United States Patent

[11] 3,581,957

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[54] **OPERATOR FOR LIQUID DISPENSERS**
3 Claims, 6 Drawing Figs.

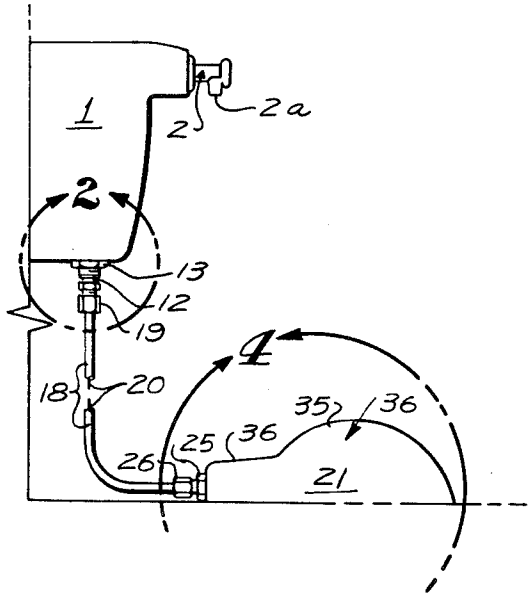
[52] **U.S. Cl.** **222/505,** 222/214
[51] **Int. Cl.** **B67d 5/06**
[50] **Field of Search** 222/278, 272, 179, 400.8, 505, 214; 103/148; 15/250.01, 250.02, 250.04

[56] **References Cited**
UNITED STATES PATENTS

2,311,624	2/1943	Bobrick	222/400.8X
2,648,288	8/1953	Marks	103/148
2,665,825	1/1954	Poitras et al.	222/179X
3,233,787	2/1966	Ross	222/179

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ABSTRACT: An operator for liquid dispensers, particularly liquid soap, which is capable of hand, foot or other remote operation to cause discharge from a single nozzle; the foot operator utilizing a tube adjacent the inlet end of the dispensing tube which is squeezed by a plunger moved by a slide rod within a control cable; the slide rod in turn being operated by the reciprocal end of a foot-engaged leaf spring.



