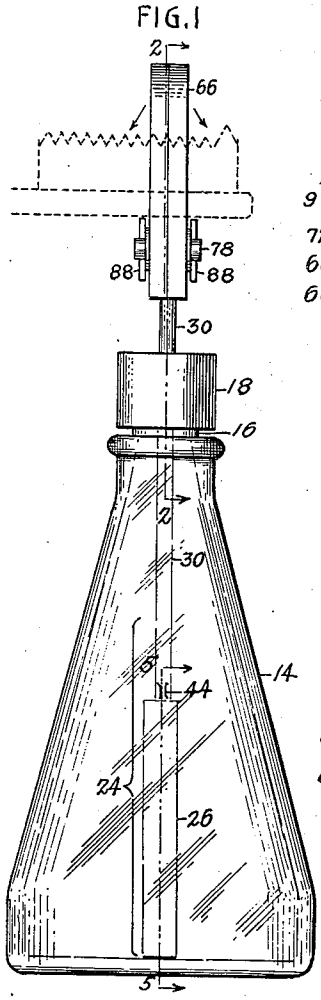
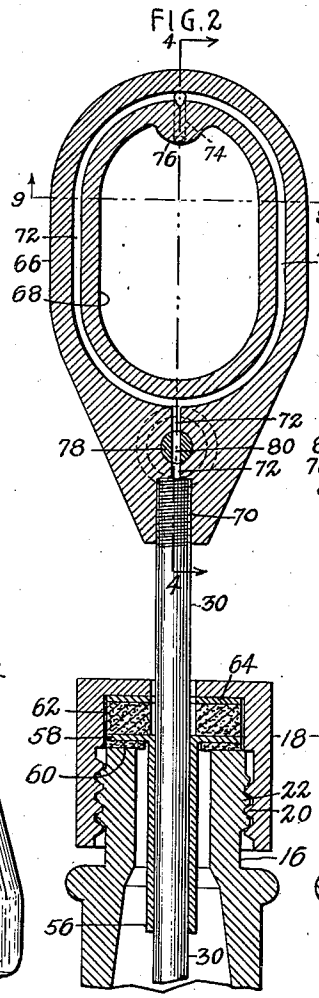
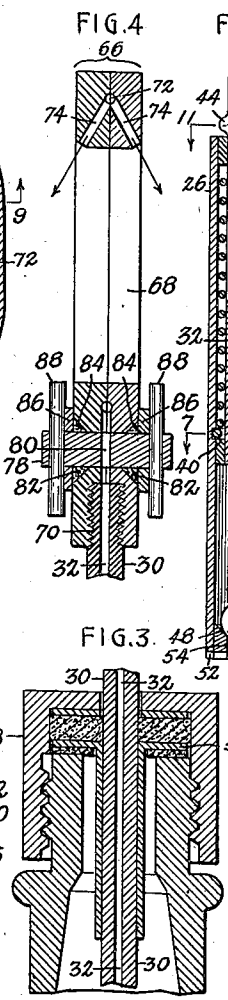
May 19, 1942. C. COOPER ET AL 2,283,414

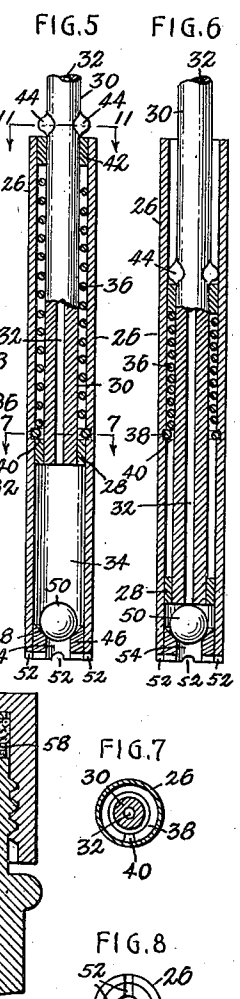
LIQUID DISPENSING DEVICE

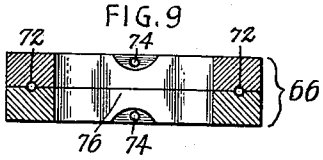
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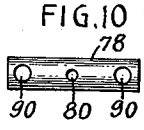




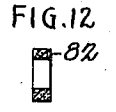












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ATT'YS

Patented May 19, 1942

2,283,414

UNITED STATES PATENT OFFICE

2,283,414

LIQUID DISPENSING DEVICE

Claude Cooper, Watertown, and Charles W. Sherman, Boston, Mass.; said Sherman assignor to said Cooper

