

April 17, 1956

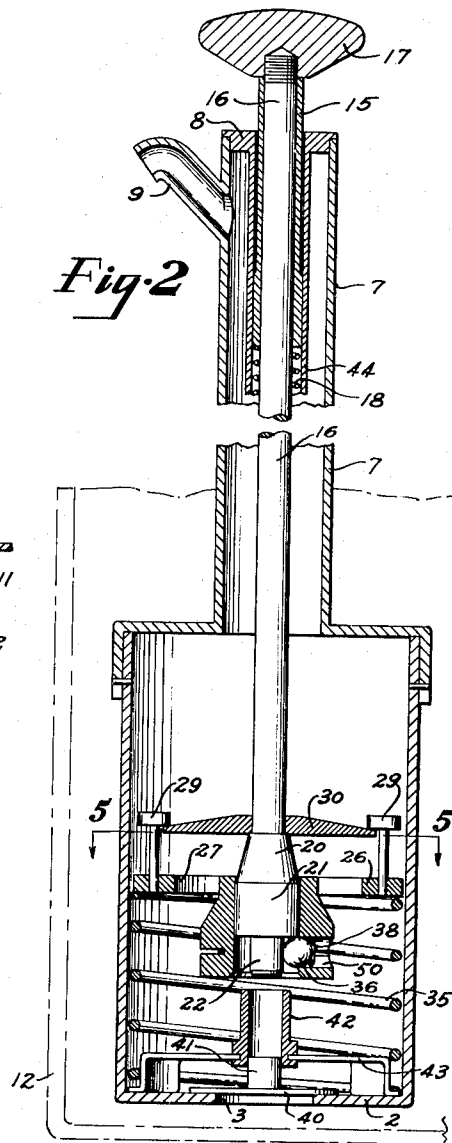
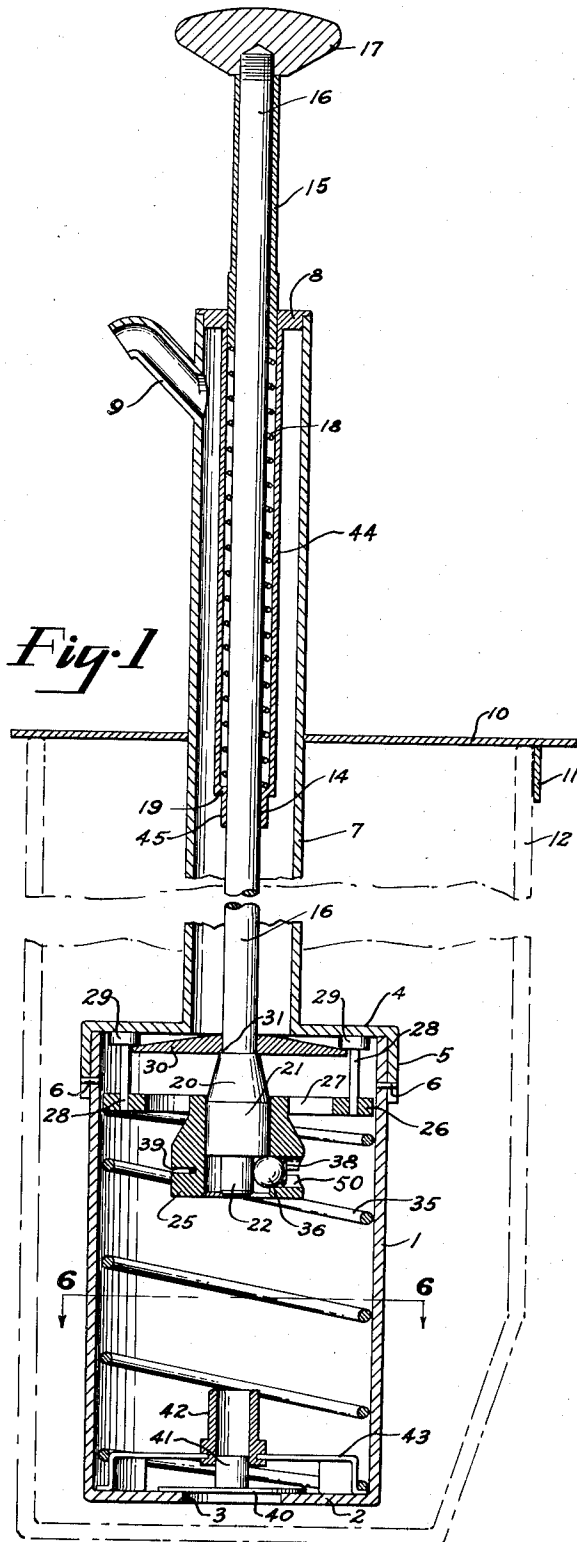
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LIFT PUMP

