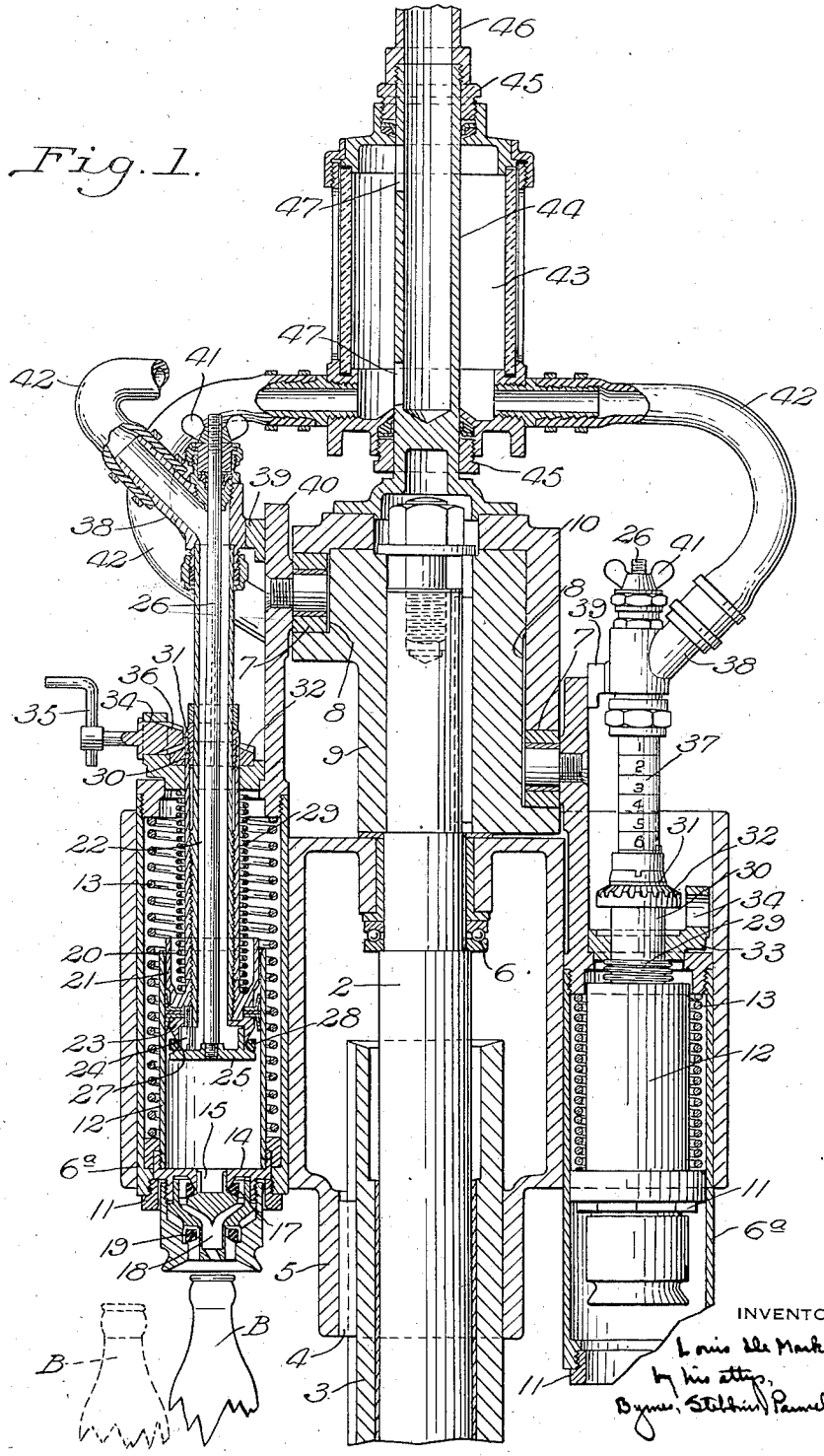
June 9, 1936. L. DE MARKUS 2,043,578

PUMP FOR FILLING MACHINES

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Fig. 1.



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Fig. 2.

