Nov. 21, 1939. P. LOHN 2,180,989

LIQUID DISPENSING APPARATUS

Filed Feb. 28, 1939

Fig. 1.

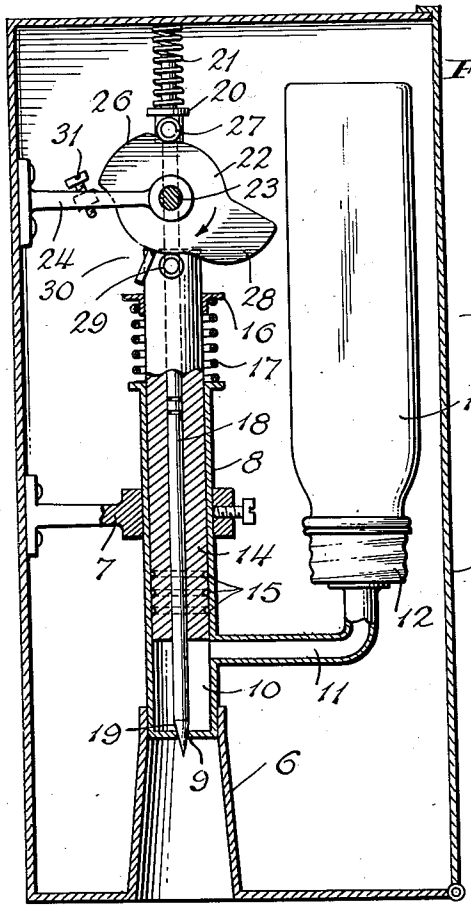


Fig. 2.

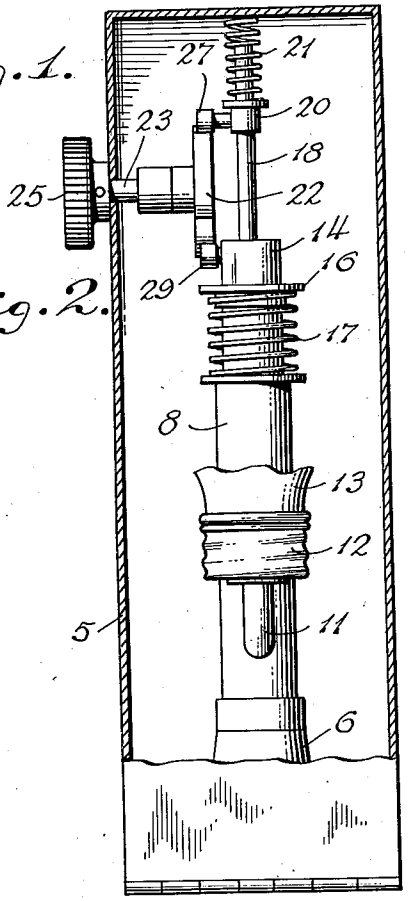


Fig. 3

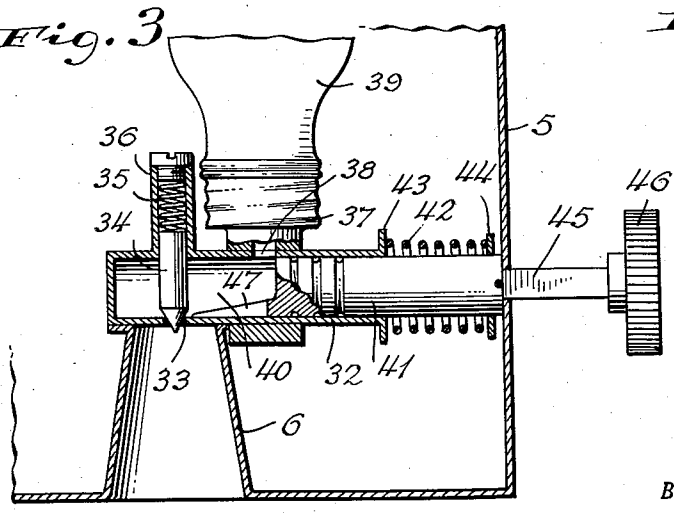
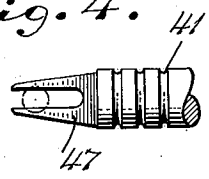


Fig. 4.



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LIQUID DISPENSING APPARATUS

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Application February 28, 1939, Serial No. 258,877

3 Claims. (Cl. 221—102)

This invention relates to improvements in liquid dispensing apparatus and has particular reference to a mechanism for dispensing a measured quantity of liquid from a container.

