

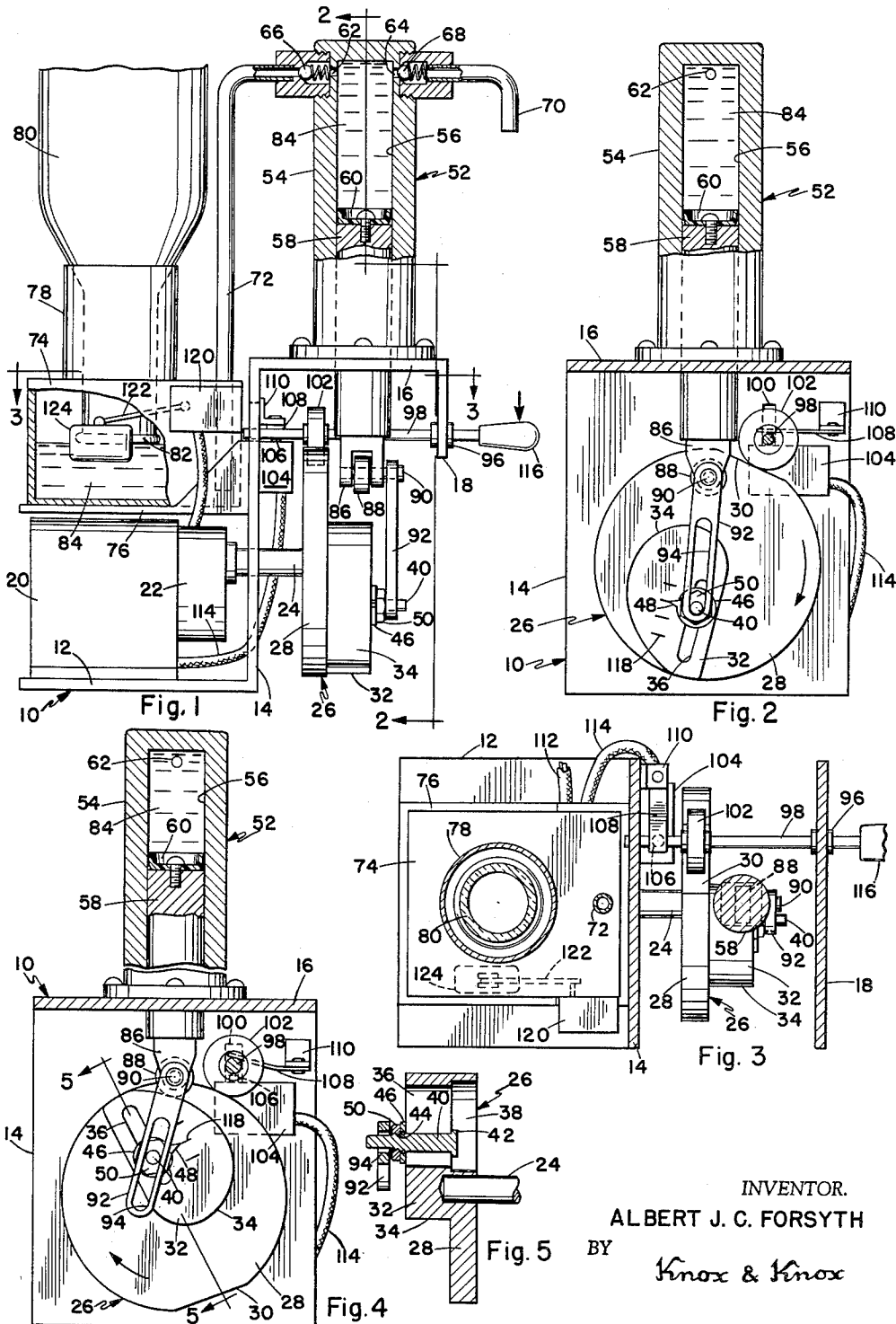
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LIQUID DISPENSER

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LIQUID DISPENSER

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1 Claim. (Cl. 222-41)

The present invention relates generally to dispensing devices and more particularly to a liquid dispenser.

The primary object of this invention is to provide a liquid dispenser which automatically dispenses a measured quantity of liquid in a complete single cycle of action and is self-resetting after each action.

Another object of this invention is to provide a liquid dispenser having a pump which refills after each stroke and is thus always primed.

Another object of this invention is to provide a liquid dispenser in which the liquid delivery volume can be varied by adjusting the return stroke of the pump through a cam and lost motion mechanism.

A further object of this invention is to provide a liquid dispenser which is a self-contained unit complete with liquid reservoir and which operates by a single action of a hand switch.

