Jan. 12, 1937. W. J. DOBKIN 2,067,601

SOAP DISPENSER

Filed July 28, 1934 3 Sheets-Sheet 1

Fig. 1.

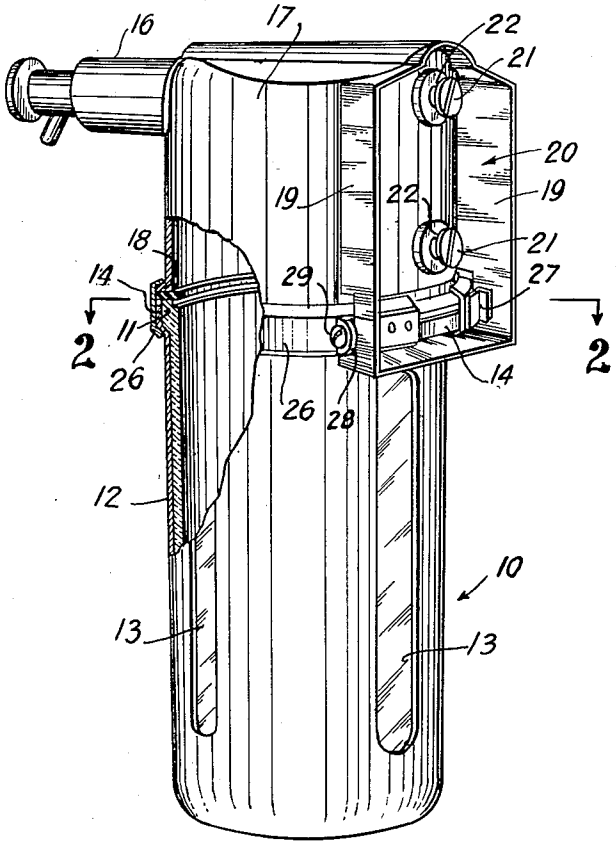
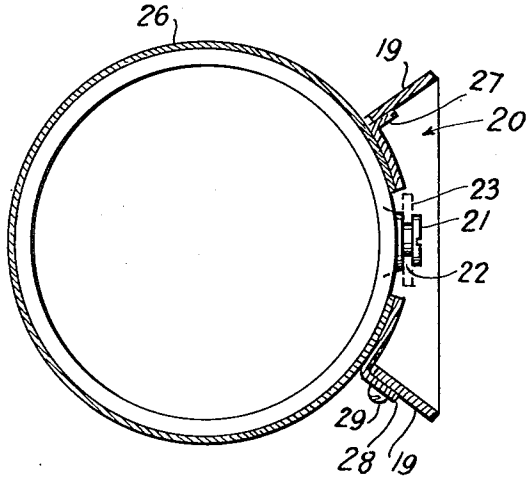


Fig. 2.



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SOAP DISPENSER

Filed July 28, 1934 3 Sheets-Sheet 2

Fig. 3.

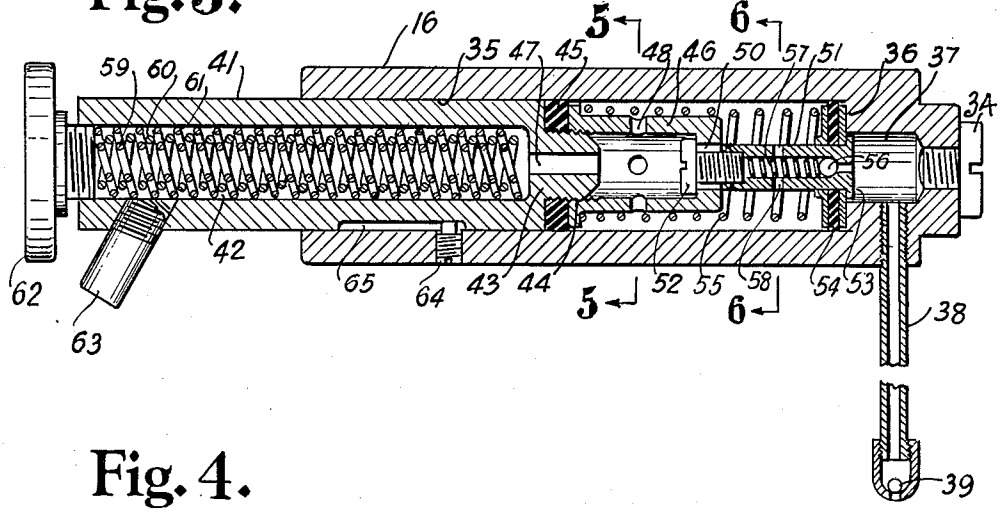


Fig. 4.