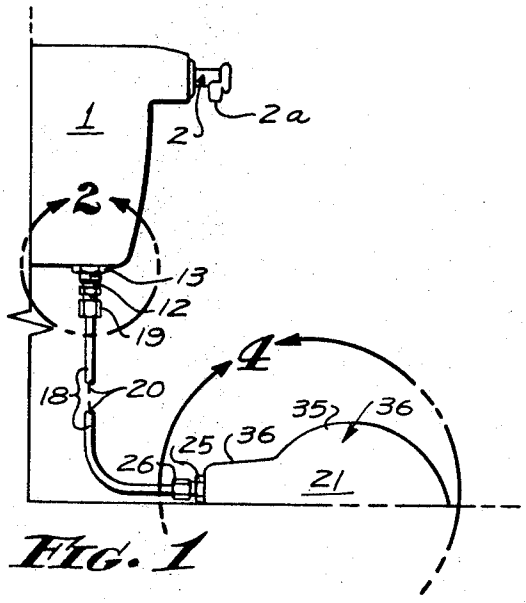


FIG. 1

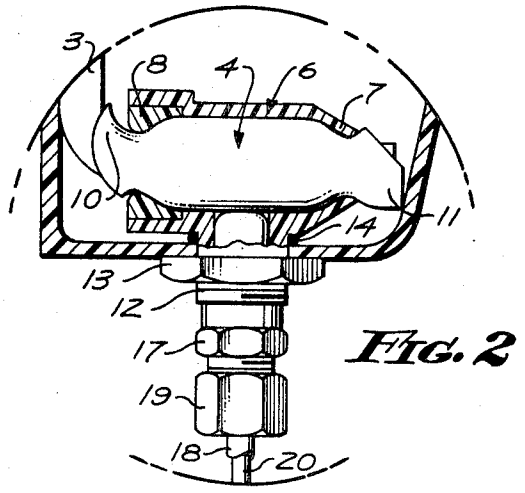


FIG. 2

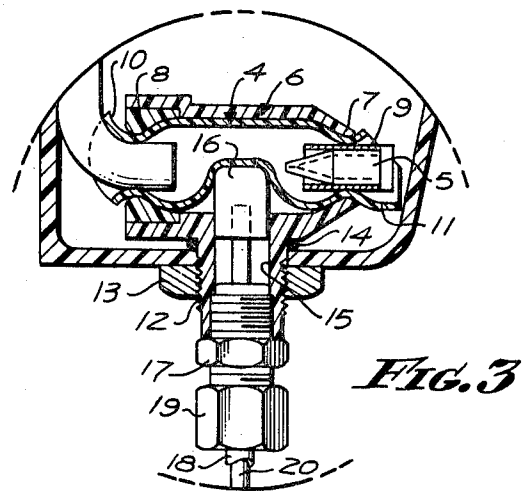


FIG. 3

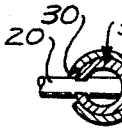


FIG. 6

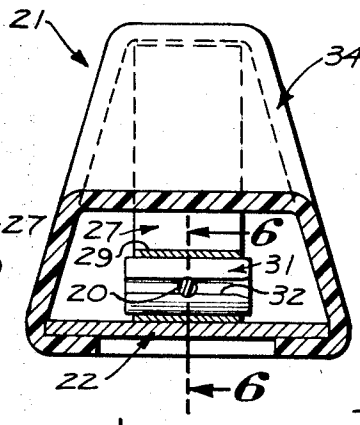


FIG. 5

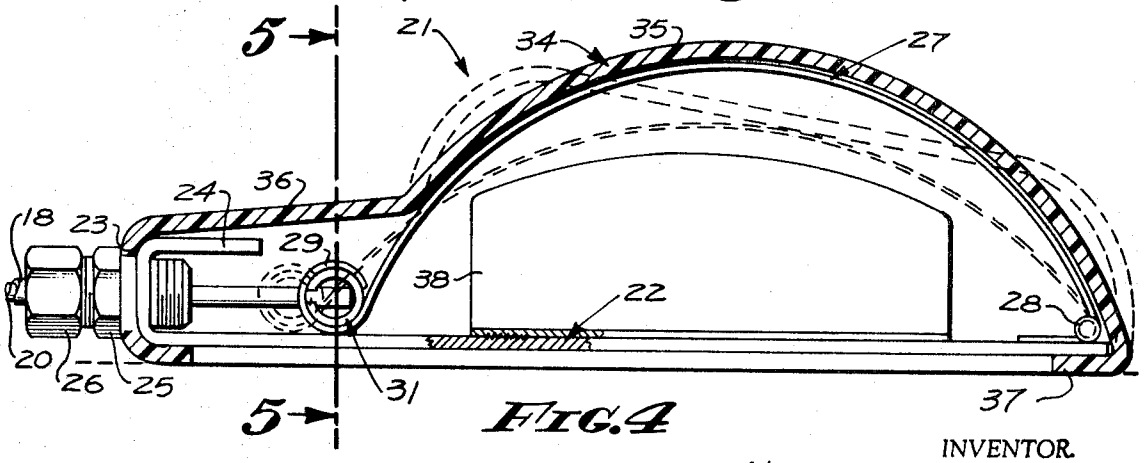


FIG. 4

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OPERATOR FOR LIQUID DISPENSERS

BACKGROUND OF THE INVENTION

Liquid dispensers which are operated either by hand or by foot are exemplified by U.S. Pat. No. 2,311,624, in which a closed liquid system transmits movement of a foot-operated diaphragm to the dispensing unit. This arrangement, while extensively used, has posed a problem in installation and maintenance of the liquid system, as well as the necessarily high cost.

