March 24, 1959 W. J. DOBKIN 2,878,974

SOAP DISPENSERS

Original Filed June 26, 1953 2 Sheets-Sheet 1

Fig. 1.

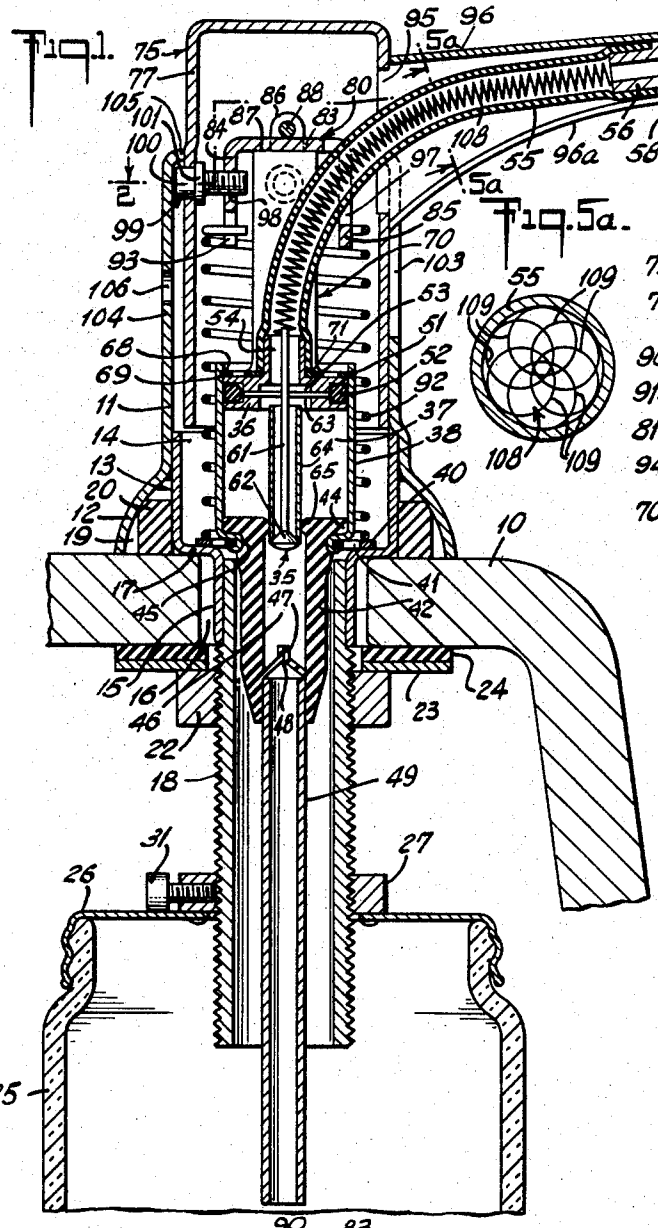


Fig. 5a.

Fig. 3.

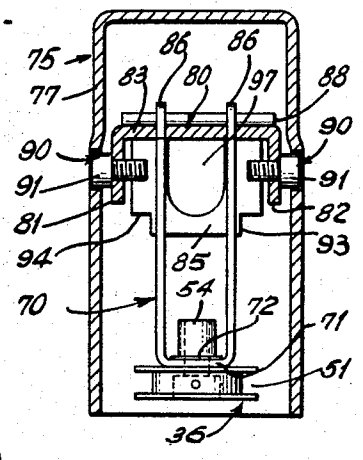


Fig. 4.

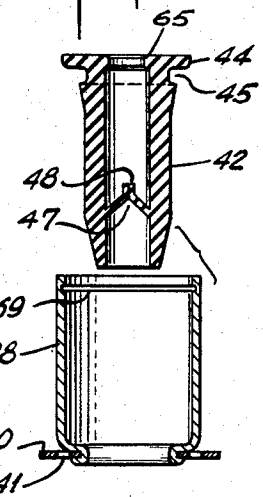
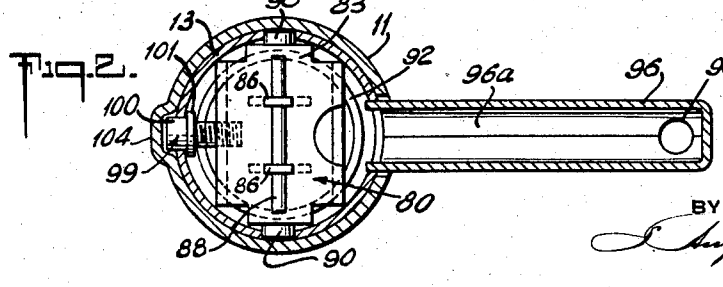


Fig. 2.



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Fig. 6.