Filed June 26, 1951

2 Sheets-Sheet 1



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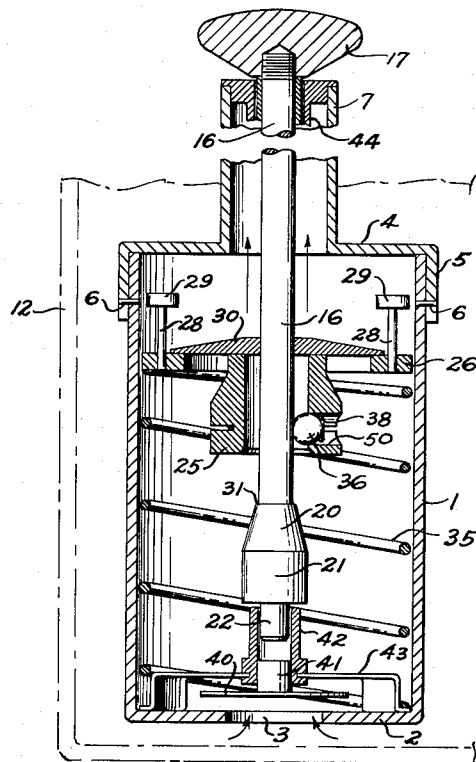
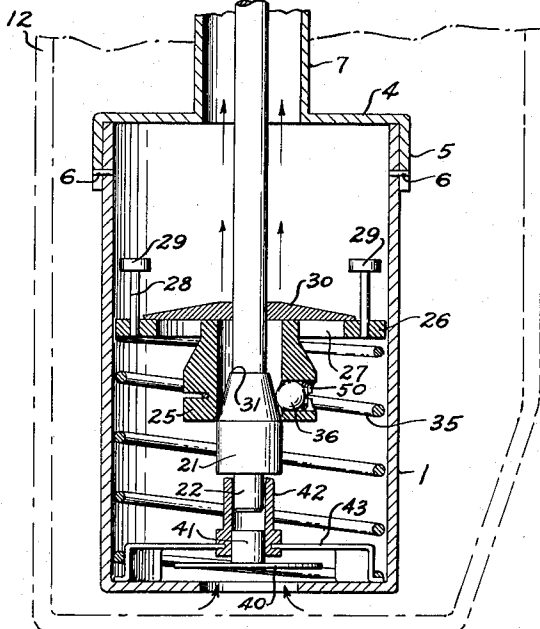
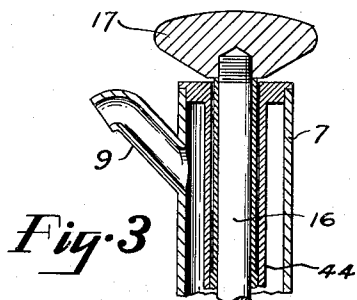


Fig. 4

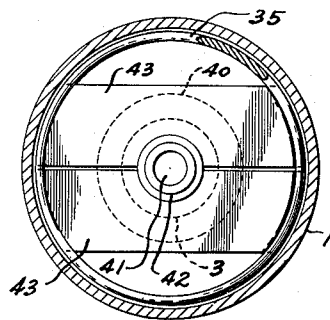


Fig. 6

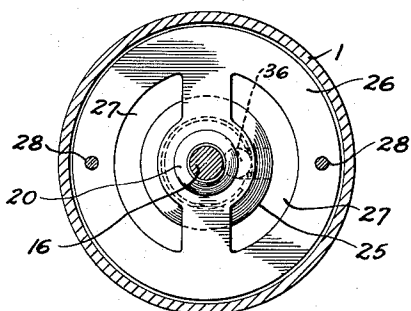


Fig. 5

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LIFT PUMP

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4 Claims. (Cl. 103—178)

