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GASOLINE DISPENSING APPARATUS

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Fig. 2

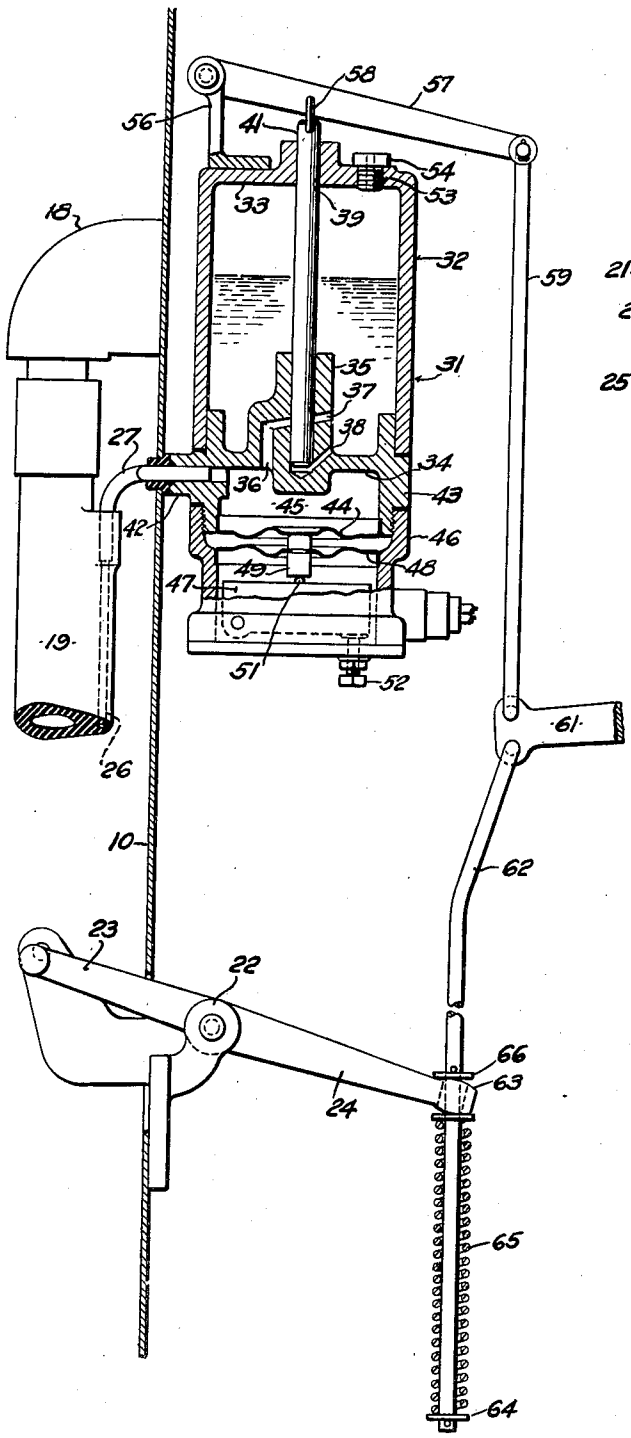
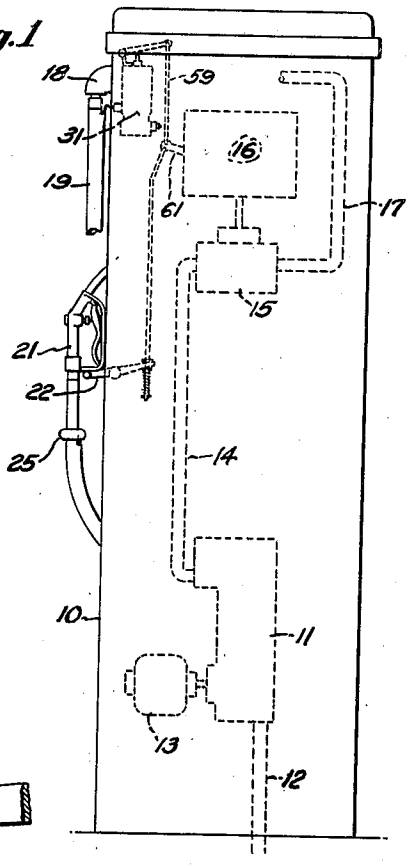


Fig. 1



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GASOLINE DISPENSING APPARATUS

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5 Claims. (Cl. 221—95)

This invention relates to gasoline dispensing apparatus, and it has particular reference to a dispenser including remotely operated means for controlling the flow of gasoline, in which the operation is made to depend upon the development of hydraulic pressure.