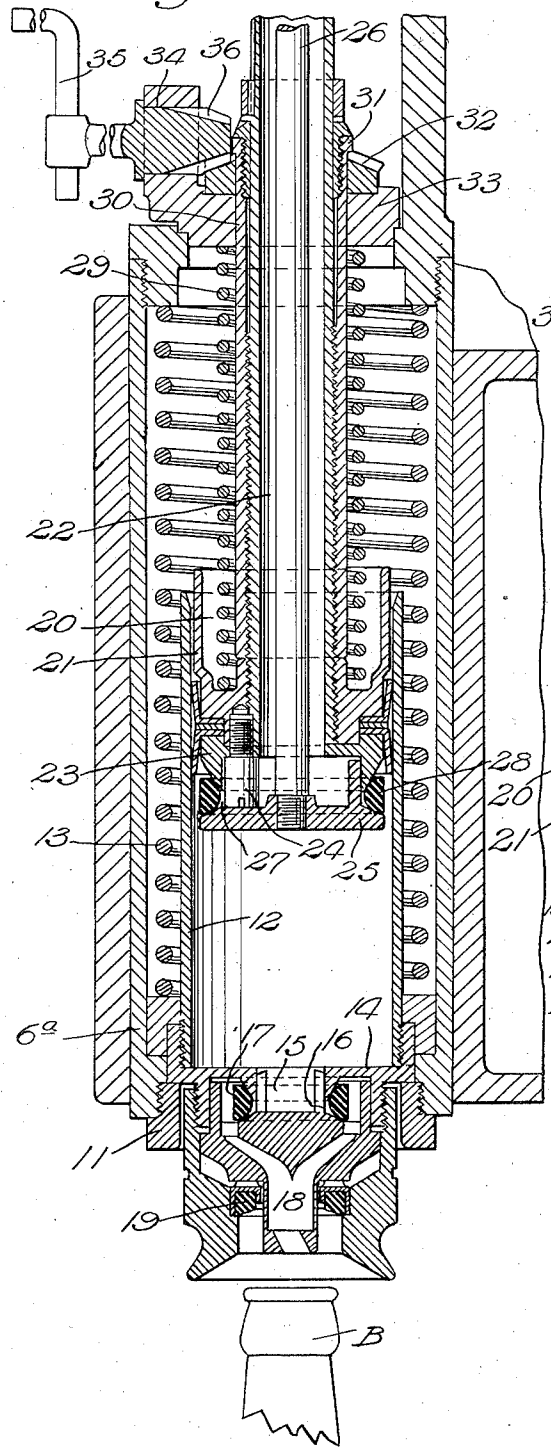
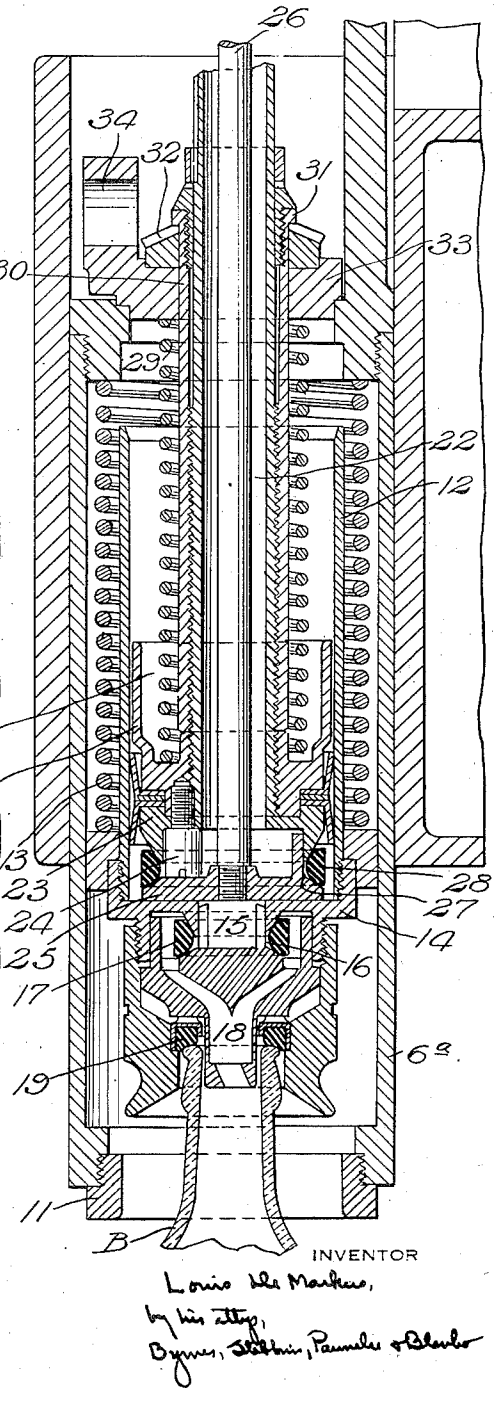


Fig. 3.