The present invention, relating as indicated to a dispensing pump, is more particularly directed to a pump particularly adapted for use at soda fountains and the like for dispensing an accurately measured quantity of any one of a number of liquids in a single stroke operation. A particular object of the invention is the provision of a pump of this nature of simple design and consisting of parts which may be readily disassembled and completely cleaned since an essential of such a pump is absolute cleanliness and the ability to clean the same completely free of solids which may have crystallized from the syrup or of bacteria.

A further object of the invention is the provision of a dispensing pump of this character in which the delivery stroke follows automatically immediately upon the completion of the manual positioning stroke which is carried out by the operator. The delivery stroke is independent of any action by the operator so long as the first or positioning stroke has been carried out.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a transverse vertical longitudinal section through my improved invention showing the same in relation to and within a liquid containing compartment;

Fig. 2 is a similar section showing the pump when nearing the completion of the inward or manually carried out piston positioning stroke;

Fig. 3 is a similar view showing the position of the piston upon the completion of the inward or positioning stroke with the piston in a partially returned position;

Fig. 4 is a similar view showing the piston when nearly returned to its upper or discharge position;

Fig. 5 is a section on the line 5—5 of Fig. 2; and

Fig. 6 is a plan view looking down upon the inlet valve retaining means.

In recent years considerable concern has been shown by health authorities in various municipalities as to the proper cleansing and sanitary facilities provided in dispensing apparatus which is used in soda fountains and the like. Much, if not all, of the present day equipment in use has been found to provide numerous recesses that are almost inaccessible from a cleansing standpoint. In these recesses liquids and syrups may collect and harden and bacteria develop and the harmful effect of the material in such uncleansed recesses is obvious. It is a requirement of most modern health authorities and sanitary codes to have in use only such apparatus as may be readily and thoroughly cleansed and in which there are no recesses and cleanliness of which cannot be observed with the naked eye.

I have designed a pump which conforms in all respects

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with the most rigorous modern codes as to type of metal used and required construction, and further have provided a pump that is automatic in its delivery operation.

Referring now to Fig. 1, my improved pump is shown to consist of a cylinder 1 having a closed lower end or bottom 2, except for an inlet opening 3 therein, and an open upper end which in operation is closed by a top 4 provided with a flange 5 having a bayonet locking connection with pins 6 disposed externally and adjacent the upper end of the cylinder 1. The top 4 of the cylinder is constructed in the form of a conduit 7 leading to the interior of the cylinder and extending upwardly to a closed upper end 8 and to a dispensing spout 9. Suitably connected to the conduit 7 is a receptacle closure 10 having flanges 11 which engage against and over the top open end of a syrup container 12.

The conduit 7 is provided with an opening in its upper end 8 within which is slidably mounted a tube 15 secured to a plunger rod 16 provided with an operating handle 17. Against the lower end of the tube 15 there bears a coil spring 18, the lower end of which is supported upon the inwardly extending shoulder 19 of the lower end 45 of the tube 44 and this lower end 45 forms a journal within which the plunger rod 16 is carried for reciprocal movement into and out of the cylinder 1.

The plunger rod 16 extends in its upper or normal position into the upper portion of the cylinder and is provided with a tapered portion 20 adjacent its lower end, followed by an enlarged cylindrical portion 21 and a reduced end portion 22 forming a flange on the portion 21.

Mounted upon the lower end of the plunger rod 16 is a piston consisting of a central skirt portion 25 and a flat piston proper 26, provided with openings 27 therethrough.

Mounted upon the piston 26 are pins 28 which, in turn, end in buttons 29 against the lower surfaces of which there is pressed a valve 30 which is carried upon a shoulder 31 at the juncture between the plunger rod proper 16 and the tapered portion 20 thereof. All of the parts above mentioned relating as they do to the piston are hereafter termed and referred to as the piston assembly.