It has heretofore been proposed to provide a gasoline dispenser in which a motor driven pump or other force medium is employed to lift the gasoline from a storage tank for discharge through a dispensing hose, and to provide at the hose nozzle some means for controlling a pump motor switch, shut-off valve, or the like, so that the system is under the instantaneous control of the operator. Such controls, however, while extensively developed and tested in numerous forms, have heretofore proved unreliable. A primary reason for this lack of success has been due to the expansion effects occurring with changes in temperature, or the stretching of the hose during service. The problem of producing a satisfactory control of this type has essentially been one of compensation for such effects, and this problem has been practically unsolved, thus necessitating the abandonment of a simple and desirable control principle.

According to the present invention, however, means are provided to insure automatic compensation for expansion and extension in the control system, and these means are particularly adapted with a positive control medium, such as hydraulic force. There is thus provided a working fluid which, under slight applied pressure, develops a positive force which may be utilized to open and close a switch or other control element, and which, by virtue of the compensating means, does not lose its effectiveness during use.

The invention will be more clearly understood from the following description of a specific embodiment thereof, illustrated in the accompanying drawing, wherein:

Fig. 1 is an elevation of a typical gasoline dispenser to which the invention is applied, conventional parts being indicated in dotted lines; and

Fig. 2 is an enlarged fragmentary sectional view of a surge tank and closure valve for the working fluid of the control system.

Referring first to Fig. 1, the dispenser comprises an upright casing 10 in which is mounted a gasoline pump 11 whose suction line 12 is connected to a storage tank, not shown, and a motor 13 directly connected to the pump. The discharge line 14 from the pump leads to a flow meter 15, operatively connected to a register 16 to indicate the number of gallons dispensed at each operation. A conduit 17, leading from the meter, conveys the gasoline to a fitting 18, to which is connected a flexible dispensing hose 19 having a valved nozzle 21 on its free end. When the unit is not in use, the nozzle 21 is supported on a pivoted lever or hook 22, the outer end 23 of which is depressed by the weight of the hose.

The inner arm 24 of the hose support is connected to control the opening and closing of a switch for the motor 13, and, in accordance with the present invention, it is also connected to govern a remote control device located on the hose. A compressible and impervious bulb 25 is mounted on the nozzle end of the hose, where it can be squeezed by the operator as he holds the nozzle for discharge into the motorist's gasoline tank. The bulb is connected to a tube 26, advantageously built into the hose body, and the tube in turn is connected by a conduit 27 to a tank and valve body 31, which is mounted within the casing 10.

The body 31 comprises a cylindrical housing 32 having a closed top 33 and an open bottom, into which is fitted a flanged closure wall 34. The central portion of the closure is formed with a boss 35 provided with an axial bore extending nearly to the opposite face of the wall, and with connected longitudinal and transverse ports 36 and 37. A relief duct 38 is also drilled into the bottom of the boss to merge into the main bore. The top wall 33 is formed with an aligned aperture 39, through which extends a valve 41, and which normally seats within the main bore to close the transverse port 37.

The lower portion of the closure wall 34 is formed with a lateral boss 42, receiving the conduit 27, and with a depending and externally threaded flange 43. The boss 42 is covered by a metal diaphragm 44, which may be soldered in place, thus forming a sealed chamber 45. A switch box 46, threaded onto the flange 43, contains a switch 47 for the circuit of the motor 13, and the switch is also sealed by a second diaphragm 48, which is provided with a contact stud 49 extending between the bellows 44 and the contact button 51 of the switch 47. By pivoting the switch 47 in the box 46 against an adjusting screw 52, a simple means is provided to adjust the switch in proper position for operation by the stud 49, when hydraulic pressure is applied.