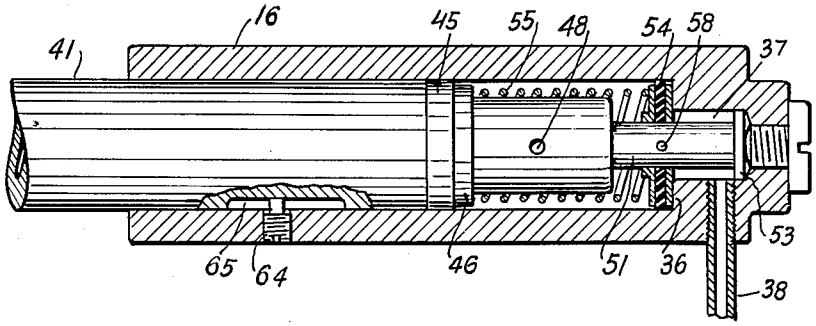


Fig. 5.

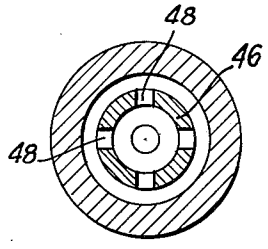
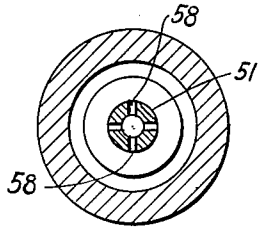


Fig. 6.



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Jan. 12, 1937. W. J. DOBKIN 2,067,601

SOAP DISPENSER

Filed July 28, 1934 3 Sheets-Sheet 3

Fig.7.

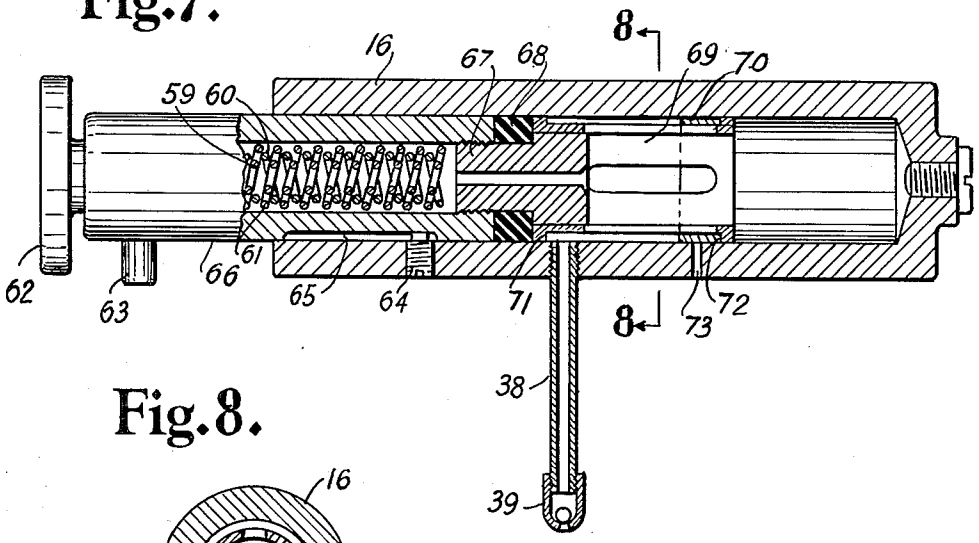


Fig.8.