Another object of this invention is to provide a liquid dispenser which is adapted for fabrication from many different materials so that the choice of material can be according to the dictates of availability and price considerations, the exact sizes and proportions being matters easily determined to suit particular conditions and needs.

Another object of this invention is to provide a liquid dispenser which is practicable and inexpensive to manufacture.

Finally, it is an object to provide a liquid dispenser of the aforementioned character which is simple and convenient to install and use and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawings which form a material part of this disclosure, and in which:

FIGURE 1 is a side elevation view of the dispenser, portions being cut away to show internal details thereof;

FIGURE 2 is a sectional view taken on the line 2—2 of FIGURE 1, with the pump in rest position;

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 1;

FIGURE 4 is a sectional view similar to FIGURE 2, but showing the pump near the end of the delivery stroke; and

FIGURE 5 is a fragmentary sectional view taken on the line 5—5 of FIGURE 4.

Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

The dispenser mechanism is mounted on a frame 10 of thick sheet metal or the like, said frame having a flat base plate 12, an upwardly extending back plate 14 at one end of the base plate, a top plate 16 extending from the upper end of said back plate on the opposite side from the base plate, and a front plate 18 projecting downwardly from the forward edge of said top plate. Mounted on the base plate 12 is an electric motor 20 having a low speed reduction gear box 22, a drive shaft 24 extending from said gear box forwardly through the back plate 14. Fixed to the drive shaft 24 is an actuating assembly 26 comprising a somewhat critically shaped and dimensioned member which may conveniently be in the form of a large diameter disc 28 having a flat 30, and a cam 32 projecting from the forward face of said disc. The cam 32 has a

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curved working face 34 extending from adjacent the axis of the disc 28 to the periphery of the disc substantially opposite the flat 30. The precise shape of the cam face 34 is not critical, but for smooth operation a face of progressively increasing radius, from the center to the periphery of disc 28, is desirable. The cam 32 has an elongated slot 36 therein extending radially of the disc 28. As illustrated, this slot 36 extends through the actuating assembly 26 generally parallel to the axis of disc 28, said slot having an enlarged portion 38 in the rear face of the disc 28, as in FIGURE 5. Fitted through the slot 36 is a return pin 40 having a head 42 which seats in the enlarged portion 38, said pin extending parallel to the drive shaft 24 and having a short screw threaded portion 44 adjacent the forward end thereof. Mounted on the forward end of the return pin 40 is a washer 46 having a pointer 48 integral therewith, said washer being held in place by a nut 50 screwed on the threaded portion 44 and clamping the return pin in place.

Secured to the top plate 16 is a pump 52 comprising an upright cylinder 54 having an internal bore 56 in which is a slidable piston 58, said piston having a conventional cup-like sealing washer 60 secured to the upper end thereof. The upper end of the cylinder 54 has an inlet 62 and an outlet 64 which are fitted with non-return valves 66 and 68, respectively. The valves are illustrated as simple spring biased ball valves, but any suitable type of non-return valves may be used. Connected to the outlet valve 68 is a short delivery pipe 70 which may be fitted with any suitable type of nozzle or spout, according to requirements. Connected to the inlet valve 66 is a supply pipe 72 leading to a reservoir tank 74, which is mounted on a bracket 76 secured to the back plate 14 above the motor. On the top of the reservoir tank 74 is an upwardly extending sleeve 78 which is of suitable diameter to support an inverted bottle 80 of a standard size, so that the lip of the bottle, indicated at 82 in FIGURE 1, is suspended above the bottom of the tank. The contents of the bottle 80 then empty into the reservoir tank 74 until the level of the liquid 84 reaches the lip 82, the liquid remaining constant at this level until the bottle is empty.

At the lower end of the piston 58 is a yoke 86 carrying a lifting roller 88 which is freely rotatable on a bearing pin 90 parallel to the drive shaft 24, said lifting roller being aligned to ride on the curved face 34 of cam 32. The bearing pin 90 projects forwardly of the yoke 86 and pivotally attached to said pin is a return link 92, said link having an elongated slot 94 which fits over the return pin 40.

In the front plate 18 is a bushing 96 through which is fitted an actuating rod 98 extending generally parallel to the axis of drive shaft 24 and being disposed at one side of the piston 58. The rear end of the actuating rod 98 projects through a vertical slot 100 in the back plate 14 and the bushing 96 is sufficiently resilient to allow limited swinging motion of the rod in a vertical plane. Mounted on the actuating rod 98 is a freely rotatable control roller 102 positioned to ride on the periphery of the disc 28. Fixed to the back plate 14 is a microswitch 104 having a button 106 which is directly under the actuating rod 98, said actuating rod being biased by a leaf spring 108 to hold said button down. The leaf spring 108 may be secured to a suitable slip 110 fixed to the back plate 14. The switch 104 is positioned so that the button 106 is held down by the actuating rod 98 when the control roller 102 is resting on the flat 30 of disc 28, as in FIGURE 2. Power is supplied to the motor 20 by an electrical wire 112, the switch 104 being connected to the motor by a further wire 114. The switch 104 is normally on with the button 106 raised, but is held in the off position by the actuating rod 98.

