

Aug. 31, 1943.

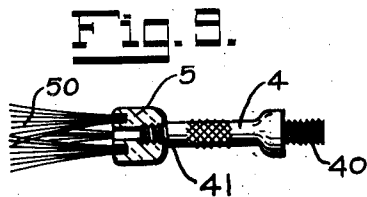
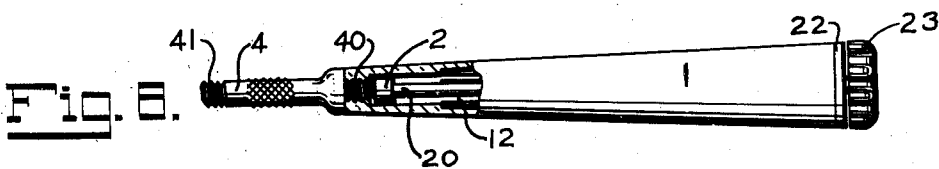
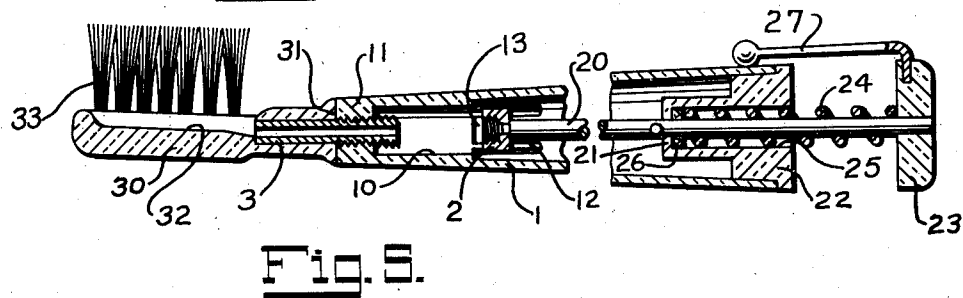
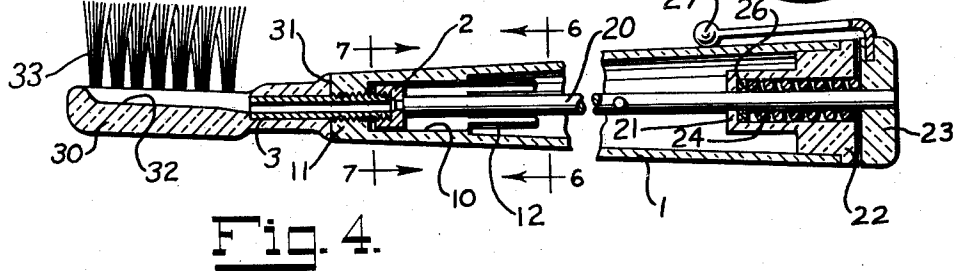
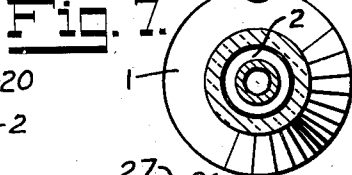
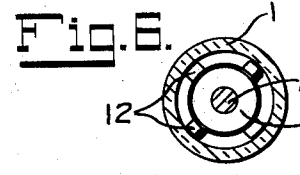
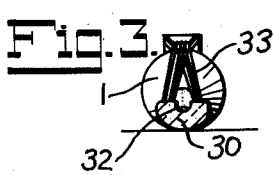
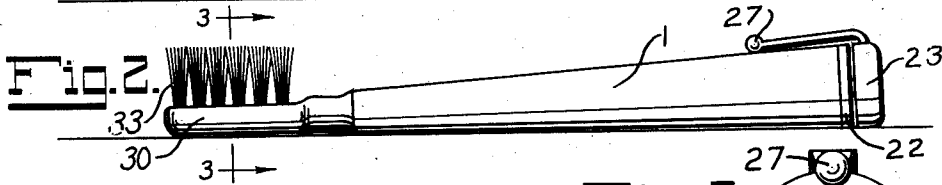
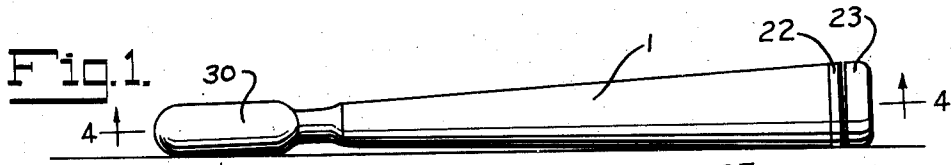
J. H. BAIR