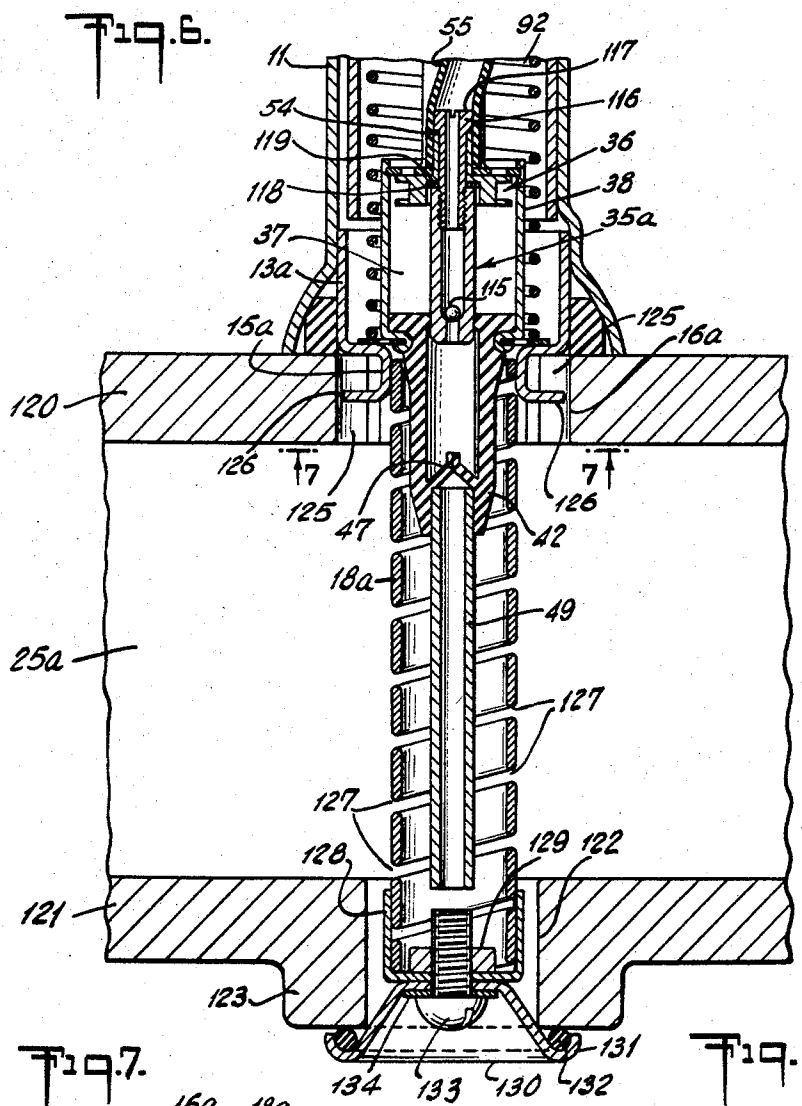


Fig. 7.

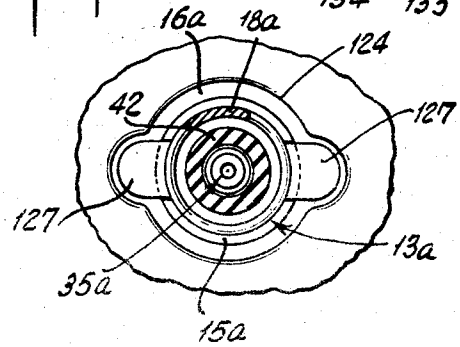
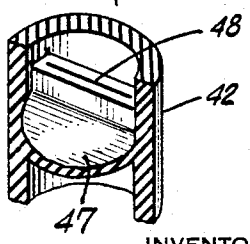


Fig. 5.



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United States Patent Office 2,878,974 Patented Mar. 24, 1959

2,878,974

SOAP DISPENSERS

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Original application June 26, 1953, Serial No. 364,350, now Patent No. 2,772,116, dated November 27, 1956. Divided and this application September 17, 1956, Serial No. 612,910

3 Claims. (Cl. 222—321)

The present invention relates to liquid soap dispensers.

The present application is a division of application Serial No. 364,350 filed June 26, 1953 which has matured into Patent No. 2,772,116 issued November 27, 1956.

One object of the present invention is to provide new and improved means by which a liquid soap dispenser can be connected to a wall of a liquid soap dispenser, while affording the dispenser ready access to the liquid soap in the reservoir.

Another object of the present invention is to provide new and improved means for firmly securing a liquid soap dispenser to a fragile wall of a reservoir, such as that of a basin, without cracking the basin, while affording to the dispenser ready access to the liquid soap in the reservoir.

In carrying out certain features of the present invention, the body of the soap dispenser adapted to be mounted on a wall of a liquid soap dispenser, such as that of a basin, has rigid therewith, one end of a shank in the form of a spiral spring enclosing the inlet of the pumping chamber, the other end being adapted to be secured to the opposite wall of the reservoir, with the shank extending into said reservoir and applying spring holding pressure to the soap dispenser against said first mentioned reservoir wall. The openings between the convolutions of the shank permit flow of liquid soap from the reservoir, through said openings and into said inlet.