The mechanism is actuated by depressing the forwardly extending end of the actuating rod 98, which is fitted with a suitable knob 116. This action lifts the rear end of the actuating rod 98 and releases the button 106, causing the motor 20 to operate and turn the actuating wheel 26. As the disc 28 rotates, the flat 30 passes beyond the control roller 102 so that, when the actuating rod 98 is released, the control roller rides on the circular periphery of said disc and the actuating rod is held clear of the button 106. Rotation of the actuating wheel 26 brings the cam 32 around to engage the lifting roller 88, which rides on the curved face 34 and causes the piston 58 to be pushed upwardly into the cylinder 54 as in FIGURE 4, expelling the liquid 84 therein through the delivery pipe 70. Due to the slot 94 in the return link 92, the cam has a period of free or lost motion relative to the link permitting the cam to drive the piston upwardly during this said period. Continued rotation of the actuating wheel 26 moves the cam 32 beyond the lifting roller 88 and leaves the piston 58 free, the piston being pulled downwardly by the return link, the return pin 40 engaging the end of the slot 94 in return link 92. The return stroke of the piston 58 draws more liquid 84 into the cylinder 54, so that the cylinder is full and primed at all times. As the actuating wheel 26 completes a revolution, the flat 30 again falls under the control roller 102, allowing leaf spring 108 to force the actuating rod 98 downwardly and depress the button 106, so shutting off the motor 20. Thus one manual depression of the actuating rod 98 initiates one complete on-off cycle of the mechanism with one complete pumping and refilling stroke.

The volume of liquid dispensed in a single stroke is controlled by adjusting the return pin 40 along the slot 36, to alter the effective eccentric throw of the return stroke linkage. Since the piston 58 is always pushed to the same maximum upward position by positive action of the cam 32, the volumetric displacement is controlled by the length of return stroke, which is adjustable by the lost motion linkage. For convenience, position marks 113 in suitable increments may be placed on the face of the cam 32 for alignment of the pointer 48 therewith to indicate the volumetric displacement.

The selected volume of liquid delivered is consistently accurate as long as the supply in the reservoir tank 74 lasts. To prevent delivery of an incomplete measure due to emptiness of the tank 74, a limit switch 120 may be mounted on the tank, said limit switch having a pivotal arm 122 on which is a float 124, such float controlled switches being conventional. The limit switch 120 is connected into the motor circuit to shut off the power when the liquid level falls below a predetermined mark, the wiring involved being obvious to those skilled in the art.

As illustrated, the dispenser is adapted to serve bottled beverages or liquors, the bottles being placed directly in the reservoir. However, a larger reservoir or storage tank containing a considerable supply of liquid may be used instead, with any type of liquid which can be handled by the pump 52.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

A liquid dispenser, comprising: a pump having a cylinder, and a piston slidable in the cylinder; said cylinder having an inlet and an outlet, whereby advancing said piston produces an evacuating stroke and retracting said piston produces a suction stroke; a source of liquid to be dispensed connected to said inlet; a frame supporting said pump; a member rotatably mounted on said frame on an axis substantially normal to the axis of said piston; first cam means mounted on said member for advancing said piston to produce an evacuating stroke, said cam having a period of operative engagement with said piston throughout a portion of the rotary movement of said member; an electric motor in driving relation with said member; a return link means for retracting said piston to produce a suction stroke, said link having a longitudinally slotted portion; means for establishing the end of said suction stroke, said means comprising a positionable pin engaged in said slotted portion; said pin being adjustable as to its distance from the axis of rotation of said member; means for energizing said motor, said energizing means comprising a normally on switch operatively connected to said motor; an actuating arm pivotally mounted on said frame; said actuating arm engaging said switch and being biased to hold the switch in an off position, whereby manual movement may overcome said bias and permit said switch to energize said motor and rotate said member; means comprising a second cam that is circular except for a flat thereon, mounted on said member for maintaining said motor energized until said flat de-energizes said motor at the end of said suction stroke, said actuating arm having a roller thereon engageable with the periphery of said second cam and disposed so that said switch is held in its on position by said circular portion, and in its off position when said roller is engaged with said flat; said actuating arm having an extended handle portion for manual operation thereof; means for visually indicating the adjusted position of said pin, whereby volumetric displacement of said pump corresponding to the throw of said pin is indicated to the user; and means for disabling said motor when the liquid in said source drops below a given level.

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