The piston assembly is normally carried or supported at the upper end of the cylinder 1 by means of a heavy coil spring 35 disposed within the cylinder and engaging against the bottom thereof and also against the bottom surface of the piston 26. The piston is releasably connected to the plunger 16 by means of a ball 36 normally held in the position in a recess shown in Fig. 1 against the reduced end portion of the rod 16 by means of a spring 38 mounted in a groove 39 encircling the lower portion of the piston skirt 25.

With the syrup jar 12 containing an amount of syrup sufficient to cover the top of the cylinder 1 and with the plunger and associated piston in the position shown in Fig. 1 the device is ready for operation. In this condition the cylinder is full of syrup which has been caused to flow into the cylinder through the inlet opening 3 in the bottom of the cylinder during a period when the inlet closing valve 40 was open in a previous cycle of operation. This valve or check plate 40 is a lift valve provided with a centrally disposed projecting portion 41 fitting within a tubular guide 42 which in turn is positioned as shown in Fig. 1 and there maintained by means of bridge pieces 43 fitted into a closure encircling the tube 42 and mounted upon the bottom of the cylinder, said tubular guide and bridge constituting a releasing means for the piston.

The operator now depresses the handle 17, pushing it its full length and thereby causing the following operation.

The entire piston assembly is moved downward thereby increasingly compressing the spring 35 against which the piston operates and such movement is continued until the bottom of the stroke is reached. In Fig. 2 the

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plunger rod and associated piston are shown at slightly over half of its inward stroke. During this downward movement of the piston the liquid contents of the cylinder flows upwardly through the openings 27 in the piston 26 and then around the disk 30, the position of which is determined by its support upon the shoulder 31 at the lower end of the piston and its contact with the heads 29 on the pins 28. During this downward movement of the piston the inlet valve 40 is closed.

The downward stroke is, as already mentioned, a manual stroke carried out by the operator who merely depresses the handle 17, forcing the plunger inwardly as far as it will go.

As the plunger is depressed toward its inward and limiting position the end 22 of the plunger enters the tube 42 and the edges of this tube engage against the ball 36 which is thus forced outwardly against its spring 38 to a position which releases the piston from the portion 21 of the piston rod. As soon as the piston and rod are released from each other the action shown in Fig. 3 begins and the force of the compressed spring 35 forces the piston assembly upward through the liquid, lifting the liquid through the conduit 7 and causing its discharge from the spout 9. This action is automatic and is caused by the compression of the spring on the downward stroke of the plunger rod. Such action is entirely free of control by the operator and begins to occur during the downward stroke of the plunger rod as soon as the end portion 22 of the latter enters the tube 42 and causes the upper edges of the tube 42 to displace the ball 36.

The initial movement of the piston assembly upward with the plunger rod in position shown in Fig. 3 permits the valve 30 to drop, sealing the openings 27 in the piston and causing the latter to act for the lift stroke as a solid piston. This is the position shown in Fig. 3 and Fig. 4 and in the latter figure the piston has reached its normal or upward position and as the plunger rod is returned to its original position by means of the spring 18 the flange 31 of the plunger rod, again picks up the valve 30 and lifts it into its position beneath the pins 29, as shown in Fig. 1.

Furthermore, as soon as the piston is urged upwardly by the compression of the spring 35, the movement upward of the liquid already contained in the cylinder 1 causes a lifting of the inlet valve 40 which is held open during the upward or delivery stroke and permits fresh liquid to flow into the bottom of the cylinder through the inlet valve 40, thus again refilling the cylinder and making it ready for a repetition of the cycle of operations.

To disassemble my pump for the purpose of cleaning, the entire pump unit consisting of the cylinder, conduit 7 and, of course, the piston assembly, can be removed with the cover plate 10 from the receptacle. The cylinder 1 can then be removed by means of the bayonet lock and cleaned separately, both inwardly and outwardly, and similarly the piston assembly can be moved downwardly from the cover by slight depression of the handle 17 with respect to the conduit 7 and all surfaces of the piston assembly, piston rod, etc., can thereupon be subjected to cleaning action.

Assembly is, of course, extremely simple after cleaning, as all that has to be done is fasten the cylinder proper to the top member 4 through the medium of the pins and the bayonet slots.