Various other objects of the invention are apparent from the following particular description and from an inspection of the accompanying drawings, in which:

Fig. 1 is a vertical section of a form of soap dispenser being shown converted to dispense foam and being shown installed in operative position on a conventional type of basin and in connection with a bottle or jar soap reservoir;

Fig. 2 is a section of the soap dispenser taken approximately along the lines 2—2 of Fig. 1 but shown without the spout tube, the spout head or the spout;

Fig. 3 is a detail section of the soap dispenser of Fig. 1 showing the plunger and piston assembly;

Fig. 4 is a detail section showing in exploded view the soap pump barrel and mixing chamber;

Fig. 5 is a perspective of a section of the soap pump barrel and of the pump value therein;

Fig. 5*a* is a section of the spout part of the dispenser taken along the lines 5*a*—5*a* of Fig. 1;

Fig. 6 shows a vertical section of the soap dispenser shown converted to dispense straight liquid soap and shown installed in a basin having a built-in soap reservoir in accordance with the present invention; and

Fig. 7 is a section of the soap dispenser taken along the lines 7—7 of Fig. 6.

Referring to Figs. 1–5 of the drawings, the dispenser is shown mounted on the top wall 10 of an ordinary wash basin requiring a separate soap reservoir. This dispenser comprises a cylindrical housing 11 with a flaring or bell-bottom flange 12 seated on the top wall 10 of the wash basin. A cup 13 has an upper cylindrical section 14 fitting snugly into the cylindrical part of the housing 11 and rigidly secured thereto, as by welding, and a lower cylindrical neck section 15 of reduced diameter extending into a hole 16 in the basin wall 10 in installed position of the dispenser and defining with said upper cup section 14 an annular shoulder 17 for seating said cup on said basin wall. This lower neck section 15 of the cup 13 embraces the upper end of an externally threaded tube 18 serving as a shank for the dispenser and is rigidly secured to said shank, as by welding. Thus the housing 11, cup 13 and shank 18 form a permanent unit.

Between the bell flange 12 of the housing 11 and the cup 13 is an annular space 19 enclosing a soft washer 20 which acts as a seal and a cushion for the top surface of the basin wall 10.

The dispenser is secured to the basin wall 10 by inserting the shank 18 through the hole 16 in said basin wall and by screwing a nut 22 onto said shank, backed up by a metal washer 23 and a soft washer 24. A suitable soap reservoir 25, shown in the form of a bottle or Mason jar and having a screw cap 26, is secured to the shank 18 below the basin wall 10 by means of a nut 27 rigidly secured to said cap, as for example, by peening and threaded to said shank. A set screw 31 is provided for locking the screw cap 26 and nut 27 to the shank 18.

The dispenser shown in Figs. 1–5 is of the foam type, requiring a mixture of air and soap to produce the desired lather. Accordingly, there is provided a small suction piston 35 for pumping a measured quantity of soap from the soap reservoir 25 and a larger piston 36 to which said small piston 35 is connected for pumping air into a mixing chamber 37, and for pumping the soap and air mixture to a discharge spout to be described.

The mixing chamber 37 is defined by a cylinder 38 extending in the housing 11 and having an external washer 40 permanently secured to the bottom thereof, as for example, by peening, and seating upon the shoulder 17 on the cup 13. This washer 40 is provided with a plurality of holes 41 permitting any residue of soap, which may seep out from the mixing chamber 37, to drain back into the soap reservoir 25.

Connected to the lower end of the cylinder 38 is the barrel 42 of a soap pump, which is molded from a suitable elastic material, such as rubber or any suitable elastomer and in which operates the soap piston 35. This pump barrel 42 has an outward flange 44 at its upper end fitting snugly in the bottom of the mixing chamber 37 for suspension therefrom and an external groove 45 into which the lower beaded end of the cylinder 38 snaps into locking engagement to prevent the pump barrel 42 from moving, after it is forced in place in the lower end of said cylinder. The pump barrel 42 has a central cylindrical passage 46 and near its lower end controlling flow through said passage, is a closure gland 47 serving as a pressure responsive pump valve. This pump valve 47 is molded integral with the pump barrel 42 and is shown having an axial cross-section in the form of an inverted Y, the stem of said valve being cut through to form a pair of facing resilient walls defining therebetween a slit 48. Thus the valve 47 acts as a diaphragm and when there is suction above the valve, the slit 48 opens up, but when there is pressure, the slit automatically closes tightly and blocks thereby flow of the soap through said valve from the passage 46 of the pump barrel 42 above said valve.

Cemented or otherwise secured to the lower end of the soap pump barrel 42 below the pump valve 47 is a flexible intake or supply tube 49, which extends downward to the bottom of the soap reservoir 25 and through which soap is delivered into the pump barrel through the suction action of the piston 35.