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Fig. 4.

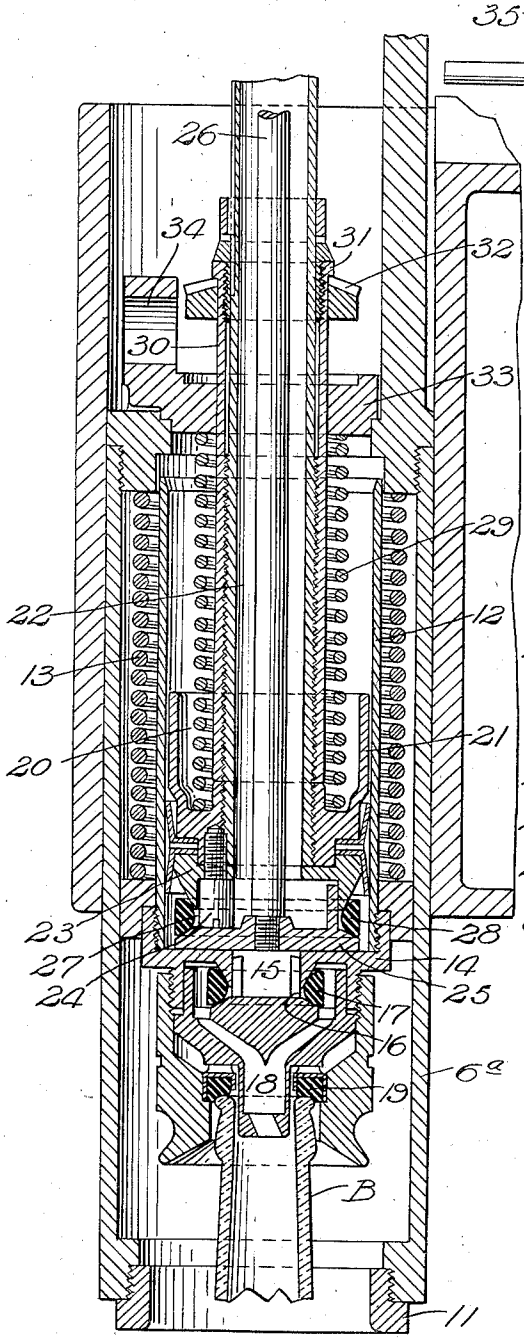
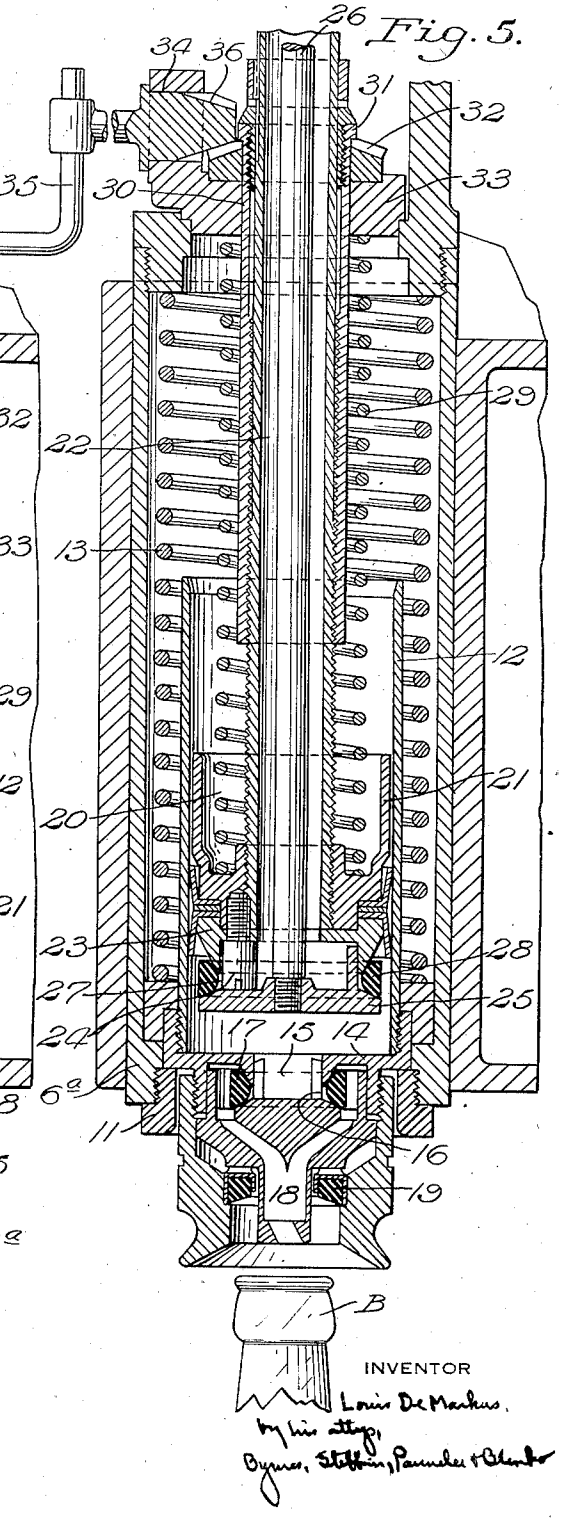


