Oct. 28, 1952 A. L. BOBRICK 2,615,757

LATHER DISPENSER

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Fig. 1

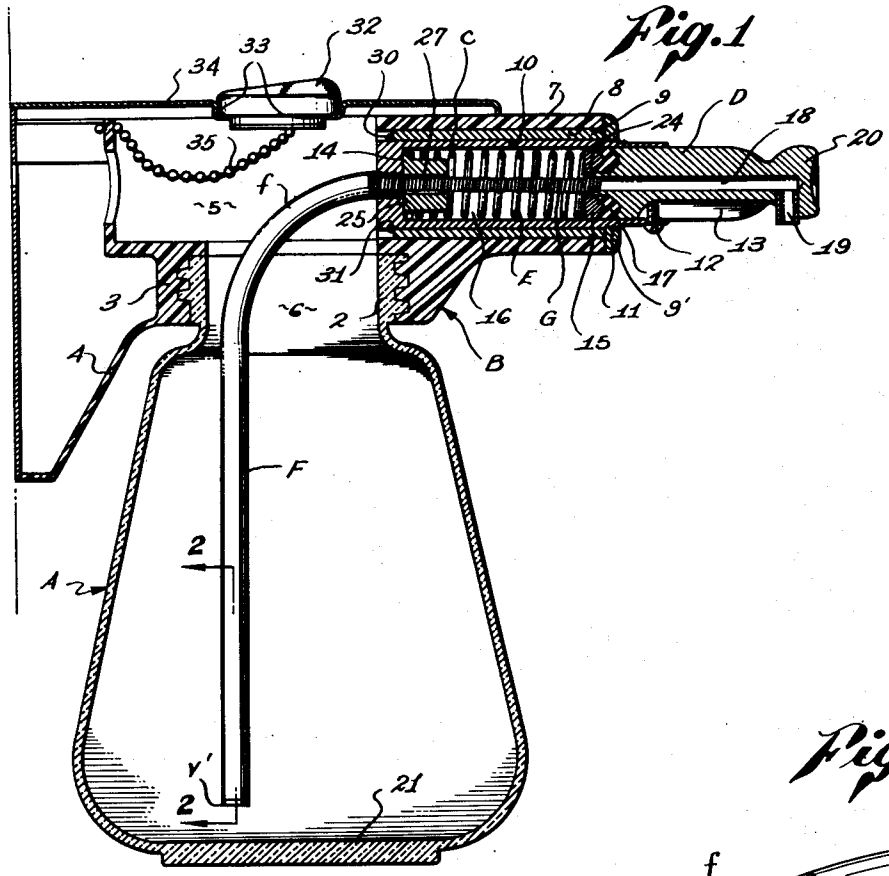



Fig. 3

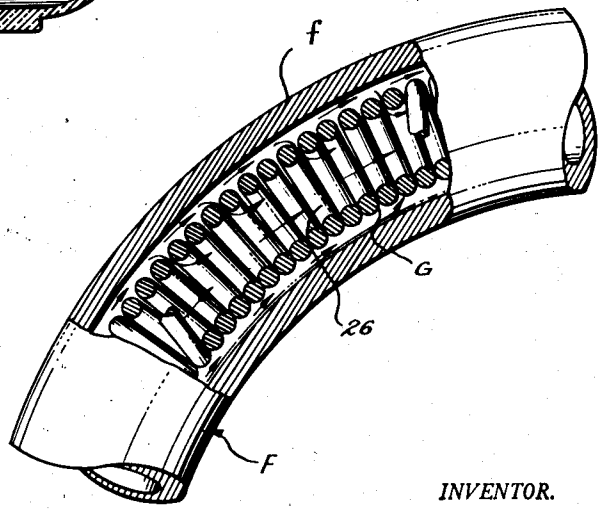
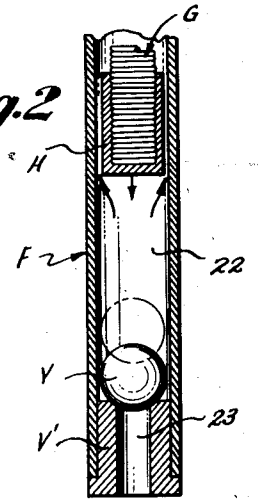



Fig. 2




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## LATHER DISPENSER

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5 Claims. (Cl. 299—84)

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This invention relates to and has for a general object the provision of lather dispenser of simple and economical design which differs from other lather dispensers in the following particulars:

First, a dispenser of my instant design actually produces lather from a volume of liquid soap at each operation instead of merely ejecting a previously formed lather;

It is free from usual springs, screens and superfluous parts at least some of which require careful and micrometric machining and fitting in order to sufficiently agitate and aerate the liquid soap to produce a satisfactory lather, and, as a consequence, requires less service to maintain the apparatus in operation;

The possibiilty of dissipation of the lather by congellation and drying of the saponaceous contents thereof is reduced to a minimum if not actually prevented, but if such a condition should exist, as from a sustained period of disuse, the complete dispensing unit may be removed from the container and readily cleaned by application of hot water thereto, and clogging of the dispenser parts either prevented or corrected.

