

July 25, 1933.

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1,919,257

FLUID DISPENSING APPARATUS

Filed March 12, 1931

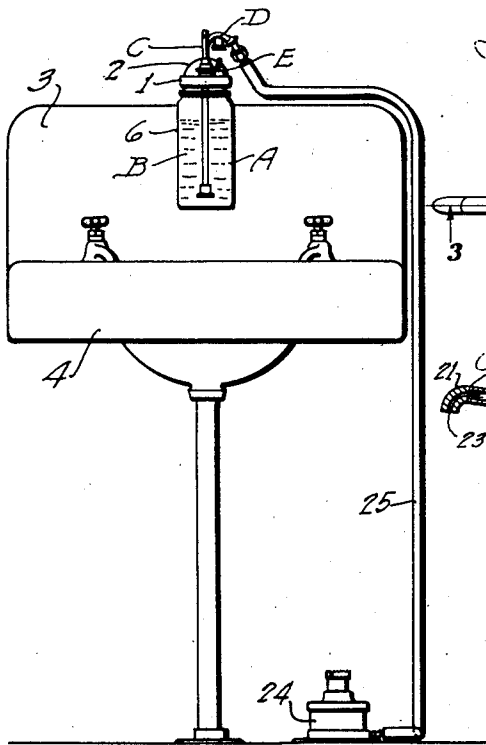


Fig. 1.

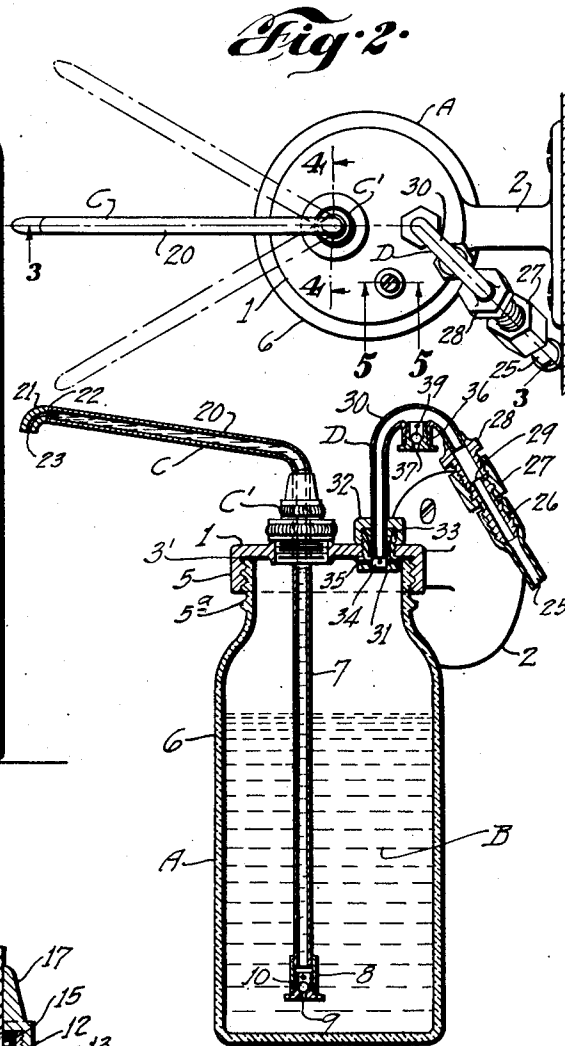


Fig. 2.

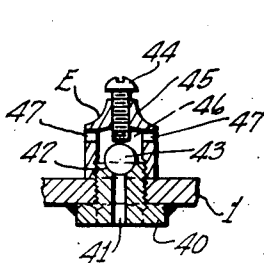


Fig. 3.

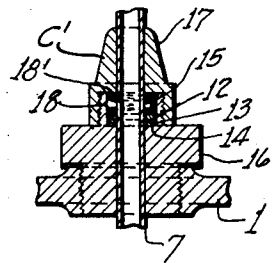


Fig. 4.

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FLUID DISPENSING APPARATUS

Application filed March 12, 1931. Serial No. 521,924.

This invention relates to fluid dispensing apparatus and, more particularly, to a certain new and useful improvement in devices especially, though not exclusively, adapted for the dispensing of liquid soap and the like.

Heretofore, so far as I am aware, soap dispensing devices of the type described have been constructed for direct mechanical motivation of the soap-liquid, as by the use of plungers and the like, which, being thus necessarily in contact with the soap, not only are subject to more or less rapid corrosion, but also contaminate the soap liquid, and, further, it is in practice difficult to prevent leakage of the soap from the apparatus, creating untidy and highly objectionable sanitary conditions.