Fig. 5.



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UNITED STATES PATENT OFFICE

2,043,578

PUMP FOR FILLING MACHINES

Louis De Markus, Pittsburgh, Pa., assignor to McKenna Brass & Manufacturing Company, Inc., Pittsburgh, Pa., a corporation of Pennsylvania

Application May 8, 1931, Serial No. 535,884

21 Claims. (Cl. 226—103)

This invention relates to pumps for filling machines and is herein particularly described as applied to a pump for supplying a measured charge of syrup to bottles.

In the bottling of carbonated beverages it is common practice to pump a measured charge of syrup into the bottles and then fill them to a desired height with carbonated water. The quantity of syrup supplied must be accurately determined by the pump, and, because of the nature of the syrup, the pump must be of such construction that it does not clog or get out of order, does not stick, is readily adjustable, and readily sterilized in the assembled condition or taken apart for purposes of sterilization. Further difficulties are encountered in that there is usually some variation in the height of the bottles which are fed to the machine. Generally speaking, a filling machine should automatically accommodate itself to variations of as much as ¾ths of an inch in the height of the bottle. It is desirable to have the syrup pump actuated through the medium of the bottle, as otherwise if the feeder should miss a bottle syrup would be discharged over the machine. The pump must be of such construction that this variation in the bottle height does not alter the quantity of syrup supplied.

My invention provides a structure which fulfills all the requirements of a proper syrup pump and is free of the disadvantages above noted. I provide a pump cylinder with a piston slidable therein, the cylinder and the piston being both axially movable, and bias both the cylinder and the piston for movement in one direction. The piston and cylinder are preferably mounted in a body which slides in a frame and which is automatically reciprocated as by a cam. When the body is moved down onto the bottle, one end of the cylinder engages the bottle opening. As the body continues to move down, the bottle holds the pump cylinder against movement, but the piston, being biased toward the bottle, continues to move down until it reaches the bottom of the piston, discharging syrup into the bottle. The body continues to move downwardly, but such movement is a mere over-travel which takes care of varying bottle heights.

In the accompanying drawings illustrating a present preferred embodiment of the invention,

Figure 1 is a vertical section through a syruping unit embodying my invention, and

Figures 2 to 5 inclusive are views to enlarged scale of a portion of Figure 1 showing successive steps in the operation of the syrup pump.

The apparatus illustrated in Figure 1 is a syruping unit for a filling machine and comprises a central stationary post 2 having a rotatable sleeve 3 thereon driven from the filling machine. The sleeve makes a spline connection 4 with a barrel 5 carried on a bearing 6 by the post 2. The post is adjustable up or down to take care of different sized bottles and the spline connection 4 provides a drive for the barrel 5 from the sleeve 3 in any adjusted position.

The barrel 5 is bored to receive slides 6^a, each carrying cam rollers 7 working in the groove 8 of a barrel cam made up of members 9 and 10 fixed against rotation on top of the post 2. As the sleeve rotates the slide or body 6^a moves up and down in the barrel 5.

