

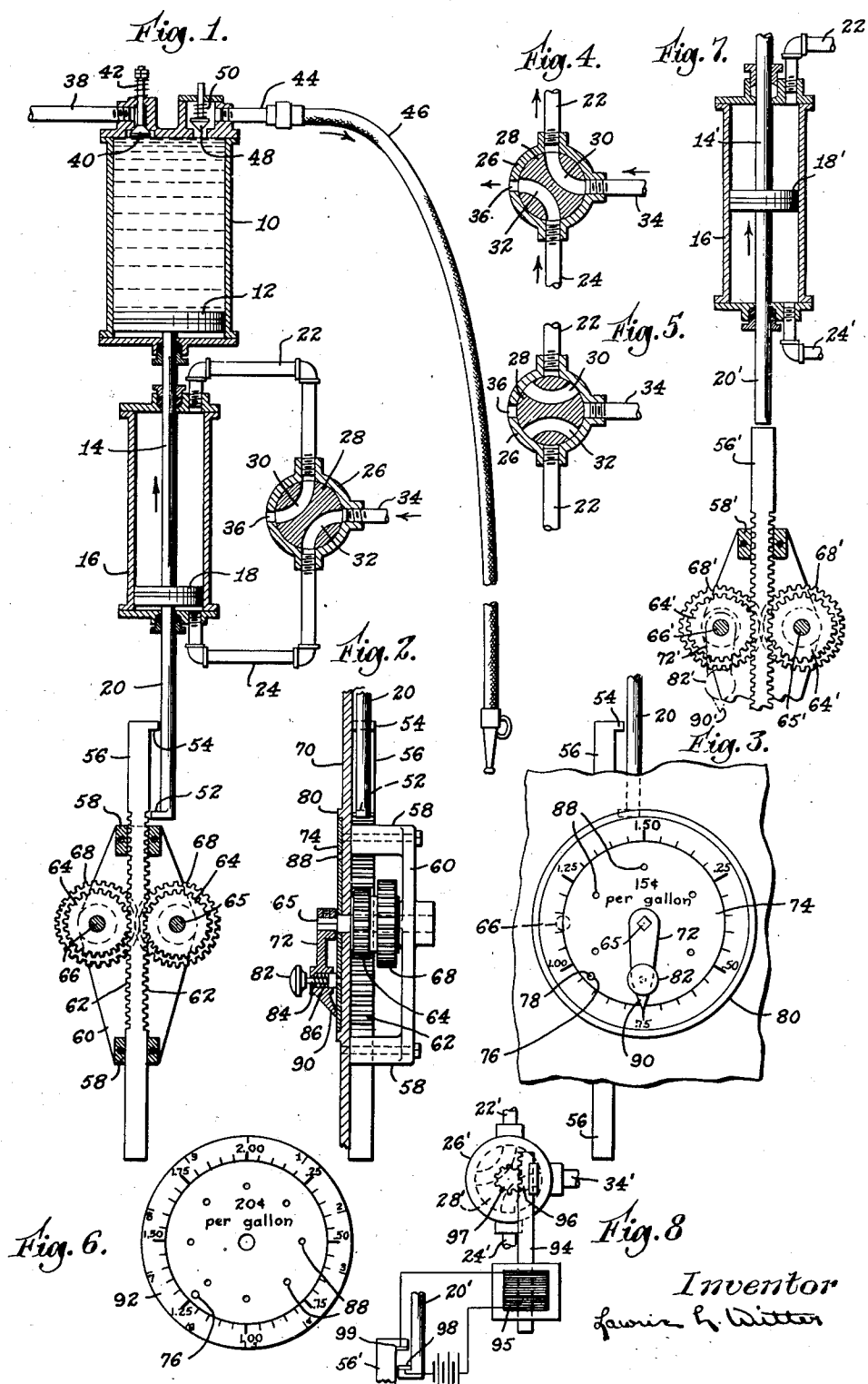
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LIQUID DISPENSING DEVICE

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LIQUID-DISPENSING DEVICE

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This invention relates to liquid dispensing devices and is especially applicable to the dispensing of gasoline. The devices or pumps in common use for this purpose are constructed to dispense in quantity amounts, as by the gallon, which is very inconvenient and troublesome due to the odd price of gasoline per gallon and, therefore, the fractional amount due for each sale; this amount usually being a few odd cents below or above an even dollar. One object of my invention is the production of an improved dispensing device by which gasoline or other liquids can be dispensed in amounts corresponding to desired or predetermined money values rather than in amounts corresponding to volume measurements.