2,328,048

FOUNTAIN IMPLEMENT

Filed June 17, 1941

2 Sheets-Sheet 1



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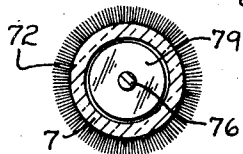
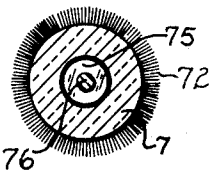
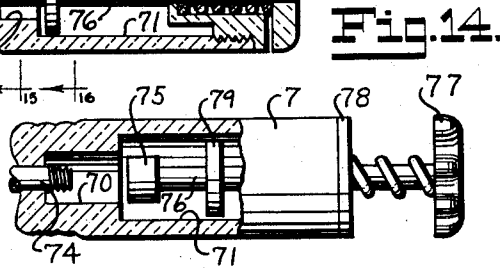
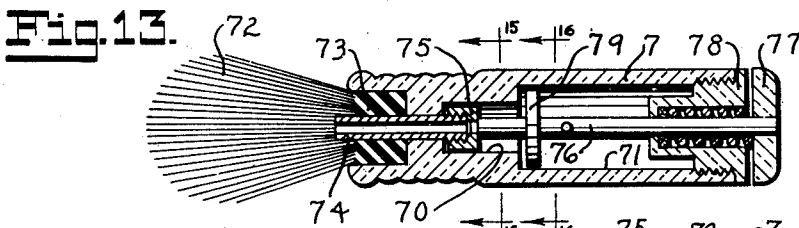
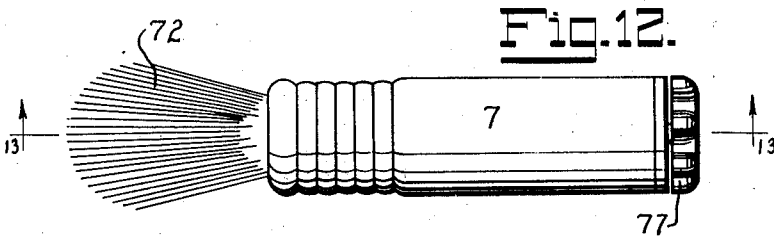
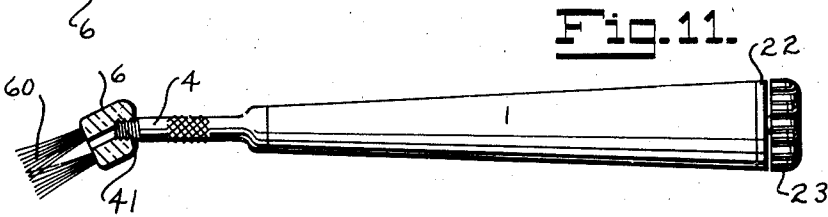
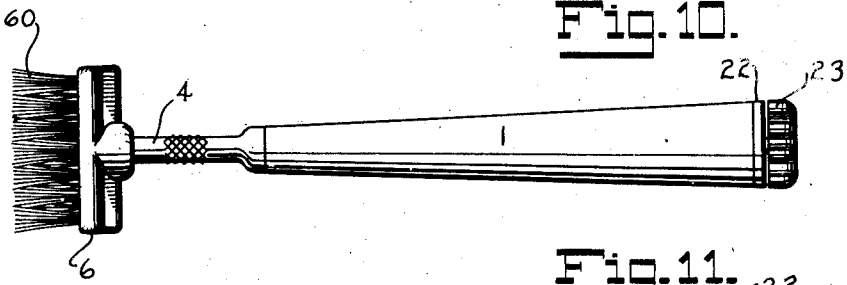
J. H. BAIR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,328,048

FOUNTAIN IMPLEMENT

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Application June 17, 1941, Serial No. 398,370

5 Claims. (Cl. 15—137)

My invention relates to brushes and similar devices of the fountain type in which detergents, oil, or other treating liquid is stored in the handle and is dispensed as needed, and in the quantity desired, to the working end of the instrument. The construction employed in my dispensing mechanism is adaptable to implements for various purposes, such as for a toothbrush, a shaving brush, a paint or lettering brush, an oil dispenser, or a cleaning brush suitable for use in cleaning business machines, computing machines and the like.

