seated in the opening 136. Packing 19 is also used in this structure as shown in Figure 1. Therefore, the float valve 138 has been substituted in Figures 30 and 31 for the spring pressed valve 7 as shown in Figure 1, otherwise the operation of the device is the same.

As shown in Figure 25, the piston 102 is similar in contour to the inner wall of the chamber or housing 89. These parts may vary in form from a rectangle with radius corners to an ellipse. A piston and chamber of any of these forms permits a comparatively great amount of air to be forced into the dentifrice supply chamber, whereby to speed up the application of the dentifrice to the bristles of the brush.

Having described my invention, its objects, construction, advantages and operation in detail, it is again emphasized that interpretation of its scope should only be conclusive when made in the light of the subjoined claims.

I claim:

1. A fountain tooth brush dispensing means, comprising a hollow elongated body part forming a reservoir for dentifrice, a casing in the dentifrice reservoir having an inlet valve and an outlet valve, a rotatable air pressure cylinder in the casing having ports selectively registering with the valves in the casing when the cylinder is turned, a piston in the cylinder for forcing air into the dentifrice reservoir or withdrawing air from said reservoir, manually controlled intake and outlet valves in the piston, and a pressure operated valve in the reservoir and normally closing a dispensing conduit to the body part when there is no pressure in the reservoir.

2. The invention as defined in claim 1, wherein the valves in the casing are opposed pressed ball check valves, one being an inlet valve and the other an outlet valve, and wherein the piston has opposed spring pressed ball check valves, one being an inlet valve and the other an outlet valve, and adjustable valve rods engaging said latter valves to manually close or open the same.

3. The invention as defined in claim 1 wherein the piston has a sectional piston rod, one section being threaded on the other section, a nut on the rod, a threaded extension on the nut engaging the cylinder to attach removably the nut thereon, and means for limiting the rotary movement of the cylinder.

4. The invention as defined in claim 1 wherein the body is substantially elliptical in cross section, and wherein the piston valves have manually operable valve control rods, a sectional extensible rod on the piston, and the valve rods being parallel with the piston rod and movable with the piston to position a part thereof without the cylinder to be grasped for manual operation.

5. A fountain tooth brush dispensing means, comprising a hollow body to contain dentifrice and a brush head on the end of the body and having a channel within the head providing communicating means between the hollow body and a remote portion oft he head, a spring seated pressure operated valve in the body controlling passage of dentifrice to the channel of the head, a removable cap on the other end of the body a centrally disposed tubular casing carried by the body and extended inwardly from the end thereof opposite to the end on which the brush head is carried, an air pressure cylinder rotatably mounted in the said tubular casing in the body, a piston in the cylinder, and a plurality of valves, one set of which is carried by the casing, and another set carried by the piston, said cylinder formed with ports selectively registering with the first set of valves when the cylinder is turned.



6. In a fountain tooth brush dispensing means, comprising a hollow body to contain dentifrice, a tapered cylindrical pressure operated float valve in the body controlling passage of dentifrice to a dispensing channel, a removable cap on the end of the body opposite to that in which the channel is positioned, a rotatable control unit in said body, means for rotating said unit extended therefrom, a piston mounted in said unit, a casing carried by the body for mounting said unit, and a plurality of valves, one set of which is carried by the casing and another set by the piston, and a plate in said casing formed with ports selectively registering with first mentioned valves when the control unit is rotated.

7. In a fountain tooth brush, the combination which comprises an elongated substantially hollow tubular handle, a brush head having an offset shank carried by one end of the handle, said shank of the brush head having a passage therethrough providing communicating means between the interior of the handle and the brush head, a cap removably mounted on the end of the handle and positioned to cover the brush head, a flow control valve in the end of the handle for controlling the amount of a dentifrice passing through the said shank to the brush head, a longitudinally disposed cylindrical casing carried by the opposite end of the handle and extended inwardly therein, a cylinder rotatably mounted in said cylindrical casing, a piston mounted to reciprocate in said cylinder, said piston having a stem extended from the end of the cylinder, a head including a disc with a knurled peripheral surface carried by the end of the stem, a cap removably mounted on the end of the handle covering the said finger gripping head of the stem of the piston, valves mounted in the inner end of the cylindrical casing, valves in the piston, said cylinder having an opening in the end thereof positioned to register with the valves in the inner end of the cylindrical casing alternately, and means adjusting the valves in the piston.

8. In a fountain tooth brush, the combination which comprises an elongated substantially hollow tubular handle oval shape in cross section, a brush head having an offset shank carried by the inner end of the handle, said shank of the brush head having a passage therethrough providing communicating means between the interior of the handle and the brush head, a cap removably mounted on the inner end of the handle and positioned to cover the brush head, a flow control valve in the inner end of the handle for controlling the amount of a dentifrice passing through the said shank to the brush head, the casing extended into the said hollow tubular handle from the outer end thereof and having an inlet valve and an outlet valve

in the inner end thereof, a rotatable air pressure cylinder in the casing having ports selectively registering with the valves in the casing upon rotation of the cylinder, a piston in the cylinder for forcing air into the interior of the said hollow tubular handle and also for withdrawing air from said handle, manually controlled intake and outlet valves in the piston thereby providing pumping means in the opposite or outer end of the handle for pumping dentifrice from the handle to the brush head and for drawing a dentifrice through the brush head to the handle.

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## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 829,449 | Whaley et al. | Aug. 28, 1906 |
| 1,235,351 | McLaughlin | July 31, 1917 |
| 1,299,487 | Loeben | Apr. 8, 1919 |
| 1,466,896 | Frame | Sept. 4, 1923 |
| 1,945,023 | Cleveland et al. | Jan. 30, 1934 |
| 2,107,242 | Gates | Feb. 1, 1938 |
| 2,405,681 | Woock | Aug. 13, 1946 |