I am aware that dispensing devices have heretofore been proposed which measure or compute the money value of the amount of liquid dispensed but these devices require great care and accuracy on the part of the attendant and leave much possibility for errors. A purchaser of gasoline usually desires a volume corresponding to a predetermined money value; and in the devices heretofore known this volume can be dispensed only by closely watching the register and stopping the pump when the corresponding figure has been reached. The accuracy of such devices, therefore, depends to a large degree upon the eye and efficiency of the attendant, whereby discrepancies and losses may occur. My invention herein provides adjustable stop means which may be conveniently set to a position corresponding to the value amount of liquid it is desired to dispense and which will automatically stop the dispensing operation at that position. A value graduated member or dial cooperates with the setting means, and this member may be conveniently removed and replaced by another graduated member whenever the price of the liquid is changed.

While, as above described, my invention deals primarily with a dispensing device adapted to dispense a predetermined money value amount of liquid, the same is also adapted to dispense any desired amount and thereupon quickly and conveniently compute the money value of the amount dispensed. The production of a liquid dispensing device of this and the above defined nature which is of relatively simple construction and definite in operation, whereby a minimum amount of supervision is required by the attendant, comprises a further object of the invention.

It should also be noted that the stop means and adjusting mechanism comprising my invention are preferably structurally independent of the dispensing pump and its operating mechanism,

thus adapting the invention to use with dispensing pumps now in operation at minimum cost.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which

Fig. 1 is a fragmentary front elevation, partially in section, of a device embodying my invention;

Fig. 2 is a fragmentary side elevation thereof;

Fig. 3 is a front elevation of a portion of the device;

Figs. 4 and 5 show a valve of Fig. 1 in two other positions;

Fig. 6 illustrates a graduated disk which may be substituted for the like disk shown in Fig. 3; and

Fig. 7 is a view similar to Fig. 1 but showing a modified form of the invention.

Fig. 8 illustrates a further modified form of the invention.

In the accompanying drawing, I have, for convenience and simplicity, illustrated the invention in connection with a gasoline or other liquid pump of the piston displacement type, it being understood that the invention is applicable to other forms of pumps within the scope of the appended claims. Referring first to Figs. 1-6, 10 indicates the pump cylinder within which is a piston 12 carried on a piston rod 14. The piston may be operated manually or by power, and I have herein illustrated the same as operated by fluid pressure within a cylinder 16. The piston rod 14 extends into the cylinder 16 and carries a piston 18, a second rod 20 carried by the piston 18 extending outwardly of the other end of the cylinder 16.

Fluid pressure is provided to the opposite sides of the piston 18 by means of pipes 22 and 24 threaded into a valve casing 26. A valve 28 within the casing has two ports 30 and 32 there-through. A fluid pressure supply pipe 34 extends into one side of the valve casing and an exhaust port 36 is provided at the opposite side. When the valve is in the position of Fig. 1, the piston is being driven upwardly; when the valve is in the position of Fig. 4, the piston is being driven downwardly; and when the valve is in the position of Fig. 5, the piston is being held stationary.

Gasoline intake and exit ports are provided at the upper end of the pump cylinder 10. The intake pipe 38 extends to any source of gasoline supply and is in communication with the cylinder through an inwardly-opening check valve 40, normally closed by a spring 42. The outlet pipe 44 has the usual flexible hose 46 attached thereto

and is in communication with the cylinder through an outwardly-opening check valve 48, normally closed by a spring 50. It will be apparent that upon upward movement of the piston 12 the valve 40 closes and the valve 48 opens, thus permitting exit of the gasoline in the cylinder through the hose 46. Upon downward movement of the piston 12, the valve 48 closes and the valve 40 opens, thus drawing a new supply of gasoline into the cylinder.

The cylinder 10 has a definite known capacity, and I have herein illustrated the same as being 10 gallons. Thus, 10 gallons of liquid are dispensed each time the piston 12 is moved from its lowermost position to its uppermost position, and any fractional part of that amount is dispensed by a like fractional upward movement of the piston. My invention embodies means not only for limiting the upward movement of the piston to definite amounts or fractions of its total upward movement, but also means for limiting the same in proportion to the money value of liquid it is desired to dispense.

An abutment 52 is carried on the lower end of the rod 20 and cooperating therewith is an abutment 54 on the upper end of a rod or bar 56, supported to slide in bearings 58 of a supporting frame 60. The intermediate portion of the bar 56 is a rack having teeth 62 on opposite edges thereof, and meshing with these teeth is a pair of gears 64 on shafts 65 and 66 mounted in the frame 60. Also mounted on these shafts is a pair of intermeshing gears 68. The shaft 65 extends outwardly through a front cover plate 70 and has an operating crank 72 on its squared outer end. Rotation of the crank is adapted to raise and lower the bar 56.