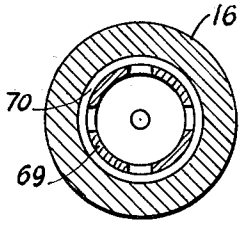
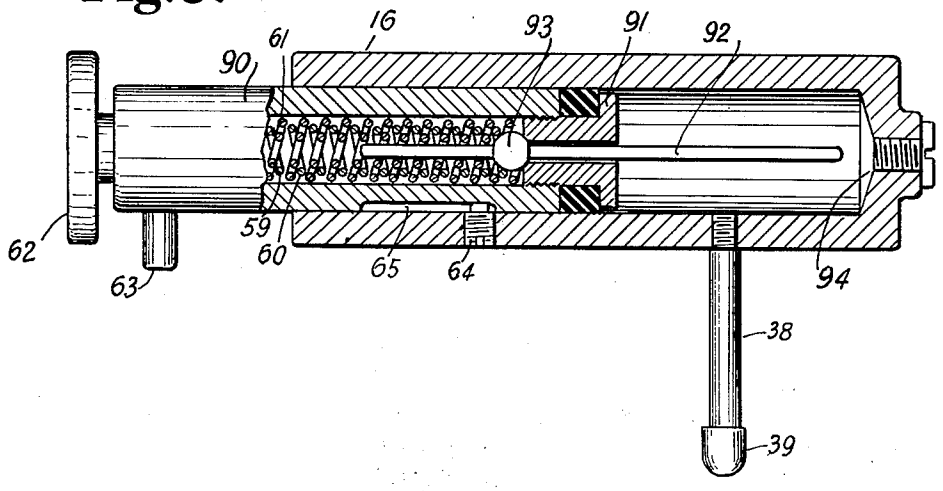


Fig.9.



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UNITED STATES PATENT OFFICE

2,067,601

SOAP DISPENSER

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Application July 28, 1934, Serial No. 737,379

22 Claims. (Cl. 299—83)

This invention relates to soap dispensers. It is an object of this invention to provide a dispenser in which soap may be conveniently dispensed while avoiding all possibility of a continuous waste of soap, even though the parts be worn. It is a further object to provide a new and improved dispenser in which the soap supply may be placed below the level of the dispensing mechanism and at the same time to insure that a predetermined quantity of soap may be dispensed. It is a further object to provide a soap dispenser in which the operation will at all times be reliable and in which the operating parts will be inexpensive.

It is a further object to provide a dispenser in which the operating mechanism may be readily removed as a unit for cleansing purposes when desired. It is a further object to provide a device of the character described which will insure that the soap is dispensed in the form of a white, finely divided lather.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

Figure 1 is a soap dispenser made in accordance with this invention, the parts being shown in section,

Figure 2 is a cross-section of the construction on line 2—2 of Figure 1,

Figures 3 and 4 are similar views showing certain of the operating parts in different operating position,

Figures 5 and 6 represent respectively cross-sections along the lines 5—5 and 6—6 of Figure 3,

Figure 7 is an elevation of a modified form of dispensing mechanism,

Figure 8 is a section on the line 8—8 of Figure 7, and

Figure 9 is a longitudinal section of a further modification of the device.

In soap dispensers in which the dispensing mechanism is fed from the soap supply by gravity there is difficulty in the event of any leakage within the mechanism that there be a continual flow of soap to waste which may make the operation of such a device expensive. Moreover, where the soap is fed to the dispenser by gravity, there is danger that any deposits of foreign matter which may be in the soap, such as unsaponified fat and sediment, may flow to the dispensing mechanism to clog it. In the forms of the invention here illustrated, these difficulties may be overcome by placing the container below the level of the dispensing mechanism and inducing the flow of soap to the dispensing mechanism by suction.

In the drawings the numeral 10 designates a container for a source of liquid soap which may be situated in any convenient location but preferably below the level of the dispensing mechanism.

In the embodiment shown in Figure 1 the container 10 may take the form of a glass receptacle having a flanged rim 11 and enclosed by a metallic shell 12 cut away as at 13 to permit the level of the liquid within the container to be viewed from the exterior. The shell 12 at its upper edge is expanded to form a rim 14 to surround the rim 11 of the container.

The dispensing mechanism is contained within a tubular member 16 which is carried in a horizontal position by a cap 17 having at its lower edge a flange 18 mating with the rim 11 of the container 10. The cap 17 has at its rear side, outwardly extending walls 19 defining a chamber 20. Attached to the cap within the chamber 20 is a pair of headed screws 21, one above the other which detachably fit into notches 22 in a plate member 23 which may be attached to the wall by screws. This plate member is preferably bent away from the wall at the center to provide clearance for the heads of the screws 21.