Application January 3, 1940, Serial No. 312,210

4 Claims. (Cl. 221—85)

This invention relates to a liquid storage and dispensing device for use in applying a liquid dentifrice to a tooth brush. The device comprises a reservoir such as a bottle with an opening at the top, a pump within the reservoir, and a pump actuator provided with a passage for the liquid extending upwardly from the reservoir and having one or more downwardly-directed orifices for the discharge of liquid upon a tooth-brush which operates the actuator to cause the expulsion of the liquid. The invention will be best understood by reference to the following description when taken in connection with the accompanying drawing of one specific embodiment thereof, while its scope will be pointed out more particularly in the appended claims.

In the drawing:

Fig. 1 is an elevation of a liquid storage and dispensing device;

Fig. 2 is a sectional view on an enlarged scale on line 2—2 of Fig. 1;

Fig. 3 shows a portion of Fig. 2 with some parts in another position;

Fig. 4 is a sectional view on line 4—4 of Fig. 2;

Fig. 5 is a sectional view on an enlarged scale on line 5—5 of Fig. 1;

Fig. 6 is a view similar to Fig. 5 but with some parts in another position;

Fig. 7 is a sectional view on an enlarged scale on line 7—7 of Fig. 5;

Fig. 8 is a bottom plan view of the parts shown in Figs. 5 and 6;

Fig. 9 is a sectional view on line 9—9 of Fig. 2;

Fig. 10 is a plan of a shut-off valve;

Fig. 11 is a sectional view on line 11—11 of Fig. 5; and

Fig. 12 is a sectional view of a packing washer.

Referring to the drawing and to the embodiment of the invention illustrated therein by way of example, there is shown a liquid storage and dispensing device comprising an appropriate reservoir such as a bottle 14 to contain a supply of liquid, such as a dentifrice to be dispensed. The bottle has a neck 16 to which an appropriate cap 18 is suitably secured as by providing the cap with an internal screw-thread 20 cooperating with an external thread 22 on the bottle neck. The cap affords a support for a novel dispensing arrangement including a pump such as that now to be described.

The pump 24, best shown in Figs. 5 and 6, comprises a vertical cylinder 26 within which a piston 28 is arranged to reciprocate vertically and has a piston-rod 30 provided with a lengthwise outlet passage 32 from a chamber 34 beneath the piston. The lower end of the cylinder rests upon the bottom of the bottle and is maintained in engagement therewith by a spring 36 which also urges the piston upwardly. The lower end of the spring rests against a fixed abutment such as a split ring 38 received in an annular groove 40 in the cylinder 26. This abutment serves also to limit upward movement of the piston under the influence of the spring. The upper end of the spring rests against a movable abutment such as a ring 42 surrounding and carried by the piston-rod 30. The upward thrust of the spring maintains this ring against one or more, herein two projections 44 conveniently formed on the piston-rod 30.

The lower end of the cylinder 26 has a fixed head 46 presenting a seat 48 for a non-return valve, herein a ball 50 permitting inflow of liquid from the bottle 14 to the chamber 34 by way of one or more, herein a plurality of branch inlet passages 52 in the bottom of the cylinder and a main inlet passage 54 which leads upwardly to the chamber 34. In the present example, gravity alone is relied upon to seat the ball valve 50 as the device is intended to be used in an upright position. When the piston rises under the influence of the spring, thereby creating a depression within the chamber beneath the piston, the inlet valve rises from its seat and liquid enters the chamber, filling the latter, whereupon the valve seats. Downward movement of the piston in opposition to the spring causes expulsion of liquid from the chamber upwardly through the passage in the piston rod. No non-return valve is needed or desired for the outlet, first, because the passage is of small cross-sectional area and second because it is desirable to utilize the return stroke of the piston to return toward the cylinder liquid remaining within the outlet passages.

The piston-rod is guided by a fixed sleeve 56 (see Fig. 2) suitably secured to the bottle-neck 16 as by an arrangement, now to be described, which performs other functions. The sleeve is provided with a flange 58 which rests upon a comparatively soft packing washer 60 which in turn rests upon the top of the bottle-neck. This prevents leakage from the bottle. Above the flange, a rather thick, compressible washer 62 surrounds the piston, and above this washer is a hard washer 64. The washer 60 may be made of semi-hard rubber, the washer 62 of soft rubber, and the washer 64 of metal. The openings in these washers are such as to afford ample clearance for freedom of movement of the piston-rod when the device is to

be operated. However, movement of the piston-rod can be prevented by screwing the cap downwardly thereby squeezing the washer **62** (see Fig. 3) and causing the latter to grip the piston-rod.