The parts are so constructed that the bar 56 is at one or the other of its ends of travel when the crank 72 is in its vertical upwardly-extending position, and a single rotation thereof brings the bar to the opposite end of its travel. The extent of this travel is also such that in the lowermost position of the bar the contact surface of the stop 54 rests on the abutment 52 in its lowermost position, and in the uppermost position of the piston 12 its abutment 52 rests against the abutment 54 in its uppermost position. Thus, one full clockwise rotation of the crank 72 permits the full upward stroke of the piston 12 and the discharging of the full 10 gallons capacity, and any fractional rotation of the crank in like manner permits a like fractional upward movement of the piston and the discharging of a like fractional part of the cylinder capacity.

Cooperating with the crank 72 is a disk 74 having a central hole therethrough fitting over the round portion of the shaft 65 and having a hole 76 receiving a locating stud 78 carried by the plate 70. The plate may also be provided with a circular flange 80 adapted to receive the disk thereinto. The disk is graduated to the value amount of the cylinder capacity of the liquid at a predetermined price, this price being illustrated in Fig. 3 as 15¢ per gallon and the total value of the 10 gallon capacity being \$1.50. The crank handle 82 is mounted on a pin 84, normally pressed inwardly by a spring 86, and cooperating with this pin are a plurality of perforations 88 in the disk. These perforations are located to correspond with the graduations, whereby when the pin is seated in a perforation the index 90 on the crank will be exactly at the corresponding graduation. The pin and perforations serve the double pur-

pose of locating the crank accurately and holding it in position.

The operation of the device as above described is believed to be obvious. The valve 28 is normally in the position of Fig. 4, wherein the piston 12 is in its lowermost position and the cylinder 10 is full of the liquid to be dispensed. When desiring to dispense a predetermined money value of the liquid, the attendant rotates the crank to a corresponding position on the disk and plugs the pin 84 into the corresponding perforation 88, it being understood that more perforations than are illustrated on the drawing may be provided in the disk, if desired. This operation so locates the stop 54 that it limits upward and dispensing movement of the piston to the corresponding value, as will be understood. For example, in Figs. 1-3, the crank is set to dispense 75¢ worth of the liquid which, at 15¢ per gallon, is 5 gallons, or one-half the capacity of the cylinder 10. In Fig. 1 the valve 28 has been rotated to the dispensing position and the piston 12 is being moved upwardly. Engagement of the stop 52 with the stop 54 arrests upward movement of the piston and the proper amount of liquid has thereupon been dispensed. The attendant then rotates the valve 28 to the position of Fig. 4, whereupon the piston is driven downwardly to refill the cylinder for the next dispensing operation. While I have herein illustrated the pump as being arrested by a positive stop means, it will be apparent that, in its broader sense, the invention is not to be considered as thus limited, since other stop means, such as an automatically operating connection to the valve 28, may be provided, if desired.

It occasionally happens that a customer desires that his gasoline tank shall be filled rather than that a predetermined money value thereof be placed thereinto, and my improved dispensing device is adapted to care for this situation with equal facility. In this case, the attendant rotates the crank 72 clockwise to its full position which permits full upward movement of the piston 12. He then turns the valve from the Fig. 4 position to the Fig. 1 position, thus causing upward movement of the piston 12. When the tank is full, the attendant turns the valve 28 to the position of Fig. 5, wherein the piston is held stationary. The crank is then rotated anticlockwise until the stop 54 engages the stop 52, in which position the index 90 points to the money value of the gasoline dispensed. It is herein assumed that less than 10 gallons have been dispensed, it being clear that a full 10 gallons may be previously dispensed and the value thereof added to the charge indicated on the disk.

It will be clear that the disk 74 is removable and may be replaced by other disks graduated at other prices per gallon. For example, in Fig. 6 is illustrated a disk 92 for use when the liquid is selling at 20¢ per gallon. The 10 gallon capacity of the cylinder 10 at 20¢ per gallon is \$2.00, and this disk is, therefore, graduated up to and including \$2.00. The disks may also be graduated in gallons, if desired as indicated in Fig. 6.

While I have above described the invention as including stop means limiting dispensing movement of the piston 12, substantially the same mechanism may be constructed to limit the refilling movement of the piston instead of the dispensing movement thereof. Such an arrangement is illustrated in Fig. 7, wherein parts cor-

responding to those shown in Fig. 1 are indicated by the same reference characters primed. The part 56' is directly beneath the rod 20', whereby to limit its downward movement, and in this construction the crank 72' is mounted on the shaft 66'. In use, rotation of the crank in reference to the graduations on the disk 74 is adapted to adjust the bar 56' to a position permitting a corresponding amount of liquid to be drawn into the cylinder 10. This liquid is then fully dispensed by moving the piston to the limit of its upward and dispensing travel.