Each slide 6^a has a stop ring 11 screwed in the bottom to limit the travel of a pump cylinder 12. The pump cylinder is normally urged against the stop ring 11 by a compression spring 13 so as to lie in the position of Figures 1 and 2. The bottom of the pump cylinder is closed off by a cap 14 having a center opening 15 leading to valve slots 16. The valve slots are closed off by a rubber ring 17 constituting the discharge valve of the pump. Syrup discharged past the rubber ring travels through a conduit 18 to the bottle B. The conduit 18 extends to the bottle and the lip of the bottle is engaged by a rubber ring 19.

A pump piston indicated generally by the reference character 20 lies inside the cylinder 12. This piston has a body 21 secured to a syrup tube 22. A cap 23 is fastened to the body 21 by means of screws 24. A plate 25 is held against the heads of the screws 24 by a draw-rod 26, extending upwardly through the tube 22. The heads of the screws 24 are of sufficient depth to space the plate 25 from the cap 23 so as to provide inlet ports 27. A rubber ring 28 lies in a groove formed by the cap 23 and the plate 25 and constitutes the inlet valve to the pump.

The piston is normally urged downwardly by means of a compression spring 29, but this movement is limited by a sleeve 30 having a shoulder 31 which constitutes a stop. The sleeve 30 is threaded on the tube 22 and is provided below the shoulder 31 with a bevel gear 32. A head 33 is provided at the upper end of the slide 6^a, which head has an opening 34 to receive a hand adjusting tool 35. This adjusting tool is rotatable in the opening 34. It carries a bevel pinion 36 which, when the tool is in position, meshes with the bevel gear 32. Rotation of the hand tool threads the sleeve 30 up or down on the tube 22 and thus adjusts the distance to which the piston

may extend in the pump cylinder. The tube is provided with graduations 37 (see Figure 1) which show the operator the amount of syrup which will be pumped in any adjusted position.

The tube 22 extends upwardly beyond the sleeve 30 and terminates in a fitting 38. This fitting has a pad 39 which bears against an extension 40 on the slide 6a and holds the tube against rotation when the sleeve 30 is being adjusted. The drawing rod 26 extends upwardly through this fitting and is provided with a wing nut 41 which holds it in position. This construction permits of ready removal of the parts for cleaning, inspection or removal.

A flexible rubber hose 42 extends from the fitting 38 to a syrup chamber 43. The syrup chamber rotates with the barrel 5. It is carried by a hollow extension 44 of the post 2 and is provided with packing glands 45. Syrup is supplied through a hollow fitting 46 on top of the extension 44 and is discharged into the syrup chamber through openings 47. The barrel of the syrup chamber 43 is made of glass so that the incoming syrup may be viewed by the operator, enabling him to make certain that there is an adequate supply.

Figures 2 to 4 inclusive show successive steps in the operation of the pump. In Figure 2 the bottle B is positioned below the pump. It will be understood that the bottle is carried on a table which rotates with the barrel 5. During such rotation the barrel cam forces the slide 6a down and the rubber ring 19 engages the lip of the bottle B. Up until this moment the slide 6a, the pump cylinder 12 and the piston 20 move as a unit.

Figure 3 shows the operation during the actual pumping of the syrup. The sealing ring 19 has engaged the bottle B but the slide 6a has continued to move downwardly. The pump cylinder 12 is restrained against downward movement and as the slide 6a moves downwardly the spring 13 is compressed. The spring 29, however, holds the piston 20 in its lowermost position relative to the slide 6a, and therefore the movement is effective for discharging the syrup past the rubber ring 17 and into the bottle. This continues until the plate 25 strikes the cap 14. Figure 3 shows the relative position of the parts just after the cap 25 has struck the cap 14. The entire contents of the pump cylinder has now been discharged and further downward movement of the piston is prevented by reason of its engagement with the cap 14 which, in turn, is restrained against downward movement by the bottle. The slide, however, continues to move downwardly, but this simply compressed the spring 29 and further compresses the spring 13.

Figure 4 shows the parts at the bottom of the stroke. When the slide moves upwardly the springs 13 and 29 re-expand and continue to press the piston and the cylinder downwardly as far as possible. After the parts have been returned to the position of Figure 3, the bevel gear 32 engages the member 33 and the piston is then carried upwardly with the slide 6a, the spring 13 continuing to urge the cylinder downwardly. The differential movement thus brought about between the piston and the cylinder creates a suction, resulting in syrup being drawn from the syrup chamber 43 through the hose 42, fitting 38 and tube 22 past the inlet valve 28, filling the pump with a fresh discharge of syrup. On continued upward movement of the slide 6a the cylinder finally reaches its bottom position therein and thereafter the slide, the piston and the cylinder move up as a unit.