An annular band 26 has an interiorly disposed channel adapted to embrace the flanges 18, 14 and 11 to hold the cap, the container and the metallic shell together. This channel has at one point an outwardly extending lug 27 which engages the interior of one of the walls 19. It has also a second lug 28 which is adjacent and exterior to the other wall 19 and connected thereto by a screw 29. In this manner by turning the screw 29 the band may be tightened around the flanges to hold the parts firmly together.

The operating mechanism (see Figure 3) is as follows:

The tube 16 is provided with a bore 35 which

extends for nearly the entire length of the tube terminating in an end wall 36. This wall in turn is pierced by a concentric bore 37 of smaller diameter which in turn is closed by one of the screws 34. The bore 37 is connected by a tube 38 to the interior of the soap receptacle, extending substantially to the bottom thereof. It is provided at its lower end with a ball-check valve 39 to permit liquid to flow into the tube but not out of it.

Within the bore 35 there slides a piston member 41 which in turn is bored out throughout the major portion of its length as shown at 42, the piston member 41 is provided on its inner end with an extension 43 of smaller diameter threaded upon its exterior as shown at 44 and upon this extension there is carried a washer 45 held in place by a cup-shaped cap 46 which screws on to the extension 43 to hold the washer and cap in place. This washer 45 may be made of any compressible, elastic material such as rubber and under such circumstances, if the washer becomes worn upon its outer surface so that it no longer makes a tight fit within the cylinder, it may be readily expanded by screwing up upon the cap 46 to bring the washer under greater longitudinal pressure thereby causing it to expand against the inner walls of the cylinder.

A bore 47, through the extension 43, connects the bore 42 in the piston member with the interior of the cap 46 to permit the passage of soap to the interior of the piston as hereinafter described and the cap 46 is provided with holes 48 through its lateral walls. The cap member 46 has a concentric sliding bearing 50 in its outer edge in which there is slidably mounted a hollow plunger 51 and a screw 52 prevents the plunger from passing completely out of the opening. The outer end of the plunger 51 carries a flange 53 and a washer 54 is slidably mounted upon the exterior of the plunger and limited in its outward movement by the flange 53.

A spring 55 under compression bears against the washer 54 and holds the latter in its outer position, firmly pressing against the end wall 36 and thereby also holding the plunger 51 withdrawn from the cap member 46. The washers 45 and 54 make a substantially tight fit within the bore 35 and the flange 53 may be substantially tight within the bore 37. The interior of the plunger 51 is provided with a ball-check valve 56 which is held outwardly by a spring 57 and the plunger 51 is provided with ports 58 in its outer walls.

The bore 42 carries mechanism for breaking up the soap and converting it into a lather. For this purpose it has been found that one of the most suitable apparatus comprises a plurality of springs, one within the other. Particularly satisfactory results have been obtained by the use of three springs, 59, 60 and 61, the middle one 60 of which is of a reverse pitch to the other two to prevent the turns of the one spring from becoming interlinked with those of the other. The bore 42 is closed by a button or cap 62 which screws into its outer end and forms the button by which the device is operated. A spout 63 communicating with the interior of the bore 42 serves to discharge the lather. A set screw 64 screwed into the walls of the tube operates within a slot 65 in the piston to limit the inward and outward movement of the piston. From the foregoing description it is believed that the operation of the device will be substantially clear.

A suitable quantity of soap is placed within the container 10, this may be a solution comprising 10% soap and 90% water, although different soap solutions may be employed. Where it is not desired to produce lather, the strength of the solution is not of importance so far as the operation of the device is concerned, but where lather is desired, sufficient water must be present for that purpose and I have found the proportions above suggested to be quite satisfactory.

When it is desired to discharge lather, the button 62 is pressed inward, carrying with it the cap 46. The length of the slot 65 is such that the washer 54 lies in contact with the end wall 36.

The pressing of the button 62 will, during the first portion of this stroke, push the mixture of soap and air from the interior of the larger bore into the interior of the piston 41, where it is thoroughly broken up by the springs 59, 60 and 61 to form a fine white lather. As the stroke continues, the lost motion between the head 52 and the projection 44 upon the plunger is taken up and the piston 51 is moved forward into the bore 37, forcing the soap from the bore 37, spraying it through the openings 57 and 58 into the larger bore. The openings 57 and 58 are of such size as to cause the soap to enter the interior of the cap and the larger bore in the form of a jet or spray, creating a natural mixture between the liquid soap and the air within the larger bore. During this portion of the stroke the discharge of lather from the spout 63 continues.