An important object is to provide a lather dispenser in which the lather is made and dispensed in one operation of an operating plunger by means of the application of pressure thereto to introduce the liquid into a measuring chamber and then pumping a definite measured amount of liquid into a mixing chamber.

Another object is to provide a fixed supply tube which serves as a pump barrel and a piston slidable in the tube and having a flexible stem formed of closely coiled wire arranged so that on a dispensing stroke the liquid soap will be forced upwardly therearound for a sufficient distance and agitated by the introduction of air to the barrel so as to thoroughly aerate the soap and produce lather and thence move through the remaining section of the flexible stem and outwardly through and from an operating member for use in the form of freshly made lather at each operation.

Other objects include the means for mixing air and liquid soap within the supply tube; means for so mounting the dispenser so that the level of soap in the container will always be below the operating unit so as to avoid possibility of leakage around or through the parts thereof, and elimination of all unnecessary packing, washers or gaskets usually provided in lather making machines.

Still other objects may appear as the description of my apparatus progresses.

I have shown a preferred form of lather maker and dispenser embodying my improvements in the accompanying drawing in which:

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Fig. 1 is a substantially full size sectional elevational view;

Fig. 2 is an enlarged fragmentary view of the lower portion of the supply tube or pump barrel on line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary section of the supply tube between the top of the soap container and a point of junction with the dispenser head.

My present dispensing means may be mounted for use on a container of any desired form, size, capacity or material but usually of transparent material such as glass or plastic so that the quantity of liquid soap therein may be visible in order to maintain an adequate supply at all times in the container.

Container A may have an externally threaded neck 2, as shown, to which a portion 3 of a metallic or plastic head B is applied. Head B is preferably formed with a rear bracket-like portion 4 arranged for suitable attachment to a wall or other upright support whereby the assembled unit is held stationarily in position for use, or the unit may be otherwise supported but preferably in such a manner that the container and head are separable for the purpose of servicing the parts or refilling the container, such details not being material to this invention.

Head B has a chamber 5 in communication with a passage 6 in neck 2 of the container, a forwardly extended horizontally disposed section 7 which is bored at 8 to receive a sleeve 9 the bore 10 of which is tooled to snugly fit and support a cylinder C in which an operating plunger D is axially slidable. Cylinder C is externally threaded at 11 so that when inserted into sleeve 9 and is held against axial movement in sleeve 9 by a nut 9' screwed onto cylinder C the dispensing unit is thus held in place. Plunger D is held against rotation in cylinder C by means of a set screw 12 which is extended to a longitudinal slot 13 on the periphery of said plunger.

Plunger D is urged outwardly to utmost extent by means of a coiled spring E which is compressed between the rear end 14 of cylinder C and a disc 15 slidable in the bore 16 of the cylinder rearwardly of plunger D and also serves to compress a sealing disc 17 against the rear end of plunger D and into sealing contact with the surface of cylinder bore 16 so as to prevent leakage of air around said plunger.

Plunger D has a central passage with an outlet 19 at the periphery of a knob 20 at the outer end of the plunger through which lather from the pump barrel F and pump piston stem G is dispensed at each inward thrust of said plunger.

Pump barrel F is screwed into end wall 14 of cylinder C at its upper end and is curved at *f* rearwardly thereof and downwardly through chamber 5 and passage 6 and is thence extended downwardly in vertical position into container A to a point near the bottom 21 where a foot valve V is mounted above and adapted to seat upon a fitting V' for regulating the flow of liquid soap into passage 22 of barrel F and through a passage 23 in fitting V'.

The member G serves as a flexible stem for a piston-like head H and is formed of closely wound wire with its upper end threaded into a nipple 24 of plunger D and its lower end similarly threaded into head H, said head H serving as a closure for the lower end of the hollow stem and but loosely fitting the internal surface of barrel F or, the lower end of member G may be closed with solder. Thus, liquid soap from the lower portion of barrel F is prevented from rising through stem G but does rise through the annular space around head H on each down stroke of the head in response to the inward thrust of plunger D.