The prime objects of my invention are hence to provide a simple, easily regulable, clean, and highly hygienic and sanitary liquid soap dispensing apparatus; to provide, furthermore, a soap dispensing apparatus which may be conveniently operated by the user with both hands free for reception of the dispensed soap; to provide a pneumatic fluid motivated dispensing apparatus adapted for precise and easily adjustable regulation of the quantity of soap dispensed; and to generally improve the construction and sanitation of fluid dispensing devices.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement and combination of parts hereinafter described and pointed out in the claims.

In the accompanying drawing,—

Figure 1 is an assembled view of a soap dispensing apparatus of my invention as installed for use;

Figure 2 is an enlarged top plan view of the apparatus;

Figure 3 is an enlarged vertical sectional view of the container and its associated parts of the apparatus, taken approximately along the line 3—3, Figure 2, a fragmentary portion of the pump-conduit being shown, and other parts omitted;

Figure 4 is an enlarged detail sectional view of the swivel packing-connection taken

approximately along the line 4—4, Figure 2; and

Figure 5 is an enlarged detail sectional view of the pneumatic fluid escape valve and its regulating means, taken approximately along the line 5—5, Figure 2.

Referring now more in detail and by reference characters to the drawing, which illustrates a preferred embodiment of my invention, my new soap-dispensing apparatus includes, I may here briefly state, a fluid-tight receptacle A adapted to contain a quantity of the fluid, as liquid soap B, which the apparatus is devised to dispense, as in the illustration of Figure 1, for lavatory use or the like, in convenient predetermined quantities, the soap flowing from the container A preferably through a swingable dispensing spout or conduit C. The liquid soap B is motivated through the conduit C by the agency of air-pressure applied to the liquid surface of the soap by means of a pneumatic pressure applying apparatus D, which includes preferably a suitable foot pump or the like, the quantity of soap B dispensed from the container A on flow of air or like fluid in the apparatus D being variably regulable by means of a pneumatic fluid escape valve E adapted to control the accumulation of fluid pressure in the container A.

The fluid-tight receptacle or container A includes a cap 1 having a bracket 2 for attachment thereof to a support or, as in the present instance, to the rear apron 3 of a lavatory 4. The cap 1 also has a depending circular flange 5 suitably interiorly threaded for supporting engagement with the co-operatively threaded neck 5a of the depending jar or reservoir 6 adapted to contain the fluid soap B to be dispensed, the cap 1 forming hence one wall or the closure of the container A. An annular gasket 3' is preferably interposed between the top of the jar-neck 5a and the underside of the cap 1 for sealing the jar 6 against escape of air, liquid, or other fluid therefrom.

The contents of the container A includes, as I have said, a body or quantity of liquid soap B, that is, soap material in fluid condition and hence freely mobile under air

pressure for movement from the container A through the effluent duct C or the like, as presently appearing.

The discharge-spout C includes a preferably angular extension or air tube 7 adapted to depend in the soap-body B and having a foot or check valve structure at its depending end for immersion in the soap liquid.

Said foot-valve, in turn, includes a ball-retaining chamber 8 communicating with the bore of the tube 7, the bottom wall of the chamber 8 having a liquid passage 9 communicating with the container A, the passage 9 at its upper end having its walls formed with a semi-spherical valve seat complementary to and engageable by a valve-member or ball 10, which by its weight is adapted to normally seal the passage 9 against reflux of the soap liquid from the tube 7 into the container A.

The upper end of the tube 7 is supported for rotation in and through the end wall of the cap 1 by means of a swivel-packing connection C'. This connection includes preferably a laterally projecting step-bearing or collar 12 fixed or mounted in any convenient manner on and encircling the tube 7 and having annular bearing engagement with a complementary ring packing member 13 constructed preferably of felt or like suitable sealing material. The member 13, in turn, annularly engages, on its lower, preferably plane, side, a corresponding seat 14 provided in or on the bottom wall of a packing chamber 15, the side walls of which preferably upstand from a plug or like closure member 16 suitably bored for accommodating the tube 7, the seat 14 preferably surrounding the bore of the tube.

The plug 16 is removably threaded, accessibly from above, into the wall of the cap 1 for providing, by simply removing the plug 16 and its carried tube 7, convenient access to the interior of the container A for replenishment of the soap liquid as required.