SUMMARY OF THE INVENTION

The present invention is directed to a hand or foot operated liquid dispenser, and included in the objects of the invention are:

First, to provide an operator for liquid dispensers wherein a conventional hand operated liquid dispenser, such as disclosed in copending application, Ser. No. 702,277, filed Feb. 1, 1968 and issued May 27, 1969 as U.S. Pat. No. 3,446,405 is modified to include a foot control.

Second, to provide a liquid dispenser control wherein a squeeze tube, located in the soap reservoir chamber at the inlet end of the discharge tube is engaged by a plunger operated by a slidable thrust rod which, in turn, is reciprocated by a foot-operated means; the squeeze tube remaining ineffective when the hand control is operated.

Third, to provide a liquid dispenser incorporating a novelly arranged foot operator wherein an arched leaf spring is encased in a flexible housing and attached to a reciprocable operating rod, the housing being yieldable to foot pressure to permit the arched spring to extend or contract thereby reciprocating the operating rod.

DESCRIPTION OF THE FIGURES.

FIG. 1 is a reduced side view of the operator for liquid dispensers.

FIG. 2 is an enlarged fragmentary sectional view, taken within Circle 2 of FIG. 1, showing the foot-operated dispensing pump in its normal or expanded condition and the operator in its retracted position.

FIG. 3 is a similar fragmentary sectional view of the dispensing pump in its contracted position and the operator in its extended position.

FIG. 4 is an enlarged sectional view of the foot operator, taken within Circle 4 of FIG. 1.

FIG. 5 is a transverse sectional view of the foot operator, taken through 5–5 of FIG. 4.

FIG. 6 is a fragmentary sectional view, taken through 6–6 of FIG. 5, showing the means of connection between the thrust rod and the foot-operated spring.

The operator for liquid dispensers is intended for use in conjunction with a liquid container or reservoir 1, having a hand dispenser or operator 2, mounted in the upper portion of the reservoir and having an outlet 2*a*. The hand dispenser or operator may be the same as that disclosed in the aforementioned copending application, Ser. No. 702,277, or the type disclosed in U.S. Pat. No. 2,311,624, issued Feb. 23, 1943, modified to include an inlet tube 3 extending to the bottom of the reservoir 1.

The lower end of the inlet tube 3 fits within a squeeze tube 4, which functions as a pump. The remaining end of the squeeze tube is provided with an inlet valve 5, preferably of the duck bill type. The squeeze tube 4 is contained within a cylindrical housing 6, having a constricted end 7, and receiving a constricted internal collar 8. The collar 8 is cemented in place and the collar 8 and constricted end 7 compress the extremities of the squeeze tube around the inlet valve 5 and the inlet tube 3. The squeeze tube may engage the inlet valve directly, but it is preferred to mount the inlet valve within a sleeve 9.

Beyond the collar 8, the squeeze tube 4 flares outwardly, as indicated by 10, and serves to prevent the inlet tube 3 from kinking. The opposite extremity of the squeeze tube is flared, as indicated by 11, to guard and to ensure access to the inlet valve 5.

The housing 6 is provided with a side fitting 12, which is screw threaded and extends through an opening in the bottom of the soap reservoir 1. The fitting 12 receives a mounting nut 13, and a suitable seal ring 14 is provided at the juncture between the housing 6 and the side fitting. The side fitting is provided with a bore 15, which receives a plunger 16. The plunger is reciprocal and moves between a retracted position, shown in FIG. 2, permitting the squeeze tube to assume its normal shape, and an extended position, shown in FIG. 3, in which the sidewall of the tube is squeezed inwardly. The squeeze tube is formed of plastic material having elastomeric qualities; for example, but not limited to, polyvinyl.

The side fitting 12 is internally screw threaded to receive a sleeve coupling 17, which is secured to one end of a sleeve 18 by means of a conventional clamp nut 19. The sleeve is preferably formed of extruded plastic tubing, and contains an operating rod 20 which may likewise be formed of plastic material.