An object of the invention is to provide an improved apparatus of simple and practical construction wherein a chamber from which a quantity of liquid is adapted to be discharged is provided with an outlet that is controlled by a valve in such manner as to practically eliminate all possibility of coagulation of the liquid in said outlet, which would otherwise hinder or stop the free flow of the liquid from said chamber.

Another object resides in controlling the valve which normally closes the discharge outlet so that said valve is opened at the inception of the operation of an ejector or plunger, utilized to force the liquid from the chamber in which it is contained.

A further object is to operate the outlet control valve and the liquid ejector through the instrumentality of an actuating member common to said valve and ejector.

A still further object is to provide the ejector, which is movable in the liquid chamber to discharge liquid therefrom, with a device which contacts and thereby opens the outlet control valve when said ejector is initially moved to discharge liquid from said chamber.

The above and other objects will appear more clearly from the following detailed description, when taken in connection with the accompanying drawing which illustrates preferred embodiments of the inventive idea.

In the drawing:

Figure 1 is a vertical sectional view through an apparatus constructed in accordance with the invention.

Figure 2 is a similar view taken at right angles to Figure 1.

Figure 3 is a fragmentary vertical section through an apparatus, showing another form of the invention, and,

Figure 4 is a detail plan view of a cam member utilized to operate the valve of Figure 3.

The apparatus of the present invention is especially designed for use in dispensing liquids, such as hand lotions and the like, which have a tendency to congeal when subjected to the atmosphere for any length of time, and one of the principal characteristics of the present construction is to control the flow of such liquid from an outlet in such manner as to avoid coagulation of the liquid in said outlet.

Referring particularly to Figures 1 and 2, the numeral 5 indicates the casing of the apparatus which may be of any design, and which is provided in the bottom thereof with a vertically extending well 6. Vertically disposed within the casing 5 and held in such position by means of a suitable bracket 7, is a cylinder 8 having its lower end projecting into the upper end of the well 6 and provided in said lower end with an outlet 9 through which liquid is discharged from a chamber 10 formed by the lower part of said cylinder. Adjacent the lower end of the cylinder 8 and communicating with the upper end of the chamber 10 is an angular inlet tube 11 for feeding liquid into the said chamber. The outer extremity of said tube terminates in a threaded nozzle 12 for receiving the neck of a receptacle 13, after the latter has been inverted. This receptacle is designed to contain the liquid to be dispensed and after it has been placed in its inverted position within the casing, the liquid will flow therefrom through the tube 11 into the chamber 10.

The size of the chamber 10, from which a measured quantity of liquid is to be dispensed, is controlled by the position of an ejector or plunger 14, mounted for longitudinal movement within the cylinder 8 and normally having its lower end terminating just above the inlet tube 11. If desired, the ejector 14 may be provided directly above the inlet tube 11 with a series of annular grooves 15, which will fill with the liquid from the inlet 11 after the ejector has been operated, and this liquid will act as a lubricant for the ejector in its sliding movement within the cylinder. The upper end of the ejector 14 projects from the adjacent end of the cylinder 8 and at a point spaced from the latter end, said ejector is provided with a collar 16, between which and the flanged end of the cylinder 8 there is interposed a coil spring 17 which yieldably maintains the ejector 14 in a normal raised position.

For controlling the closing and opening of the outlet 9 in the bottom of the chamber 10 there is provided an elongated needle valve 18 which extends centrally through the ejector 14 and has its lower end 19 pointed so that the same will project through the outlet 9 when the valve is in closing position and will thus prevent congealing of liquid in said outlet. The upper end of the valve 18 extends above the adjacent end of the ejector 14 and through a collar 20 secured to said valve. Between said collar and the top of the casing there is interposed a coil spring 21 normally exerting downward pressure upon said collar and consequently upon the valve 18, to

yieldably maintain the point 19 of said valve in its closing position in the outlet 9.