A nut or the like 17 bored to fit on the tube 7 threadedly engages the exterior walls of the chamber 15, and a spring 18, mounted over the tube 7, is tensionally engaged between an interposed washer or spring retainer 18' and the opposing upper face of the annular collar 12 for effecting yielding pressure or sealing contact of the opposite faces of the packing ring 13 with the respective opposing faces of the collar 12 and seat 14, thus maintaining fluid-tightness of the container A, while permitting rotatory actuation of the tube 7, for purposes presently appearing.

The efflux conduit C, extending thus rotarily through the swivel packing device C', has its container-exterior portion curved or laterally bent preferably just above the packing device C', in such manner as to provide a swingable dispensing-spout 20, which has a slight inclination from its base or bend up-

wardly towards its discharge end for the accumulation of a body or column of soap-liquid in the spout 20 and the tube 7 normally supported by the foot valve 10.

Mounted on the discharge end of the spout 20, is a tip 21 comprising a bent tubular member having a bore smaller than the bore of the spout 20, the tip 21 having a shouldered portion 22 adapted for interfitting in the bore of the spout 20 for abutting the shoulder of the tip 21 with the end of the spout 20 and thereby providing a smooth continuity to the exterior surface of the spout. The bore of the tip 21 provides a short downwardly turned passage 23 terminating at a point above the bend at the base of the spout 20 for substantially preventing siphonic action on the fluid in the conduit, while the annular interfitted end face of the tip 21 serves as a dam, so to speak, for raising the drainage level of the liquid in the spout 20 in such manner, hence, as to substantially reduce the overflow of liquid from the spout 20 on cessation of pressure conditions in the container A. The tip 21 is, further, at its inner end beveled, as shown, which prevents the adherence thereto of the discharging fluid and hence obviates the formation across the bore of the tip of a soap-film or the like which might interfere with the proper efflux of the dispensed material.

The means D for applying pneumatic fluid pressure to the container A includes a pneumatic foot-pump 24 of suitable construction, and adapted, for convenience, to be disposed on the floor beneath the lavatory 4. The pump chamber (not shown) of the pump 24 communicates with a flexible conduit 25, as a rubber tube or the like, extending from the pump 24 for connection with the container A for supplying pumped air thereto, the conduit 25, for such purpose, being engaged over the suitably scored end of a tube-receptive nipple 26 having a passageway therethrough communicating with the tube 25. The nipple 26 is supported by and projects from a cap 27 threadedly engaging a head 28 having a passageway therethrough provided with a semi-spherical seat engageable by a complementary ball-end 29 formed on the inner end of the nipple 26, as best seen in Figure 3.

The nipple 26 and head 28 when engaged are adapted suitably for communicating with each other and, also, for communicating the tube 25 with a tubular member or goose-neck 30, that is, a tube 30 having an upstanding leg portion and a downwardly or reversely curved leg portion at its upper end, on which latter the head 28 is mounted.

The upstanding leg of the goose-neck 30 is mounted in a socket 31 threaded from beneath through the cap 1 for reception of the end of the goose-neck 30, the projecting end of the socket 31 being, in turn, threadedly engaged by a screw-cap 32 slidable on the

tube 30. The cap 32 has a part adapted to bear on a compression sleeve 33 having a conical seat in the socket 31 for grippingly engaging the inserted end of the goose-neck

5 30. The head of the socket member 31 is provided with a chamber 34 communicating with the bore of the goose-neck 30, the walls of the chamber 34 having suitable ports 35 for communicating the chamber also with the interior of the container A for laterally diverting the entering air and thereby preventing agitation of the container contents.

10 At the bend of the goose-neck 30 depends a valve chamber 36 having communication with the bore of the goose-neck and having in its lower wall a valve-port 37 communicating with the atmosphere, the walls of said port 37 at their upper end terminating in a semi-spherical valve seat complementary to, and adapted to be engaged by, a valve-member or ball 39, which by its weight normally seals the port 37 against escape of air from the pump conduit, a suction flow of air being permitted, however, for hence supplying replacement air to the conduit 25 from a point closely contiguous to the container A.