Figure 5 shows the parts in the position of Figure 2 except that the piston has been adjusted downwardly so as to give a very short stroke and a correspondingly small discharge of syrup.

It will be seen that the construction and operation of the pump are relatively simple, that the quantity of syrup discharged may be readily adjusted, and that the entire pump may be easily and thoroughly sterilized. These constitute important advantages of my construction.

I have illustrated and described the present preferred embodiment of the invention. It will be understood, however, that it is not limited to the form shown but may be otherwise embodied within the scope of the following claims.

I claim:

1. In a filling machine, a source of liquid and a pump for discharging a measured quantity thereof comprising a body, means for reciprocating the same, a stop on the body, a pump cylinder carried by the body, yieldable means urging the cylinder against the stop, a piston slidable in the cylinder, yieldable means urging the piston into the pump cylinder, a stop for limiting such movement, a rod for the piston, the rod being hollow and adapted for the supplying of liquid to the pump cylinder, and a flexible connection from the hollow piston rod to the source of liquid.

2. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, means for reciprocating the same, a stop on the body, a pump cylinder carried by the body, yieldable means urging it against the stop, a piston slidable in the pump cylinder, yieldable means for urging the piston into the cylinder, a piston rod, a sleeve adjustable on the rod, and stop means cooperating with the sleeve.

3. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body reciprocable in a vertically extending direction, a pump cylinder carried by the body, means for urging the pump cylinder downwardly, a stop for limiting the downward movement, means on the lower end of the cylinder for engaging a container, said means including a discharge valve for the pump cylinder, a piston carried by the body and extending into the pump cylinder, the piston being slidable, yieldable means for urging the piston downwardly, stop means for the piston, a piston rod extending upwardly, the piston rod being hollow, inlet valve means carried by the piston, and a source of liquid connected to the hollow piston rod.

4. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, a pump cylinder carried by the body, means for urging the pump cylinder downwardly, a stop for limiting the downward movement, means on the lower end of the cylinder for engaging a container, said means including a discharge valve operable by pressure within the pump cylinder for permitting discharge from the pump cylinder, a piston reciprocable in the cylinder for pumping liquid, said piston being also movable relative to the body, and means limiting downward movement of the piston relative to the body.

5. In a filling machine, a pump for discharging a measured quantity of liquid comprising a slide, means for reciprocating the slide, a pump

cylinder carried by the slide and reciprocable relative thereto, a cylinder stop on the slide, a spring for pressing the cylinder against said stop, a piston reciprocable in the cylinder for discharging liquid from the cylinder, a spring for biasing the piston in discharging direction, and a piston stop on the slide limiting movement of the piston by its spring relative to the slide.

6. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, a pump cylinder carried by the body and movable relative thereto, a stop on the body, means for biasing the cylinder against the stop, a piston movable longitudinally of the cylinder for discharging liquid from the cylinder, a pressure-operated inlet valve carried by the piston for controlling the supply of liquid to the pump cylinder, a stop limiting movement of the piston relative to the body, and means for biasing the piston against its stop, said cylinder having means for engaging a container.

7. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, means for reciprocating said body, a pump chamber carried by the body, said pump chamber being biased for bringing about suction of liquid into the same, a member yieldably carried by the body and cooperating with said pump chamber to displace liquid therefrom, said member being biased to bring about discharge of liquid from the pump chamber, and means limiting the quantity of liquid drawn into said chamber on the suction stroke including means connected to the piston for limiting movement of said member relative to said body.

8. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, means for reciprocating said body, a pump chamber carried by the body, said pump chamber being biased for bringing about suction of liquid into the same, a member yieldably carried by the body and cooperating with said pump chamber to displace liquid therefrom, said member being biased to bring about discharge of liquid from the pump chamber, and means limiting the quantity of liquid drawn into said chamber on the suction stroke including adjustable means connected to the piston for limiting movement of said member relative to said body.

9. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, means for reciprocating said body, a pump chamber carried by the body, said pump chamber being biased for bringing about suction of liquid into the same, a member yieldably carried upwardly and downwardly by the body and cooperating with said pump chamber to displace liquid therefrom, said member being biased to bring about discharge of liquid from the pump chamber, and means limiting the travel of said member relative to said pump chamber on the suction stroke including means connected to the piston for limiting movement of said pump chamber and movement of said member relative to said body.