Liquid dentifrices have become increasingly popular, and range from freely flowing liquids to viscous liquids which flow very sluggishly. When liquid dentifrices are poured out of their containers onto the bristles of a toothbrush, a considerable amount of the liquid ordinarily is wasted by flowing through the bristles and off the sides of the brush. If a small enough amount of liquid dentifrice is placed on the brush to avoid such wastage, the bristles will not be uniformly saturated, and some of them will not even be dampened. Economy of use of liquid dentifrice dictates the employment of a fountain type of brush, but these have not been popular because of the presence of defects in the construction or operation of such toothbrushes. For the most part they have been ungainly in appearance and awkward to handle, or contained such a small amount of liquid that frequent filling was necessary. The construction employed for controlling the flow of liquid from the handle to the head was such that either leakage of liquid from one or both ends of the reservoir occurred when delivery was not desired, or it was difficult to dispense the liquid from the handle to the head at will.

The fountain mechanism which I have devised has overcome these defects and deficiencies. In general, the mechanism which I employ for implements such as toothbrushes includes a frustoconical handle tapered from a relatively large diameter at its butt end to a small diameter at the end connected to the head. This construction provides maximum storage space besides being of pleasing "streamlined" shape, but such tapered form is not necessary and in some instruments is not preferred. A positive dispensing action is produced by the provision of a loosely fitting plunger or piston adapted for reciprocation within the handle. In unlocked position a spring urged the plunger away from the discharge tube communicating with the head, but it may be moved toward the tube in opposition to

the spring by pressure upon a button at the butt end of the handle secured upon a rod fixed to the plunger, to force liquid out of the handle to the head. When sufficient liquid has thus been dispensed, the piston may be threadedly engaged with the discharge tube to serve as a sealing cap. Further flow of liquid from the handle to the head is thus positively prevented.

In order to utilize most effectively the liquid supplied to the toothbrush head a sump is provided which extends lengthwise between rows of bristles located along each side of the head. Furthermore these bristles are preferably inclined toward each other, so that their outer ends are interwoven to form an arch over the sump. The dentifrice, in the sump when the brush is held with the bristles projecting upward, will flow along them to their outer ends when the brush is inverted in brushing the teeth. Moreover, the brush may be laid down after the sump has been filled with dentifrice without risk of its being spilled by the brush tipping over, because the back of the head is rounded and disposed in continuation of an element of the frustoconical handle. Even if the brush is tilted when laid down, as soon as freed it will roll into position with the bristles upright and thereafter will remain in that attitude.

Because of the positive ejection of liquid from the brush handle, and the sealing of the passage to the brush head at other times, the same handle and dispensing mechanism is well suited for use as the handle of a cleaning brush or oiler. In fact, the cleaning brush head may be removable to convert the instrument into an oiler, or different types of brush heads may be provided for interchangeable use on the same handle.

Mechanism of the same general type is also suitable for incorporation in a fountain shaving brush. The handle described above would not ordinarily be used in such instance, however, for shaving brush handles are conventionally much shorter and larger in diameter. Equal, or even greater, storage capacity can therefore be obtained in a handle of this type without increasing its length or diameter sufficiently to be awkward. Other large brushes of the fountain type may be similarly constructed. The dispensing mechanism and its operation will closely resemble that used in the tapered handle. It is preferable, however, that there be an abrupt change in diameter between the main reservoir portion and a bore adjacent to the discharge tube. To facilitate delivery from such a reservoir a supplemental piston or plunger, loosely

fitting within the larger bore portion, may be provided to feed the liquid soap or other stored liquid into the small bore and around the smaller piston for flow through the discharge tube.

It will be evident that my dispensing mechanism enables liquid, even of high viscosity, to be discharged positively from a reservoir of large capacity by a simple manipulation, and the user at all times may control accurately both the amount and rate of liquid dispensed. Between dispensing operations the reservoir is sealed positively to prevent leakage. The mechanism required, however, is inexpensive to manufacture, including few parts of simple design. The handle is preferably made of suitable plastic material.