The piston 36 for drawing air into the mixing chamber 37 and for pumping the soap and air mixture to the discharge spout of the dispenser is located in the mixing chamber and is reciprocable therein. This piston 36 has a peripheral groove 51 receiving an O-ring 52 of rubber or similar sealing material, serving as a piston ring to seal the slide contact between the piston and the walls of the cylinder 38. A hole 53 through the piston 36 serves to define a passage for admitting air into the mixing chamber 37 from the discharge spout to be described and for discharging soap and air mixture from said mixing chamber towards said discharge spout. A tubular neck 54 extending from the upper side of the piston 36 over the passage 53 is embraced by and secured to one end of a spout tube 55, the other end of which is laterally spaced from the housing 11 and carries a spout head 56 and a spout 57, thus providing flow communication between the mixing chamber 37 and the outside of the dispenser. For effecting a removable connection between the spout head 56 and the spout 57, this spout is threaded into the spout head. To prevent unauthorized tampering with the spout 57, this spout has a fluted discharge passage 58 designed to receive a special key or wrench, such as an "Allen" wrench.

Connected to the piston 36 is the piston 35 for pumping soap from the reservoir 25 into the mixing chamber 37. This piston 35 comprises a flat piston rod 61 extending at its upper end through the central passage 53 of the piston 36 and carrying at its lower end a conical piston head 62. The piston rod 61 is attached to the piston 36 by a cross-pin 63 which passes through a hole in the piston rod and which extends at its ends into holes in the piston 36. This cross-pin 63, while loosely inserted, is retained in place by the O-ring 52. Mounted loosely on the piston rod 61 is a piston sleeve 64, which in association with the piston head 62 forms the piston 35 and which is slightly shorter than the space between the conical face of the piston head 62 and the cross-pin 63. This permits the sleeve 64 to slide up and down on the piston rod 61 between the piston head 62 and the cross-pin 63, for the purpose to be described.

The piston rod 61 is flat as described and its cross-sectional dimensions are such, that the rod across its width extends from wall to wall in the sleeve 64 and in the piston neck 54, thus locating the rod and the sleeve concentrically with respect to the piston 36 and restricting any wobbling to a minimum during assembly or operation. The narrow dimension of the piston rod 61 across its thickness on the other hand, provides an opening in the piston 36 for the passage of soap and air therethrough.

The upper end of the pump barrel 42 has an inwardly extending lip 65 forming a restricted opening or throat into which the sleeve 64 extends with a friction sealing fit, so that said sleeve is constantly under the restraining influence of said lip. Therefore, during the downward stroke of the piston rod 61, the sleeve 64 frictionally held by the lip 65 of the pump barrel 42 remains stationary, causing the piston head 62 to move below said sleeve to form an opening between the lower end of said sleeve and said piston head. This separating movement between the sleeve 64 and the piston head 62 continues until the cross-pin 63 carried by the piston 36 comes in contact with the upper end of said sleeve, whereupon the piston rod 61, piston head 62 and sleeve 64 move downwardly together as a unit. This downward movement of the piston head 62 and sleeve 64 together while separated, as described, causes the soap to be pumped from above the valve 47, through the sleeve 64, over the upper rim of said sleeve and into the mixing chamber 37.

On the upward stroke of the piston rod 61, the piston sleeve 64 frictionally held by the lip 65 of the pump barrel 42 remains stationary, until the piston head 62 reaches the bottom of the sleeve and seals said sleeve,

whereupon both the sleeve and the piston head move upward in unison. During this action, the combined piston head 62 and sleeve 64 form a suction piston for pumping additional soap from the soap reservoir 25, through the valve 47 and into the section of the pump barrel 42 above said valve.

The piston 36 is limited in its downward movement in the cylinder 38 by the top of the pump barrel 42 and is limited in its upward movement in said cylinder by a snap ring 68 fitting in an internal peripheral groove 69 near the upper end of said cylinder.

For moving the piston 36 in the cylinder 38, there is provided a U-shaped link 70 having a base cross-piece 71 with a hole fitted over the tubular neck 54 of said piston. The link 70 and the piston 36 are assembled and are permanently secured together as a unit by welding, or by peening, as for example at 72.

For operating the link 70 to move thereby the piston 36 in the mixing chamber 37, there is provided a hollow hand plunger 75 in the form of an inverted cup, slidably assembled telescopically in the fixed housing 11 and projecting thereabove. The portion 77 of the plunger 75 projecting above the housing 11 is reduced slightly in diameter to prevent this exposed plunger portion from rubbing against the walls of the housing and to prevent thereby the finish on said exposed plunger portion from being marred by the operation of the plunger.