When the foregoing parts are assembled as shown in Fig. 2, and with the housing 31 advantageously located at a high point in the casing 10, the cylinder 32 is filled with oil or like hydraulic fluid through a filling opening 53 located in the top wall 33, which is normally plugged by

a vent cap 54. The oil runs through the passages 37 and 36 into the chamber 45, and thence into the passage 26 and bulb 25, and the parts are squeezed and manipulated until air is expelled, and the system is filled with the incompressible liquid.

The valve 41 is then connected to a link system, for operation by the hook lever 22. Mounted on the top wall 33 is a bracket 56 to which is pivoted a lever arm 57 carrying a chain link 58 which engages the top of the valve 41. The end of the lever 57 is pivotally connected to a link 59 which extends to a pivoted lever 61 constituting a part of the register 16. The purpose of the lever 61 is to enforce the return of the register dials to a zero position, before instituting a dispensing operation, and it is to be understood that the register is so made that, unless the resetting is effected, the lever 61 is locked from movement, but becomes free to move when the dials are properly restored. The register mechanism is old and well known, and therefore it is thought that it need not be described at greater length.

The lever 61 also receives a pivoted link 62 which extends down to and through an eye 63 formed on the inner end 24 of the nozzle support 22. The lower end of the link receives a stop washer 64, which supports a helical spring 65 also contacting the eye 63. A second stop washer 66 is mounted on the link 62 above the lever arm 24. With the parts so connected, it will be observed that the act of placing the nozzle 21 on its support causes the inner arm 24 to move up, carrying with it the links 62 and 59, and the levers 61 and 57. This action lifts the valve 41 a sufficient distance to place the chamber 45 in free fluid communication with the cylinder 32, through the ports 36 and 37.

When the nozzle is removed from the hook, and first assuming that the register 15 has not been reset, upward movement of the arm 23 simply causes the spring 65 to be compressed against the washer 64, since the lever 61 cannot move. When the lever 61 is released, however, then the entire linkage system is free to move, to lower the valve 41 to close the port 37, and thus isolate the chamber 45 and cylinder 32. As the valve 41 moves to closed position, any liquid trapped in its bore is free to escape through the relief passage 38.

The switch 47 is of a standard commercial type, and is biased toward an open position by a built-in spring, not shown. It will here be assumed that the switch 47 is the only unit-operated switch for the motor circuit, although it is to be understood that a second switch may be included if desired, for manual operation or directly through the hose support 22, in accordance with prior proposals. Under the assumption just made, it will be understood that, when the attendant removes the hose from its support, he pushes the outer arm 23 upwardly, thus closing the passage 37 in the body 31. Upon instituting a dispensing operation, he compresses the bulb 25 at the nozzle end of the hose, thereby displacing the hydraulic liquid contained in it.

Since the liquid is incompressible, the displaced liquid is forced into the chamber 45, but it cannot escape into the cylinder 32, because the passages are closed. It therefore exerts its undiminished pressure against the diaphragm 44, to move the stud 49 and close the switch 47. The motor 13 is thereby excited, and gasoline will be pumped until the bulb 25 is released, thus relieving the hydraulic pressure and permitting the switch to open automatically.

When the valve 41 is lifted, any pressure applied to the bulb 25 will displace fluid, as before, but the fluid preferentially flows through the passages 36 and 37 into the cylinder 32, and the switch 47 will therefore not be closed. The cylinder 32 is free to breathe to the atmosphere through the vent plug 54, whose bore is too small to permit loss of oil under normal conditions.