It is not essential that the brush or dispensing head be separable from the handle, but this is preferable in most cases. The reservoir may then be filled at the factory and the handle sold as a liquid container. The purchaser need merely remove the brush or dispensing head from an empty handle and apply it to the filled one. Such merchandising plan is feasible because of the economical construction of the handle and dispensing mechanism, together with the relatively large capacity of the reservoir. The user need not bother with refilling, thus saving time and avoiding the possibility of wastefully spilling liquid. Commercially spilling is avoided by using a suitable machine for filling the handles. It is further intended that the reservoirs be made of transparent material so that the user may know at a glance when it has been emptied.

Representative forms of brush and dispensing heads are shown in the drawings but it will be evident that other types of heads, as mentioned previously, may be used with my fountain mechanism, having features similar to those in the constructions illustrated.

Figure 1 is a side elevation view of my toothbrush turned on its side, while Figure 2 is a side elevation of the same toothbrush lying on its back. Figure 3 is a transverse section taken on line 3-3 of Figure 2. Figure 4 is a longitudinal section on line 4-4 of Figure 1. Figure 5 is a similar longitudinal section showing parts in a different operative position. Figure 6 is a transverse section taken on line 6-6 of Figure 4, and Figure 7 is another transverse section along line 7-7 of Figure 4.

Figure 8 is a side elevation view of my reservoir handle showing an oiling spout attached, part of the handle being broken away to show the interior mechanism.

Figure 9 is a side elevation view showing one type of brush head attached to the oiling spout of Figure 8. Figure 10 is a plan view of a cleaning brush head attached to an oiling spout such as shown in Figure 8, in place upon the handle, and Figure 11 is a side elevation view of the brush shown in Figure 10, the head being in section.

Figure 12 is a side elevation view of a shaving brush incorporating my invention, and Figure 13 is a longitudinal section taken on line 13-13 of Figure 12. Figure 14 is a longitudinal section similar to Figure 13, showing parts in a different operative position. Figure 15 is a transverse section on line 15-15 of Figure 13, and Figure 16 is a transverse section along line 16-16 of Figure 13.

The operating mechanism for dispensing liquid from the handle reservoir to the applicator head in each case includes a force feed plunger

and operating mechanism therefor, which is normally urged away from the head or passage communicating therewith. In the dispensing mechanism shown in Figures 1 to 11, inclusive, the reservoir takes the form of a tapered handle 1 which is preferably made of transparent plastic material. Within a bore 10, of uniform diameter, in the smaller end of this handle loosely fits the piston or plunger 2, which is reciprocable lengthwise of such bore. Ribs 12 extend along the inner wall of the reservoir toward the larger end of the handle with their inner surfaces in continuation of the wall of bore 10. Thus these ribs serve as guides for the plunger or piston 2 as it is inserted into the handle or upon being retracted from the bore 10 to the position shown in Figure 5. Four of these ribs are shown, although three would be sufficient to provide the necessary guiding action. Passageways 13 between the ribs, and circumventing the plunger 2 when in the position of Figure 5, will be afforded from the reservoir proper to the bore 10. A volume of liquid approximately equal to that displaced by the plunger during its retracting movement will be forced through these openings into the bore ahead of the plunger.

Linear movement of the plunger 12 is insured by providing a stem 20 having one end riveted or otherwise suitably secured to the piston, and its opposite end guided in a collar 21 formed as an integral part of plug 22, which closes the larger end of the handle reservoir remote from its dispensing end. This plug is preferably made of plastic material similar to that of which the handle is constructed, but it may be made of rubber or other suitable material. The plug may be merely wedged into the handle end as a stopper, or it may be secured more positively in place by an adhesive joint, or by complementally threading the handle end and plug.