For connecting the U-shaped link 70 and the hand plunger 75 for operation together, there is provided a keeper 80 in the form of a saddle having two opposed sides 81 and 82 depending from a flat top plate 83 and two opposed sides 84 and 85 quadrantly arranged with respect to said sides 81 and 82 and also depending from said top plate. This saddle 80 straddles the upper end of the link 70. The upper ends of the arms of the link 70 are reduced and shaped to form semi-circular tabs 86 passing through the top plate 83 of the saddle and to form shoulders 87 on which this saddle top plate seats. A pin 88 above the saddle 80 fits through the tabs 86 to lock the saddle 80 and the link 70 together.

The saddle 80 is secured to the hand plunger 75 for operation therewith. To that end, the two depending opposed sides 81 and 82 of the saddle 80 have threaded therein screws 90 respectively, the heads 91 of which extend through holes in the plunger 75. These screw heads 91 have special fluted keyways, requiring them to be turned with a special key or wrench to prevent unauthorized tampering therewith. These keyways are preferably of the same design as that of the spout 57, to permit the screws 90 to be turned by the same special key or wrench, such as the "Allen" wrench, employed to turn said spout in or out of position.

To urge the plunger 75 upwardly, there is provided a recoil spring 92, encircling the cylinder 38 and having its lower end seated on the washer 40 secured to the bottom of the cylinder 38. The two depending opposed sides 84 and 85 of the saddle 80 have lower tab sections 93 of reduced width extending into the upper end of the spring 92 to form guides for the upper section of the spring and define shoulders 94 against which the spring bears. The cylinder 38 forms a guide for the lower section of the spring 92.

One side of the plunger 75 has an opening 95 and secured to this side of the plunger and against this opening, as for example, by welding, is a spout housing 96. The depending side 85 of the saddle 80 has an oblong or elongated hole 97 through which the spout tube 55 extends freely. This tube 55 also extends through the plunger opening 95 and into the spout housing 96. This spout housing 96 is closed on all sides and has a bottom wall 96*a* with a juncture therealong as a result of making said housing from a single metal sheet stamped or bent to bring the opposite edges of said sheet together. This bottom spout housing wall 96*a* has a hole 96*b* through which the spout 57 extends. The spout tube 55

is thereby retained in extended position along the spout housing **96**.

To prevent the unauthorized separation of the plunger **75** from the housing **11** after assembly, the saddle side **84** is provided with a threaded hole **98** to receive a screw **99**. This screw **99** has a head **100** passing snugly through a hole in the plunger **75** and a shoulder **101** at the base of said screw head to limit inward and outward movement of said screw. When the screw **99** is all the way in and shoulder **101** bears against the saddle side **84**, the head of the screw **99** clears the wall of the plunger, thereby permitting the saddle **80** to be freely inserted in or removed from within the plunger **75**. When the saddle **80** is in place in the plunger **75**, and the screw **99** is moved out until its shoulder **101** bears against the wall of the plunger, the head **100** of said screw protrudes through the side of said plunger and forms a lock stud on the outside of said plunger. A fluted keyway similar to those in the heads **91** of the screws **90** is provided in the screw head **100**, requiring the same special turning key, such as the "Allen" wrench, as is employed for said screws **90** and the spout **57**. Unauthorized tampering with the screw **99** is thereby prevented.

The housing **11** is provided with a slot **103** on one side to receive the spout housing **96** during its reciprocation up and down with the plunger **75** and on the diametrical opposite side is formed with a channel **104** closed at the top with an inward closure flange **105** serving as a stop for the head **100** of the screw **99** secured to the plunger **75**, to prevent the withdrawal of said plunger from said housing. About midway of the channel **104**, the outer wall thereof has a hole **106** permitting access to the head **100** of the screw **99**, when the plunger **75** has been depressed to the bottom of its downward stroke. In this fully depressed position of the plunger **75**, the head **100** of the screw **99** will be opposite the hole **106**.

Normally, the plunger **75** is raised in the housing **11** by the action of the spring **92** to the elevated position shown in Fig. 1. In this position of the plunger **75**, the spout housing **96** will extend partway in the housing slot **103** and the head **100** of the screw **99** will be inaccessibly concealed in the upper end of the housing channel **104**. The housing slot **103** and the housing channel **104** act as guideways for the plunger **75**, serving thereby to maintain said plunger against rotation with respect to the housing **11**.

To withdraw the plunger **75** from the housing **11** for disassembly, the plunger is depressed to its full stroke to bring the head **100** of the screw **99** opposite the hole **106** in the outer wall of the housing channel **104**. In this fully depressed position of the plunger **75**, the special key or wrench may be inserted through the channel hole **106** and into the keyway of the screw head **100** and turned until said screw head clears the closure or stop flange **105** in the upper end of the channel **104**. With the screw **99** so set into inoperative position, the plunger **75** may be withdrawn from the housing **11**.