Obviously, pressure applied to valve V on each down stroke of head H closes valve V in its seat over passage 23 and forces the soap upwardly into and through barrel F around the closely wound section of stem G and the flow of the upwardly rising liquid soap is interrupted by the serrated periphery of stem G to an extent which sufficiently agitates the liquid soap to occasion its braking up into small globules and affording access of air between the globules and thus thoroughly aerate the soap and produce lather.

When plunger D is pressed inwardly of cylinder C, air in said cylinder is forced through passage 27 into barrel F and mixes with soap at the curved portion *f* of the barrel whereupon air and soap are together forced through openings between adjacent coils of member G, as shown in Fig. 3, thereby forming a lather. The lather so formed is then, by the pressure created in piston G and displacement created by piston G when valve V is closed, forced through member G and thence through passage 18 and outlet 19 into the hand of a user.

When plunger D is released the spring E restores the plunger D to its normally outermost position and the stem G and its head H correspondingly upwardly in barrel F, thereby relieving pressure on valve V and permitting a recharging of the chamber in barrel F above the valve with liquid soap from the container A preparatory to a subsequent dispensing operation.

Of course the barrel F will normally have liquid soap therein to the level of the soap in the container A and when pressure is applied thereto by the inward thrust of plunger D and the downward thrust of head H the valve V will be closed against return of the fluid from said barrel to the container and the level of soap rises in barrel F. At the same time and by the same means the inward thrust of plunger D into cylinder C forces air through a bore 27 in member 25 around member 25 into and through passage 26 of stem G and thence outwardly between the coils of stem G into the surrounding space in barrel F where the air is mixed with the rising soapy liquid and aerates the liquid as it enters passage 26 in stem G to an extent necessary to form a lather and one thrust of plunger D serves to both produce and expel the lather for use.



A return (outward) stroke of plunger D induces a fresh supply of soap from container A into the bottom portion of barrel F and also air is drawn from the atmosphere through outlet 19 and passage 18 and stem G into cylinder C. The size of bore 27 in member 25 is important because if it is too small the flow of air therethrough is unnecessarily restricted or if too large, admits an excessive volume of air to barrel F; also, if too large, an excessive quantity of soap will be admitted to the barrel when plunger D is retracted.

It may be noted that while bore 27 of member 25 is always open to barrel F as the liquid soap rises in the barrel, the pressure of air introduced to the barrel through bore 27 opposes the flow of soap through said bore into cylinder C as plunger D is pushed inwardly and the turbulence thus created in the upper portion of the barrel results in an effective aeration of the soap and transforms the liquid into a lather. The opposing forces generated by plunger D at opposite points in the barrel also force the lather to enter and exhaust through passage 26 in stem G. The curved section of stem G slightly but sufficiently spreads the coils of the stem apart at the outermost arc of the stem so that the lather can freely enter passage 26 without impairing the quality or character of the lather.

Cylinder C being fixed in its position in portion 7 of head B, by removal of set screw 12 the plunger D, stem G and piston H may be removed as a unit from the head B, while barrel F and valve parts V and V' remain in position, but said barrel and cylinder may be removed when the cylinder is detached. Cylinder C is locked against unintentional removal as by means of a split tensioned ring 30 held in a groove 31 near the inner end of the cylinder in such a manner that the ring 30 will abut the rear end of sleeve 9 as shown in Fig. 1.

Usually a closure 32 is provided for closing an opening 33 in the top wall 34 of head B and said cap is secured by a chain 35 to head B for holding the cap on the head against loss or misplacement.

Sleeve 9 may be split longitudinally so that it may be held by inherent tension in the portion 7 of head B or said sleeve may be otherwise stationarily held on head B.

The essence of this invention is in the employment of the means herein described and arranged for simultaneously introducing liquid soap and air under pressure in a barrel at spaced points through the operation of a single member in a single operation to create turbulence at a point in the barrel where the opposing forces are effective for aerating the liquid soap to an extent to produce lather, and for dispensing quantities of lather for use in the same operation.