An operating button or disc 23 of a diameter substantially equal to that of the plug 22, or larger end of the handle 1, is secured to the end of rod 20. Between this button and guide collar 21 is interposed a compression spring 24 encircling rod 20, and received within a bore 25, formed centrally in the plug 22. The principal purpose of this spring is, by reacting against button 23, to force it outward from the position of Figure 4 to that of Figure 5, whereby the rod 20 and plunger 2 will be withdrawn to place channels 13 in communication with bore 10. The spring 24 serves the additional purpose, however, of holding a packing disc 26 of felt, or similar material, against the outer face of guide collar 21 to prevent seepage of liquid from the reservoir through the guide aperture, and to wipe the rod 20 free from liquid each time it is projected into the position of Figure 5. A pocket clip 27 may be attached either to button 23, to plug 22, or to handle 1 to retain the implement in a clothing pocket. Preferably the clip is attached to the button 23 so that the handle will not project appreciably beyond the pocket edge. When carried in this manner a suitable case would be provided to cover the brush head so that it will not come into contact with the clothing.

Into a threaded aperture provided in the end wall 11 can be screwed a discharge tube 3 embedded in the toothbrush head 30, which head also may be of plastic material. The portion of the brush head encircling the tube forms a flange to abut the end of the handle when the discharge tube is screwed in as far as possible.

In this position the unembedded end of the tube projects through the wall 11 into the handle bore 10, as shown in Figures 4 and 5. The adjacent side of plunger 2 is provided with a cavity threaded internally complementary to the thread on tube 3, so that by pressing button 23 inward against spring 24 and simultaneously revolving it the plunger may be screwed onto the tube end in the manner shown in Figure 4, to serve as a cap positively severing the connection between the handle reservoir and the discharge tube.

The embedded end of the tube 3 communicates with a sump 32 extending lengthwise of the brush head between marginal rows 33 of bristles. It will be noted in Figure 3 that the bristles are inclined from the edges of the brush head centrally toward each other so that their tips are interwoven or intermeshed for a substantial portion of their length. In fact the inner bristles of the rows may mesh down to their central portions, so that a dense arch of interspersed bristles spans the sump.

The back of the brush head 30 preferably is rounded in the manner shown in Figure 3, and is disposed with relation to the handle so that the central portion of the brush back is collinear with an element extended of the frusto-conical handle on the corresponding side. At least the tip end of the brush head should not project radially beyond such element of the handle extended. When the brush is placed on a flat surface with the back of the head down as in Figure 2, it will maintain this position despite its rounded contour. If the brush should be turned in being laid on a flat surface, partially or wholly on its side, as in Figure 1, only the larger end of the handle will contact the surface and the remainder of the handle will be raised clear of it. The brush will thus be suspended between the zones of surface contact, one near each end, and its center of gravity will be raised above the position assumed when the brush is lying with the bristles upright. The weight of the brush will therefore roll it to bring all the handle into contact with the surface, as it is in Figure 2, when the center of gravity will be in the lowest possible position. To produce such stability of the brush with the bristles upright it is not necessary, of course, that the handle be shaped to touch along its entire length in that position, but this construction provides a handle of largest capacity with the most desirable shape. It is merely required that the center of gravity be nearest the brush back contact line.

In using my toothbrush it may be assumed that a reservoir handle filled with liquid dentifrice has been purchased. The aperture in end wall 11 in such case will be plugged by a solid rod projecting through it onto which plunger 2 has been screwed. Holding the handle with the smaller end projecting upward, disc 23 is now rotated to unscrew plunger 2 from the threaded rod. This rod is then screwed out of the end wall 11, and in its place tube 3 of the brush head is screwed in. If the brush is not to be used immediately plunger 2 may be screwed on the tube end projecting into the reservoir by pressing inwardly on and rotating button 23, as previously described.

When it is desired to use the toothbrush, it is held in a generally horizontal position and button 23 is turned in a direction to release plunger 2 from tube 3. Immediately spring 24 forces the button, rod 20, and plunger outward into the

position which these parts assume in Figure 5, during which movement dentifrice is forced around the plunger through the channels 13 into bore 10. By pressing disc 23 inward and then releasing it one or more pumping movements of piston 2 may be effected, during each of which a predetermined quantity of dentifrice is forced through the discharge tube into sump 32. Each time button 23 is released, so that plunger 2 is retracted by spring 24, air is sucked into the reservoir through tube 3 to replace the dentifrice which has been expelled. When the desired quantity of liquid has thus been delivered to sump 32 button 23 is again pressed inward and rotated to cap the end of the tube 3, to retain plunger 2 within the handle, and to hold spring 24 compressed, in the manner shown in Figure 4.