Since no operating pressure can be applied to the switch 47, which is sealed into its own casing, unless the valve 41 is in closed position, the dispensing apparatus cannot be operated until the attendant goes through the manual operations of resetting the register, lifting the hose support, and squeezing the bulb 25, and as these operations are not performed until a customer orders gasoline, it is apparent that the apparatus is protected from unintended dispensing operations. It will also be noted that, by providing the tank and valve assembly 31, the hydraulic fluid may expand or contract and move through the system under temperature changes, without either causing the accidental closing of the switch 47, or changing the internal pressures to a point where the switch no longer responds under applied pressure.

While the invention has been described with reference to a single embodiment illustrative of its principles, it will be apparent that it may be embodied in other forms or types of dispensers, and therefore it is intended that the scope of the invention shall be determined from the following claims.

I claim:

1. In a gasoline dispenser wherein gasoline is dispensed through a flexible hose under pressure developed by the operation of a control switch, hydraulic pressure means for actuating said switch, said hydraulic means comprising a liquid reservoir and surge tank, a pressure chamber in fluid communication with said tank, said chamber having a movable wall movable to actuate the switch, a valve for closing communication between the tank and chamber, a manually operable bulb disposed on the hose, a fluid conduit connecting the bulb and chamber, whereby the bulb, conduit, chamber and tank may be filled with hydraulic fluid, and means for selectively closing and opening said valve to condition and decondition the movable wall of said chamber for operation upon manipulation of said bulb.

2. In a gasoline dispenser wherein gasoline is dispensed through a flexible hose under pressure developed by the operation of a control switch, hydraulic pressure means for actuating the switch, said hydraulic means comprising a manually operable liquid displacing member and an expansible chamber into which the liquid may flow, a surge tank in fluid communication with the chamber, a valve for closing communication between the tank and chamber to prevent escape of displaced liquid into the tank, a support for the hose when not in use, and means operated from the support for positioning the valve.

3. In a gasoline dispenser wherein gasoline is forced into a flexible dispensing hose by a motor driven pump controlled by a circuit switch, a hydraulic operating unit for the switch, said unit comprising a cylinder adapted to contain hydraulic fluid, a chamber disposed in fluid communication with the cylinder, a valve for closing the fluid communication, a movable diaphragm wall for the chamber, a self-contained

switch casing detachably connected to the chamber, and pressure transmitting means movable by the diaphragm wall for operating the switch, said switch being mounted in said casing.

4. In a gasoline dispenser wherein gasoline is forced into a flexible dispensing hose by means controlled by a switch, a hydraulic operating unit for actuating the switch, said unit comprising a cylinder having a valve port therein, a valve disposed in the port, said valve extending exteriorly of the cylinder, an air vent in the cylinder for maintaining the pressure therein at substantially atmospheric pressure, a pressure chamber connected to said cylinder, said chamber and cylinder being in fluid communication with each other when said valve is open, a movable wall sealing one end of the chamber, a hydraulic pressure conduit connected to said chamber for transmission of hydraulic force from a remote point, a switch casing connected to the chamber and adapted to contain a circuit switch, said casing being sealed by a second movable wall, and an operating stud extending between the movable walls and to said switch for transmitting pressure thereto upon application of hydraulic force against said first named wall when said valve is closed.

5. Gasoline dispensing apparatus comprising a casing containing a pump and a motor operatively connected to the pump, a discharge line leading from the pump to a flexible dispensing hose, a support for the hose when not in use, a circuit switch for the motor, a hydraulic surge tank mounted in the casing, a conduit extending from the tank to a point adjacent the free end of the hose, a compressible member mounted on the free end of the hose and to which said conduit is connected, whereby actuation of the compressible member will cause displacement of liquid contained therein to said surge tank, a wall in said tank dividing the same into a surge chamber and a pressure chamber, a fluid passage formed in said wall, a valve positioned in said surge chamber for closing said fluid passage, a linkage connecting the valve and hose support for operating the valve through the support, a diaphragm for closing the pressure chamber, said diaphragm being movable under hydraulic force when said fluid passage is closed, a switch casing containing said circuit switch, said casing being positioned adjacent said diaphragm for actuation thereby, said valve being moved to open said fluid passage when the hose is on its said support.

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