I claim:

1. In a dispensing lift pump having a manually operated positioning stroke and an automatic delivery stroke, a plunger rod having a bottom portion with a reduced diameter forming a flange, a valved piston releasably connected with said rod, said piston having a recess and a spring pressed ball in said recess for connection with the rod, a cylinder closely surrounding said piston having a lower end, a dispensing spout, a conduit connecting said spout to the cylinder, independent resilient mounting

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means for both the piston and the plunger rod, said mounting means for the piston being positioned between the piston and the lower end of the cylinder, said piston and plunger rod being connected by means of engagement between the ball in the recess of the piston and said flange on the plunger rod whereby force on said plunger rod will depress the piston through the ball and at the same time depress the resilient mounting means between the piston and the cylinder, said cylinder having tripping means at the lower end thereof engaging and depressing said ball at the end of positioning stroke whereby at the completion of said manually operated positioning stroke the piston and plunger rod are released from one another and the delivery stroke is effected by the expansion of the resilient mounting means for the piston.

2. In a dispensing lift pump having a manually operated positioning stroke and an automatic delivery stroke, a plunger rod, a piston having a recess therein for connection with said plunger rod, a cylinder closely surrounding said piston having a lower end, a dispensing spout, a conduit connecting said dispensing spout to the cylinder, valving means for said piston and cylinder comprising a check plate valve for the piston and a further valve at the lower end of the cylinder, and spring mounting means for the plunger rod with respect to said cylinder, and spring mounting means between the piston and the lower end of the cylinder, said plunger rod being releasably connected to the piston by means of the recess in said piston, and a resiliently mounted ball in said recess to be contacted by the end of said plunger rod, said check plate valve slidably mounted on said plunger rod, said piston having means for limiting the vertical travel of said check plate valve, a shoulder on said plunger rod adapted to hold said check plate valve in open position whereby pressure on said plunger rod forces said piston downwardly permitting fluid to flow through said piston, said check plate valve being limited by the limit means, said cylinder having tripping means at the lower end thereof engaging and depressing said ball at the end of the positioning stroke whereby the release of said plunger rod and piston and the reversal of the direction of said piston movement by the expansion of the spring mounting means for the piston forces the liquid against said check plate valve and dispenses the liquid and the spring mounting means for the plunger rod returns the plunger rod to its original position.

3. In a dispensing lift pump having a manually activated positioning stroke and an automatic delivery stroke, a plunger rod having a flanged lower end, a piston releasably connected therewith, a cylinder closely surrounding said piston having a lower end, a dispensing spout, a conduit connecting said cylinder to the spout, a fluid valve in said piston, another fluid valve at said end of said cylinder, a spring between said piston and said end of said cylinder, releasing means in the piston consisting of a resiliently mounted ball and a recess for said ball in the piston, said flanged end on the plunger rod connected to the piston through said resiliently mounted ball, and tripping means at the end of the cylinder engaging said ball at the end of the positioning stroke for releasing said plunger rod and piston whereby the piston is released from said plunger rod for the activation of the automatic delivery stroke.

4. In a dispensing lift pump of the plunger type having a manually activated positioning stroke and an automatically activated delivery stroke whereby precision delivery of fluid is possible, a plunger rod, a piston releasably connected to said rod and having valve openings therein for fluid flow, a cylinder closely surrounding said piston and having a lower end, a dispenser spout, a conduit connecting said dispensing spout to the cylinder, support means for said dispensing spout, cylinder and conduit, resilient mounting means for the plunger rod, further resilient mounting means between the cyl-

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inder and the piston to effect the mechanically activated delivery stroke, said last mentioned resilient mounting means being stronger than said plunger rod resilient mounting means, a check valve for said cylinder at the lower end thereof, a check valve for said piston valve openings comprising a check plate adapted to cover said openings, means releasably connecting said piston and plunger rod, said means comprising a recess in the piston, a spring mounted ball in said recess, and a flange on said plunger rod adapted to contact said spring mounted ball, tripping means on the lower end of said cylinder for releasing said plunger rod from the piston by forcing the spring mounted ball into the recess where-

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by the strong resilient mounting means for the piston forces the piston upwardly against the check plate thereby forcing fluid out the dispensing spout.

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