If it is not desired to use the brush immediately it may be laid on a level surface with its back down. No great care need be exercised in thus placing the brush, for even though the bristles do not project directly upward, because of the shape of the brush head and its relationship to the handle, as previously explained, the force of gravity will cause it to roll into the position shown in Figures 2 and 3, in which attitude it will remain indefinitely. The liquid in the sump therefore cannot be spilled, as would be the case with a normal brush which tends to roll onto its side. Moreover, the bristles are thus retained out of contact with the supporting surface so that they will not be contaminated by it.

When the brush is picked up and inverted for use the dentifrice does not spill from the sump through a space between the bristles because of their inward inclination which causes them to intermesh. Instead even the dentifrice falling midway between the rows of bristle roots, strikes their central portions and flows thence toward their tips. Since the sump is of substantially uniform depth throughout the length of the head, and because of the interwoven disposition of the bristles, they will all be saturated substantially uniformly, and the dentifrice will thus be carried on the tips of the bristles to the teeth with the least possible waste. At all times other than during the dispensing operation the liquid will be tightly sealed within the handle reservoir, being closed at one end by the threaded engagement of the tube 3 in the wall 11, which tube is capped by the plunger 2, and at the other end by the packing disc 26 encircling rod 20 and by the pressed or adhesive fit, or threaded connection between plug 22 and the handle.

Thus liquid can be dispensed from the reservoir at the time and in the quantity desired, and the dispensing action can be performed accurately and conveniently while the brush is in a horizontal position. No shaking of the brush is necessary, so that the dentifrice delivered will not be spattered about.

In Figure 3 the construction of the handle and dispensing mechanism is the same as previously described, except that the clip 27, which is of course optional, has been omitted. Instead of a toothbrush head being applied to the handle, however, an oiling spout 4 having a threaded tubular projection 40 is shown. The discharge tip 41 of the spout is threaded externally for attachment of a brush head, but it will be evident that if the implement is to be used for oiling purposes only, these threads may be omitted. The dispensing action is, of course, precisely the same

as for the toothbrush described above, the liquid discharged being oil instead of dentifrice. In oiling, however, the handle will normally be held with the spout inclined downward so that the oil may drip from its tip onto the part to be oiled, instead of the handle being held level as in filling the toothbrush sump. The control afforded by my dispensing mechanism enables one or a dozen drops of oil to be applied rapidly or slowly, depending upon the number and length of strokes made by the plunger.

Figure 9 illustrates the spout 4 used as a support for one type of brush head 5, which may be screwed onto the tip 41. Such head is apertured for delivery of liquid flowing through the spout to the roots of the bristles. Obviously, the head might be secured removably or permanently to the spout otherwise than by a threaded connection. The brush 5 may be used either dry or saturated with cleaning fluid as a cleaning brush, saturated with oil as an oiling brush, or saturated with paint as a paint or lettering brush, depending upon the type of liquid in the handle reservoir. Moreover, the shape of the brush head, circular or elongated, its size, and the length, number and texture of the bristles 59 may be selected according to the purpose for which the brush is to be used.

Figures 10 and 11 illustrate a special type of cleaning and oiling brush having an elongated head 6 which is disposed at an angle of about 30° to the handle 1. As in the brush of Figure 9, a bore is provided through the head so that liquid may flow from the spout 4 to the bristles 60. The angular disposition of the head with respect to the handle makes this brush particularly well suited for cleaning typewriters.

A convenient form in which the principle of my invention may be incorporated in a shaving brush is shown in Figures 12 to 16, inclusive. In this modification the handle 7 is not tapered, but is cylindrical throughout. Preferably it also is made of transparent plastic material. The reservoir, as before, has two portions, one being a bore 70 adjacent to the brush, of relatively small diameter, and the other 71 being of much larger diameter and constituting the reservoir proper. The bristles 72 are secured in the end of the handle, preferably being set in rubber material 73 in the conventional manner. A tube 74 affords communication from the hollow handle to the central portion of the bristle group, its reservoir end projecting into the bore 70 and being threaded externally. As in the construction previously described, a plunger 75 is received loosely within the bore 70, and has a cavity in its surface adjacent to the tube 74 which is threaded internally complementary to the tube thread. The plunger is carried by one end of rod 76 which has a disc or button 77 integral with its opposite end for effecting plunger reciprocation. The opposite end of the handle is closed by a plug 78 threaded into it, and this plug is provided with a guide collar, packing washer, and operating spring which function in the same manner as the similar structure described above.