It may be desirable automatically to stop the dispensing operation, as by rotating the valve 28 from the position of Fig. 1 to the position of Fig. 4, when the predetermined amount of liquid has been dispensed, and I desire it to be understood that my invention contemplates such a modified construction. This feature may be incorporated in the mechanism illustrated in the drawing by providing a mechanical or electrical connection to the valve 28, in conjunction with one or both stops 52 and 54. An example thereof is illustrated in Fig. 8 wherein the core 94 of a solenoid 95 is connected to a rack 96 in mesh with a pinion 97 on the valve. The solenoid is adapted to be energized by the closing of two switch contacts 98 and 99 on the stops 52 and 54, and thereupon cause rotation of the valve from the dispensing position (Fig. 1) to the cylinder filling position (Fig. 4). With such an arrangement, the attendant needs only to set the crank 72 to the proper position and rotate the valve 28 from the position of Fig. 4 to the position of Fig. 1, all other functions of the device being automatic.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A liquid dispensing device comprising a cylinder with inlet and outlet ports, a piston in the cylinder, means for operating the piston, two abutment members, means connecting one of said members for movement synchronously with the piston toward and from the other member, a dial graduated to the value amount of the liquid dispensing capacity of the cylinder at a predetermined price, and means including an index cooperating with the dial graduations for adjusting the second member from an initial position toward the first member along the path of movement thereof, said last named means indicating the money value of the liquid dispensed.

2. A liquid dispensing device comprising a power-operated pump for causing a flow of liquid, means for controlling the operation of the pump, means including an adjustable member cooperating with and causing automatic movement of the first-named means to reverse the operation of the pump after a predetermined flow of liquid has been effected, and a graduated member cooperating with the second-named means whereby said adjustable member may be set to permit a predetermined flow of liquid by the pump.

3. In a liquid dispensing device, means for causing a flow of liquid, a member movable along a fixed path during the dispensing of the liquid and synchronously with the dispensing rate thereof, a second member adjustable relative to the first member in and along said path, means including an indicator for so adjusting the second member to predetermined positions along said path, and means for automatically checking the

liquid dispensing operation when the first-named member reaches a predetermined position relative to the second-named member.

4. In a liquid dispensing device, means for causing a flow of liquid, a member movable along a fixed path synchronously with the dispensing rate of the liquid, a second member adjustable relative to the first member, means including an indicator for so adjusting the second member to predetermined positions, and means including an electric switch operated by said members for automatically checking the liquid dispensing operation when the first-named member reaches a predetermined position relative to the second-named member.

5. A liquid dispensing device comprising a pump for causing a flow of liquid, two cooperating abutment members, one of said members being movable toward the other member synchronously with and during the dispensing operation, means for adjusting the other member toward and from the said one member in and along the path of movement thereof, and cooperating graduated means for indicating the adjusted and dispensing position of the said other member.

6. A liquid dispensing device comprising a pump for causing a flow of liquid, means including a stop mounted on a longitudinally movable bar and having a contact surface for limiting the extent of operation of the pump, means including an operating handle and a mechanical connection therefrom to the bar for adjusting the stop progressively to different limiting positions wherein its said surface permits progressively increased dispensing operation of the pump, and a value graduated member cooperating with the adjusting means whereby the stop may be set to permit predetermined value amounts flow of liquid by the pump.

7. A liquid dispensing device comprising a reciprocating and fluid operating pump for causing a flow of liquid upon movement of the pump in the forward direction, a valve for controlling the operation of the pump and movable to two positions adapted to operate the pump in the forward and reverse directions respectively, means including an adjustable member cooperating with and causing automatic movement of the valve to the pump reversing position after the pump has moved forwardly an amount effecting a predetermined flow of liquid, and a graduated member cooperating with said means whereby said adjustable member may be set progressively to different positions permitting various selected amounts of flow of liquid by the pump.

8. A liquid dispensing device comprising a piston pump for causing a flow of liquid, means including two cooperating stops for limiting the extent of operation of the pump, means so connecting one of the stops to the piston of the pump that the stop moves synchronously with and during the entire dispensing movement of the piston, means for adjusting the other stop to different limiting positions away from the said one stop and in the path of movement thereof, a graduated member cooperating with the adjusting means whereby the said other stop may be set to permit predetermined amounts flow of liquid by the pump, and means auxiliary to the adjusting means and graduated member for locating accurately and holding the adjusting means in the adjusted positions.

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