The tooth-brush (illustrated in dotted lines in Fig. 1) is utilized to cause expulsion of liquid onto the brush by an actuating arrangement such as that now to be described. In the example shown, the brush is placed, bristles upward, upon a suitable upwardly-presented abutment carried by the piston-rod, and the brush is beneath one or more downwardly-directed orifices for the discharge of the liquid upon the bristles. One convenient construction comprises an actuator **66** having an opening **68** to receive the brush. The actuator is suitably secured to the piston-rod **30** as by a screw-thread **70**, and the passage **32** in the piston-rod leads to a passage **72** within the actuator. In the present example, the passage is branched and extends about the opening **68** to the top of the latter where the passage has one or more, herein two outlets **74** which, in this instance, diverge so as to spread the liquid. To prevent the liquid from trickling down the sides of the openings **68**, the outlets **74** are formed in a nozzle **76** (see Fig. 2). The pump piston displacement and the passages to the outlets are so calculated as to cubic capacity that on the one hand the downward thrust of the piston displaces enough liquid to supply the brush, and on the other hand, the return stroke of the piston withdraws unused liquid a considerable distance from the outlets.

If desired, an appropriate shut-off valve may be provided to insure that there shall be no possible leakage from the outlet passages during transportation. In the example shown, this shut-off valve takes the form of a rotatable plug **78** having a passage **80** which (see Fig. 2) normally registers with the passage **72** but may be turned to shut off the latter. Leakage from about the valve is conveniently prevented as by two compressible packing rings **82** each of which appears, for example, as shown in Fig. 12 before being installed in countersunk seats **84** in which they are held under compression as by washers **86** held in place by pins **88** which (see Fig. 10) are received in holes **90** in the valve. Either pin may serve as a handle to turn the valve.

As shown, the actuator is made in two duplicate parts with the passage **72** formed partly in each, and these parts are suitably secured together as by cement. The parts may be molded of appropriate material such as one of the numerous plastics or synthetic resins so commonly used nowadays.

Having thus described one embodiment of the invention, but without limiting ourselves thereto, what we claim, and desire by Letters Patent to secure is:

1. In a device for dispensing liquid from a reservoir onto a tooth brush, the combination of a liquid outlet and an abutment arranged one above the other in vertical alignment so that liquid may be discharged from the outlet onto the ends of the bristles when the back of the brush rests upon the abutment, and means operated by vertical movement of said abutment under the influence of the back of the brush to cause liquid to be released at said outlet.

2. In a device for dispensing liquid from a reservoir onto a tooth brush, the combination of a member having an opening presenting at the top a liquid outlet and at the bottom an abutment arranged one above the other in vertical alignment so that liquid may be discharged from said outlet downwardly upon the upper ends of upwardly directed bristles when the back of the brush rests on the top of said abutment, and means operated by downward pressure of the back of the brush to cause the discharge of liquid from said outlet onto upper ends of the bristles.

3. In a device for dispensing liquid from a reservoir onto a tooth brush having its bristles directed upwardly, the combination of an upwardly facing abutment upon which the back of the brush may be placed to enable a downward thrust to be exerted thereon by the brush, a conduit having a downwardly-directed outlet above said upwardly facing abutment and so spaced laterally as to cause the outflowing liquid to fall on the bristles of the brush, and means operated by downward movement of said abutment to cause liquid to be released at said outlet.

4. In a device for dispensing liquid from a reservoir onto the bristles of a tooth brush, the combination of a head member including an abutment and a conduit having an outlet, said abutment and said outlet being spaced from and aligned with each other, and separated from each other by a space to receive a brush with its back on said abutment and its bristles toward said outlet, said conduit having a portion laterally offset from said outlet and said abutment, and means to utilize pressure of the brush on said abutment to cause liquid to flow through said conduit to said outlet to be discharged onto the bristles of the brush.

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CHARLES W. SHERMAN.

CERTIFICATE OF CORRECTION.

Patent No. 2,283,414. May 19, 1942.

CLAUDE COOPER, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 6, claim 1, after "of" insert --a conduit having--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of June, A. D. 1942.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)