In a soap dispenser of the foam type, in addition to forming a mixture of air and liquid soap, it is necessary, in order to form a dense lather, to break up the larger bubbles. To accomplish this, a screen **108** is provided inside the spout tube **55** consisting of a plurality of fine coil springs **109** arranged alongside of each other. These coil springs **109** are of such outside diameter with respect to the inside diameter of the spout tube **55** and the number of these springs is such, that they overlap and intermesh in the inside of said spout tube, as shown in Fig. *5a*, thereby breaking up the inside cross-sectional area of said tube into small openings, and causing the larger soap bubbles to break up into smaller ones, as they pass through said openings. In the form shown in Fig. *5a*, the outside diameter of each coil spring **109** is larger than the inside radius of the spout tube **55** and about six of these coil springs are provided equally spaced around the longitudinal center line of the spout tube.

The assembling of the coil springs **109** as a screen unit **108** into the spout tube **55** is easily accomplished. To that end, the coil springs **109** are arranged side by side in a circle, and at one end they are pressed towards the center to overlap and intermesh these springs at this end and to make the spring unit at this end small enough, in cross-sectional dimensions, to permit its entry into the spout tube **55**. These springs **109** at this end of the unit may be held together into reduced overlapping intermeshing relationship by a clamp, collar or clip. The spring unit at this reduced end is then inserted into the end of the spout tube **55** and the unit pushed endwise into said spout tube. As the spring unit is pushed into the spout tube **55**, the coil springs **109** are forced laterally progressively towards the center of the unit into overlapping, intermeshing relationship by the confining walls of said spout tube, until the spring unit is entirely in said spout tube and has formed the screen **108**. This screen **108** interferes with the free passage of the air-soap mixture from the mixing chamber **37** to the spout **57** and breaks up the larger bubbles, thus forming a lather of the desired consistency.

In liquid soap dispensers, especially of the foam type, there is a tendency for the soap to dry up in the passage to the spout, when the dispenser is not used for an extended period of time. The dried soap clogs up the passage to the spout, thus rendering the dispenser useless. In accordance with the present invention, in order to prevent such flow blockage in the spout tube **55**, this tube is made from resilient material, such as rubber or neoprene (chloroprene) which can be stretched and enlarged under pressure. Hence, if the screen **108** should become clogged, the pumping pressure will force the spout tube **55** to expand, permitting fresh soap mixture to reach the discharge spout **57**. This fresh soap mixture in its passage through the spout tube **55** will dissolve the soap which has dried and caked in said tube, thus making the dispenser self-cleaning.

In assembling the dispenser, the cylinder **38**, the pump barrel **42** and the soap supply or intake tube **49** are put together as a subassembly. Also, to the unit consisting of the piston **36** and the link **70**, are connected the piston sleeve **64**, the piston rod **61**, the piston ring **52**, the spout tube **55**, the screen **108** and the spout head **56**, to form another subassembly. The two subassemblies are then connected together by inserting the piston **36** into the cylinder **38** and securing them together by means of the snap ring **68**. After placing the spring **92** over the cylinder **38** from the top, and seating said spring on the washer **40**, the spout tube **55** with the spout head **56** are inserted through the oblong hole **97** in the side **85** of the saddle **80**. The saddle **80** is then seated on top of the spring **92** and this spring is compressed until the tabs **86** of the arms of the link **70** pass through openings in the top plate **83** of the saddle **80** and protrude from said plate. At this point, the pin **88** is inserted through the protruding tabs **86** to lock the saddle **80** and the link together. In this position, the spring **92** is maintained under semi-compression between the saddle **80** and the washer **40** with the piston **36** bearing against the snap ring **68** under the action of said spring.

When the assembly operation so far described has been accomplished, the spout tube **55**, due to the location of the oblong hole **97** in the side **85** of the saddle **80**, becomes deflected to one side. This assists the spout tube **55** in finding its way into the spout housing **96**, when the assembly is inserted from the bottom into the plunger **75**. When the assembly described is placed within the plunger **75**, it is secured therein by the screws **90**. The spout head **56** at this stage of assembly will align with the hole **96***b* near the outer end of the spout housing **96**, permitting thereby the spout **57** to be screwed into said

housing to complete the assembly of the working parts of the dispenser.

The housing **11** with the cup **13** and shank tube **18** permanently connected thereto to form a unit are first secured to the basin wall **10** by means of the nut **22** threaded on to the shank tube **18**. The unit made up of the working parts of the dispenser including the plunger **75**, cylinder **38** and supply tube **49** assembled as described, is then fitted within the housing **11**. The plunger **75** is depressed to its full stroke, until the head **100** of the screw **99**, which at this stage is threaded all the way into the saddle **80** is opposite the hole **106** in the wall of the housing channel **104**. The screw head **100** is turned by means of the special key or wrench, until the shoulder **101** on said head abuts the wall of the plunger **75**. The screw **99** in this position locks the plunger **75** against separation from the housing **11**.