The operating rod or thrust rod 20 is controlled by a foot operator 21, which includes a baseplate 22, one end of which is folded upwardly to form a mounting member 23, then is doubled backwardly to form a guard portion 24. The mounting member 23 receives a sleeve coupling 25, and clamp nut 26 which secures the sleeve 18 with respect to the foot operator. The thrust rod 20 extends beyond the sleeve into the foot operator above the baseplate 22.

Mounted on top of the baseplate 22 is an arched leaf spring 27. The end of the spring remote from the mounting member 23 is joined to the baseplate by a hinge 28. The spring 27 arches upwardly from the hinge 28 and toward the mounting member 23, terminating in a cylindrical loop end 29, having a circumferential slot 30 which receives the end of the thrust rod 20. The cylindrical loop end 29 receives a split tubular pin 31, having a longitudinal slot 32, which in turn is dimensioned so that the tubular pin 31 is firmly clamped to the thrust rod 20.

The spring 27 and baseplate 22 are encased in a yieldable housing or cover 34, having an arched portion 35, conforming to the curvature of the spring 27, and an end portion 36 overlying the guard portion 24. The lower side of the cover 34 is open except for an internal rim 37 which underlies the margins of the baseplate 22.

The housing 34 and the spring 27 are intended to be depressed by foot pressure and a stop 38 is provided under the spring 27 so as to limit movement of the loop end 29.

Operation of the operator for liquid dispensers is as follows:

It is desired to obtain liquid by hand operation, the hand dispenser or operator 2 is reciprocated in a conventional manner which draws in a charge of liquid through the inlet valve 5, causing a like amount of liquid to be dispensed all as more fully set forth in the aforementioned copending application.

If it is desired to use the foot operator 21, the housing or cover 34 and spring 27 are depressed, as shown by dotted lines in FIG. 4, causing the loop end 27 to move the operating or thrust rod 20 in a direction to drive the plunger 16 from the position shown in FIG. 2 to the position shown in FIG. 3. This operation compresses the squeeze tube 4 causing a charge of liquid to issue from the dispenser 2.

While particular embodiments of this invention have been shown and described, it is not intended to limit the same to the details of the constructions set forth, but instead, the invention embraces such changes, modifications and equivalents of the various parts and their relationships as come within the purview of the appended claims.

I claim:

1. A liquid dispenser, comprising:
   a. a liquid reservoir;
   b. a reciprocal hand operated pump mounted on said reservoir for the discharge of liquid from the reservoir;
   c. an inlet tube for supplying liquid to said hand operator, said inlet tube extending to the bottom of said reservoir;

d. a squeeze tube of larger diameter than said inlet tube continuing therefrom;
c. an inlet valve at the extremity of said squeeze tube;
f. a tubular housing for said squeeze tube within said reservoir, said housing having an integral constricted end to receive and compress one end of said squeeze tube and a plug in its other end to compress the other end of said squeeze tube, the ends of said squeeze tube being compressed into sealing engagement with said inlet tube and said inlet valve;
g. said housing having a side fitting projecting from said housing through a wall of the reservoir and having a bore confronting said squeeze tube;
h. a reciprocal means for squeezing said squeeze tube mounted in said bore; and
i. foot operator means for activating said reciprocal means to provide a foot-operated pump for the discharge of liquid from the reservoir.

2. A liquid dispenser, as defined in claim **1**, wherein said foot operator comprises:

a. a baseplate;
b. an arched leaf spring mounted on said baseplate and including a free end reciprocal when the arched leaf spring is foot depressed; and
c. a thrust rod operatively connecting said spring and said reciprocal tube squeezing means.

3. A liquid dispenser, as defined in claim **1**, wherein said foot operator comprises:
a. a baseplate;
b. an arched leaf spring hinged at one end to said baseplate and having a free end reciprocal on said baseplate;
c. a flexible cover for said leaf spring arched in conformity thereto, said cover and spring being foot depressible to reciprocate the free end of said spring;
d. a guide sleeve extending from said baseplate to the side fitting of said squeeze tube housing; and
e. a thrust rod slidable in said sleeve and secured to said spring and to said reciprocal means.