The use of the springs for breaking up the soap to form the lather has been found particularly advantageous because it serves as an effective means for thoroughly mingling the air and soap and yet it is free from the tendency to clog, which the use of screen material presents. The resistance of the springs to the passage of the lather causes a slight compression of the springs which would be increased with any increase in the obstruction and this movement of the coils of the spring in itself is sufficient to overcome any tendency to clog.

During the return stroke, piston 51 at first remains stationary and the independent movement of the piston 41 sucks air into the interior of the larger bore through the discharge spout 63. As soon, however, as the lost motion is taken up the piston 51 is withdrawn from the smaller bore which fills with the soap solution through the supply tube 38.

The relative amount of soap and air is determined by the relative piston displacement of pistons 41 and 51, which may be regulated by regulating the lost motion of the piston 51 or by regulating the stroke of the piston 41, or both.

It will be obvious in the construction shown in Figures 3 and 4 that the tube 38 may be made of any desired convenient length so that the soap container may be located separate from the dispensing mechanism. It is thus possible to install the mechanism shown in Figure 3 through the wall above a wash basin and connected by a tube 38 to a container placed beneath the basin and if desired a single container may be used to supply a plurality of the dispensing mechanisms.

In the form of the invention illustrated in Figure 7 the valve mechanism described in the foregoing embodiment is slightly altered. In this modification there is screwed into the inner end of the piston member 66, corresponding to the piston member 41 of the previous modifica-

tion, a plug 67, confining between it and the end of the piston a washer 68. The plug 67 carries on its outer end a shell 69 on which there is slidably mounted an annular sleeve valve 70. This valve fits snugly upon the exterior of the shell 69 and upon the interior of the bore of the tubular member 16 but has room for longitudinal movement upon both. Its position is confined between two flanges 71 and 72 upon the shell. An air port 73 is cut through the walls of the member 16 in position to be uncovered by the piston member toward the end of its travel.

The valve 70 is so positioned that it opens the vent hole 73 at the close of the inward movement of the piston 66 and closes that hole again at the close of the outward movement. In this manner during the outward or suction stroke of the piston, air is sucked inwardly through the vent hole until the vent hole is closed. The mixture of the soap and air to form the lather is substantially identical to that previously described. The operation of this embodiment is substantially the same as that shown in Figure 3.

In the modification illustrated in Figure 9 the piston member 90, corresponding to the piston member 41, has a plug 91 through which there extends a rod 92 carrying the check valve 93. This rod 92 is so proportioned that as the piston moves inwardly it strikes against the end wall 94 of the interior definitely to force the valve to open position.

The valve 93 is so positioned that on the return stroke of the piston the valve 93 is held open for a considerable period during which air is sucked into the interior of the piston through the spout 63. As soon however as the back stroke has progressed far enough to draw in the desired quantity of air the pin 92 is released to permit the valve 93 to close against its seat, the further retraction of the piston will suck up soap into the suction chamber behind the piston. During the reverse stroke the mixture of soap and air within the suction chamber is slightly compressed until the valve 93 opens, whereupon it is discharged in the manner previously described.

There is a specific advantage in this form of construction and that is that as the ball 93, at the close of the inward movement of the piston, is moved backwardly away from the valve seat against the action of the springs 59, 60 and 61 these springs are definitely compressed, thereby freeing the coils from any clogging that might otherwise result during a long period of disuse of the device. For many purposes the mechanical compression of the springs is more satisfactory than the compression of the springs by the force of the soap stream, as previously described.

The dispenser has specific advantages in its ability to produce a fine lather, and to discharge soap from a container below the level of the dispensing device, but it will be clear that many features of the device possess an independent utility. For example, in many cases it will be found unnecessary to provide the lather forming elements, including the valves timed to admit air and the elements for breaking up the mixture of air and soap. In such case the device may be used simply for the discharge of the soap solution.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope hereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What I claim and desire to secure by Letters Patent is:

1. A liquid soap dispensing mechanism comprising a supply of liquid soap, a cylinder and a hollow piston fitting tightly within the cylinder, a connection between said cylinder and said piston, said cylinder having a port and a valve for the admission of liquid soap from said supply to the interior thereof on movement of the piston and said piston being provided with means for discharging lather from and admitting air to its interior and having in its interior, mechanism for thoroughly mingling said soap with air to form lather.