To fill or refill the soap reservoir **25**, the plunger assembly is removed from the housing **11**, by depressing the plunger **75** fully, so that the screw **99** is aligned with the hole **106** in the wall of the housing channel **104**, turning the screw with the special key or wrench inserted through said hole, until said screw clears the stop flange **105** on the housing **11**, to unlock the plunger assembly from said housing and lifting said plunger assembly from said housing. This removal of the plunger assembly leaves a wide soap passage through the housing **11** and through the shank tube **18** to the soap reservoir **25**. After the soap reservoir **25** has been filled, the plunger assembly is inserted into the housing **11** and locked thereto by means of the screw **99**, following an operation reversed from that described in preparation for the filling of the soap reservoir **25**.

Since the spout **57** has a fluted hole, the same special key or wrench which is used for turning the screws **90** and **99** is also used for inserting the spout in position into the spout head **56** and for removing said spout from said head.

The operation of the dispenser is as follows:

Normally, the dispenser remains as shown in Fig. 1 and is operated by manually depressing the plunger **75** against the action of the spring **92**. Upon release of the plunger **75**, it returns by the action of the spring **92** into the normal position shown.

On the initial downward stroke of the plunger **75**, the valve **47** in the pump barrel **42** is closed and the air is expelled from the mixing chamber **37** and from the pump barrel above said valve and is ejected from the discharge spout **57** by the action of the pistons **36** and **35**. On the next upward stroke of the plunger **75**, the piston **35** moving upward in the pump barrel **42** creates a suction therein, causing the valve **47** in said barrel to open and soap to be drawn upward from the reservoir **25** through the intake tube **49** and through the valve **47** into the pump barrel **42** above said valve. At the same time, air is drawn into the mixing chamber **37** through the spout **57**.

On the succeeding downward stroke, soap, from the pump barrel **42** above the valve **47** is injected into the mixing chamber **37** through the open sleeve **64** of the piston **35**, as a result of the downward action of said piston in said pump barrel. The mixture of soap and air in the mixing chamber **37** is forced by the continued downward stroke of the plunger **75** through the screened spout tube **55** and through the spout **57**, from which the mixture is discharged as a foam.

On the next upward stroke of the plunger **75**, air is drawn through the spout **57**, through the spout head **56**, through the spout tube **55** and into the mixing chamber **37**, thus clearing the passage through said spout members after each discharge. At the same time, a measured amount of soap is sucked into the pump barrel **42** above the valve **47** therein.

On the next downward stroke of the plunger **75**, the action of the next previous downward stroke is repeated.

Figs. 6 and 7 show the dispenser of Figs. 1–5 converted to form a dispenser of the type in which liquid soap instead of soap foam is dispensed. In this modified form of dispenser, the piston rod **61**, the cross-pin **63**, the sleeve **64**, the piston ring **52** and the screen **108** of Figs. 1–5 are left out. Instead of the piston **35**, there is provided a hollow piston **35***a* with a check valve **115**. This piston **35***a* is secured to the piston **36** by a hollow screw **116** threaded into said piston and having a head **117** bearing against the upper end of the piston neck **54**, a soft washer **118** being provided between the upper end of the piston and a shoulder **119** on the piston **36** to make the connection air-tight. Without the piston ring **52** of Figs. 1–5, no compression or suction can take place in the mixing chamber **37**, so that said chamber remains idle.

On the downward strokes of the piston **35***a*, resulting from the downward manipulation of the plunger **75**, the soap which has been sucked into the pump barrel **42** above the valve **47** from the previous upward stroke of the plunger **35***a*, is forced through the check valve **115**, through the hollow of said piston **35***a*, through the hollow screw **116**, the spout tube **55** and in liquid form out through the discharge spout.

The modified dispenser of Figs. 6 and 7 is shown attached to a form of wash basin having a built-in sealed soap reservoir **25***a*. This basin is shown with a top slab **120** and a bottom slab **121**, with the soap reservoir **25***a* formed between said slabs. In one corner of the basin, the top basin slab **120** has a hole **16***a* leading into the reservoir **25***a* and the bottom basin slab **121** has a hole **122** located directly below said hole **16***a* and surrounded by a boss **123** for reinforcement.

Due to the fragile nature of the basin, it is extremely difficult to install the dispenser sufficiently tight to prevent leakage through the bottom basin hole **122**, without cracking the basin. Since the dispenser cannot be sufficiently tight in this type of basin to prevent turning, the basin hole **16***a* is formed with a round center **124** having a pair of diametrically opposed wing or lobe extensions **125** serving as keyways. The cup **13***a* corresponding to the cup **13** in the construction of Figs. 1–5, has its neck section **15***a* with outward side lugs or tongues **126** fitting into the hole extensions **125** respectively, to prevent the dispenser from being turned by hand from the top and to prevent thereby, the dispenser from being unscrewed from the basin.