15 The means E for regulating the accumulation of pneumatic fluid in the container A comprises a plug 40 threaded through the end wall of cap 1 and having a port 41 communicating with the interior of the container. The walls of the upper end of the port 41 are formed with a semi-spherical valve-seat 42 complementary to, and adapted to be engaged by, a valve member or ball 43, which by its weight normally seals the port 41 against admission of air thereinto, but on accumulation of pressure in the container A is adapted to be lifted from its seat 42 for escape of accumulated air from the container A, the rate of flow of the escaping air being regulable by means of a ball-impingeable member or screw 44 threaded through a cap 45 having threaded engagement, in turn, with the projecting end of the plug 40, the cap 45 having a chamber 46 in which the ball 43 may work and the chamber 46 having suitable ports 47 for emission to the atmosphere of air escaping from the container A past the ball 43 when lifted from its seat 42 according to the permissible movement of the ball as determined by the setting of the screw 44.

20 In the use and employment of the apparatus, a suitable quantity of liquid soap B is disposed in the container A preferably through the opening in the cap 1 provided by removing the packing-device C' and conduit C, which, being for such purpose temporarily removed, are then replaced, thus substantially establishing fluid tightness of the container A. However, as I desire to here point out, the entire apparatus is, as will be observed, supported in or by the cap 1 from the bracket

5 2, hence the jar 6 of the container A may,

without disturbing the rest of the apparatus, be readily removed for filling and, also, for cleaning purposes, as may from time to time appear desirable.

On foot-actuation of the pump 24 by the user of the apparatus, air will be pumped into the container A, which air, if not allowed to escape, will accumulate under pressure, thus supplying the necessary force for motivating the soap-liquid outwardly through the conduit C, the soap passing between the ball 10 and its seat, thence through the tube 7 and spout 20 to the user, who, of course, swings the spout 20 to one side or the other as may be most convenient for his purpose.

It will be seen, however, that the duration of motivating pressure conditions on the soap body will depend upon the relief of pressure permitted on pressure lifting actuation of the ball 43 in the escape valve E, which, being determined by the position of the regulating screw 44, may thus be nicely regulated in such manner that, in practice, the amount of soap dispensed on each actuation of the pump 24 may be predetermined in amount, ranging from a few drops to a full ounce, or more, according to the relative proportions of the apparatus.

The regulating device E is simple in adjustment and effectively controls the flow of the soap liquid from the container A, and I might point out that the user of the apparatus is, by pedal actuation of the pump 24, enabled to most conveniently employ both hands, if desired, for reception of the dispensed soap, and, as will be obvious, it is unnecessary to manipulate the apparatus with wet or soapy hands, or to most unhygienically rehandle parts previously used by others.

Upon diminution of pressure conditions in the container, the weight of the column of liquid in the conduit C causes the ball 10 to return to its seat, thus preventing reflux or counter flow of soap-liquid into the container A from the tube 7 and hence maintaining the fluid column in the conduit C substantially at the overflow or drainage level of the spout 20 as determined by the bore of the tip 21. Thus, on renewed dispensing actuation of the pump, the soap merely flows from the hence already filled spout 20 through the short tip passage 23, thereby effectively avoiding spouts, splashings, air pockets, and the like, in dispensing the soap and affording a smooth, even, and easily regulable flow of the soap liquid. I might add that the passage 23 in the tip 21 is so short that siphonic action is practically impossible; thus the flow of soap liquid ceases promptly on relief of motivating pressure, and dripping at the spout is substantially prevented.

It will be seen also that the location of the air inlet valve 37 in the pump-conduit 25 at a point contiguous to the container A is such as to substantially remove the possibility of

dirt or other foreign matter entering into the apparatus with the suction air, a contingency rather unavoidable when the suction inlet is located at the pump or near the floor.

5 It will be seen that my invention accomplishes its objects, and it will be understood that, while I have illustrated a preferred embodiment of my invention, changes and modifications in the form, construction, arrangement, and combination of the several parts
10 thereof may be made and substituted for those herein shown and described without departing from the nature and principle of my invention as defined in the appended claims.

15 Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a fluid dispensing apparatus, in combination, a container having an externally threaded open neck, a flanged cap having

threaded engagement with the container-neck for closure thereof, a bracket fixed to the cap for connection to a support, and a discharge conduit mounted intermediate its ends in the cap for swivelling movement relatively to the container. 70

2. In a fluid dispensing apparatus, in combination, a container having an open neck, a cap having engagement with the container for closure of the neck thereof, said cap having a socket, means including a conduit for accumulating fluid pressure in the container, said conduit having an end presented downwardly through said socket, and a chambered member mounted on the cap in communication with the conduit, said member having a port in its lateral wall for diverting the entering fluid for preventing agitation of the container contents. 75 80 85

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