2. A liquid soap dispensing mechanism comprising a supply of liquid soap, a cylinder and a hollow piston fitting tightly within the cylinder, a connection between said cylinder and said piston, said cylinder having a port and a valve for the admission of liquid soap from said supply to the interior thereof on movement of the piston and said piston being provided with means for ditcharging lather from and admitting air to its interior and having in its interior mechanism for thoroughly mingling said soap with air to form lather, comprising a plurality of wires intercepting the movement of the soap at different points along the pathway thereof.

3. A liquid soap dispensing mechanism comprising a cylinder and a hollow piston, a restricted connection between said cylinder and said piston, said cylinder having a port for the admission of soap to the interior thereof and said piston having in its interior, mechanism for thoroughly mingling said soap with air to form lather comprising a plurality of concentric coil springs interposed in the pathway of the movement of the soap and means for admitting air to the interior of the piston.

4. A soap dispenser comprising, in combination, a cylinder and piston, a spring for urging said piston out of said cylinder, means for supplying soap to the interior of said cylinder having a check-valve for admitting soap, a chamber within said piston a discharge port for said chamber, an air port in said chamber having a connection to the interior of said cylinder, whereby air is caused to be sucked in when said piston is forced out of said cylinder and means within the chamber in said piston thoroughly to mingle said soap and air.

5. A soap dispenser comprising, in combination, a cylinder and piston, a spring for urging said piston out of said cylinder, means for supplying soap to the interior of said cylinder having a check-valve for admitting soap, a chamber within said piston a discharge port for said chamber, an air port in said chamber having a connection to the interior of said cylinder, whereby air is caused to be sucked in when said piston is forced out of said cylinder and means within the chamber in said piston thoroughly to mingle said soap and air comprising a plurality of con-

centric springs in the pathway of movement of the mixture.

6. A soap dispenser comprising a cylinder having a plurality of concentric bores of different diameters, means for supplying soap to the smaller of said bores, a piston movable within the larger of said bores and urged outwardly by the spring, a smaller piston movable in the smaller of said bores having a lost motion connection with said first mentioned piston, connections through said smaller piston having a spring pressed check valve to the interior of said larger bore, a chamber within said first mentioned piston having connections to said interior of said larger bore, a plurality of concentric springs within said chamber and a spout for discharging lather from said chamber.

7. A soap dispenser comprising a cylinder having a plurality of concentric bores of different diameters, means for supplying soap to the smaller of said bores, a hollow piston movable within the larger of said bores and urged outwardly by a spring said piston having a port connecting its interior with the outer air, a smaller piston movable in the smaller of said bores having a lost motion connection with said first mentioned piston, connections through said smaller piston having a spring pressed check valve admitting soap to the interior of said larger bore, thereby to cause a suction of air into the interior of said outer bore and a suction of soap into the smaller bore in proportions to form a lather and means within said first mentioned piston thoroughly to mingle said soap and air.

8. A cylinder and piston for pumping soap and a cylinder and piston for pumping air, and connections between said pistons for operating one from the other displacement of the one cylinder being a fixed proportion of the displacement of the other and means for discharging the soap from the former cylinder into the latter and means for breaking up the soap and air into a lather.

9. A cylinder and piston for pumping soap and a cylinder and piston for pumping air, and connections between said pistons for operating one from the other displacement of the one cylinder being a fixed proportion of the displacement of the other and means for discharging the soap from the former cylinder into the latter in the form of a spray and means for breaking up the soap and air into a lather.

10. In a soap dispenser, a member having two concentric bores of different diameter, an operative element comprising a pair of pistons, one adapted to cooperate with each of said bores and a washer carried by said element closing the end of the smaller cylinder for separating said bores into separate chambers.

11. A liquid soap dispenser comprising a pair of concentric cylinders, the outer cylinder being of larger diameter than the inner, a soap supply and means for connecting the same to the smaller cylinder, including a check valve to admit soap to the cylinder, a piston element carrying a small piston for cooperating with the smaller cylinder and a large piston for cooperating with the larger cylinder, a port through the small piston to permit soap to flow from the smaller cylinder into the larger cylinder when the piston element is depressed, including a check valve to prevent soap again flowing into the smaller cylinder when the piston element is withdrawn, a port for admitting air into the larger cylinder when its piston is withdrawn, and means for breaking up the mixture of soap and air, thereby caused to form a lather.