The dispenser of Figs. 6 and 7 may have a shank corresponding to the shank **18** in the construction of Figs. 1–5 inserted through the basin holes **16***a* and **122** and secured to the basin by a cap-nut threaded to said shank. Suitable openings would be provided in the shank to allow for the passage of the soap therethrough from the shank to the soap reservoir **25***a* and vice versa.

In the actual construction shown in Figs. 6 and 7, a spiral shank **18***a* is provided made from flat spring wire and affording suitable openings **127** between the successive coils or convolutions to permit the passage therethrough of the liquid soap. The upper end of this spiral shank **18***a* is welded to the neck section **15***a* of the cup **13***a*, while the lower end is welded to a cup **128** having a nut **129** welded thereto. Before welding the upper end of the shank **18***a* to the neck section **15***a* of the cup **13***a*, the opposite parts of said neck section are sheared and bent outwardly to form the lugs or tongues **126**, which fit into the lobe keyway sections **125** of the top basin hole **16***a*.

To secure the dispenser of Figs. 6 and 7 to the basin, a bell-shaped or inverted dished metal washer **130** is provided, having a skirt with its outer edge section curved upwardly to form an annular channel **131**, in which a soft O ring **132** is received for the purpose of sealing the bottom hole **122** of the basin. The shank **18***a* is made of such length as to afford a gap between the bottom of said shank and the washer **130**, while the shank is unstressed and before the dispenser is attached to the basin.

A screw **133** carrying a soft washer **134** and threaded into the nut **129** is employed to stretch the spiral shank **18***a* until the washer **130** is tight against the bottom opening boss **123** of the bottom basin slab **121**.

The design of the spiral shank **18***a* as described, serves to secure the dispenser with the desired pressure between the upper basin slab **120** and the bottom basin slab **121** without requiring any particular care or skill on the part of the person installing the dispenser. The spring tension of the shank **18***a* maintains constant pressure on the seal **132**, even though this seal may shrink or the basin may warp slightly due to ageing.

The means of attaching the dispenser to the basin of the type shown in Figs. 6 and 7, may be applied to the dispenser of the foam type shown in Figs. 1–5.

Except as indicated, the dispenser of Figs. 6 and 7 is the same as the dispenser of Figs. 1–5.

While the invention has been described with particular reference to specific embodiments, it is to be understood that it is not to be limited thereto but is to be construed broadly and restricted solely by the scope of the appended claims.

What is claimed is:

1. A liquid soap dispenser for a wash basin having a pair of opposed walls and a built-in reservoir between said walls, comprising a pump barrel having an inlet and an outlet, a housing to which said barrel is connected, a discharge spout connected to said housing, means in said housing establishing flow communication between said outlet and said discharge spout, a hand operable plunger extending from said housing, means responsive to the reciprocation of said plunger for drawing soap into said barrel through said inlet and for discharging it through said outlet and then through said discharge spout, a spiral shank extending from said housing, said shank when expanded lengthwise under tension defining openings between the convolutions of the shank, means for rigidly securing one end of said shank to said housing with the interior of the shank communicating with said inlet, and means for securing said pump in operative position to the wash basin, with the housing bearing against one of said walls and the shank extending through said soap reservoir and between said walls, and including means for anchoring the other end of said shank to the other wall with said shank under lengthwise tension, whereby liquid is drawn by the operation of said plunger from the soap reservoir through the spiral opening in the shank and through the inlet into the pump barrel.

2. A liquid soap dispenser for a wash basin having a pair of opposed walls with respective aligned holes and with a built-in reservoir between said walls, comprising a pump barrel having an inlet and an outlet, a housing to which said barrel is connected, a discharge spout connected to said housing, means in said housing establishing flow communication between said outlet and said discharge spout, a hand operable plunger extending from said housing, means responsive to the reciprocation of said plunger for drawing soap into said barrel through said inlet and for discharging it through said outlet and then through said discharge spout, a spiral shank extending from said housing, said shank when expanded lengthwise under tension defining openings between the convolutions of the shank, means for rigidly securing one end of said shank to said housing with the interior of the shank communicating with said inlet, and means for securing said pump in operative position to the wash basin with the housing bearing against one of said walls and the shank extending through the hole in the latter wall, through said soap reservoir and into the hole of the other wall, and including a washer secured to the end of the shank and adapted in installed position of said dispenser to tension said shank axially and to have sealing contact with the latter basin wall around the hole thereof.

3. A liquid soap dispenser as described in claim 2, wherein the means for securing one end of the shank to the housing comprises an annular member rigidly secured to the housing and adapted to extend into the hole of the wall against which said housing bears, the latter end of said shank being rigidly secured to said annular member and said annular member having an outwardly extending lug serving as a key to extend into a keyway extension in the latter hole of the basin wall to prevent the dispenser from turning in installed position.

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