10. In a sirup dispenser for bottle filling machines, the combination with a reciprocating support, of a sirup receptacle having a delivery spout, a connection between said support and receptacle for causing said support and receptacle to move together while permitting a continued movement of the support after the receptacle has come to rest, a plunger in said receptacle and a support for said plunger carried by and movable relatively to said reciprocating support.

11. In a sirup dispenser for bottle filling machines, the combination with a reciprocating support, of a sirup receptacle having a delivery spout, a connection between said receptacle and support for moving the receptacle and support together while permitting a continued downward movement of the support after the receptacle has come to rest on its downward movement, a plunger in said receptacle and means engaged by said support for raising said plunger as the support moves upwardly while permitting the support to move downwardly independently of the plunger.

12. In a sirup dispenser for bottle filling machines, the combination with a reciprocating support, of a sirup receptacle, a connection between said support and receptacle effecting limited downward movement of the receptacle with the support permitting a continued downward movement of the support after the downward movement of the receptacle has stopped, a plunger in said receptacle, and lost-motion means permitting said plunger and support to have an independent downward movement with respect to said receptacle while causing the support to move the plunger upwardly with respect to said receptacle.

13. In a filling machine, a pump for discharging a measured quantity of liquid comprising a pump cylinder and a piston slidable therein, the cylinder and the piston being both axially movable, and means for biasing the said cylinder and piston for movement in one direction, said piston having a pressure-operated valve therein for controlling the entrance of liquids into the pump cylinder.

14. In a filling machine, a pump for discharging a measured quantity of liquid comprising a pump cylinder and a piston slidable therein, the cylinder and the piston being both axially movable, means for biasing the said cylinder and piston for movement in one direction, said piston having a valve therein for controlling the entrance of liquids into the pump cylinder, and stops for the piston and the cylinder, at least one of the stops being adjustable.

15. In a filling machine, a pump for discharging a measured quantity of liquid comprising a pump cylinder and a piston slidable therein, the cylinder and the piston being both axially movable, means for biasing the said cylinder and piston for movement in one direction, said piston having a pressure-operated valve therein for controlling the entrance of liquids into the pump cylinder, and means connected to said piston for limiting the movement of the piston.

16. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body reciprocable in a vertically extending direction, a pump cylinder carried by the body, a pump piston movable relative to the cylinder, pressure-operated inlet valve means carried by the piston, and a source of liquid connected to said inlet valve.

17. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body reciprocable in a vertically extending direction, a pump cylinder carried by the body, a pump piston biased for movement relative to the body, means connected to the piston for limiting the biased movement thereof, pressure-operated inlet valve means carried by said piston, and a source of liquid connected to said inlet valve.

18. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body reciprocable in a vertically extending direction, a pump cylinder carried by the body, means for urging the pump cylinder downwardly, a stop for limiting the downward movement, means on the lower end of the cylinder for engaging a container, said means including a discharge valve for the pump cylinder, a piston carried by the body and extending into the pump cylinder, the piston being slidable, yieldable means for urging the piston downwardly, means connected to the body for moving the piston upwardly, and means connected to the piston for limiting its downward movement relative to the body.

19. In a filling machine, a pump for discharging a measured quantity of liquid comprising a body, a pump cylinder carried by the body and reciprocable relative thereto, means biasing said cylinder in one direction, a piston movable in the cylinder in said direction for displacing liquid from the cylinder, said piston being also movable relative to the body, and means connected to the piston for limiting movement thereof upwardly and downwardly relative to the body.

20. In a filling machine, a pump for discharging a measured quantity of liquid comprising a pump cylinder, a piston slidable therein for discharging liquid from the cylinder upon movement toward one end thereof, the cylinder and the piston being both axially movable, means biasing them for movement in the direction of discharging movement of the piston, a stop for the cylinder and means connected with the piston for moving it upwardly and for limiting its movement caused by its biasing means.

21. In a filling machine, a pump having means for activating it on the expulsion and intake strokes for discharging a measured quantity of liquid comprising a body, a pump cylinder carried by the body, said pump cylinder being reciprocable relative to the body and biased downwardly, means on the cylinder for engaging a container, a piston reciprocable in the cylinder for pumping liquid, said piston being also movable relative to the body, and means connected to the piston for limiting movement of the piston relative to the body.

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