Means are provided in connection with the ejector 14 and valve 18 for concurrently operating the same to lift the valve 18 from its closing position and force the ejector 14 downwardly to discharge the measured quantity of liquid in the chamber 10 through the outlet 9. This operation of moving the ejector and valve in opposite directions is preferably accomplished through the medium of a cam member 22 secured to a shaft 23 mounted for turning movement in a bearing bracket 24 fastened to an inner wall of the casing 5. Said shaft 23 projects outwardly through another wall of the casing and carries upon its projecting end a knob 25 utilized to turn the shaft in the direction indicated by the arrow in Figure 1. At one point on the periphery of the cam member 22, the same is provided with a cam surface 26 engageable with a roller 27 carried by the collar 20 of the needle valve 18, so that as the cam member 22 is turned by manipulation of the knob 25, the roller 27 will immediately be engaged by the cam surface 26, with the result that the needle valve will be raised to open the outlet 9. At substantially the same time that the needle valve starts its upward movement, another cam portion 28, diametrically opposed to the cam surface 26, engages with a roller 29 secured to the upper projecting end of the ejector 14. As the cam 28 engages the roller 29 during the progressive turning movement of the knob 25, said cam 28 acts to force the ejector 14 downwardly in the cylinder 8 against the tension of the spring 17, with the result that the ejector will first close the inlet tube 11 and thereafter forcibly discharge the liquid in the chamber 10 through the outlet 9. The turning movement of the cam member 22 is limited by contact of a projection 30 thereon with an adjustable stop 31 mounted upon the bearing bracket 24, the extent of the turning movement being indicated by the dotted lines in Figure 1. It will be noted that the surfaces of the two cam portions 26 and 28 are so inclined that after the knob 25 has been turned to its extreme position, during which time the springs 17 and 21 are compressed, and the knob is then released, said springs will act to force the rollers 29 and 27, respectively, against the cam surfaces in such manner that the cam member 22 will be restored to its normal position by the pressure of said springs and the latter will also effect the restoration of the ejector 14 and valve 18 to their normal positions.

In the form of the invention shown in Figures 3 and 4, the casing 5 of the apparatus is again provided with the well 6 in the bottom thereof. A cylinder 32, somewhat similar to the cylinder 8, is mounted in a horizontal position within the casing 5 with a portion of the closed end of the cylinder positioned directly above the upper end of the well 6, said portion having the outlet opening 33 therein. Said opening is normally closed by the needle valve 34 extending diametrically across the cylinder 32 and the valve yieldably held in its normal position by a coil spring 35 positioned within the extension 36 of the cylinder and into which the upper end of the valve projects so as to be guided in its movements to opening and closing positions. A threaded nozzle 37 is carried by the cylinder 32 intermediate its ends and has an opening therein communicating with the inlet opening 38 formed in said cylinder, so that liquid from the inverted receptacle 39, the neck of which is mounted in said nozzle, may flow into the chamber 40 formed in one end of the cylinder 32.

The size of the chamber 40 is defined by the ejector 41 slidably mounted within the cylinder 32 and normally held in a retracted position by the coil spring 42 interposed between the flange 43 of said cylinder and a collar 44 secured to the projecting end of the ejector 41. An extension 45 of the ejector projects through a wall of the casing 5 and on its projecting end is provided with a knob or handle 46 utilized to force the ejector 41 inwardly against the tension of the spring 42, when it is desired to discharge the contents of the chamber 40.

The inward movement of the ejector is utilized to open the valve 34 so that the liquid within the chamber 40 will be forced through the outlet 33. For this purpose, the inner end of the ejector 41 has extending horizontally therefrom a bifurcated cam member 47, which is so positioned with respect to the needle valve 41 that the point of the latter will be engaged in the bifurcation of the member 47, as the ejector 41 is moved inwardly and the cam surfaces of said member 47 will consequently engage the pointed end of the valve and raise the same against the tension of the spring 35, thus permitting the liquid in the chamber 40 to flow through the outlet 33 under pressure of the ejector 41. When the knob 46 is released, the spring 42 will act to restore the ejector 41 and as the cam member 47 is retracted, the spring 35 will force the valve 34 to its closed position, where it will, like the valve 18, clear the outlet of liquid and thus prevent any coagulation thereabout.

What is claimed is:

1. In a liquid dispensing apparatus, a liquid receiving chamber having an outlet, a spring pressed valve normally closing said outlet, an ejector movable in said chamber to discharge liquid therefrom and through said outlet when said valve is opened, and means on said ejector to open said valve at the inception of movement of said ejector.

2. In a liquid dispensing apparatus, a liquid receiving chamber having an outlet, a spring pressed valve normally closing said outlet, an ejector movable in said chamber to discharge liquid therefrom and through said outlet when said valve is opened, and a cam extending from one end of said ejector and engageable with said valve to open the same when said ejector is moved to discharge liquid from said chamber.

3. In a liquid dispensing apparatus, a liquid receiving chamber having an outlet in a wall thereof adjacent one end, a spring pressed valve extending across said chamber and normally closing said outlet, an ejector movable in said chamber to discharge liquid therefrom and through said outlet when said valve is opened, and a cam extending from one end of said ejector and engageable with said valve to open the same when said ejector is moved to discharge liquid from said chamber.

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