It will be noted that because bore 71 is straight instead of being tapered an appreciably greater difference in diameter occurs at the junction of the bores 70 and 71 than in the other type of construction. Instead of providing ribs to guide plunger 75 after it is retracted from the bore 70, therefore, a second plunger or piston 79 is secured to rod 76 in a location such that when the plunger 75 is in capping position plunger 79 is

disposed adjacent to the open end of bore 70. This larger plunger fits quite loosely in bore 71 so that while being resiliently urged outward the liquid shaving soap will flow around it into the space between the two plungers. As the plungers are then conjointly forced inwardly by manual pressure on button 77 plunger 79 forces the liquid around plunger 75 even during its inward movement, thus supplementing the action of the smaller plunger in expelling liquid through tube 74 into the bristle mass. This cumulative action is particularly valuable when a relatively viscous, sluggishly flowing liquid is being dispensed. After a sufficient quantity of soap has been forced through tube 74 button 77 is pressed inwardly and rotated, to screw the plunger onto the delivery tube to seal the reservoir while the brush is in use.

I claim:

1. A fountain implement, comprising a hollow handle constituting a reservoir for liquid and having a dispensing passage leading therefrom narrower in width than the reservoir, a plunger received within the handle reservoir, means operable to move said plunger from the reservoir through said narrower dispensing passage, to force a charge of liquid therethrough and thereafter to effect a positive seal of said dispensing passage thereby, and holding means within said narrower dispensing passage interengageable with said plunger by rotation of said plunger moving means, to restrain lengthwise movement of said plunger moving means and thus to maintain said plunger in sealing position.

2. A fountain implement comprising a dispensing head, a hollow handle connected to said head, constituting a reservoir for liquid, and having a passage affording communication between the handle reservoir and said dispensing head, plunger means received in the handle reservoir, and a spring normally urging said plunger means away from said passage, said plunger being reciprocable toward said head in opposition to said spring to force liquid from the handle reservoir into such passage and in its limiting position toward said head being adapted to seal the passage positively, and said handle and plunger means being complementally threaded for interengagement by rotation of said plunger means in such limiting position, thereby to retain the plunger in such passage sealing position and to maintain said spring in stressed condition.

3. A fountain implement comprising a dispensing head, a hollow handle connected to said head, constituting a reservoir for liquid, and having a passage affording communication between the handle reservoir and said dispensing head, plunger means received in the handle reservoir, and a spring normally urging said plunger means away from said passage, said plunger being reciprocable toward said head in opposition to said spring to force liquid from the handle reservoir into such passage and in its limiting position toward said head being adapted to seal the passage positively, and said handle and plunger means being complementally constructed for interengagement by manipulation of said plunger means in such limiting position, thereby to retain the plunger in such passage sealing position and to maintain said spring in stressed condition.

4. A fountain implement, comprising a hollow handle constituting a reservoir for liquid, a dispensing head carried by one end thereof, conduit means affording communication between said handle reservoir and said dispensing head, a

plunger received in the handle reservoir and reciprocable to force liquid therefrom into said conduit means, said conduit means and said plunger being complementally threaded for interengagement to effect a positive seal of said conduit means, a rod extending lengthwise through the handle, projecting from the end thereof remote from said dispensing head, and secured to said plunger, and a spring urging said rod and plunger away from said conduit means, said rod being both reciprocable inwardly in opposition to said spring, to move said plunger to dispense liquid from the handle reservoir into said conduit means, and rotatable while held in its inner position to screw together said plunger and said conduit means, thereby to positively seal said conduit means, to retain said rod in its inner position,

and to maintain said spring in stressed condition.

5 5. A toothbrush, comprising a head having a curved back, and a tapered handle secured to said head in alignment therewith and having a curved surface on the side thereof corresponding to the back of said head, the radius of curvature of such surface being greatest at the end remote from said head and considerably greater than the radius of curvature of every portion of the head back, the remainder of the head and handle being constructed and arranged so that the center of gravity of the toothbrush as a whole is closer to the line of head and handle supporting contact along the center of the curved head back than to any other line of head and handle supporting contact.

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