I claim:

1. In a lather dispensing mechanism having a container for a dispensable soap: a stationary cylinder secured to said container, a right angularly bent barrel secured at one end thereto and provided at its other end with a valve for regulating flow of a soapy liquid from a source into the barrel, a piston vertically reciprocable in the barrel, an operating plunger horizontally reciprocable in said cylinder, and a flexible stem formed of closely coiled wire right angularly bent and secured at opposite ends to said piston and said plunger, means for admitting air from said cylinder as a charge of liquid resident between said valve and said piston is raised in the

barrel to a point of mixture with air from said cylinder preparatory to expulsion through said stem and said plunger for use.

2. In a lather dispensing mechanism having a container for a dispensable soap: a stationary cylinder secured to said container, a right angularly bent barrel secured at one end thereto and provided at its other end with a valve for regulating flow of a soapy liquid from a source into the barrel, a piston vertically reciprocable in the barrel, an operating plunger horizontally reciprocable in said cylinder, and a flexible stem formed of closely coiled wire right angularly bent and secured at opposite ends to said piston and said plunger, means for admitting air from said cylinder as a charge of liquid resident between said valve and said piston is raised in the barrel to a point of mixture with air from said cylinder preparatory to expulsion through said stem and said plunger for use, and means in said cylinder for retracting said plunger and said piston at the completion of each pressure stroke and thereby opening said valve for recharging the barrel with liquid preparatory to a subsequent operation.

3. In a lather dispenser, the combination with a container for liquid soap, of a dispensing head mounted at the top of the container and a dispensing mechanism borne by said head and including a horizontal cylinder, an operating plunger axially slidable in said cylinder in each dispensing operation and formed with a longitudinal outlet passage, a rigid tube forming a pump barrel and formed with an uppermost arcuate section secured to the inner end of said cylinder and having a continuing vertical section depending into said container and the contained liquid soap, a piston slidable in the vertical section of said barrel, a flexible stem formed of closely wound wire secured to the inner end of said plunger with the passage within said coils in communication with the outlet passage of said plunger, a valve in the bottom of the vertical section of said barrel below said piston for controlling flow of soap to said barrel and means for admitting air to said barrel from said cylinder as said plunger is thrust inwardly in each dispensing operation, whereby when said piston is correspondingly thrust downwardly in the barrel said valve will be closed against entrance of further liquid soap thereinto and the liquid soap then contained by the barrel will be forced upwardly around the piston to a point of mixture with the air admitted from said cylinder and aerated to form lather, the lather so formed being expelled from the barrel through the spaces between the coils of said stem and thence outwardly through said stem to the outlet passage in said plunger.

4. In a lather dispenser, the combination with a container for liquid soap, of a dispensing head mounted at the top of the container and a dispensing mechanism borne by said head and including a horizontal cylinder, an operating plunger axially slidable in said cylinder in each



dispensing operation and formed with a longitudinal outlet passage, a rigid tube forming a pump barrel and formed with an uppermost arcuate section secured to the inner end of said cylinder and having a continuing vertical section depending into said container and the contained liquid soap, a piston slidable in the vertical section of said barrel, a flexible stem formed of closely wound wire secured to the inner end of said plunger with the passage within said coils in communication with the outlet passage of said plunger, a valve in the bottom of the vertical section of said barrel below said piston for controlling flow of soap to said barrel and means for admitting air to said barrel from said cylinder as said plunger is thrust inwardly in each dispensing operation, whereby when said piston is correspondingly thrust downwardly in the barrel said valve will be closed against entrance of further liquid soap thereinto and the liquid soap then contained by the barrel will be forced upwardly around the piston to a point of mixture with the air admitted from said cylinder and aerated to form lather, the lather so formed being expelled from the barrel through the spaces between the coils of said stem and thence outwardly through said stem to the outlet passage in said plunger and a spring in said cylinder bearing against and for extending said plunger to its normally outermost position, and a member slidable in said cylinder between which and said plunger said spring is compressed and bored to loosely receive said flexible piston stem so as to permit flow of air around the stem and through said bore to said barrel.

5. In a lather dispenser, a cylinder, a rigid barrel bent from a horizontal to a vertical plane, a plunger reciprocable in said cylinder, a piston loosely fitting and slidable in the vertical section of said barrel and having a flexible stem formed of closely coiled wire defining a passage therein and secured to said plunger in communication with an outlet in the plunger, a valve in said barrel below said piston for controlling communication between a source of soap and said barrel, and means effective at each dispensing stroke of the plunger for simultaneously forcing liquid soap from a source upwardly in the barrel around the piston and air from said cylinder into said barrel for impingement upon and mixture with the rising liquid soap to produce lather for expulsion through the passage in said stem and thence through said plunger for use.

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