12. A liquid soap dispenser comprising a soap supply, a cylinder connected to said soap supply, a piston working in said cylinder and means carried by said piston for admitting air into the cylinder and for discharging the contents of said cylinder when the piston is pushed out and in, including a plurality of concentric springs for breaking up the soap and air mixture.

13. A liquid soap dispenser comprising a soap supply, a cylinder connected to said soap supply, a piston working in said cylinder and means carried by said piston for admitting air into the cylinder and for discharging the contents of said cylinder when the piston is pushed in and out, including a plurality of concentric springs for breaking up the soap and air mixture, and a member adapted to compress said springs when said piston is depressed.

14. A liquid soap dispenser comprising in combination a cylinder, a piston within said cylinder, a measuring device for discharging a fixed quantity of soap to the interior of said cylinder, and means for admitting air into the interior of said cylinder when the piston is withdrawn and for discharging a mixture of soap and air therefrom when the piston is depressed and lather forming means for breaking up said soap and air mixture into a lather, said measuring device and said communicating means to and from said cylinder, and said lather forming means being carried wholly by said piston and removable therewith from said cylinder.

15. A liquid soap dispenser comprising in combination a pair of concentric cylinders of different sizes, a pair of concentric pistons and means including a lost motion device for connecting said pistons, each cooperating with one of said cylinders, a check controlled discharge port through the smaller of said pistons from the smaller cylinder to the larger, and a check controlled port for admitting soap to the smaller of said cylinders.

16. A soap dispenser comprising means for simultaneously discharging soap and air mixed together in substantially fixed proportions, means for breaking up said mixture into a lather comprising concentric springs in the path of movement of the mixture, and means for periodically compressing the springs.

17. A soap dispenser comprising means for mixing air and soap in proportions to form a lather, including a cylinder and piston for discharging said mixture, a plurality of springs in the pathway of said discharge to break up said mixture into a lather and means operated by the depression of said piston to compress said springs.

18. In a soap dispenser, a member having two concentric bores of different diameter, having a shoulder between them, an operative element comprising a pair of pistons one adapted to cooperate with each of said bores, a washer carried by said element and resiliently held outwardly, and means for holding said element within said bores in position to hold said washer against said shoulder to separate said bores into two separate and distinct chambers.

19. A liquid dispenser comprising a soap container, a horizontally disposed dispensing mechanism above the level of the container comprising a cylinder and a hollow piston movable within said cylinder having a discharge opening in its side wall, a pumping mechanism operative-

ly connected to said piston for forcing a definite quantity of soap within said cylinder on the outstroke of said piston whereby said soap is forcibly driven from said cylinder through said piston on an inward stroke of said piston.

20. A liquid dispenser comprising a soap container, a horizontally disposed dispensing mechanism above the level of the container comprising a cylinder and a hollow piston movable within said cylinder having a discharge opening in its side wall, a pumping mechanism operatively connected to said piston for forcing a definite quantity of soap within said cylinder on the outstroke of said piston, said pump having a volume of discharge materially less than the piston displacement.

21. A liquid soap dispenser comprising in combination a pair of concentric cylinders of different sizes, a pair of concentric pistons each cooperating with one of said cylinders, a soap supply and means for admitting soap from the soap supply to the smaller of said cylinders behind the said piston, a check controlled discharge port through the smaller of said pistons, space behind the larger of said pistons, said larger piston extending outside of its cylinder to the exterior and affording a discharge passageway for soap from behind said piston and operative connections between said pistons, whereby upon depression of said protruding piston, soap is forced into the larger cylinder from the smaller, spring means for holding said larger piston in outer position whereby upon release of said piston it will be forced outwardly to draw soap into the smaller cylinder and will thereby draw air into the larger cylinder, and means for breaking up the mixture of soap and air into a lather.

22. A soap dispenser including in combination a cylinder and piston, a chamber connected with said cylinder including a lather forming device, said chamber being connected at its other end to the outer air, means for admitting soap to said cylinder including means automatically to limit the quantity of liquid soap to a quantity less than the displacement of said piston, whereby on depression of the piston the contents of the cylinder is discharged through the lather forming device and the latter becomes thoroughly coated with soap and on withdrawal of said plunger air is again sucked in to said chamber from the outside over the same surface.

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